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Psychological consequences and differential impact of the COVID-19 pandemic in patients with mental disorders

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ABSTRACT

Objective: People with mental disorders might be differentially affected by the COVID-19 pandemic. The aim of the current study was to evaluate the impact of the pandemic on patients with various psychiatric disorders who were admitted to inpatient treatment.

Methods: Five-hundred thirty-eight inpatients with mental disorders participated in a survey about psychological consequences of the pandemic between March–December 2020. We examined the perceived burden by restrictions and worries, changes in health care utilization, and helpfulness of coping strategies.

Results: More than 50% reported any worsening of symptoms, 40% stated increased need of therapeutic support. High rates of symptom deterioration were observed for depressive symptoms (>55%), anxiety (>40%), and sleeping behavior (>40%). Treatment impairment was stated by 27.9%. Patients with anxiety disorders were less affected by contact restrictions compared with eating disorders and depression. Patients with anorexia nervosa and post-traumatic stress disorder experienced higher helpfulness by daily structuring than patients with depression.

Discussion: About half of our sample of psychiatric patients experienced symptom deterioration due to the pandemic and about one quarter reported impairment of treatment modalities. Especially patients with eating disorders and depressive disorders were more frequently affected. The results indicate a needed improvement of treatment options during a pandemic.

1. Introduction

The ongoing COVID-19 pandemic globally changed daily life routines nearly for all humans e.g., due to contact restrictions (social distancing), temporary societal lockdown scenarios, or economic destabilization. Even though the COVID-19 pandemic poses challenges for all of us, preliminary results suggest that the current pandemic is even more challenging for patients with pre-existing mental disorders and psychological consequences may differ between diagnoses.

Previous studies in the general population revealed elevated rates of suicidal ideations, generalized anxiety, COVID-19 related anxiety,

depression, and feelings of loneliness during the COVID-19 pandemic (Bauerle et al., 2020; Li & Wang, 2020; Ren et al., 2020; Skoda et al., 2021; Wang et al., 2020; Xiong et al., 2020). These findings were extended by a recently published meta-analysis indicating increased psychiatric symptoms, depression, and anxiety with medium effect sizes among patients with pre-existing mental disorders compared to healthy controls (Neelam et al., 2021). Similar, higher levels of anxiety, perceived risk of getting infected with COVID-19, and worries about the pandemic situation were found in psychiatric patients versus healthy controls by Burrai et al. (2020). In a longitudinal study by Pan et al. (2020), patients with depression, anxiety disorders, or

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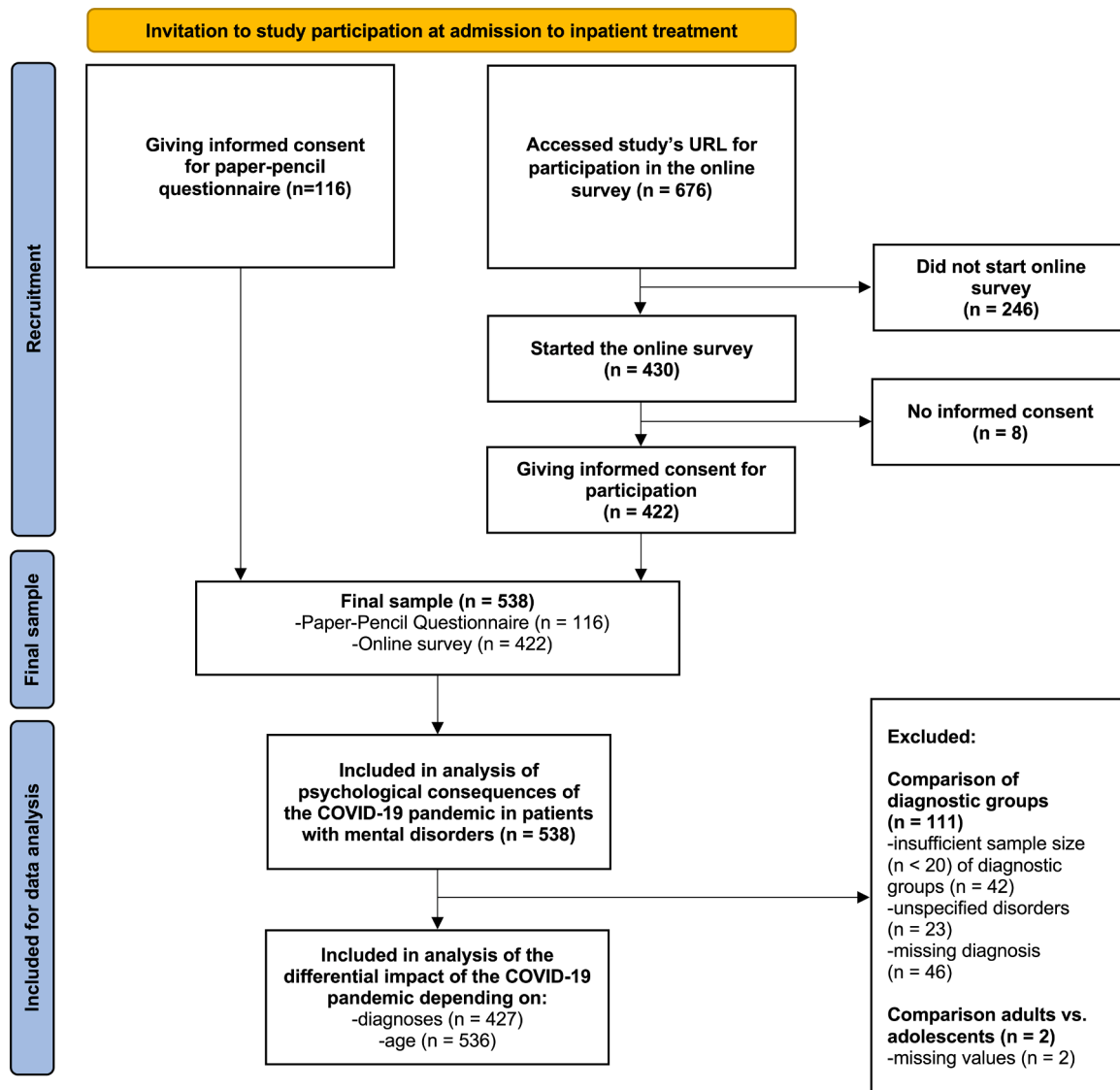


Fig. 1. Flow diagram of participants ($N = 538$).

obsessive-compulsive disorder (OCD) scored significantly higher on psychopathology than healthy controls but, increases during the pandemic did not differ between the groups. Studies by Alonzi et al. (2020) and Skoda et al. (2020) yielded elevated symptoms of depression, COVID-19-related fears, distress, and anxiety in patients with mental health conditions in general compared to healthy individuals and patients with physical conditions only. However, no group differences between diagnoses were reported in all of those studies.

Furthermore, several studies investigated the impact of the pandemic in patients with specific mental disorders like eating disorders (Baenas et al., 2020; Schlegl, Maier, et al., 2020; Schlegl et al., 2020), affective disorders (Asmundson et al., 2020), anxiety-related disorders (Asmundson et al., 2020) or OCD (Benatti et al., 2020; Davide et al., 2020; Jelinek et al., 2021; Nissen et al., 2020). Results predominantly revealed high rates of disorder-specific symptom deterioration, increases in general psychopathology, and a substantial proportion of patients experiencing newly emerging symptoms. Similar trends were observed in children and adolescents with and without mental disorders during the pandemic (Conti et al., 2020; Guessoum et al., 2020; Racine et al., 2020; Tanir et al., 2020; Zhou et al., 2020). In general, younger individuals seemed to be more severely affected by the pandemic than older persons, for example, Gray et al. (2020) found a 6.5-fold increased

probability of severe psychological distress for the youngest age group (16-24 years) in contrast to participants ≥ 75 years in an online-survey with 12,000 participants.

Few studies have been reported on the differential impact of the pandemic on psychopathological symptoms. Asmundson et al. (2020) found significantly higher levels of distress for COVID-19-related stress, danger and contamination fears, fears of socioeconomic consequences, compulsive checking and reassurance-seeking, and traumatic stress symptoms for anxiety-related disorders ($N = 700$) compared to mood disorders ($N = 368$). Hölzle et al. (2020) and Solé et al. (2021) reported higher depression, anxiety, stress ratings, and stress-related somatic complaints in patients with affective disorders and anxiety disorders compared to patients with substance-use, bipolar or psychotic disorders. In summary, evidence about the differential impact of the COVID-19 pandemic on mental health between diagnostic groups of mental disorders is limited.

Another issue is the differential impact of the various consequences of the pandemic on daily life of patients with psychiatric disorders. To our knowledge, mental-health consequences of specific COVID-19 restrictions and helpfulness of coping strategies were assessed only in a small number of studies. Furthermore, only few data exist about differences between diagnostic groups in altered psychopathology, and

Table 1
Descriptive sample characteristics.

Sample Characteristic	Full sample (N=538)	
	n	%
Sex		
Female	378	70.3
Male	155	28.8
Diverse	5	0.9
Age		
<18 years	100	18.6
≥18 years	436	81.4
Missing	2	0.4
Self-reported diagnoses		
Depressive disorders (F32/F33)	183	37.2
Anxiety disorders (F40/F41)	35	7.1
OCD (F42)	38	7.7
PTSD (F43.1)	33	6.7
AN (F50.0/F50.1)	88	17.9
BN (F50.2/F50.3)	30	6.1
BPD (F60.3)	20	4.1
Chronic pain (F45.4)	7	1.4
Tinnitus aurium (H93.1)	13	2.6
Other	45	9.2
Infection with SARS-CoV-2		
Own infection	4	0.7
Infections among household members	5	0.9
Infections among related persons	36	6.7
Marital status		
Unmarried, in relationship	235	43.8
Unmarried, not in relationship	106	19.7
Married/ Cohabiting	139	25.9
Divorced/ Separated/Widowed, currently in relationship	19	3.5
Divorced/Separated/Widowed, currently not in relationship	38	7.1
Occupation/Employment		
Self-employed	10	1.9
Freelanced	9	1.7
Employee/Public official/servant in higher or leading position	94	17.5
Employee/Public official/servant in middle or junior position	105	19.6
Homemaker	10	1.9
Pupil/Student or in training	166	30.9
Unemployed	62	11.5
Other	81	15.1
Occupational situation during the COVID-19 pandemic:		
Homeschooling	120	22.5
University online classes	38	7.1
Home-Office	70	13.1
Working as usual at workplace	96	18.0
Reduced working hours due to the pandemic	19	3.6
Job loss due to the pandemic	6	1.1
Other	185	34.6
Living situation		
Together with parents/relatives	162	30.2
Flat-sharing community	27	5.0
Together with husband/partner	187	34.8
Alone	136	25.3
Frequently changing	14	2.6
Other	11	2.0

Note. $N = 538$. Participants were on average 35.29 years old ($SD = 16.34$). Mean age for adults was 39.75 years ($SD = 14.87$) and 15.83 years ($SD = 1.06$) for adolescents. OCD = Obsessive-compulsive disorder, PTSD = Post-traumatic stress disorder, AN = Anorexia nervosa, BN = Bulimia nervosa, BPD = Borderline personality disorder.

changes in treatment utilization due to the pandemic (Fullana et al., 2020; Solé et al., 2021; Wang et al., 2020). The current study aimed to examine the perceived burden by pandemic-related restrictions and worries, changes in psychopathology and health care utilization due to the pandemic, and the subjective helpfulness of various coping strategies in patients with mental disorders using self-developed questionnaires and differences between diagnostic groups.

2. Methods

2.1. Recruitment

Participants were invited by treating psychotherapists or the nursing staff either to complete an anonymous online survey [Median (Mdn.) completion time: 13.00 minutes] via www.unipark.com or the same questionnaire in paper-pencil format (duration approximately 15 minutes) at admission to inpatient treatment of mental disorders. Participants were not offered any compensation or reward for their participation. Participants were informed that the data collection is anonymized, participation is voluntary, data are used only for scientific, non-commercial purposes, and they agree to participate by giving informed consent before starting the survey.

676 individuals accessed the study's URL, and 430 of them started the survey. However, informed consent was denied at the beginning by eight individuals (1.9% of the online sample). Thus, data of 422 individuals who completed the survey were available from the online questionnaire. Participation rate was 63.6% (430/676), whereas the completion rate was 62.4% (422/676) for the online survey. 116 individuals completed the questionnaire in paper-pencil format. In total, the final sample consisted of 538 participants who completed the survey. An overview of recruitment and inclusion of participants in the analyses is given in the flow chart of Fig. 1.

2.2. Participants

538 inpatients (70.3% female, $n = 378$) with mental disorders and a mean age of 35.3 years ($SD = 16.3$, Range = 12-82) participated in the study. Patients received inpatient treatment during the COVID-19 pandemic at six hospitals of the Schoen Clinic, Germany, specialized for inpatient treatment of affective disorders, anxiety disorders, eating disorders, posttraumatic stress disorder (PTSD) and obsessive-compulsive and related disorders. All Participants received multi-modal inpatient treatment with individual, non-manualized cognitive-behavioral psychotherapy (1-2 sessions per week), specialized group therapy sessions (e.g., social skills, mindfulness, relaxation, exercise, arts), and psychotropic medication according to national guidelines for evidence-based disorder-specific treatment, if indicated. Treatment solely differed in the treatment focus according to the patients' main diagnosis.

Descriptive sample characteristics are displayed in Table 1. Subgroup differences between adults ($n = 436$) and adolescents ($n = 100$) can be found in the supplement (2 participants were excluded due to missing values). The groups also differed significantly regarding sex ($p < .001$) with more female participants among adolescents and self-reported diagnoses ($p < .001$) with a higher prevalence of anorexia nervosa (AN), but lower rates of PTSD, chronic pain, and tinnitus aurium among adolescents. To avoid confounding effects due to differences in the pandemic risk situation and imposed restrictions over the study period, a chi-square test of independence was performed to examine the relationship between diagnostic groups and date of participation (month). Results revealed no significant association between self-report diagnoses and month of participation, $X^2(30, N = 307) = 28.61, p = .54$.

2.3. Materials and survey procedures

The survey was conducted between April 01, 2020 and December 31, 2020. In this period of time, Germany imposed a complete societal lockdown from end of march to end of April and a lockdown with stepwise re-instated restrictions since November 2020. The patients were told the following purpose of the study: "The COVID-19 pandemic has profoundly changed our everyday lives. The associated challenges can influence the symptoms of mental illnesses. To systematically investigate its impact on patients with mental disorders, we would kindly ask you to take part in our survey." We assessed psychological

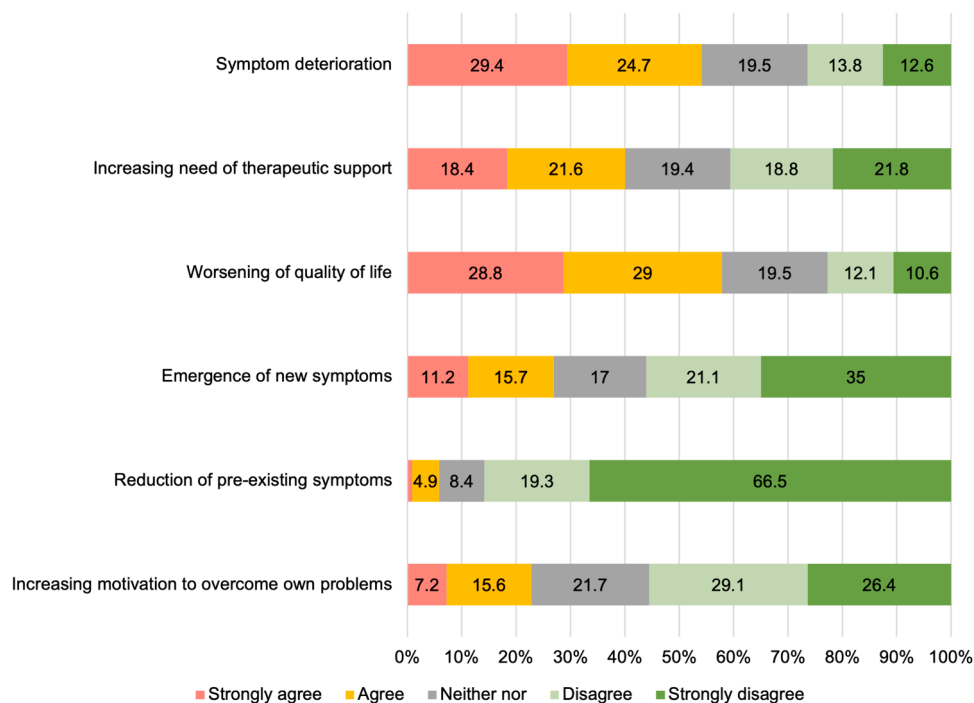


Fig. 2. Overall impact of the COVID-19 pandemic on patients with mental disorders.

consequences of the COVID-19 pandemic using a self-developed questionnaire at admission to inpatient treatment of mental disorders. The questionnaire was developed by a multidisciplinary team of clinicians, psychotherapists, and researchers at a specialized hospital for inpatient treatment of mental disorders (Schoen Clinic Roseneck, Germany). During a series of structured discussions focusing on psychological consequences of the COVID-19 pandemic, the team agreed upon a questionnaire-based, anonymized assessment of psychological consequences in general, perceived burden by pandemic-related restrictions and worries, changes in psychological symptoms, helpfulness of coping strategies, and changes in health care utilization. To avoid confounding effects due to inpatient treatment, patients were invited to participate in the survey at admission to inpatient treatment of mental disorders. The questionnaire was divided into the following parts:

- a) sociodemographic data including age, sex, family relations, marital status, occupational status during the pandemic, primary diagnosis (self-report), contact history to SARS-CoV-2
- b) changes in symptom severity, quality of life, need for therapeutic support, treatment motivation and possible emergence of new symptoms due to the pandemic (5-point scale with 1 = strongly disagree to 5 = strongly agree)
- c) perceived burden by specific restrictions to slow down the spread of the coronavirus and pandemic-related worries (5-point scale with 1 = not burdened at all to 5 = heavily burdened)
- d) alterations in specific psychopathology due to the pandemic (5-point scale from 1 = significantly improved/strongly decreased to 5 = significantly worsened/strongly increased)
- e) use and subjective helpfulness of various coping strategies (5-point scale with 1 = not helpful at all to 5 = very helpful)
- f) health care utilization before and during the COVID-19 pandemic
- g) an optional opened question at the end of the survey: “If you like, you can tell us here about your personal experiences or helpful strategies during the COVID-19 pandemic. You can also report positive consequences of the pandemic here.”

All procedures were in accordance with the ethical standards of the institutional review board of the LMU Munich and with the 1964

Helsinki declaration and its later amendments. Electronic informed patient consent was obtained. According to the guidelines by the institutional review board of the LMU Munich, completely anonymized prospective surveys are exempt from requiring ethics approval.

2.4. Statistical analysis

Descriptive results for all items of the questionnaire are shown in Figs. 2–7. Descriptive analyses were conducted with IBM SPSS Statistics, version 24. To examine whether responses differed as a function of self-report diagnoses and age (adolescents [age < 18 years] vs. adults [age ≥ 18 years]), we reduced the number of dependent variables by aggregating items based on theoretical assumptions and exploratory factor analysis conducted with JASP version 0.13.0, which uses the R-package lavaan (<http://lavaan.ugent.be>). COVID-19 restrictions were clustered into contact restrictions (social distancing; 5 items), visiting restrictions (of older or chronically ill persons; 2 items), and hygienic standards (handwashing, disinfection, physical distancing, wearing face masks in public; 4 items). Worries were categorized into worries about financial problems (2 items), treatment impairment (2 items), food insecurity (1 item), and worries related to COVID-19 infections (3 items). Treatment impairment was defined as the deviation of obtained treatment from preferred treatment in terms of treatment format (videoconference instead of preferred face-to-face treatment), treatment frequency (monthly visits instead of preferred weekly appointments), or general utilization of treatment (treatment aspired, but not received). Changes in psychological symptoms were classified into depressive symptoms (8 items), somatic symptoms (4 items), anxiety (5 items), alcohol consumption (1 item), suicidality/self-harm (2 items), and interpersonal conflicts (4 items). Coping strategies were grouped in mindfulness + meditation (6 items), digital social contacts (2 items), pleasant activities (6 items), day structuring (2 items), and positive thinking (4 items). Model fit was proved for each aggregated subscale with a minimum of 3 items by confirmatory factor analysis also computed with JASP version 0.13.0. Diagonally Weighted Least Squares was chosen as estimation method because of the ordinal response format (Li, 2016). Model fit was considered as good according to the recommendations by Schermelleh-Engel et al. (2003): Comparative Fit Index (CFI) ≥ .97, Goodness of Fit

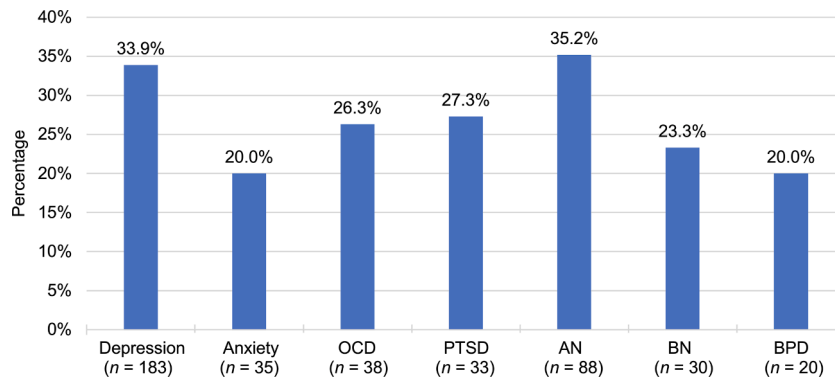


Fig. 3. Proportion of patients expressing symptom worsening due to the pandemic (“Strongly agree”) by diagnoses.

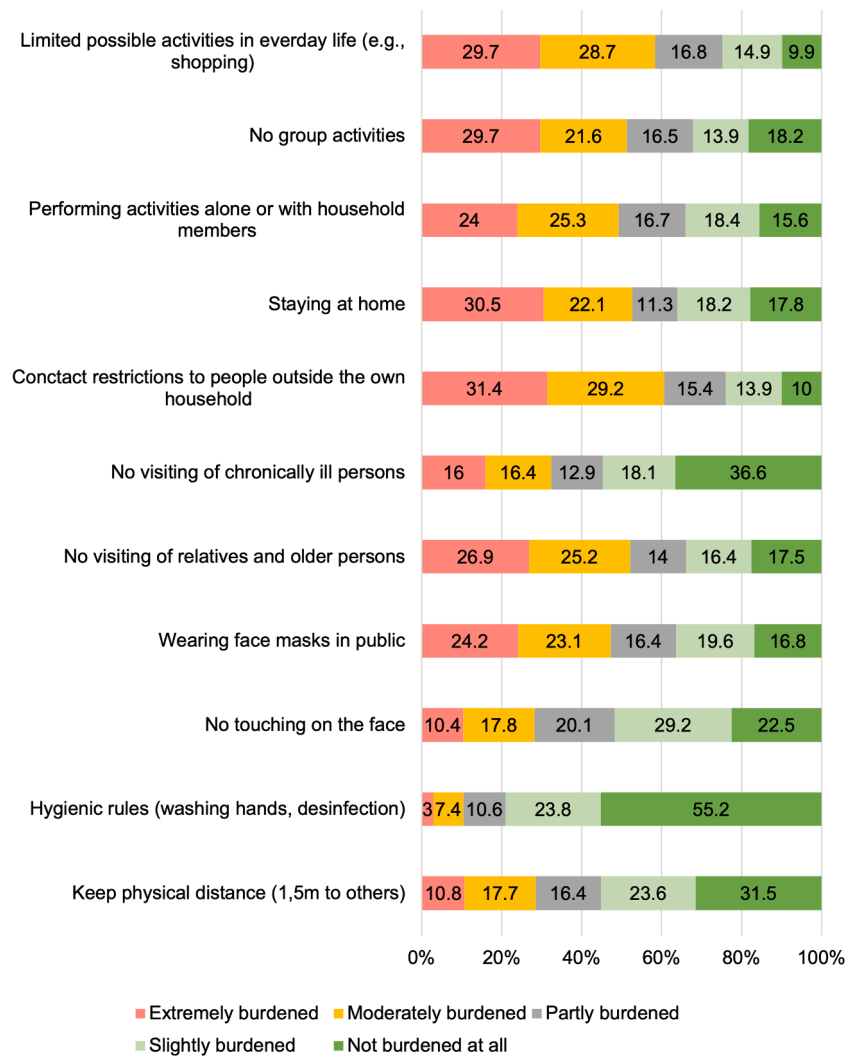


Fig. 4. Perceived burden by COVID-19 related restrictions.

Index (GFI) $\geq .95$, Root Mean Square Error of Approximation (RMSEA) $\leq .05$, and Standardized Root Mean Square Residual (SRMR) $\leq .05$. For categories with three or less items, Cronbachs Alpha (for three-item scales), or Spearman-Brown coefficient (for two-item scales) as an equivalent to standardized coefficient alpha was computed to confirm internal reliability (Eisinga et al., 2013). All aggregated subscales achieved coefficients for internal reliability of $\geq .70$, interpretable as acceptable internal reliability according to Schmitt (1996). Normally

distributed item responses as a precondition for parametric statistics could not be achieved due to ordinally scaled data. As non-parametric alternatives for analysis of variance (ANOVA) and independent samples t-tests, Kruskal-Wallis tests, and Mann-Whitney-U tests were used to investigate the differential influence of the pandemic depending on self-report diagnoses and age. Dunn’s test was chosen for post-hoc pairwise comparisons in case of a significant Kruskal-Wallis test. For all tests, an alpha level of .05 was used. Diagnostic groups with a sample

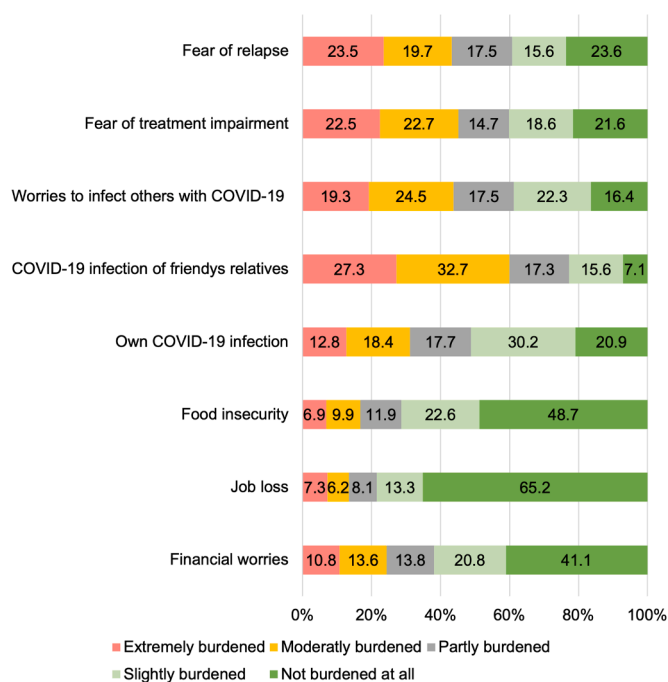


Fig. 5. Perceived burden by worries during the COVID-19 pandemic.

size <20 or unspecified disorders were excluded from the analysis when examining differences between self-report diagnoses. Kruskal-Wallis and Mann-Whitney-U tests were performed with IBM SPSS Statistics, version 24. Reported effect sizes were computed using an online calculator for effect sizes (see https://www.psychometrica.de/effect_size.html).

3. Results

3.1. General impact of the COVID-19 pandemic on psychological symptoms

The overall impact of the COVID-19 pandemic on general psychopathology, need of therapeutic support, general well-being, emergence of new symptoms, reduction in preexisting symptoms, and individual motivation to overcome own problems is shown in Figure 2. More than 50% of all participants reported a general worsening of their symptomatology and 57.8% expressed a reduced quality of life caused by the COVID-19 pandemic. Symptom worsening was stated most frequently by patients with AN and depressive disorders, as can be seen in Fig. 3. Increased need of therapeutic support was reported by 40.0%, while new symptoms emerged in 27.0% of all patients during the pandemic. Positive consequences like an increased motivation to work on overcoming own problems or reductions in preexisting symptoms were only stated by a minority of 22.7% and 5.8%, respectively.

3.2. Perceived burden by imposed pandemic-related restrictions and associated worries

The subjectively perceived burden by specific governmental imposed restrictions of societal life and associated worries are depicted in Figs. 4 and 5. Contact restrictions, limited possible activities in everyday life, staying at home, and wearing face masks in public were perceived as burdening in nearly 50% or more participants among pandemic-related restrictions. Participants were most negatively affected by worries about treatment impairment, COVID-19 infections of friends or relatives, and a potential relapse.

3.3. COVID-19-related alterations in specific psychopathology

Changes in specific psychopathology across all disorders are displayed in Fig. 6. Most frequently, participants stated exacerbations of somatic symptoms, various types of anxiety, and depressive symptoms. Across all symptoms, percentages of patients who reported improvement were consistently below 10% of the sample.

3.4. Usage and perceived helpfulness of coping strategies during the COVID-19 pandemic

An overview of usage and perceived helpfulness of coping strategies during the COVID-19 pandemic is given in Fig. 7. Overall, strategies were predominantly rated as slightly to moderately helpful. While enjoyable activities, daily routines, and virtual social contact to friends were used most commonly, playing parlour games with the family, enjoyable activities, and relaxing time with family or friends were experienced as most helpful.

3.5. Impact of the COVID-19 pandemic on health care utilization

27.9% reported that treatment was negatively affected by the COVID-19 pandemic. 7.8% of the participants receiving treatment before the pandemic did not get any treatment during the COVID-19 pandemic. The percentage of patients receiving face-to-face outpatient psychotherapy decreased from 68.0% before the COVID-19 pandemic to 60.1% during the pandemic. The frequency of face-to-face contact to psychotherapists was reduced in 24.8% of all participants receiving psychotherapy. Among patients, who did not use face-to-face psychotherapy prior to the pandemic, 37.8% received psychotherapeutic treatment face-to-face during the pandemic. Strong increases were recorded for the use of videoconference-based psychotherapy (2.2% to 21.8%) and telephone contacts to therapists (2.4% to 18.6%). Mainly unaffected seemed appointments to general practitioners when comparing utilization before and during the pandemic (58.3% vs. 53.4%). Nevertheless, 7.9% stated a reduced frequency of contact. Increases in use rates and usage frequency were also observed for online add-ons and therapeutic smartphone apps.

3.6. Responses as a function of self-report diagnoses

Kruskal-Wallis Tests revealed significant differences between diagnostic groups in the perceived burden associated with contact restrictions, $H(6) = 15.34, p = .018$ (see Table 2). Pairwise comparisons indicated that the perceived burden of contact restrictions was significantly lower for patients with anxiety disorders in contrast to inpatients with AN, bulimia nervosa (BN), and depressive disorders (all $p \leq .05$, see Table 3). Furthermore, diagnostic groups also differed in helpfulness rating for day structure, $H(6) = 22.8, p = .001$ (see Table 2). Pairwise comparisons showed that daily structuring as a potential coping strategy was perceived as significantly more helpful in patients with AN and PTSD compared to depressive disorders and OCD (only compared to AN) (see Table 3). No significant differences between diagnostic groups emerged in any other variable (all $p > .05$, see Table 2.).

3.7. Impact of age

Results indicated significant differences with small effect sizes between adults and adolescents for restricted visiting of older or chronically ill persons, financial worries, worries associated with potential COVID-19 infections, and helpfulness of positive thinking with higher values for adults ($p < .05$). None of the other comparisons reached significance (all $p > .05$) (see Table 4).

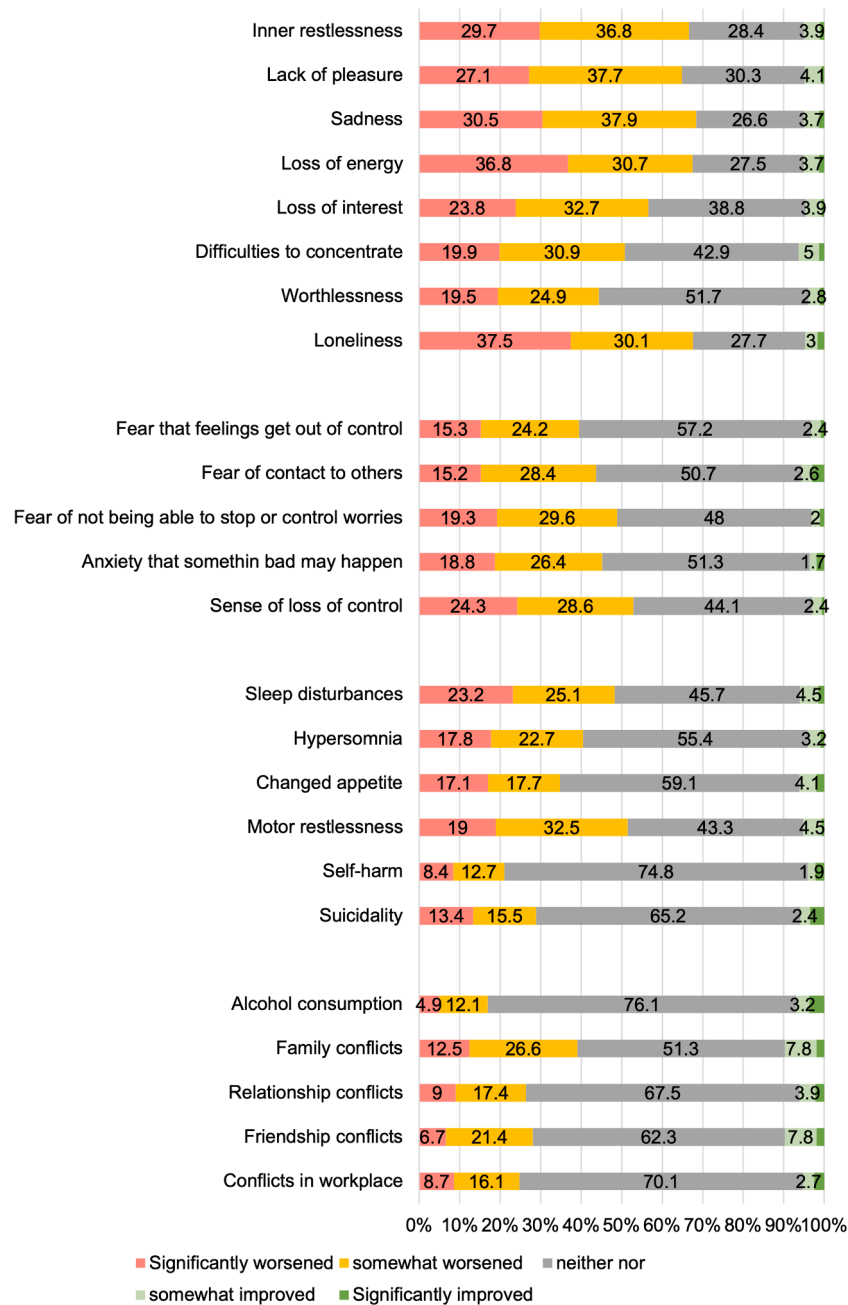


Fig. 6. Changes in psychopathology during the COVID-19 pandemic in patients with mental disorders.

4. Discussion

This is one of the few studies investigating the differential impact of the COVID-19 pandemic in a large sample of inpatients with mental disorders. In agreement with previous studies, we found a high psychological burden by the COVID-19 pandemic in patients with mental disorders in terms of worsening of pre-existing symptoms, but also newly emerging symptoms and substantial treatment impairment. Significant differences between diagnostic groups were found for patients with anxiety disorders, who less frequently reported a burden by contact restrictions compared to patients with depressive disorders and patients with eating disorders. Patients with eating disorders and PTSD reported higher helpfulness ratings of daily structuring than patients with depression and OCD. Patients with AN and depressive disorders most frequently stated symptom deteriorations.

4.1. General impact of the COVID-19 pandemic

Rates of symptom worsening in about half of the participants were in line with previous results in the literature for concurrent existing or a history of mental illness and higher than in the general population (Alonzi et al., 2020; Asmundson et al., 2020; Neelam et al., 2021; Quittkat et al., 2020; Ren et al., 2020; Xiong et al., 2020).

4.2. Perceived burden due to restrictions and worries

Among pandemic-related restrictions, contact restrictions were rated as being highly distressing, highlighting the importance of interpersonal contact in patients with mental disorders. Therefore, the challenging situation of increased social isolation due to contact restrictions should be specifically addressed in the treatment of patients with mental disorders. However, due to a lacking healthy control group, it remains

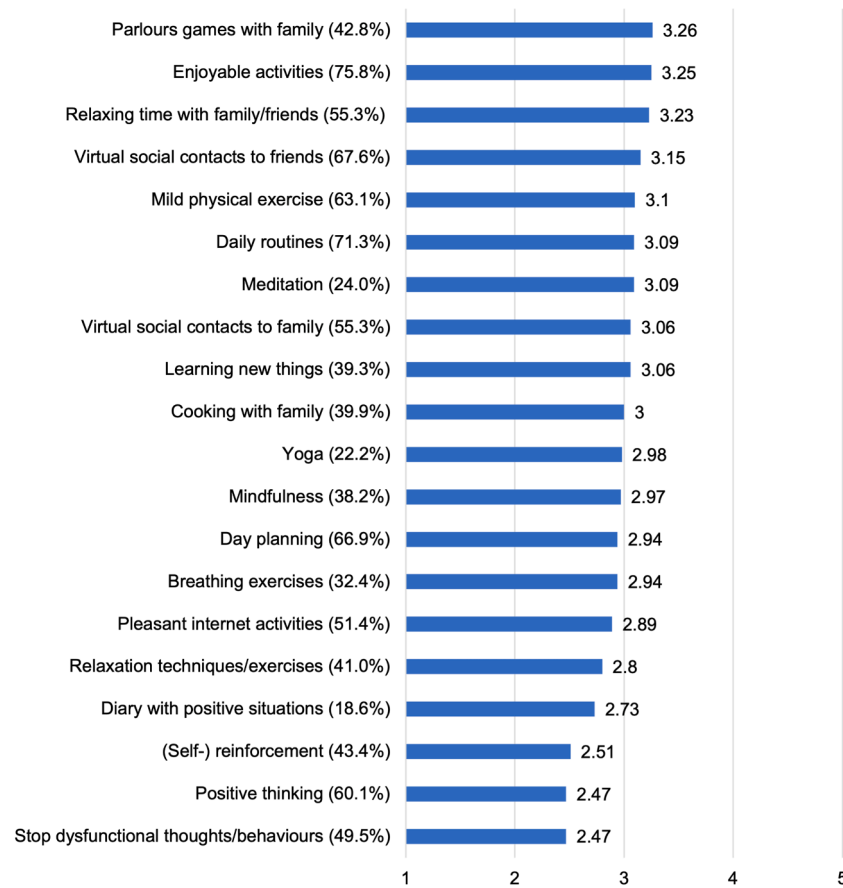


Fig. 7. Means of perceived helpfulness of different coping strategies. Higher scores indicate higher helpfulness. Values in parentheses represent the percentages of patients that used respective strategies.

Table 2
Differential influence of the COVID-19 pandemic in patients with mental disorders between diagnostic groups: results of Kruskal-Wallis tests.

Measure	Depression (n=183)		Anxiety (n=35)		OCD (n=38)		PTSD (n=33)		AN (n=88)		BN (n=30)		BPD (n=20)		H(6)	p	η ²
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD			
Burden by COVID-19 restrictions																	
Hygienic standards	2.64	.85	2.19	.92	2.56	.87	2.69	1.12	2.55	.90	2.34	.73	2.33	.84	12.42	.053	.015
Contact restrictions	3.40	1.23	2.86	1.08	3.32	1.03	3.18	1.39	3.71	.98	3.56	1.07	3.25	1.22	15.34	.018	.022
Visiting restrictions	2.97	1.32	2.67	1.29	3.20	1.27	3.11	1.36	2.86	1.30	2.74	1.07	2.45	1.58	7.18	.304	.003
Burden due to worries																	
Financial worries	2.08	1.23	2.21	1.11	1.96	1.15	2.12	1.46	1.91	1.05	1.93	1.18	2.58	1.52	4.64	.590	.003
COVID-19 infection	3.09	1.11	3.23	1.12	3.04	1.25	3.49	1.22	3.14	1.00	3.08	1.03	2.87	1.06	5.94	.430	.000
Food insecurity	1.79	1.08	2.00	1.21	2.13	1.36	2.12	1.34	2.38	1.38	2.00	1.44	2.05	1.43	11.75	.068	.014
Treatment impairment	2.99	1.22	2.77	1.27	3.14	1.26	3.26	1.41	3.41	1.29	3.35	1.29	3.15	1.62	10.67	.099	.011
Changes in psychopathology																	
Depressive symptoms	3.87	.67	3.66	.68	3.79	.66	3.81	.88	3.94	.67	3.83	.56	3.73	.84	5.34	.501	.002
Somatic symptoms	3.61	.64	3.57	.63	3.52	.57	3.61	.71	3.51	.53	3.43	.49	3.66	.62	3.16	.788	.007
Anxiety	3.58	.61	3.59	.67	3.69	.56	3.61	.82	3.66	.63	3.51	.44	3.39	.72	4.00	.676	.005
Suicidality/self-harm	3.27	.66	3.18	.44	3.22	.49	3.38	.94	3.32	.74	3.27	.57	3.28	.91	3.23	.779	.007
Conflicts	3.34	.56	3.15	.45	3.20	.45	3.48	.69	3.24	.47	3.29	.35	3.25	.60	9.04	.171	.007
Helpfulness of coping strategies																	
Positive thinking	2.25	.90	2.61	.99	2.38	.90	2.60	.97	2.56	.88	2.64	1.10	2.43	1.22	10.73	.097	.013
Day structuring	2.67	1.08	2.98	1.19	2.81	1.11	3.30	1.23	3.37	1.21	2.98	1.16	3.23	1.41	22.8	.001	.048
Pleasant activities	2.82	.90	3.31	1.01	3.01	.91	3.18	.91	3.15	.95	3.04	1.02	2.88	1.18	12.19	.058	.016
Digital social contacts	3.00	1.11	2.91	1.25	3.31	1.13	3.00	1.10	3.14	1.20	3.10	1.28	2.78	1.08	3.96	.683	.006
Mindfulness + meditation	2.85	1.10	2.82	1.04	2.82	.91	3.03	1.16	3.07	1.10	2.86	1.02	2.64	1.10	4.08	.665	.006

Notes: Significant differences between groups with $p < .05$ are boldfaced. Higher ratings indicate higher burden, worsening of symptoms, and higher perceived helpfulness of coping strategies on a 5-point scale with 1 = not burdened/significantly improved/not helpful to 5 = extremely burdened/significantly worsened/very helpful. OCD = obsessive-compulsive disorders, PTSD = posttraumatic stress disorder, AN = anorexia nervosa, BN = bulimia nervosa, BPD = borderline personality disorder.

Table 3
Summary of significant pairwise post-hoc comparisons of diagnostic groups using Dunn's test.

Measure	Comparison	z	p
Contact restrictions	Anxiety vs. AN	-3.67	<.001
	Anxiety vs. BN	-2.40	.016
	Anxiety vs. Depression	2.72	.007
Helpfulness of daily structure	Depression vs. PTSD	-2.47	.013
	Depression vs. AN	-4.40	<.001
	AN vs. OCD	2.27	.023

Notes: All comparisons are significant with $p < .05$. OCD = obsessive-compulsive disorders, PTSD = posttraumatic stress disorder, AN = anorexia nervosa, BN = bulimia nervosa, BPD = borderline personality disorder.

unclear whether the perceived distress by contact restrictions differ from healthy individuals.

4.3. Changes in specific psychopathology due to the COVID-19 pandemic

Worsening of depressive symptoms might be explained by overlapping features of both depressive and pandemic-related social withdrawal, like reduced social contacts, pleasant activities, daily structure, or increased preoccupation with own thoughts and feelings. Comparable to results in the general population, alcohol consumption seems not to be a widespread (dysfunctional) coping strategy (Every-Palmer et al., 2020).

4.4. Usage and perceived helpfulness of coping strategies during the COVID-19 pandemic

In accordance with the high burden of contact restrictions, activities with contact to others (albeit to a limited extent) showed a beneficial effect. The general importance of staying in contact with others to maintain mental health is also emphasized by the fact that virtual social contacts are among the most helpful strategies in our analyses. Patients with mental disorders should be encouraged to fill the gaps created by societal restrictions by regular enjoyable activities to ensure a daily structure.

Table 4
Differential influence of the COVID-19 pandemic in adults and adolescents as a function of age: results of Mann-Whitney-U test.

Measure	Adults (n=436)		Adolescents (n=100)		z	p	r
	M	SD	M	SD			
Burden by COVID-19 restrictions							
Hygienic rules	2.54	.90	2.53	.77	-.287	.774	-.012
Contact restrictions	3.39	1.18	3.36	1.12	-.053	.958	-.002
Visiting restrictions	3.02	1.33	2.57	1.15	-2.217	.027	-.096
Burden due to worries							
Financial worries	2.17	1.25	1.49	.77	-4.721	<.001	-.204
COVID-19 infection	3.24	1.08	2.74	1.08	-3.440	.001	-.149
Food insecurity	2.02	1.26	2.10	1.35	-.348	.728	-.015
Treatment impairment	3.06	1.30	3.22	1.27	.849	.396	.037
Changes in psychopathology							
Depressive symptoms	3.82	.69	3.91	.60	.770	.441	.033
Somatic symptoms	3.56	.63	3.61	.51	.845	.398	.036
Anxiety	3.59	.64	3.60	.54	.483	.629	.021
Suicidality/self-harm	3.24	.65	3.43	.75	2.190	.029	.095
Conflicts	3.30	.56	3.31	.39	.405	.686	.017
Helpfulness of coping strategies							
Positive thinking	2.57	.99	2.26	.82	-2.533	.011	-.119
Daily structuring	3.00	1.19	2.85	1.19	-1.030	.303	-.049
Pleasant activities	3.04	1.00	2.93	.90	-1.051	.293	-.047
Digital contacts	3.11	1.19	3.02	1.17	-.545	.586	-.026
Mindfulness/meditation	2.97	1.06	2.71	1.12	-1.852	.064	-.088

Notes: Significant differences with $p < .05$ between age groups are boldfaced. Ratings on a 5-point scale with 1 = not burdened/significantly improved/not helpful to 5 = extremely burdened/significantly worsened/very helpful.

4.5. Changes in health care utilization due to the COVID-19 pandemic

As a central finding, the number of patients reporting treatment impairment exceeded the number of patients who did not get any treatment during the pandemic, indicating that treatment impairment is probably also related to a reduced frequency or changes in treatment format. Availability and usage of treatment alternatives to traditional face-to-face psychotherapy such as videoconference therapy or other forms of E-Mental health treatment could still be improved to provide appropriate treatment based on individualized needs for all patients.

4.6. Responses as a function of self-reported diagnoses

Patients with anxiety disorders were significantly less affected by contact restrictions, which might be the case because social distancing partially confirmed existing interpersonal anxieties and reinforced behavioral avoidance of feared situations. Burden by contact restrictions could be reduced because it is in line with disorder-specific psychopathology, and patients with anxiety disorders are partly accustomed to reduced contact frequency.

Maintaining regular daily structure seems to be crucial for patients with AN and PTSD. According to qualitative interviews, daily structures were considered essential for regulating dysfunctional emotions, cognitions, and behaviors in eating disorders during the pandemic (Brown et al., 2021). Fernández-Aranda et al. (2020) concluded that times of reduced face-to-face therapy (e.g., lack of weigh-ins) are associated with less everyday structure and require more self-management skills. In case of PTSD, loss of daily structure might be associated with a general sense of loss of control. Identifying subgroups with an increased risk of mental health difficulties is essential to provide additional support and relieve emotional distress.

4.7. Responses as a function of age

Higher financial worries in adults are probably explainable by higher employment rates and personal responsibility to secure livelihood. Perceptions of a lower risk of a severe illness course in case of a COVID-19 infection may contribute to the reduced burden by infection-related worries. Even though not significant, numerically lower helpfulness ratings of coping strategies were observed in adolescents indicating an

increased need for external support.

4.8. Strengths

Results are based on a large sample size including inpatients with mental disorders, treated in six hospitals in Germany during the current COVID-19 pandemic. As a major advantage of our approach, the psychological burden associated with the COVID-19 pandemic can be attributed to specific domains of restrictions, worries, and psychopathology. Similar, perceived helpfulness can be quantified for several different coping strategies and compared between diagnostic groups and adults vs. adolescents to identify subgroup differences.

4.9. Limitations

Due to a lacking healthy control group, no conclusions can be drawn about differences between patients with mental disorders and healthy individuals. All results were based on self-reported data and, thus, may potentially be biased. It cannot be ruled out that other reasons also contributed to the results. There was no standardized assessment of diagnoses or psychopathology. Other limiting factors are the heterogeneity of pandemic risks at times of measurement and differences in imposed pandemic-related restrictions between federal states. During data collection, Germany imposed a societal lockdown with some local differences in restrictions twice (April-May 2020 and November-December 2020), while in between, everyday life was affected by fewer restrictions. Date of participation and location of residents or hospitals were not specifically considered in our analyses, but analyses showed statistical independence of self-report diagnoses and month of participation.

4.10. Future research

Health care utilization of e-mental health should be addressed in future research focusing on possibilities to enhance treatment availability, implementation of low-threshold services and willingness of both therapists and patients to engage in such treatment formats. Comparing psychological consequences of the pandemic to a healthy control group would be of great interest. Longitudinal studies are needed to determine the long-term course and long-lasting psychological consequences of the COVID-19 pandemic. Furthermore, it would be of great importance for future studies to consider also moderating variables and their impact on mental health that were not assessed in the present study such as exposure to restrictions before participation, differences in restriction severity between federal states or passed time since the beginning of the pandemic.

5. Conclusion

In conclusion, our results display a high psychological burden due to the COVID-19 pandemic in a subgroup of patients with a variety of mental disorders, who were admitted to inpatient treatment. About half of the sample experienced symptom deteriorations and nearly a quarter reported a treatment impairment. Especially patients with AN and depressive disorders seem to be more frequently and severely affected compared to other diagnostic groups. The results indicate urgently needed quantitative and qualitative improvements of accessible treatment options during a pandemic for patients with mental disorders to provide additional support during times of limited personal contact.

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CRedit authorship contribution statement

Matthias Favreau: Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing, Visualization. **Andreas Hillert:** Resources, Writing – review & editing. **Bernhard Osen:** Investigation, Data curation, Resources, Writing – review & editing. **Thomas Gärtner:** Investigation, Data curation, Resources, Writing – review & editing. **Sandra Hunatschek:** Investigation, Data curation, Resources, Writing – review & editing. **Moritz Riese:** Investigation, Data curation, Resources, Writing – review & editing. **Karina Hewera:** Investigation, Data curation, Resources, Writing – review & editing. **Ulrich Voderholzer:** Conceptualization, Methodology, Validation, Resources, Writing – review & editing, Supervision, Project administration.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Prof. Dr. Voderholzer receive fees for books, lectures and workshops on psychotherapy and pharmacotherapy. All other authors have no conflicts of interest to declare.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.psychres.2021.114045](https://doi.org/10.1016/j.psychres.2021.114045).

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