



The psychological impact of COVID-19-related lockdown measures among a sample of Italian patients with eating disorders: a preliminary longitudinal study

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Received: 6 November 2020 / Accepted: 28 January 2021 / Published online: 13 February 2021
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Abstract

Purpose To explore the prevalence of symptoms of anxiety and depression, along with PTSD- and ED-related symptoms, across a sample of patients with Eating Disorders (EDs) compared to a group of healthy controls (HC) during the lockdown period in Italy; to assess whether patients' reported aforementioned psychiatric symptoms improved, remained stable or worsened with the easing of the lockdown measures.

Methods t0 assessment (during lockdown): 59 ED patients and 43 HC completed an online survey, including the Depression, Anxiety and Stress Scale-21 items (DASS-21), the Impact of Event Scale-Revised (IES-R), the Perceived Stress Scale (PSS), and specific ad-hoc questions extracted from the Eating Disorder Examination-Questionnaire; t1 assessment (post-lockdown): 40 EDs patients, a subset of the t0 sample, completed the same assessment 2 months after t0.

Results EDs patients scored higher than HC at the DASS-21, IES-R and PSS. At t1, levels of stress, anxiety and depression were not different than at t0, but symptoms related to post-traumatic stress disorder (PTSD), patients' reported level of psychological wellbeing and specific EDs symptomatology improved.

Discussion During the lockdown, EDs patients presented significantly higher levels of stress, anxiety, depression, PTSD- and ED-related symptoms than HC. With the easing of the lockdown, PTSD- and ED-related symptoms improved, but high levels of stress, anxiety and depression persisted.

Level of evidence Level I, experimental study.

Keywords COVID-19 · SARS-CoV-2 · Lockdown · Eating disorder · Anorexia nervosa · Bulimia nervosa · Binge eating disorder · Anxiety · Depression · PTSD

Introduction

The psychological impact of the strict COVID-19-related lockdown measures has been widely reported in the general population, healthcare workers and psychiatric patients [1–3]. Patients suffering from Eating Disorders (EDs) are considered at higher risk, for several factors [4]. First, the relatively limited access to food, due to the Authorities' recommendations of limiting supermarket visits as much as possible, and the consequent stockpiling from a large part of the population which left supermarkets almost empty, as reported by local media [5]; second, the scarce possibility to perform physical activity indoor and the disruption of one's own physiological routine (i.e. eating, exercising and sleeping pattern), which might lead to increased anxiety to gain weight [6]; third, the need for social routine reorganization,

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which might lead to a deprivation of social support and adaptive coping strategies, known to be protective factors against the increase of EDs symptoms [6]; finally, the restricted access to healthcare [6, 7]. First evidence suggests that patients with EDs suffered from high levels of anxiety, together with increased restricting, binge eating, purging, and exercise behaviours, during the lockdown [8–10]; it was also reported a re-emergence of symptoms of Bulimia Nervosa in patients who were recovering from this condition [10]. To highlight potential factors for symptoms exacerbation, two studies tried to associate EDs patients' reaction to lockdown and confinement to their pre-epidemic status. Baenas et al. [11] found that the deterioration in EDs symptoms, anxiety and depression (shown in 25.7% of their EDs patients during lockdown) was associated with low self-directedness (i.e. the ability to regulate one's own behaviour to the demands of the environment to achieve personal goals [12]). Castellini and colleagues [10] found that ordinary domestic tension (due to the forced confinement at home) and the fear for the safety of loved ones predicted increased symptoms during the lockdown within the EDs group. Specifically, patients with an insecure attachment and childhood trauma resulted more vulnerable to severe COVID-19-related post-traumatic symptomatology.

At the moment of writing, many governments around the world have started to gradually ease the lockdown restrictions, and citizens from several countries are taking their first steps into a new "social reality", characterized by social distancing measures. Up to date, no studies have ever assessed the time course of psychiatric symptoms in patients with EDs during and after the lockdown.

We aimed to explore the prevalence of symptoms of anxiety and depression, PTSD- and ED-related symptoms across a sample of patients with EDs, compared to a group of HC, during the lockdown period in Italy. In line with the recent literature, we hypothesized that patients with EDs would show significantly higher levels of the aforementioned symptoms than the HC group. Furthermore, in a longitudinal perspective, we assessed whether patients' reported psychiatric symptoms improved, remained stable or worsened with the easing of the lockdown measures [13].

Methods

We administered questionnaires to patients with EDs (at two time-points) and HC (only at the first time-point) through an online survey. Exclusion criteria: (1) age < 18 years old; (2) inability to understand the experimenter's instructions; (3) psychotic disorders. Further demographic information is reported in Table 1. All participants signed an online written informed consent form. The study was approved by San Paolo hospital Ethics Committee.

t0 assessment

Fifty-nine patients with EDs were recruited from the tertiary level outpatient clinic of San Paolo hospital (Milan). Diagnosis of EDs was made by a psychiatrist according to DSM-5 criteria, through a complete anamnestic questionnaire and the Structured Clinical Interview for DSM-5 [14]. Before the lockdown started, 57 patients were treated with psychotherapy. During the lockdown, 54 patients continued psychotherapy (on video conference) [7], three patients decided to suspend it (as they were not comfortable with the video-sessions) and one patient started it.

Forty-three HC were recruited, through advertisement and word of mouth, from staff members and their acquaintances. HC "healthy state" was determined through a specifically designed online anamnestic questionnaire, including questions on medical and psychiatric history. Lockdown measures were implemented in Italy on 8th March 2020, and the present assessment took place between 25th and 28th April 2020.

The online survey included: (1) demographic information; (2) the Depression, Anxiety and Stress Scale-21 items (DASS-21), assessing depressive and anxiety symptoms [15]; (3) the Impact of Event Scale-Revised (IES-R), assessing subjective distress caused by traumatic events [16]; (4) the Perceived Stress Scale (PSS), measuring "the degree to which situations in one's life are appraised as stressful" [17]; (5) five selected questions from the Eating Disorder Examination-Questionnaire (EDE-Q) [18], which we believed best reflected EDs patients' disturbances during the lockdown period, adapted to measure possible changes in these behaviours during the lockdown, compared to before; (6) one question assessing psychological wellbeing (for a further explanation on the EDE-Q item selection and the complete version of the questionnaire, see Supplementary Materials). The following variables were extrapolated (each variable representing one ad-hoc question): Restrictive_Diet_t0; Losing_Control_Over_Food_t0; Thinking_About_Food_t0; Thinking_About_Body_t0; Seeing_Body_t0; Psychological_Wellbeing_t0.

t1 assessment

Patients with EDs recruited at t0 were re-contacted via e-mail 2 months after the first assessment (between 25th and 28th June 2020, with the Italian government starting to ease lockdown measures on 4th May); from the original sample of 59 patients, 40 patients replied and completed the test.

Participants completed the same online questionnaire administered at t0 and we extrapolated the following

Table 1 Sociodemographic and psychometric information for patients with eating disorders, compared to healthy controls, at t0 (during the lockdown)

	EDs (N=59)	HC (N=43)	<i>t/χ</i>	<i>df</i>	<i>p</i>	Cohen's <i>D</i>
Age	30.1 (12.9)	34.7 (12.7)	1.787	100	0.077	0.36
Gender (M/F)	2/57	2/41	$\chi = 0.105$	1	0.746	N/A
COVID-19_diagnosis (Y/N)	1/0	0/0	N/A	N/A	N/A	N/A
COVID-19_relatives (Y/N)	6/53	13/30	N/A	N/A	N/A	N/A
DASS-21 total score	27.4 (12.7)	10.9 (7.8)	− 8.1	94.4	< 0.001	1.56
DASS-21 stress	11.4 (4.8)	5.7 (3.4)	− 7.1	99.9	< 0.001	1.37
DASS-21 anxiety	5.7 (3.4)	1.7 (2.4)	− 6.2	96.7	< 0.001	1.36
DASS-21 depression	10.3 (5.8)	3.5 (3.5)	− 7.4	96.8	< 0.001	1.42
IES-R total score	32 (19.3)	11 (9)	− 7.4	86.9	< 0.001	1.39
IES-R Avoidance	1.3 (0.8)	0.6 (1.3)	− 5.2	99.6	< 0.001	0.65
IES-R Intrusion	1.5 (1)	0.5 (0.4)	− 7.2	84.4	< 0.001	1.31
IES-R Hyperarousal	1.6 (1)	0.5 (0.4)	− 8.081	78.5	< 0.001	1.44
PSS total score	25.3 (8)	15.5 (5.6)	− 5.4	71	< 0.001	1.42
Restrictive_Diet_t0	4.2 (2.4)	4.3 (1.7)	0.1	100	0.919	0.05
Losing_Control_Over_Food_t0	5.4 (2.1)	4.7 (1.5)	− 2.2	100	0.031	0.38
Thinking_About_Food_t0	5.3 (1.7)	4.1 (0.7)	4.4	83.7	< 0.001	0.92
Thinking_About_Body_t0	5.2 (1.5)	4.2 (0.8)	− 4.2	94	< 0.001	0.83
Seeing_Body_t0	5.6 (1.8)	4.2 (1)	− 4.7	95.7	< 0.001	0.96
Psychological_Wellbeing_t0	4.1 (2.1)	4.4 (1)	0.9	86.1	0.366	0.18

Between-group differences with significance levels < 0.05 are highlighted. Unless otherwise indicated, data are expressed as mean (standard deviation)

Cohen's D = effect size measure; *COVID-19* = COronaVirus Disease 2019; *DASS-21* = Depression, Anxiety and Stress Scale-21 items; *df*: degrees of freedom (reflecting the Greenhouse–Geisser correction where sphericity was violated, according to Levene's test); *EDs* = Eating Disorders patients; *HC* = Healthy Controls; *IES-R* = Impact of Event Scale-Revised (IES-R); *M/F* = male/female; *PSS* = Perceived Stress Scale; *SD* = standard deviation; *t0* = assessment during lockdown; *Y/N* = Yes/No

variables: Restrictive_Diet_t1; Losing_Control_Over_Food_t1; Thinking_About_Food_t1; Thinking_About_Body_t1; Seeing_Body_t1; Psychological_Wellbeing_t1.

Statistical analysis

Statistical analysis was performed using SPSS.26 ($\alpha = 0.05$ deemed significant).

t0 assessment

Descriptive statistics were calculated for sociodemographic variables. To assess differences between groups, we ran *t* test for continuous variables and Pearson χ^2 test for categorical variables.

t1 assessment

First, we compared the sample of patients on whom we had t1 assessment data with the sample of patients on whom these data were missing, using *t* test and χ^2 test as appropriate. Second, descriptive statistics were calculated for this subsample of patients. Third, a series of repeated measures ANOVA was run with the variables extrapolated by our

questionnaire as within-subject factors, at two levels (t0 and t1).

Results

t0 assessment

We did not have any missing data. Groups were balanced for age ($p = 0.077$) and gender ($p = 0.746$). All participants were Caucasian. Amongst patients with eating disorders, 22 had a diagnosis of anorexia nervosa [body mass index (BMI): 15.94 ± 1.02], 15 of bulimia nervosa (BMI: 22.77 ± 2.59), and 22 of binge eating disorder (BMI: 32.95 ± 9.74). One patient was infected by COVID-19 and 4 patients had a relative infected by COVID-19; no HC was infected by COVID-19, but 13 HC had an infected relative.

Patients with EDs scored significantly higher than HC at the DASS-21 Total Score and its subscales Stress, Anxiety and Depression (all $p < 0.001$); the IES-R Total Score and its subscales Avoidance, Intrusion and Hyperarousal (all $p < 0.001$); the Perceived Stress Scale ($p < 0.001$). Moreover, we found a significant difference between groups at the following variables, all with patients with EDs scoring

higher than HC: Losing_Control_Over_Food_t0 ($p=0.031$), Thinking_About_Food_t0, Thinking_About_Body_t0 and Seeing_Body_t0 (all $p < 0.001$). No differences emerged at the variables Restrictive_Diet_t0 ($p=0.919$) and Psychological_Wellbeing_t0 ($p=0.366$) (Table 1).

t1 assessment

The sample of patients on whom we had t1 assessment data did not differ from the sample of patients on whom these data were missing for all the variables examined (all $p > 0.05$), except for Thinking_About_Food_t0 ($p=0.035$), which was excluded from the longitudinal assessment (Supplementary Materials).

Mean age of the sample was 30.85 ± 14.168 years. Fifteen patients had a diagnosis of anorexia nervosa (BMI: 15.86 ± 2.2), 11 of bulimia nervosa (BMI: 22.68 ± 2.3) and 14 of binge eating disorder (BMI: 33.64 ± 10.01). Two participants were male. Between t0 and t1, one patient was infected and three patients had a relative infected by COVID-19. At the DASS-21, no significant effect was found between t0 and t1 at the Total Score, nor at its subscales Stress, Anxiety and Depression (all $p > 0.05$). A significant within-subject effect emerged at the IES-R Total Score ($p=0.014$) and its subscales Intrusion ($p=0.038$) and Hyperarousal ($p=0.002$), with patients scoring significantly lower at t1 than at t0. No difference emerged at the PSS ($p=0.717$).

t1 scores were significantly lower than t0 scores at the variables: Losing_Control_Over_Food, Thinking_About_Body, Seeing_Body (all $p < 0.02$). No difference emerged

at Restrictive_Diet ($p=0.876$). A trend towards significance emerged at the variable Psychological_Wellbeing ($p=0.051$), with scores at t1 significantly higher than scores at t0 (Table 2).

Discussion

Our data showed that EDs patients experienced higher levels of stress, anxiety and depression (as evaluated through the DASS-21 and the PSS), and higher PTSD-related symptoms (Intrusion, Avoidance and Hyperarousal) than HC during the lockdown period. A major limitation of our finding resides in the fact that we did not have a pre-pandemic assessment of these symptoms in our samples, and therefore we cannot rule out the possibility that the differences detected between EDs patients and HC during the COVID-19 lockdown period were only reflecting those existing before the pandemic onset. However, our data warrant attention; since COVID-19 represented an unprecedented public health threat in the contemporary society, most individuals, regardless of their pre-epidemic health status, experienced higher levels of anxiety in response to widespread uncertainty [2, 19]. Here we showed that the difference in levels of stress, anxiety and depression between patients with EDs and HC remains significant in the lockdown period, underlying that patients with EDs should receive adequate psychological support. Moreover, our data fit perfectly with a recent review discussing the risk of EDs patients in the context of COVID-19 [4]. With respect to PTSD-related symptoms, our data are in line

Table 2 Psychometric information for patients with Eating Disorders at t0 and t1 (during and after lockdown, respectively)

	t0 mean (SD)	t1 mean (SD)	<i>F</i>	<i>p</i>	η_p^2	Observed power
DASS-21 total score	26.7 (13.9)	23.3 (13.9)	3.331	0.076	0.079	0.429
DASS-21 stress	11.4 (14)	10.1 (5.5)	2.451	0.125	0.059	0.333
DASS-21 anxiety	11.4 (5.1)	4.7 (4.3)	2.783	0.103	0.067	0.37
DASS-21 depression	9.6 (5.9)	8.5 (5.9)	1.762	0.192	0.043	0.254
IES-R total score	30.6 (20.3)	25 (18.1)	6.634	0.014	0.145	0.709
IES-R Avoidance	1.2 (0.9)	1.1 (0.9)	1.156	0.289	0.029	0.182
IES-R Intrusion	1.4 (1.1)	1.2 (1)	4.625	0.038	0.038	0.555
IES-R Hyperarousal	1.6 (1)	1.1 (0.9)	11.126	0.002	0.222	0.902
PSS total score	24.7 (8.4)	24.3 (8.4)	0.134	0.717	0.003	0.065
Restrictive_Diet	4.3 (2.3)	4.4 (2.1)	0.025	0.876	0.001	0.053
Losing_Control_Over_Food	5.7 (1.9)	4.5 (2.2)	6.465	0.015	0.142	0.698
Thinking_About_Body	5.12 (1.6)	4.4 (1.8)	7.82	0.008	0.167	0.778
Seeing_Body	5.9 (1.4)	4.5 (1.9)	12.53	0.001	0.249	0.933
Psychological_Wellbeing	3.53 (2.1)	4.2 (1.9)	4.067	0.051	0.094	0.503

Within-group differences with significance levels < 0.05 are highlighted. Degrees of freedom = (1, 39) for every analysis run

DASS-21 Depression, Anxiety and Stress Scale-21 items; IES-R Impact of Event Scale-Revised (IES-R); PSS Perceived Stress Scale; SD standard deviation; t0 assessment at baseline, during lockdown; t1 assessment 2 months after t0, after lockdown; η_p^2 = partial eta squared

with previous studies showing that ED patients, given their elevated intolerance of uncertainty [20] and less effective coping strategies [21], are more vulnerable to develop stress, anxiety and PTSD-related symptoms than HC in different stressful situations [22].

Our longitudinal assessment showed that PTSD-related symptoms significantly improved with the end of the lockdown, while the high levels of anxiety, stress and depression persisted in patients with EDs. On one hand, again, we cannot reject the hypothesis that the anxious-depressive symptomatology was present even before the lockdown, representing a stable feature of our sample of patients and therefore was not directly linked to the pandemic onset. On the other hand, however, the persistence of psychiatric symptoms after similar stressful situations has been widely reported in the literature: for example, the psychological consequences of the SARS outbreak had long-lasting effects in the general population, in survivors from the pandemic disease, in healthcare workers and in specific sample of patients [23–26; for a review see 27].

With respect to PTSD-related symptoms, which improved at t1, some considerations about coping strategies should be done. It is reported that patients with EDs are more likely to use cognitive avoidance or cognitive rumination as a coping strategy, and are less likely to receive crisis support from a relative or friend [21], which is a crucial risk factor, given that psychosocial resources were found to have a strong association with PTSD-like symptomatology [28]. In our sample, at the IES-R, a reduction of Intrusion and Hyperarousal symptomatology, but not of Avoidance, emerged. We might hypothesize that the loss of routine and the isolation suffered during the lockdown have rendered ED patients more susceptible to experience traumatic symptoms.

Finally, we asked participants to evaluate whether their behaviour towards eating and their body image changed with the pandemic onset. To the best of our knowledge, this is the first study longitudinally assessing the time course of these symptoms in a sample of patients with EDs during and after the COVID-19 lockdown. Patients with ED, compared to HC, reported to experience a heightened fear of losing control over eating and discomfort of seeing their own body, and to spend more time thinking about their body during the lockdown than before. These results are in line with previous studies suggesting that the COVID-19 lockdown might have worsened EDs symptoms [8, 10], and with the hypothesis advanced by Rogers and colleagues suggesting that the restricted possibility to perform physical activity and the change in one's own eating and sleeping habits might have induced changes in body shape or weight, and might have worsened ED-specific anxiety concerns [6]. On the other hand, no differences between groups emerged at the variable Restrictive_Diet,

suggesting that both EDs and HC groups did not perceive any change in their diet following the lockdown restrictions (i.e. EDs patients kept trying to control their calories intake as they did before the lockdown, while HC kept their normal eating habits). Here we made a step further showing that the levels of most of the concerns linked to EDs psychopathology lowered after the end of the lockdown, supporting the hypothesis that specific conditions occurring during the lockdown might directly affect specific ED symptoms.

Finally, together with reduced PTSD-like and EDs symptomatology, patients with EDs reported feeling significantly better with the easing of the lockdown. As Cooper and colleagues suggested [4], social distancing measures might be thought, for patients with EDs, as a potential short-term relief, given the decrease in social interactions (i.e. the decrease in showing in public one's own body figure) [4, 13]; in their review, they highlighted the fact that, despite this short-term mitigation of interpersonal social triggers of EDs, the risk for EDs patients to experience a worsening of their symptomatology, in association with the COVID-19 outbreak, was high. Moreover, they suggested investigating the potential benefit of the end of the lockdown, which we did in the present study, showing first evidence that EDs patients' psychological wellbeing actually improved with the end of the lockdown.

Our study has several limitations: (1) the lack of a pre-lockdown psychometric assessment of our samples; (2) we did not assess HC group at t1, and therefore we could not evaluate whether our results were specific of EDs patients or generalizable to the healthy population; (3) we arbitrarily selected five questions from the EDE-Q, which might have affected the psychometric validity of the questionnaire; (4) the limited sample size, which rendered unreliable any statistical analysis comparing patients with different EDs subtypes; (5) all data were self-reported; (6) we included only Caucasian participants, and therefore, we cannot generalize our results to other ethnicities; (7), we did not consider the socio-economical and employment status, which might have created a bias in our results.

In conclusion, our study showed that patients with EDs presented significantly higher levels of anxiety, depression, stress, PTSD- and ED-related symptoms than HC during the COVID-19 lockdown period in Italy. With the easing of the lockdown measures, PTSD- and ED-related symptoms improved in our sample of patients with EDs, but high levels of stress, anxiety and depression persisted. Our results should be taken into account when conceiving specific interventions for the EDs population, both in the context of a psychotherapy treatment tailored on the single patient and when designing large interventions of prevention.

What is already known on this subject?

The psychological impact of COVID-19 and related lockdown measures has been reported both in the general population and in patients with pre-existing psychiatric conditions. Patients with eating disorders have been considered at high risk of worsening their symptomatology.

What this study adds?

In this longitudinal study, we show that patients with EDs presented higher levels of anxiety, depression, stress, PTSD- and ED-related symptoms than HC during the COVID-19 lockdown period in Italy. With the easing of the lockdown measures, PTSD- and ED-related symptoms improved in our sample of patients with ED, but high levels of stress, anxiety and depression remained.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s40519-021-01137-0>.

Funding No role of the funding source.

Data availability Anonymized data will be shared by request from any qualified investigator.

Code availability SPSS v.26 code for data analysis will be shared by request from any qualified investigator.

Compliance with ethical standards

Conflict of interest Authors have no conflict of interests to declare.

Ethical approval The study was approved and registered by the ethics committee of ASST Santi Paolo e Carlo, Milan, Italy.

Consent to participate and for publication All patients and healthy controls gave their written informed consent for the study.

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