Contents lists available at ScienceDirect

Journal of Affective Disorders Reports

Research Paper

The effects of the COVID-19 outbreak and measures in patients with a pre-existing psychiatric diagnosis: A cross-sectional study

Conrad E. Vissink, Hendrika Heiltje van Hell, Niek Galenkamp, Inge Winter van Rossum*

Department of Psychiatry, University Medical Center Utrecht Brain Center, Utrecht University, Heidelberglaan 100, Postal box 5500, A.01.216, Utrecht 3508 GA, the Netherlands

A B S T R A C T

Background COVID-19 has seriously affected physical and mental health world-wide, both due to spreading of the virus and due to the socially restrictive measures most governments have enforced. Increased anxiety, stress and depressive symptoms have been widely reported in the general population. The current study investigated the effects of COVID and the restrictive measures in the Netherlands on stress, anxiety and loneliness in patients with a pre-existing psychiatric disorder. Methods 189 patients with a pre-existing psychiatric disorder treated at the University Medical Center Utrecht (UMCU) provided consent to participate in an electronically provided survey. Questionnaires on anxiety, depressive symptoms, worry, stress and general health were completed by 148 participants. Results All patients reported heightened distress as well as the presence of depressive symptoms and loneliness during the initial phase of the restrictive measures. Patients could be divided into two major subgroups with either psychotic disorder ($n = 71$) and affective disorder ($n = 86$). Patients with affective disorders were more affected by the outbreak and accompanying socially restrictive measures than patients with psychotic disorders. Conclusions Our findings indicate negative mental health effects of the global COVID-19 pandemic and the restrictive measures in a particularly vulnerable population, with differential effects on diagnostic groups.

Introduction

As the virus causing the disease COVID-19 (SARS-CoV-2) has spread world-wide, the scientific community has focused on unraveling the pathology of the virus and developing treatment options as well as a vaccine, while governments have imposed rigorous measures to contain the spread. Social distancing is a core feature of these measures, even though it is widely known that social isolation can lead to loneliness, and both are strongly associated with anxiety, depression, self-harm, and suicide attempts in the general population (Elovainio et al., 2017; Matthews et al., 2019). In most countries, all non-essential businesses have been closed for several weeks to months, which will have a significant and long-term socioeconomic effect, including an increase in unemployment, financial insecurity and poverty (Barr et al., 2012; Brooks et al., 2020; Frasquilho et al., 2016), which in turn will inevitably have serious effects on mental health. Concerns about one's own health or that of loved ones, as well as uncertainty about the future, can also generate or exacerbate fear, depression and anxiety (Fiorillo and Gorwood, 2020). Overall, the COVID-19 outbreak and subsequent measures are expected to be followed by a surge in mental health issues.

An impressive amount of research has already been published on the mental health effects of COVID-19, although most studies focused on the general population, healthcare workers and infected people. These reports consistently show increased depression, anxiety and insomnia in these populations (Hao et al., 2020; Holman et al., 2020; McCracken et al., 2020; Muller et al., 2020; Vindegaard and Benros, 2020). Pre-existing mental health problems showed to be a significant risk factor for presenting with these symptoms in some of these studies (Hao et al., 2020; Holman et al., 2020; McCracken et al., 2020). Even though this population is expected to be more vulnerable to the mental health effects of the COVID-19 outbreak, only a small proportion of studies focus on patients with pre-existing psychiatric diagnoses. Two studies in psychiatric populations in Spain and Denmark, and one study in the US including people with self-reported mental disorders, reported predominantly increased anxiety symptoms (González-Blanco et al., 2020; Liu et al., 2020; Rohde et al., 2020) as well as depression and a two-fold likelihood for Post-Traumatic Stress Disorder (PTSD) (Liu et al., 2020). Multiple studies in patients with Obsessive Compulsive Disorder (OCD) demonstrated a substantial increase in obsessions and compulsions since the outbreak (Benatti et al., 2020; Davide et al., 2020; Sulaimani and Bagadood, 2020). In contrast, the outbreak and measures did not impact the mental wellbeing of elderly patients with major depression disorder or patients with borderline disorder (Álvaro et al., 2020; Hamm et al., 2020).

---

* Corresponding author.
  E-mail address: i.winter@umcutrecht.nl (I.W. van Rossum).

Overall, our knowledge on the effects of the COVID-19 outbreak and measures on pre-existing psychiatric symptomatology is currently limited, nor is it known whether people with specific psychiatric diagnoses suffer disproportionally. The current study aims to explore the effects of the COVID-19 outbreak and measures in patients with pre-existing psychiatric disorders. To our knowledge, this is the first study to report on the mental health effects on patients with pre-existing psychotic disorders.

Methods

Study design

A cross-sectional design was used to explore the effects of the COVID-19 outbreak and governmental measures on the mental well-being of patients with a pre-existent psychiatric disorder. Data was gathered between May 15 to September 2, 2020, using a one-time assessment through an online 30-minute survey. The restrictive measures issued by the Dutch government between March 16 and September 2 were described as an intelligent lockdown. From 16 March, the schools and child day care were closed, people with non-essential jobs were asked to work from home or not at all, and non-essential shops and restaurants were closed. No physical visits were allowed between households. Per 19 May, measures were slowly released; shops and restaurants were re-opened, primary and secondary schools reopened beginning of June and physical visits were allowed up to a number of four adults from different households, provided that a distance of 1.5 m was always maintained between people over 11 years of age. The study followed the ethical principles of the World Medical Association Declaration of Helsinki (2020).

Study population

Survey invitations were sent out electronically to all patients who had signed broad consent at the Department of Psychiatry of the University Medical Center Utrecht (UMCU), the Netherlands. These patients were currently in treatment, had been so in the past, visited for a second opinion, or had participated in other research projects at the UMCU. Through this broad consent, patients had provided permission to be approached for participation in future scientific research and to keep a limited amount of data on file (e.g., name, contact information, diagnosis) in order to facilitate the process of contacting patients for this purpose. In order to be eligible to participate in this study, a subject had to be 16 years or older, have a confirmed psychiatric diagnosis and provide informed consent for the current study.

Assessments

To capture plausible effects of the COVID-19 outbreak and measures on mental well-being, a survey was sent out consisting of a wide array of questionnaires. Anxiety and depression symptoms were measured through the 21-item Beck Anxiety Inventory (BDI) (Beck et al., 1988) and the 21-item Beck Depression Inventory (Beck et al., 1996), respectively. The 16-item Penn State Worry Questionnaire (Meyer et al., 1990) was used to assess worry, while perceived stress was measured through the 20-item checklist for Post-Traumatic Stress Disorder derived from DSM-V (PCL-5) (Boeschoten et al., 2014) as well as the 10-item Perceived Stress Scale (PSS) (Cohen et al., 1983). PTSD indication was derived from the PCL-5. The 6-item De Jong-Loneliness scale was used to assess overall, emotional and social loneliness (Gierveld and Tilburg, 2006), categorizing the total loneliness score into four levels: 1) not lonely (score 0–2), 2) moderate lonely (score 3–8), 3) severe lonely (score 9–10) and 4) very severe lonely (score 11 or higher). Participants were instructed before every questionnaire to answer all questions based on their current status and the period since the COVID-19 outbreak and

accompanying restrictive measures implemented mid March 2020 in the Netherlands.

Drug and alcohol use since the COVID-19 outbreak, as well as changes in use relative to the period before the outbreak, were assessed through an abbreviated version of the WHO-ASSIST questionnaire (Group, 2002). Changes in general health since the outbreak, relative to the period pre-COVID, was assessed with the General Health Questionnaire (Goldberg and Hillier, 1979). A general socio-demographics section consisted of questions about demographics, whether or not the subject was in treatment for their psychiatric illness at the time of assessment and the extent of exposure to COVID-19. Finally, participants were asked which effect the COVID outbreak and measures have had on the quality of their mental health, sleep and life in general.

Statistical analysis

Statistical analyses were performed using software of IBM SPSS Statistics for Windows, version 25.0. $P < 0.05$ was regarded as statistically significant. Mean, standard deviation and frequency values were used for descriptive statistics. Statistical differences of sample characteristics were tested with ANOVA, for continuous data, and Fisher's exact Chi-square ($\chi 2$) test for categorical data. Differences in questionnaire scorings were detected with one-way analyses of covariance (ANCOVA), statistically controlling for age. Bonferroni correction was applied on the latter statistical tests, to correct for multiple testing.

Results

Patients were invited for participation between May 15 and September 2, 2020. The final questionnaire was completed on August 25, 2020. Out of the 596 patients who were invited to participate, 189 (32%) patients signed informed consent and started the assessment. Only 29 patients were still under active treatment at the hospital at the time the pandemic started. The survey was completed by 146 (77%) participants. Baseline characteristics for the whole sample are provided in Table 1. The two largest subgroups, based on DSM diagnoses, were patients with a psychotic disorder ($n = 71$) and those with an affective disorder (depression or anxiety; $n = 86$). Smaller subgroups consisted of patients with a developmental disorder ($n = 15$), a personality disorder ($n = 4$) and a group with a variety of other DSM-V diagnoses ($n = 13$). As the three latter groups are relatively small, comparisons between groups focused on the two largest subgroups.

The mean age of the sample was 39.7 (SD 14.5), with patients with a psychotic disorder (PD) being significantly younger than those with an affective disorder (AD; $p = 0.011$). In the latter group, 45% of the patients was male, compared to 59% in the psychotic disorder group.

Denominators change because of incomplete data. Data are mean (SD) or n/N (%). *data missing for 7 participants (n per group: 1 psychotic disorder, 2 affective disorder, 1 developmental disorder, 3 other diagnoses); ** data missing for 42 participants (n per group: 19 psychotic disorder, 16 affective disorder, 4 developmental disorder, 1 personality disorder, 2 other diagnoses); *** data missing for 41 participants (n per group: 18 psychotic disorder, 16 affective disorder, 4 developmental disorder, 1 personality disorder, 2 other diagnoses).

The results regarding general health, depression and worry are provided in Table 2. For all subgroups of patients, general health has deteriorated since the COVID outbreak and measures, indicated by a mean score exceeding the threshold for 'heightened distress' of 24 or higher. Patients with affective disorder scored significantly higher compared to patients with psychotic disorder, providing an indication of somatic symptoms, anxiety, insomnia, social dysfunction and depression ($p < 0.001$). Depressive symptoms were present in all subgroups: mean scores on the BDI indicate that the patients with psychotic disorder and the group with 'other psychiatric disorders' suffered from mild depression, while the patients with affective disorder, a developmental disorder or a personality disorder suffered from moderate depression. Com-

Table 1

Characteristics for the complete sample and subgroups.

	All (n = 189)	Psychotic disorder (n = 71)	Affective disorder (n = 86)	Developmental disorder (n = 15)	Personality disorder (n = 4)	Other diagnoses (n = 13)
Age	39.9 (14.5)	38.4 (11.7)	44.2 (15.6)	28.7 (13.0)	34.8 (17.2)	32.8 (12.3)
Gender*						
Women	84/189 (46%)	29/71 (41%)	46/86 (53%)	3/15 (20%)	1/4 (25%)	5/13 (38%)
Men	105/189(54%)	42/71 (59%)	40/86 (47%)	12/15 (80%)	3/4 (75%)	8/13 (62%)
Highest Education** Primary school	2/147 (1%)	0 (0%)	1/70 (1%)	0 (0%)	0 (0%)	1/11 (9%)
Secondary school	39/147 (27%)	19/52 (37%)	16/70 (23%)	2/11 (18%)	1/3 (33%)	1/11 (9%)
College/University	105/147 (71%)	32/52 (62%)	53/70 (76%)	9/11 (82%)	2/3 (67%)	9/11 (82%)
No education	1/147 (1%)	1/52 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Relationship status*** Single	58/148 (39%)	28/53 (53%)	21/70 (30%)	2/11 (18%)	1/3 (33%)	6/11 (55%)
In a relationship	69/148 (47%)	20/53 (38%)	37/70 (53%)	6/11 (55%)	1/3 (33%)	5/11 (45%
Divorced/widow	18/148 (12%)	4/53 (8%)	10/70 (14%)	3/11 (27%)	1/3 (33%)	0 (0%)
Other	3/148 (2%)	1/53 (2%)	2/70 (3%)	0 (0%)	0 (0%)	0 (0%)
Living environment** Alone	63/147 (43%)	28/53 (53%)	28/70 (40%)	2/10 (20%)	2/3 (67%)	3/11 (27%)
With family/partner/ roommate(s)/other	84/147 (57%)	25/53 (47%)	42/70 (60%)	8/10 (80%)	1/3 (33%)	8/11 (73%)
Work*** Full time / part time	50/148 (34%)	16/53 (30%)	21/70 (30%)	6/11 (55%)	0 (0%)	7/11 (64%)
Looking for work	11/148 (7%)	6/53 (11%)	4/70 (6%)	1/11 (9%)	0 (0%)	0 (0%)
Homemaker	10/148 (7%)	5/53 (9%)	4/70 (6%)	0 (0%)	0 (0%)	1/11 (9%)
Student	8/148 (5%)	3/53 (6%)	5/70 (7%)	0 (0%)	0 (0%)	0 (0%)
Retired	7/148 (5%)	1/53 (2%)	5/70 (7%)	1/11 (9%)	0 (0%)	0 (0%)
Other	62/148 (42%)	22/53 (42%)	31/70 (44%)	3/11 (27%)	3/3 (100%)	3/11 (27%)

Table 2

General health, depression and worry for the complete sample and subgroups.

	All (n = 189)	Psychotic disorder (n = 71)	Affective disorder (n = 86)	Developmental disorder (n = 15)	Personality disorder (n = 4)	Other diagnoses (n = 13)
General Health Questionnaire*	29.5 (11.2)	24.8 (10.1)	33.1 (10.6)	29.8 (12.9)	38.0 (7.9)	26.8 (10.6)
Beck Depression Inventory**	16.6 (14.4)	11.4 (12.8)	20.9 (14.6)	17.5 (14.0)	22.0 (3.5)	12.1 (15.1)
Penn State Worry Questionnaire#	35.6 (13.2)	27.3 (11.9)	35.9 (13.3)	36.3 (13.3)	38.7 (10.7)	30.8 (12.2)

pared to the psychotic disorder subgroup, patients with affective disorder had significantly more severe depressive symptoms ($p<0.001$). The mean score of all subgroups fell in the lowest category of worry on the Penn State Worry Questionnaire, although affective disorder patients scored significantly higher within this category compared to psychotic disorder patients ($p<0.001$), approaching the lower limit of the category 'moderate worry'.

Data are mean (SD). General Health Questionnaire: score ranges from 0 to 84, higher scores indicate more distress, threshold for increased distress is 24 or higher. Beck Depression Inventory: scores ranges from 0 to 63; score 0–9 = none to minimal symptoms, 10–16 = mild depression, 17–29 = moderate depression, 30–63 = severe depression. Penn State Worry Questionnaire: scores ranges from 16 to 80; score 16–39 = low worry, 40–59 = moderate worry, 60–80 = high worry. *assessments of 33 participants are missing (n per group: 17 psychotic disorder, 12 affective disorder, 2 developmental disorder, 1 personality disorder, 1 other diagnoses); **assessments of 35 participants are missing (n per group: 17 psychotic disorder, 14 affective disorder, 2 developmental disorder, 1 personality disorder, 1 other diagnoses); #assessments of 41 participants missing (n per group: 18 psychotic disorder, 16 affective disorder, 4 developmental disorder, 1 personality disorder, 2 other diagnoses).

Scores reflecting the presence of anxiety-related symptoms are provided in Table 3. Anxiety symptoms were limited in most subgroups: mean scores on the BAI indicate that the patients in the psychotic disorder, affective disorder, developmental disorder and 'other diagnoses' subgroups suffer from a low level of anxiety, in contrast to patients with a personality disorder, who suffer from anxiety symptoms of mod-

erate severity. Although affective disorder and psychotic disorder patients both show mild anxiety symptoms, affective disorder patients suffer from slightly more severe symptoms ($p<0.009$). This pattern in BAI scores is reflected in the scores on the PCL-5; affective disorder patients suffered from more severe PTSD-related symptoms since the COVID outbreak compared to the psychotic disorder subgroup ($p<0.045$), while patients with a personality disorder have a relatively high mean score of 37.3. Initial research suggests that a PCL-5 cutoff score between 31 and 33 is indicative of probable PTSD, which is reflected in the relatively high percentage of patients with a personality disorder who indeed meet the DSM-V diagnostic criteria as derived from the PLC-5 (25%).

Data are mean (SD). Beck Anxiety Inventory: score ranges from 0–63; score of 0–21 = low anxiety, 22–35 = moderate anxiety, 36 and above = potentially concerning levels of anxiety. PCL-5 = Post-traumatic stress disorder Check List DSM-V: score ranges from 0–80; a minimum score on a combination of pre-defined items are required for a PTSD DSM-5 diagnosis. *assessments of 32 participants are missing (n per group: 16 psychotic disorder, 12 affective disorder, 2 developmental disorder, 1 personality disorder, 1 other diagnoses); **assessments of 39 participants are missing (n per group: 18 psychotic disorder, 14 affective disorder, 4 developmental disorder, 1 personality disorder, 2 other diagnoses); #based on the PLC-5.

The extent of social support and loneliness is summarized in Table 4. The mean scores of the affective disorder and psychotic disorder patients on the Perceived Social Support scale indicate that, in the patient's perception, social support has slightly increased relative to the period before the COVID outbreak and measures, as indicated by a mean total score below 10. The perceived increase in social support is larger for pa-

Table 3

Anxiety and PTSD for the complete sample and subgroups.

	All (n = 189)	Psychotic disorder (n = 71)	Affective disorder (n = 86)	Developmental disorder (n = 15)	Personality disorder (n = 4)	Other diagnoses (n = 13)
Beck Anxiety Inventory *	13.5 (10.2)	11.0 (10.3)	15.7 (9.8)	13.3 (8.1)	24.0 (12.8)	8.3 (9.0)
PCL-5**	18.5 (15.9)	15.1 (14.9)	20.5 (15.3)	21.8 (18.3)	37.3 (23.3)	13.8 (17.0)
PTSD indication#	13.2%	8.5%	16.3%	13.3%	25.0%	15.4%

Table 4

Social support and loneliness for the complete sample and subgroups.

	All (n = 189)	Psychotic disorder (n = 71)	Affective disorder (n = 86)	Developmental disorder (n = 15)	Personality disorder (n = 4)	Other diagnoses (n = 13)
PSS*	9.3 (3.5)	7.9 (3.4)	9.7 (3.3)	10.2 (2.2)	15.0 (4.6)	10.7 (4.3)
Loneliness*#	3.0 (2.1)	2.5 (2.1)	3.3 (2.1)	3.8 (2.0)	5.0 (1.7)	3.1 (2.5)
Lonely	56/148 (38%)	24/53 (45%)	27/72 (38%)	3/11 (27%)	0	1/11 (9%)
Quite lonely	18/148 (12%)	6/53 (11%)	7/72 (10%)	3/11 (27%)	1/3 (33%)	2/11 (18%)
Severely lonely	32/148 (22%)	5/53 (9%)	19/72 (26%)	3/11 (27%)	2/3 (67%)	3/11 (27%)

*assessments of 41 participants are missing (n per group: 18 psychotic disorder, 14 affective disorder, 4 developmental disorder, 1 personality disorder, 2 other diagnoses). PSS=Perceived Social Support; lower score indicates an increase in social support, score ranges from 5–25. A score below 10 indicates an increase in perceived social support. #As measured through the De Jong Loneliness Scale; a higher score indicates more loneliness, score ranges from 0 to 6.
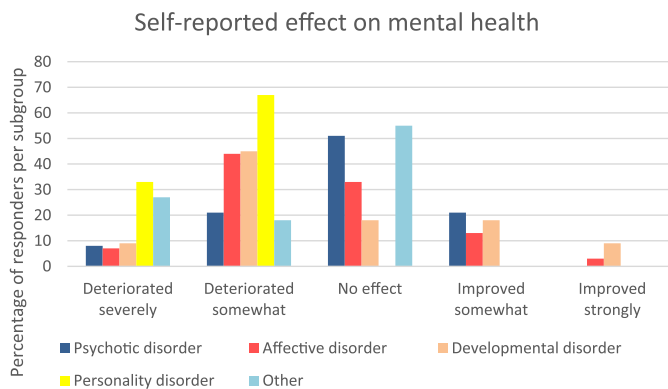

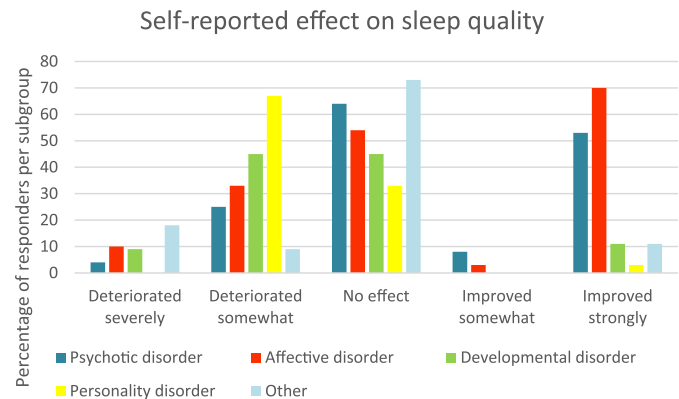**Fig. 1.** Self-reported effects on mental health, per subgroup.

Fig. 2. Self-reported effect on sleep quality per subgroup.

Fig. 3. Self-reported general effect on the subject's quality of life per subgroup.

tients with psychotic disorder compared to those with affective disorder ($p = 0.012$). Social support has decreased in the perception of patients with a developmental disorder, personality disorder or one of the other DSM-V diagnosis, as illustrated by a score above 10. Various degrees of loneliness were reported in all diagnostic subgroups (Table 4). Although affective disorder participants reported loneliness more frequently compared to psychotic disorder patients (74% versus 65%, respectively) and in a higher intensity (mean score 3.3 versus 2.5, respectively), this difference was not significant. Twenty-six percent of the affective disorder patients reported severe loneliness, versus 9% of the psychotic disorder participants.

Changes in substance use since the COVID-19 outbreak, relative to the period preceding COVID, are presented in Table 5. Overall, only a small proportion of both psychotic disorder and affective disorder patient groups have increased their frequency of use of all types of substances; the majority of these subgroups have kept their substance use at the same level or even reduced the frequency.

148 subjects answered questions about the impact of the COVID outbreak and measures on their mental health as well as the quality of sleep and their life in general; these results are shown in Figs. 1–3. Patients with an affective disorder indicated to be more negatively affected compared to patients with a psychotic disorder ($p = 0.046$). There was no difference in sleep quality between groups and the effect on the quality of life in general was also comparable between patients with psychotic and those with affective disorder.
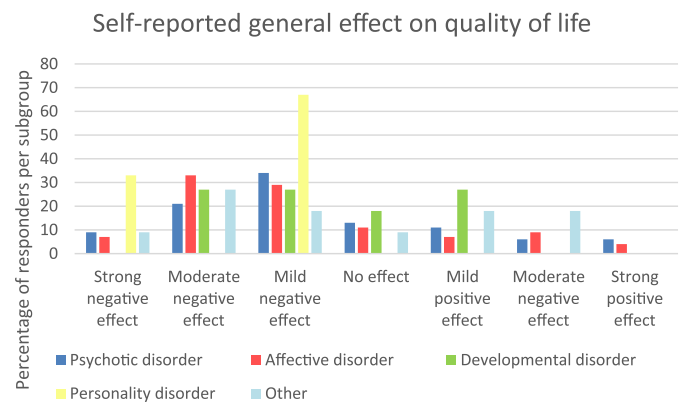
Discussion

The COVID-19 outbreak and the subsequent restrictive measures taken in the Netherlands to prevent the spread, have negatively affected mental health and wellbeing in a particularly vulnerable population of patients with a pre-existing psychiatric diagnosis. Specifically, patients reported a deterioration in general health and mental health, as well as the presence of depressive symptoms and loneliness, with differential

Table 5
Change in substance use in the complete sample and subgroups.

	Lifetime users (n)	Psychotic disorder		Affective disorder		Developmental disorder		Personality disorder		Other diagnoses	
		Current users (n)	Using less/same as before/more since COVID outbreak (% of current users)	Current users (n)	Using less/same as before/more since COVID outbreak (% of current users)	Current users (n)	Using less/same as before/more since COVID outbreak (% of current users)	Current users (n)	Using less/same as before/more since COVID outbreak (% of current users)	Current users (n)	Using less/same as before/more since COVID outbreak (% of current users)
Tobacco	77/148 (52%)	19	26/42/32	20	30/50/20	3	33/67/0	1	0/0/100	6	17/33/50
Alcohol	115/148 (78%)	32	19/66/16	47	21/62/17	9	33/22/44	2	0/0/100	7	14/71/14
Cannabis	59/148 (40%)	9	22/67/11	12	50/42/8	3	0/67/33	-	-	2	0/50/50
Cocaine	24/148 (16%)	3	67/0/33	1	0/100/0	-	-	-	-	-	-
Amphetamine	36/148 (24%)	5	60/40/0	2	0/50/50	1	0/100/0	-	-	-	-
Inhalation substances	15/148 (10%)	2	100/0/0	1	100/0/0	-	-	-	-	-	-
Calming drugs	58/148 (39%)	13	30/54/15	24	13/54/33	-	-	2	0/100/0	2	0/100/0
Hallucinogenic	28/148 (19%)	4	75/25/0	1	100/0/0	-	-	-	-	1	0/0/100
Opioids	15/148 (10%)	3	67/0/33	5	20/60/20	-	-	-	-	1	100/0/0
Other	8/148 (5%)	3	33/33/33	2	0/50/50	-	-	-	-	-	-

*assessments of 41 participants are missing (n per group: 18 psychotic disorder, 16 affective disorder, 4 developmental disorder, 1 personality disorder, 2 other diagnoses). Data was collected through the WHO.
ASSIST = The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST).

effects on diagnostic groups; the impact of the outbreak and measures were most notable for patients with affective disorder.

As depressive and anxiety symptoms are key features of affective disorders, and worry is closely related, the finding that these symptoms were more pronounced in affective disorder patients compared to psychotic disorder patients was not unexpected. However, affective disorder patients did experience a larger deterioration in general health compared to patients with a psychotic disorder, suggesting a larger (negative) impact on overall wellbeing. This finding may be closely related to our results on perceived social support and loneliness; whereas patients with psychotic disorder experienced an increase in perceived social support, this remained unchanged relative to pre-COVID in affective disorder patients. While 20% of the psychotic disorder patients indicated to be quite or severely lonely, this proportion was almost double for patients with affective disorder (36%). Past research demonstrates that, for affective disorder as well as psychotic disorder, higher levels of perceived social support are associated with better outcomes; patients with psychotic disorder were less likely to relapse within 6 and 12-month follow-up periods when their relatives were rated high on 'expressed emotion warmth', or when they perceived more positive affect from their family, which sustained after controlling for baseline symptoms, substance use and employment status (Lee et al., 2014). Patients with depression who perceive their social support as poorer have worse outcomes in terms of symptoms, recovery and social functioning (Wang et al., 2018). Loneliness has been investigated less extensively compared to perceived social support; the available evidence suggests that greater loneliness predicts poorer depression outcome, while a review on the effect of loneliness in psychotic disorders demonstrated a significant positive association between loneliness and psychotic symptom severely and it was suggested that a decrease in loneliness may aid subsequent recovery (Michalska da Rocha et al., 2018). While social support and loneliness are exactly the most challenging aspects of the current pandemic, where social distancing is a key feature, healthcare professionals could consider involving family members in their contact with affective disorder patients more extensively and focus on the importance of social support and loneliness during the current pandemic.

Even though the subgroup of patients with personality disorder was very small, it appeared to be a relatively vulnerable group due to depression and anxiety symptoms of moderate severity as well as a high percentage of patients meeting DSM-V criteria for PTSD, combined with a decrease in perceived social support. All subjects reported a moderate to severe deterioration in mental health since the outbreak. This conflicts with the only study available focusing on personality disorder, where 55 patients with a borderline personality disorder did not seem to be impacted by the outbreak or measures. However, these patients were provided with 7 cognitive behavioral therapy sessions over the phone during the 2.5 month lockdown period before the impact was assessed, which may suggest an effective way to bridge a lockdown while minimizing any impact on wellbeing.

Overall, our findings suggests that the COVID outbreak and measures impacts people with a pre-existing psychiatric diagnosis substantially, differentially affecting diagnostic groups. To our knowledge, our study is the first to report on patients with a psychotic disorder. Our findings substantiate the position papers of international groups of experts that call for prioritizing the collection of high-quality data in patients with pre-existing psychiatric problems as well as developing ways to mitigate mental health consequences for these groups under pandemic conditions (Holmes et al., 2020; Moreno et al., 2020).

Our results should be interpreted while taking into consideration certain limitations. One important limitation of the current study is the absence of healthy controls, especially given that the COVID-19 outbreak and the restrictive measures appears to have a significant effect on mental wellbeing of the general population as well. Additionally, patients answered the questionnaires only once during the pandemic and were asked to provide information since the start of the pandemic and restrictive measures were instigated; unfortunately, data on symptom

severity pre-pandemic were not available. Another limitation is the setting of the study; as UMCU is an academic hospital, our patient population may present with more complex symptomatology, which could affect generalizability of our findings. Also, although the size of the affective disorder and psychotic disorder subgroups was reasonable, this was not the case for the subgroups, preventing any clear conclusions to be drawn for personality disorders, developmental disorders and any other psychiatric diagnosis. Finally, our one-time assessment provided little information on the pre-COVID symptomatology of our participants. Despite these limitations, our findings indicate that COVID has had a substantial impact on mental wellbeing in this particular population; more robust studies are urgently needed to explore this further. Given the extended presence of COVID in societies worldwide, and the repeated re-introduction of measures to contain the spread, long-term mental health effects on the general population and in particular the vulnerable population of psychiatric patients should be continuously measured and monitored throughout the pandemic.

In conclusion, our findings indicate negative mental health effects of the global COVID-19 pandemic and the restrictive measures in a particularly vulnerable population, with differential effects on diagnostic groups.

References

Álvaro, F., Navarro, S., Palma, C., Farriols, N., Aliaga, F., Solves, L., Hernández, M., Antón, M., Riera, A., 2020. Clinical course and predictors in patients with borderline personality disorder during the COVID-19 outbreak: a 2.5-month naturalistic exploratory study in Spain. Psychiatry Res. 292, 113306.

Barr, B., Taylor-Robinson, D., Scott-Samuel, A., McKee, M., Stuckler, D., 2012. Suicides associated with the 2008-10 economic recession in England: time trend analysis. BMJ: Br. Med. J. 345, e5142.

Beck, A.T., Epstein, N., Brown, G., Steer, R.A., 1988. An inventory for measuring clinical anxiety: psychometric properties. J. Consult. Clin. Psychol. 56, 893–897.

Beck, A.T., Steer, R.A., Brown, G., 1996. Beck depression inventory–II. Psychol. Assess.

Benatti, B., Albert, U., Maina, G., Fiorillo, A., Celebre, L., Girone, N., Fineberg, N., Bramante, S., Rigardetto, S., Dell'Osso, B., 2020. What happened to patients with obsessive compulsive disorder during the COVID-19 pandemic? A multicentre report from tertiary clinics in Northern Italy. Front Psychiatry 11.

Boeschoten, M.A., Bakker, A., Jongedijk, R.A., Olff, M., 2014. PTSD Checklist for DSM-5–Nederlandstalige versie. Uitgave: Stichting Centrum '45. Arq Psychotrauma Expert Groep, Diemen.

Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., Rubin, G.J., 2020. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. The Lancet 395, 912–920.

Cohen, S., Kamarck, T., Mermelstein, R., 1983. A global measure of perceived stress. J. Health Soc. Behav. 385–396.

Davide, P., Andrea, P., Martina, O., Andrea, E., Davide, D., Mario, A., 2020. The impact of the COVID-19 pandemic on patients with OCD: effects of contamination symptoms and remission state before the quarantine in a preliminary naturalistic study. Psychiatry Res. 291, 113213.

Elovainio, M., Hakulinen, C., Pulkki-Råback, L., Virtanen, M., Josefsson, K., Jokela, M., Vahtera, J., Kivimäki, M., 2017. Contribution of risk factors to excess mortality in isolated and lonely individuals: an analysis of data from the UK Biobank cohort study. Lancet Public Health 2, e260–e266.

Fiorillo, A., Gorwood, P., 2020. The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. Eur. Psychiatry 63, e32 -e32.

Frasquilho, D., Matos, M.G., Salonna, F., Guerreiro, D., Storti, C.C., Gaspar, T., Caldas-de-Almeida, J.M., 2016. Mental health outcomes in times of economic recession: a systematic literature review. BMC Public Health 16, 115.

Giervel, J.D.J., Tilburg, T.V., 2006. A 6-item scale for overall, emotional, and social loneliness: confirmatory tests on survey data. Res. Aging 28, 582–598.

Goldberg, D.P., Hillier, V.F., 1979. A scaled version of the General Health Questionnaire. Psychol. Med. 9, 139–145.

González-Blanco, L., Santo, Dal, F., García-Álvarez, L., de la Fuente-Tomás, L., Moya Lacasa, C., Paniagua, G., Sáiz, P.A., García-Portilla, M.P., Bobes, 2020. COVID-19 lockdown in people with severe mental disorders in Spain: do they have a specific psychological reaction compared with other mental disorders and healthy controls? Schizophrenia Res.

Group, W.A.W., 2002. The alcohol, smoking and substance involvement screening test (ASSIST): development, reliability and feasibility. Addiction 97, 1183–1194.

Hamm, M.E., Brown, P.J., Karp, J.F., Lenard, E., Cameron, F., Dawdani, A., Lavretsky, H., Miller, J.P., Mulsant, B.H., Pham, V.T., Reynolds, C.F., Roose, S.P., Lenze, E.J., 2020. Experiences of American older adults with pre-existing depression during the beginnings of the COVID-19 pandemic: a multicity, mixed-methods study. Am. J. Geriatric Psychiatry 28, 924–932.

Hao, F., Tan, W., Jiang, L., Zhang, L., Zhao, X., Zou, Y., Hu, Y., Luo, X., Jiang, X., McIntyre, R.S., Tran, B., Sun, J., Zhang, Z., Ho, R., Ho, C., Tam, W., 2020. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. Brain Behav. Immun. 87, 100–106.

Holman, E.A., Thompson, R.R., Garfin, D.R., Silver, R.C., 2020. The unfolding COVID-19 pandemic: a probability-based, nationally representative study of mental health in the U.S. Sci. Adv. eabd5390.

Holmes, E.A., O'Connor, R.C., Perry, V.H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Silver, R.C., Everall, I., 2020. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. The Lancet Psychiatry.

Lee, G., Barrowclough, C., Lobban, F., 2014. Positive affect in the family environment protects against relapse in first-episode psychosis. Soc. Psychiatry Psychiatr. Epidemiol. 49, 367–376.

Liu, C.H., Stevens, C., Conrad, R.C., Hahm, H.C., 2020. Evidence for elevated psychiatric distress, poor sleep, and quality of life concerns during the COVID-19 pandemic among U.S. young adults with suspected and reported psychiatric diagnoses. Psychiatry Res. 292, 113345.

Matthews, T., Danese, A., Caspi, A., Fisher, H.L., Goldman-Mellor, S., Kepa, A., Moffitt, T.E., Odgers, C.L., Arseneault, L., 2019. Lonely young adults in modern Britain: findings from an epidemiological cohort study. Psychol. Med. 49, 268–277.

McCracken, L.M., Badinlou, F., Buhrman, M., Brocki, K.C., 2020. Psychological impact of COVID-19 in the Swedish population: depression, anxiety, and insomnia and their associations to risk and vulnerability factors. Eur. Psychiatry 63, e81.

Meyer, T.J., Miller, M.L., Metzger, R.L., Borkovec, T.D., 1990. Development and validation of the penn state worry questionnaire. Behav. Res. Ther. 28, 487–495.

Michalska da Rocha, B., Rhodes, S., Vasilopoulou, E., Hutton, P., 2018. Loneliness in psychosis: a meta-analytical review. Schizophr. Bull. 44, 114–125.

Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., Cannon, M., Correll, C.U., Byrne, L., Carr, S., Chen, E.Y.H., Gorwood, P., Johnson, S., Kärkkäinen, H., Krystal, J.H., Lee, J., Lieberman, J., López-Jaramillo, C., Männikkö, M., Phillips, M.R., Uchida, H., Vieta, E., Vita, A., Arango, C., 2020. How mental health care should change as a consequence of the COVID-19 pandemic. Lancet Psychiatry 7, 813–824.

Muller, A.E., Hafstad, E.V., Himmels, J.P.W., Smedslund, G., Flottorp, S., Stensland, S., Stroobants, S., Van de Velde, S., Vist, G.E., 2020. The mental health impact of the covid-19 pandemic on healthcare workers, and interventions to help them: a rapid systematic review. Psychiatry Res. 293, 113441.

Rohde, C., Hougaard Jefsen, O., Noerremark, B., Aalkjaer Danielsen, A., & Dinesen Østergaard, S. (2020). Psychiatric symptoms related to the COVID-19 pandemic. medRxiv, 2004.16.20067744.

Sulaimani, M.F., Bagadood, N.H., 2020. Implication of coronavirus pandemic on obsessive-compulsive-disorder symptoms. Rev. Environ. Health.

Vindegaard, N., Benros, M.E., 2020. COVID-19 pandemic and mental health consequences: systematic review of the current evidence. Brain Behav. Immun. 89, 531–542.

Wang, J., Mann, F., Lloyd-Evans, B., Ma, R., Johnson, S., 2018. Associations between loneliness and perceived social support and outcomes of mental health problems: a systematic review. BMC Psychiatry 18, 156.

World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects, 2021. JAMA 310, 2191–2194.