

The Impact of COVID-19 Lockdown on Disordered Eating Behaviors in a Community Sample: The Mediation Role of Psychological Distress

Sofia Ramalho (✉ sofia.mm.ramalho@gmail.com)

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

Ana Trovisqueira

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

Marta de Lourdes

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

Sónia Gonçalves

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

Inês Ribeiro

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

Ana R. Vaz

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

Paulo P. P. Machado

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

Eva Conceição

Psychotherapy and Psychopathology Research Unit – Psychology Research Centre, School of Psychology, University of Minho

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Abstract

Objective: This study aims to explore associations between disordered eating behaviors in adults during the COVID-19 lockdown period, and the experienced psychosocial impact of the COVID-19 pandemic, depressive symptomatology, anxiety/stress levels.

Methods: This was a community-based cross-sectional study assessing 254 Portuguese adults (82.7% women; 35.82 ± 11.82 years) one week after the end of the mandatory COVID-19 lockdown in Portugal. An online survey was conducted to evaluate psychological distress, disordered eating, and psychosocial impact of the COVID-19 pandemic. Pearson correlations and Structural Equation Modeling (SEM) were performed.

Results: Participants reported the presence of meal skipping (52.8%), grazing eating behavior (80.9%), overeating (81.0%), loss of control over eating (47.2%), and binge eating episodes (39.2%) during lockdown. Uncontrolled and emotional eating were significantly correlated with the psychosocial impact of COVID-19 pandemic, depression, anxiety, and stress levels. SEM analyses indicated that the relationship between experienced psychosocial impact of COVID-19 pandemic on disordered eating behaviors was mediated through psychological distress experienced (CMIN/DF= 1.499, CFI = .99, RMSEA = .045).

Conclusions: The psychosocial impact of the COVID-19 pandemic crisis may lead to disordered eating, and this relation may occur through the elevation of psychological distress. These findings inform about clinical targets for preventive interventions to promote disordered eating in a community sample during potential similar future situations.

Introduction

The World Health Organization (WHO) declared the COVID-19 outbreak as a public health emergency of international concern (World Health Organization, 2020). In this pandemic context, governments worldwide followed public health recommendations imposing lockdown and restrictions to curb the spread of this disease. These restrictive measures resulted in an unprecedented impact on live core domains, such as social and family interaction, employment, health care access, and finances. In Portugal, the first COVID-19 case was confirmed on the 2nd of March of 2020. On the 18th of March, 16 days later, the state of emergency was declared imposing home confinement, prohibiting public gatherings, and closing public services/commercial establishments. At the end of the emergency state (3rd May 2020), Portugal had 25,282 confirmed cases and 1,043 deaths due to COVID-19 (Direção Geral da Saúde, 2020).

While these restrictive measures aimed to ensure social distancing and help to decrease the rate of SARS-COV-2 infection, such limitations imposed a burden on the mental health of the general population. Emerging studies report increased levels of stress, depression, anxiety, insomnia, feelings of loneliness, cases of post-traumatic stress and suicide (Arslan, Yıldırım, Tanhan, Buluş, & Allen, 2020; Bhuiyan, Sakib,

Pakpour, Griffiths, & Mamun, 2020; Brooks et al., 2020; Carvalho, Moreira, de Oliveira, Landim, & Neto, 2020; Torales, O'Higgins, Castaldelli-Maia, & Ventriglio, 2020) among the general population. For example, a recent study showed that higher levels of intolerance for uncertainty seemed to have a direct impact on mental wellbeing during the COVID-19 pandemic, with rumination and fear of COVID-19 mediating this association (Satici, Saricali, Satici, & Griffiths, 2020).

Moreover, results from an international online survey confirmed the negative effect of COVID-19 in dietary habits, specifically on unhealthy food consumption, loss of control over eating, meal skipping, and snacking (Ammar et al., 2020). Nevertheless, up to date, the influence of the COVID-19 pandemic crisis on eating behaviors during lockdown is largely understudied. This is critical since the adverse mental health consequences related to COVID-19 pandemic can result in chronic psychopathology stimulating the upsurge of disordered eating and the exacerbation of symptoms in individuals previously diagnosed with an eating disorder (Fernández-Aranda et al., 2020; Phillipou et al., 2020; Rodgers et al., 2020; Shah, Sachdeva, & Johnston, 2020). This may also have clear consequences for weight management and individuals suffering from overweight or obesity (McCuen-Wurst, Ruggieri, & Allison, 2018; Nightingale & Cassin, 2019; Pinto-Bastos, Ramalho, Conceição, & Mitchell, 2015).

Home confinement, imposed by the mandatory lockdown, might have prompted the increase of food availability and generalized disorganized eating patterns (Fernández-Aranda et al., 2020; Phillipou et al., 2020). Rodgers and colleagues (2020) proposed three pathways through which the COVID-19 pandemic, together with its associated high rates of psychological distress, may increase the risk of suffering from an eating disorder. The first path postulates that weight and shape concerns can increase due to the interferences in daily routines, outdoor activity restriction, and social distance restrictions, undermining eating disorder protective factors such as social support and adaptive coping strategies. The second and third pathways are associated with the amplified exposure to anxiety-provoking media and with the hypothetical effects of health-related concerns on the adoption of restrictive dietary patterns, characterized by the exclusion of certain foods groups or/and reduced household food availability due to fear of leaving the house and contamination, respectively. Rodgers and colleagues (2020) proposal is supported by the literature linking stress, depression, anxiety, and other adverse mood states to a negative impact on eating behaviors (Fletcher, Kupshik, Uprichard, Shah, & Nash, 2008; Rosenbaum & White, 2015; Royal & Kurtz, 2010; Yannakoulia et al., 2008). Hence, in the scope of exploring the impact of COVID-19 pandemic on eating behaviors, psychological distress seems to assume particular relevance due to its shared risk factors and associations with disordered eating behaviors, such binge eating (Fletcher et al., 2008; Rosenbaum & White, 2015; Royal & Kurtz, 2010; Yannakoulia et al., 2008).

Lastly, the current uptrend in COVID-19 cases and the management difficulties in reducing the spread of the virus worldwide, highlight the possibility of future lockdown periods and the importance of investigating how eating behaviors can be affected by public health restriction measures. In this context, it is mandatory to develop suitable lifestyle/dietary guidelines and to identify high-risk groups to minimize the impact of pandemic situations on eating behaviors (Tanhan et al., 2020).

Therefore, this study sought to explore the relationship between disordered eating behaviors/attitudes and the experienced psychosocial impact of COVID-19 pandemic, depressive symptomatology, and anxiety/stress in adults during the COVID-19 lockdown period in Portugal. Based on previous research showing associations between psychological distress and disordered eating behaviors (Fletcher et al., 2008; Rosenbaum & White, 2015; Royal & Kurtz, 2010; Yannakoulia et al., 2008), we aimed to test an atemporal mediation model (Winer et al., 2016) based on the hypothesis that the relation between disordered eating behaviors and experienced psychosocial impact of COVID-19 pandemic is mediated by psychological distress during the COVID-19 lockdown period.

Methods

Participants

This is a community-based cross-sectional study assessing adults one week after the 46 days mandatory COVID-19 lockdown in Portugal (18th March to 3rd May 2020).

Participants inclusion criteria: 1) Aged between 18 and 68 years old; 2) living in Portugal during the COVID-19 lockdown. A total of 364 adults responded to our survey. Participants missing more than 20% of the items (Peng, Harwell, Liou, & Ehman, 2006) on at least one of the variables under study were excluded (n = 95). Participants that have been diagnosed with COVID-19 (n = 15) were also excluded resulting in a final sample size of 254 participants.

Procedure

The data collection was exclusively online using Qualtrics^{XM}: *Online Survey Software*. A non-probability consecutive sampling method was used. The study aims, participants' inclusion criteria and the link for accessing the anonymous online survey were publicized in social networks and academic/personal mailing lists. The survey took approximately 20 minutes to complete. Randomization of self-report measures presentation was used to reduce response bias. Participants provided their online consent, were informed about the risks/benefits of participation, and about the right to quit the survey at any time. The research team contact details were provided for participants' support regarding any concern/distress resulting from taking part in the survey.

Data collection started at May 11th 2020, one week after the end of the mandatory COVID-19 lockdown in Portugal, and took place for two weeks under a state of calamity where the Portuguese population had the civic duty of home confinement, in spite of the reopening of some commercial establishments and public services. During this time, official data points to a national percentage of individuals in home confinement ranging from 47.4 to 48.1% (<https://www.pse.pt/evolucao-confinamento-mobilidade/>). This study was implemented in accordance with the Declaration of Helsinki and approved by the University ethics review board.

Measures

Sociodemographic and lifestyle questionnaire: participants answered about sociodemographic/lifestyle information's and social isolation conditions in the context of COVID-19 pandemic, namely: age, sex, education level, marital status, working status, household income, number of hours of sleep (weekdays/weekend) and physical activity ("*In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate.*" (Milton, Bull, & Bauman, 2011)).

Anthropometric data: weight (in kilogram) and height with no shoes (in centimeter) were self-reported. Body Mass Index (BMI) was computed for each participant and classified according to WHO BMI cut-offs (World Health Organization, 2018). Perception of weight change (increase, decrease or maintenance) during the COVID- 19 lockdown period was also assessed.

Disordered Eating Behaviors Screening Questionnaire: this questionnaire was designed in the scope of this study and includes five questions (one per eating behavior) concerning the frequency of the following disordered eating behaviors in the last month (from 0 to 31 days): meal skipping, grazing eating behavior, objective overeating, loss of control eating, and (objective) binge eating episodes. Explicitly "*Thinking about the previous month (31 days), how many days did you (...)*":

- 1) "*(...) skip meals (e.g. breakfast, morning snack, lunch, etc.)?*";
- 2) "*(...) eat repetitively small or modest amounts of food between meals without planning it throughout the day?*";
- 3) "*(...) feel you ate too much or more than you should (for example, repeating the plate, continuing to eat after you were already feeling full, or overeating without being hungry)?*";
- 4) "*(...) feel that you ate compulsively or that you had lost control over what you were eating (e.g., not being able to resist eating, or not being able to stop after starting eating)?*";
- 5) "*(...) feel that you ate compulsively, uncontrollably eating excessively large amounts of food for the circumstances (e.g., eating twice or more than someone else would eat in the same situation)?*".

Coronavirus Impact Scale (CIS) (Kaufman & Stoddard, 2020): It comprises 10 questions rated on a 4-point Likert scale (0 = none/no change to 3 = severe) that follow the probe statement: "*Please rate to what extent the COVID-19 pandemic changed your life in each of the following areas*": routines, family income/employment, food and mental health care access, access to social support, experience of stress related to COVID-19 pandemic, stress/family discord, personal diagnosis of coronavirus, immediate/extended family members and close friends diagnosed with COVID-19. The final item is an open question about other ways the pandemic might have affected the respondent daily life. In this study we used the overall COVID-19 psychosocial impact score that was computed as the direct sum of participants answers to all 10 closed-ended questions, as suggested by the original authors. This scale was adapted from English to Portuguese following a translation-back-translation procedure (van der

Vijver & Leung, 1997). Preliminary analyses indicate good reliability (McDonald's ω for this sample: total score = .77)

Depression Anxiety Stress Scales (DASS-21) (Antony, Cox, Enns, Bieling, & Swinson, 1998): This instrument has 21 items and generates three subscales: depression, anxiety and stress. The score of each subscale ranges between 0 and 21 points. Higher scores correspond to more negative affective states in adults (McDonald's ω for this sample: Depression Scale = .91; Anxiety Scale = .88; Stress Scale = .89). Participants in this study completed the Portuguese version of the DASS-21 (Pais-Ribeiro, Honrado, & Leal, 2004).

Three-Factor Eating Questionnaire Revised 21-item version (TFEQ-R21) (Cappelleri et al., 2009): It consists of 21 items divided into 3 scales, corresponding to restrained eating, emotional eating, and uncontrolled eating. Scores for each scale vary between 0 and 100. Higher scores are indicative of greater cognitive restraint, uncontrolled, emotional eating (McDonald's ω for this sample: Uncontrolled Eating = .89; Emotional Eating = .93; Cognitive Restraint = .85). Participants in this study completed the Portuguese version of the TFEQ-R21 (Duarte, Palmeira, & Pinto-Gouveia, 2020).

Statistical Analyses

Descriptive statistics were conducted to describe participants' sociodemographic, anthropometric, lifestyle and disordered eating behavior characteristics. Missing value analysis indicated that DASS-21 and TFEQ-R21 missing value percentages varied between 2.6% and 4.4%. Little's MCAR test showed that data were missing completely at random (DASS-21: $\chi^2(20) = 12.19, p = .909$; TFEQ-R21: $\chi^2(1) = 1.46, p = .228$) and item-level missing data was handled by mean imputation. Kurtosis and skewness values for main variables were below |1.0| denoting a normal distribution. The IBM® SPSS® Statistics 25.0 (SPSS Inc., Chicago, IL) was used. Additionally, McDonald's ω was calculated as an estimate of scale reliability for all the self-report measures using JASP version 0.12.2 (JASP Team University of Amsterdam, Amsterdam, The Netherlands).

Firstly, Pearson's correlation coefficients were used to investigate associations between variables under study and to define the final mediation model to test. Subsequently, to explore the relationships among psychosocial COVID-19 pandemic impact, psychological distress variables (anxiety, depression and stress) and disordered eating behaviors (uncontrolled eating and emotional eating) mediation effects were tested with a Structural Equation Model (SEM) using Maximum Likelihood Estimation in IBM® SPSS® Amos™ 22.0 after the measurement model validation (Anderson & Gerbing, 1988). The bias-corrected bootstrapping procedure (95% confidence) was applied to compute the standard errors of the indirect effects. Model fit was examined using the following fit indexes: normed chi-square (CMIN/DF) with values < 5 representing acceptable fit; Tucker–Lewis Index (TLI), Incremental Fit Index (IFI) > .90; Comparative Fit Index (CFI) > .95; Root Mean Square Error of Approximation index (RMSEA) ≤ 0.08 (Hu & Bentler, 1999; Schumaker & Lomax, 2010). Age and sex were included as covariables. P values < .05 were considered significant. As recommended by Winer et al. (2016), the term “*atemporal*” was used through

the paper to emphasize that the mediational effects derived from a cross-sectional design, and therefore do not imply causation.

Results

Participants

A total of 254 adults participated in this study. Age ranged from 18 to 68 years (M = 35.82, SD = 11.82), 210 were women (82.7%). Table 1 shows the detailed participants' characterization.

Table 1. Participants' sociodemographic, anthropometric and lifestyle characterization

	n	%	Mean (SD)
Age, years			35.82 (11.82)
Sex			
Female	210	82.7	
Male	44	17.3	
Educational attainment			
≤High school degree	33	13.0	
≤Bachelor's degree	69	27.2	
≥ Master's degree/Ph.D.	152	59.8	
Marital status			
Single	120	47.2	
Married/Living together	121	47.7	
Divorced/separated	13	5.1	
BMI kg/m ² (Self-reported)			24.08 (4.57)
BMI Status - WHO†			
Underweight	16	6.3	
Normal weight	154	60.6	
Overweight	56	22.0	
Obesity	28	11.0	
Perception of weight change during COVID-19 lockdown			
Weight increase	97	38.2	
Weight decrease	40	15.7	
Weight maintenance	117	46.1	
Number of hours of sleep (weekday)			7.24 (1.12)
Number of hours of sleep (weekend day)			7.89 (1.38)
Physical Activity (number of days per week ≥ 30 min)			2.24 (2.26)

Note. N=254; † BMI Status- WHO = WHO BMI cut offs: Underweight <18; normal weight ≥ 18 < 25; Overweight = ≥ 25; Obesity = ≥ 30.

Abbreviations: BMI, Body Mass Index; SD, Standard Deviation.

Table 2 illustrates the presence/absence (present at least once in the previous month) and monthly frequency (number of days over the last month) of the following disordered eating behaviors during COVID-19 lockdown: meal skipping, grazing eating behavior, objective overeating, loss of control eating, and (objective) binge eating episodes.

Table 2. Presence (present at least once in the previous month) and monthly frequency (number of days in the previous month) of disordered eating behaviors during COVID-19 lockdown

	n	%	Mean (SD)
Skipping meals (no. of days)			
Absence	120	47.2%	5.08 (7.96)
Presence (at least one day)	134	52.8%	
			10.16 (9.72)
Grazing eating behavior† (no. of days)			
Absence	48	19.1%	7.85 (8.38)
Presence (at least one day)	203	80.9%	
Objective overeating episode† (no. of days)			
Absence	48	19.0%	3.88 (6.69)
Presence (at least one day)	205	81.0%	
Loss of control over eating episode† (no. of days) (regardless the amount of food ingested)			
Absence	132	52.8%	3.00 (5.89)
Presence (at least one day)	118	47.2%	
Binge eating episode† (no. of days)			
Absence	152	60.8%	3.00 (5.89)
Presence (at least one day)	98	39.2%	

Note. N = 254

Abbreviations: SD, Standard Deviation.

The mean (S.D.) values represent the number of days reporting the behavior in the previous month of those who engaged on the behavior at least once during that period (“present”).

Psychosocial impact of COVID-19 pandemic

Regarding the COVID-19 pandemic psychosocial impact, 59.1% individuals (n = 151) described serious changes on daily routines on more than three life domains (e.g. work, social life, education, hobbies, etc.), 28.74% (n = 73) reported mild to serious difficulties in food access, and 21.3% (n = 54) stated mild to moderate changes in medical/mental health care access, with appointments moved to telehealth or delays/cancellations in appointments/getting prescriptions. Access to in-person extended family and non-family social support was also limited for 77.2% (n = 196) of the sample during the lockdown. Most

participants (n=223, 87%) reported experiencing mild to severe stress related to COVID-19 pandemic (worries and/or stress-related symptoms) and 52% (n = 132) mild to severe family discord, with family members frequently engaged in arguments and/or physical fights. Only ten (3.9%) individuals stated to have at least one immediate family member diagnosed with COVID-19, and 36 (14.17%) reported to have at least one extended family member and/or close friend diagnosed with COVID-19.

Associations between the experienced psychosocial impact of COVID-19 pandemic, psychological distress, and disordered eating behaviors during lockdown

Table 3 presents the correlations between sociodemographic and anthropometric variables, disordered eating behaviors, psychological distress, and psychosocial impact of COVID-19. Results suggest that the experience of psychosocial impact of COVID-19 pandemic during lockdown was positively associated with increased uncontrolled and emotional eating, depression, anxiety, and stress levels. Moreover, higher psychosocial impact of COVID-19 pandemic was significantly correlated with being women and younger ages. There were no statistically significant associations between the psychosocial impact of COVID-19 pandemic with BMI or cognitive restraint.

The mediation role of psychological distress

Existing research supports an association between psychological distress and disordered eating behaviors (Fletcher et al., 2008; Rosenbaum & White, 2015; Royal & Kurtz, 2010; Yannakoulia et al., 2008), and our results showed correlations between psychosocial impact of COVID-19 pandemic during lockdown, depressive symptomatology, anxiety/stress levels, uncontrolled and emotional eating (Table 3). Based on these findings, we hypothesized a mediation model in which the experienced psychosocial impact of COVID-19 pandemic is associated with disordered eating behaviors (uncontrolled and emotional eating) through (mediated by) the experienced psychological distress (depressive symptomatology, anxiety, stress levels). Structural equation modeling was used to test this atemporal association model (Winer et al., 2016).

Firstly, the hypothesized measurement model was tested using Confirmatory Factor Analysis (Anderson & Gerbing, 1988) resulting in a good fit to the data, CMIN/DF= 1.499, CFI = .99, RMSEA = .045 (90% CI: .00, .10). These values suggest that the loadings of the measured variables on the two latent variables were significant ($p < .001$) and that the latent variables (psychological distress and disordered eating behaviors) were adequately measured by their corresponding indicators [Psychological Distress: depressive symptomatology, anxiety/stress levels (DASS-21 scales); disordered eating behaviors: uncontrolled and emotional eating (TFEQ-R21 scales)].

The mediation model produced goodness-of-fit indexes that suggest a good fit to the data: CMIN/DF = 2.84, CFI = .95, TLI = .92, IFI = .95, RMSEA = .08 (90% CI: .057, .114). Sex and age were specified as covariates in the model based on the previous correlation analysis (Table 3), indicating its significant associations with the variables in the model. Mediation model parameters are presented in Figure 1.

There was a full mediation between psychosocial impact of COVID-19 pandemic on disordered eating behaviors through psychological distress [(b = .97 (CI: -.71, 2.60), β = .10, p = .262)]. The indirect effect (psychosocial impact of COVID-19 pandemic à psychological distress à disordered eating) was significant [(b = 1.21 (CI: .44, 2.38), β = .12, p < .003)]. Finally, the total effect of psychosocial impact of COVID-19 pandemic during lockdown on disordered eating was also significant [(b = 2.17 (CI: .53, 3.69), β = .22, p < .013)]. These results suggest a significant and positive mediating effect of psychological distress.

Table 3. Correlations between the psychosocial impact of COVID-19 during lockdown and age, sex, BMI, psychological distress variables, and disordered eating behaviors.

	1	2	3	4	5	6	7	8	9	10
1 COVID-19 Psychosocial Impact (CIS)	-									
2 Age	-.22***	-								
3 Sex	-.15*	.17**	-							
4 BMI	-.03	.15*	.13*	-						
5 Depressive Symptomatology (DASS-21)	.34***	-.19**	-.03	.09	-					
6 Anxiety (DASS-21)	.34***	-.19**	-.13*	.02	.66***	-				
7 Stress (DASS-21)	.45***	-.24***	-.22***	.05	.63***	.74***	-			
8 Uncontrolled Eating (TFEQ-R21)	.18**	-.12*	-.14*	.23***	.21**	.22***	.26***	-		
9 Emotional Eating (TFEQ-R21)	.23***	-.12	-.16*	.22***	.23***	.21**	.30***	.71***	-	
10 Cognitive Restraint (TFEQ-R21)	.08	.05	-.10	.14*	.00	.02	.03	.04	.10	-

Note. N = 254; Pearson's correlation coefficients.

Abbreviations: BMI, Body Mass Index (Calculated from self-reported weight/height); CIS, Coronavirus Impact Scale; DASS-21, Depression Anxiety Stress Scales; TFEQ-R21, Three-Factor Eating Questionnaire Revised 21-item version.

* p < 0.05; ** p < 0.01; *** p < 0.001.

Discussion

To our knowledge, this was the first study to examine the relationship between psychosocial impact of COVID-19 pandemic and disordered eating behaviors during the lockdown period in a community sample in Portugal. We found that the change imposed by the psychosocial impact of COVID-19 lockdown on disordered eating behaviors was significantly associated with psychological distress. More importantly, the association between the psychosocial impact of COVID-19 and disorder eating (specifically, emotional and uncontrolled eating) seems to be better explained by the experienced psychological distress (depression, anxiety and stress) during this period. Our findings suggest that individuals who

experience notable changes in a variety of domains in their daily life will experience increased psychological distress, which, in turn, results in more disordered eating. Despite being hypothesized by previous authors (Phillipou et al., 2020; Rodgers et al., 2020), this is the first study to bring support for this association. In this context, eating may serve as a means to cope with the adverse psychological effects of COVID-19 pandemic during the lockdown (Deroost & Cserjési, 2018; Hepworth, Mogg, Brignell, & Bradley, 2010).

Additionally, 38.2% of participants reported a perceived increase in weight due to the COVID-19 lockdown period. This percentage is slightly inferior to the 48.6% observed in an Italian study (Di Renzo et al., 2020) but it is still a significant figure. Although this is a self-report of perceived weight variations, it calls for the attention to the impact of lockdown on overweight and obesity rates (Bhutani & Cooper, 2020). Moreover, the perceived weight gain on itself may indicate underlying disordered eating attitudes/behaviors making it a target for clinical attention.

For instance, participants in our study reported the presence of a variety of disordered eating behaviors, such as skipping meals (52.8%), grazing eating behavior (80.9%), overeating (81.0%), loss of control eating (47.2%), and (objective) binge eating episodes (39.2%). These figures point to a notable presence of unhealthy dietary patterns, during the lockdown in this sample of the Portuguese population, prominently associated with obesity, characterized by the consumption of large portions, snacking, and loss of control eating. In spite of the lack of a pre-COVID-19 pandemic assessment, a study with the Australian population suggested an increase of 27.6% in food restriction and 34.6% in binge eating behaviors of the adult population, when compared with pre-pandemic period, illustrating the impact of lockdown periods on eating behaviors (Phillipou et al., 2020).

Individuals with disordered eating, eating disorders or obesity frequently show compromised social-emotional communication and poor insight regarding their illness which can delay help-seeking behaviors (Fernández-Aranda et al., 2020). In this scope, the tested model can significantly inform intervention approaches designed to mitigate the short and long-term consequences of COVID-19 pandemic on eating disorders and obesity, creating a groundwork for future pandemic situations involving lockdown and social isolation. It is of major importance to guarantee that COVID-19 pandemic does not inflate rates of obesity, which is not only associated with exacerbated manifestation of COVID-19 (Hajifathalian et al., 2020) but is also considered an epidemic (Bhutani & Cooper, 2020). Moreover, telehealth/*m*health approaches are promising strategies to address the modifiable domains that account for the psychosocial impact of COVID-19 pandemic (e.g. stress, family discordance, mental health care access, etc.), and decrease psychological distress and disordered eating during lockdown without rising the risk of infection (Zhou et al., 2020).

This study brings attention for the fact that individuals in crisis situations might experience long-lasting psychological trauma and “emotional contagion” (the spread of affect and mood states through populations by exposure) (Minihan, Gavin, Psychiatry, Kelly, & McNicholas, 2020). Plus, depressive states

seem to be linked to peripheral inflammation markers in COVID-19 quarantined patients, and consequently to a poorer prognosis (Guo et al., 2020).

To the best of our knowledge, this is the first study that focuses on the COVID-19 lockdown impact on eating behaviors in Portugal. Additionally, data was collected in the early stage of calamity period in Portugal, just after a 3 consecutive periods of emergency state enabling the evaluation of the immediate impact of the COVID-19 lockdown period on eating behaviors.

Yet, this study is limited due to the high proportion of highly educated women in the sample which prevents broader generalizations to more diverse populations, and also to its cross-sectional nature that inhibits causal hypotheses to be tested. Even though, we proposed to test an atemporal mediation model (Winer et al., 2016) that do not imply causation to avoid potential misinterpretation and literature supports the validation of the mathematical methods underlying mediation with cross-sectional data (Hayes, 2018). The limited scientific evidence about the effects of COVID-19 lockdown on eating behaviors reinforces the relevance and potential theoretical contribution of the tested model. Notwithstanding, future work should examine these variables longitudinally to confirm causality in a sample with a reduced overrepresentation of women with higher education. Also exploring other assessment approaches, such as Ecological Momentary Assessment (EMA), to verify the temporal sequence of psychological distress and disordered eating behaviors (Smyth et al., 2001) and its associations with emotional regulation strategies during lockdown periods.

Conclusion

Previous studies found that COVID-19 has a negative effect on daily habits, mental health, and eating behavior. However, the present work takes a step further by showing that the change imposed by the psychosocial impact of COVID-19 lockdown on disordered eating behaviors was mediated with psychological distress. On whole, the findings highlight the importance of designing interventions to mitigate the short and long-term consequences of COVID-19 pandemic on eating disorders, creating a groundwork for future pandemic situations involving lockdown and social isolation.

Declarations

Conflict of Interest

The authors declare that there is no conflict of interest

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Figures

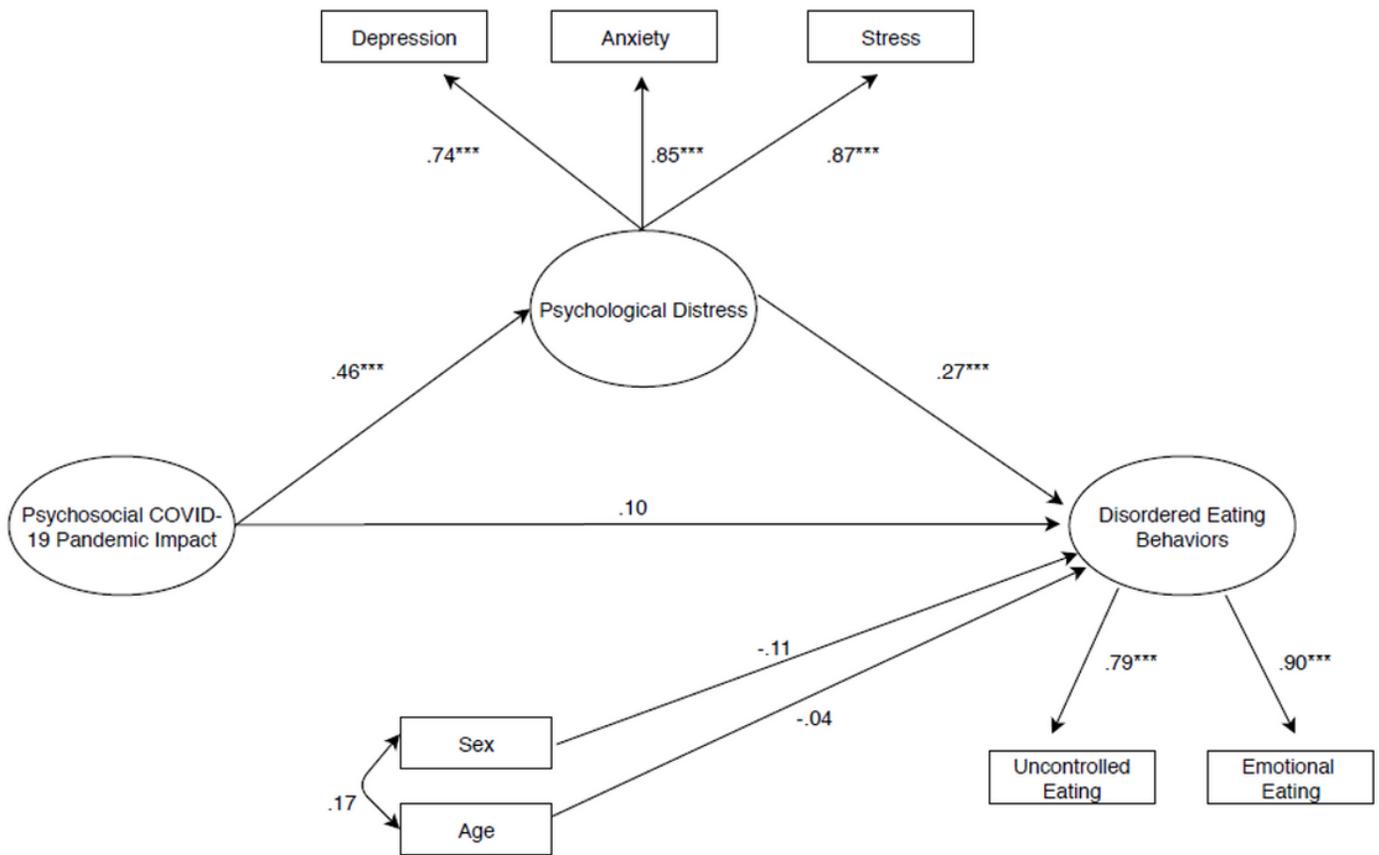


Figure 1

Graphic representation of the mediation model: the mediating role of psychological distress in the relation between the experienced psychosocial impact of COVID-19 pandemic and disordered eating behaviors during lockdown. Note: Estimated standardized coefficients. All endogenous variables were associated with errors; *** p < 0.001.