Disclaimer: The findings and conclusions of this study are those of the authors and do not necessarily reflect the views of the National Institute on Drug Abuse of the National Institutes of Health and the US Department of Health and Human Services.

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Posttraumatic Stress Disorder in Patients After Severe COVID-19 Infection

Posttraumatic stress disorder (PTSD) may occur in individuals who have experienced a traumatic event. Previous coronavirus epidemics were associated with PTSD diagnoses in postillness stages, with meta-analytic findings indicating a prevalence of 32.2% (95% CI, 23.7-42.0).[1] However, information after severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is piecemeal. We aimed at filling this gap by studying a group of patients with coronavirus disease 2019 (COVID-19) who sought treatment at the emergency department, most of whom required hospitalization, eventually recovered, and were subsequently referred to a postacute care service for multidisciplinary assessment.

Methods | A total of 381 consecutive patients who presented to the emergency department with SARS-CoV-2 and recovered from COVID-19 infection were referred for a postrecovery health check to a postacute care service established April 21, 2020, at the Fondazione Policlinico Universitario Agostino Gemelli IRCCS in Rome, Italy. Patients were offered a comprehensive and

Table. Characteristics of Patients With and Without Posttraumatic Stress Disorder (PTSD) After Severe Coronavirus Disease 2019 (COVID-19)

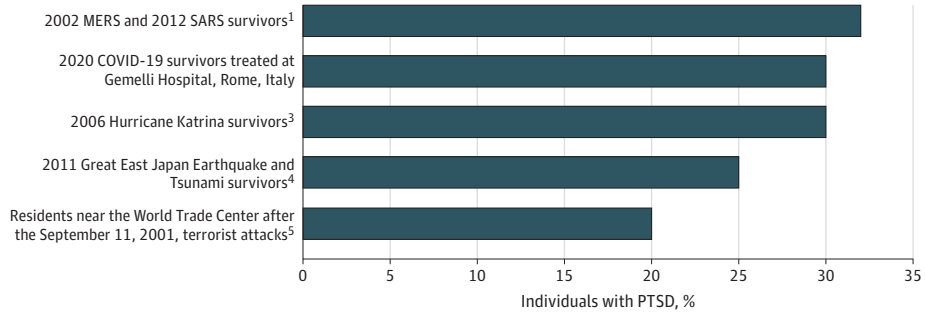
Characteristic	No. (%; 95% CI) Total (N = 381)	Without PTSD (n = 266)	With PTSD (n = 115)	Statistical test	*P* value
Demographic and clinical characteristics					
Age, mean (SD), y	55.26 (14.86)	56.23 (15.97)	53.01 (11.65)	$F_1 = 3.78$	.05
Female	166 (43.6; 38.5-48.7)	102 (38.3; 32.5-44.5)	64 (55.7; 46.1-64.9)	$\chi^2_1 = 9.78$	.002
Education, mean (SD), y	14.36 (5.35)	14.32 (5.97)	14.45 (3.52)	$F_1 = 0.04$	.82
Married	229 (60.1; 55.0-65.1)	153 (57.5; 51.3-63.5)	76 (66.1; 56.7-74.7)	$\chi^2_1 = 2.45$	.11
BMI, mean (SD)[a]	26.22 (4.42)	25.96 (4.37)	26.84 (4.48)	$F_1 = 3.17$	.07
Smoker status					
Never	183 (48.0; 42.9-53.2)	123 (46.2; 40.1-52.4)	60 (52.2; 42.7-61.6)		
Active	41 (10.8; 7.8-14.3)	31 (11.7; 8.1-16.1)	10 (8.7; 4.2-15.4)	$\chi^2_2 = 1.41$	.49
Former	157 (41.2; 36.2-46.3)	112 (42.1; 36.1-48.3)	45 (39.1; 30.2-48.7)		
Regular physical activity	220 (57.7; 52.6-62.8)	158 (59.4; 53.2-65.4)	62 (53.9; 44.4-63.2)	$\chi^2_1 = 0.99$	.32
Previous history of psychiatric disorders	95 (24.9; 20.4-29.3)	55 (20.7; 16.0-26.0)	40 (34.8; 26.1-44.2)	$\chi^2_1 = 8.53$	.003
Family history of psychiatric disorders	84 (22.0; 18.0-26.6)	54 (20.3; 15.6-25.6)	30 (26.1; 18.3-35.1)	$\chi^2_1 = 1.56$	.21
Childhood trauma (CTQ total score), mean (SD)	40.55 (8.93)	40.90 (9.13)	39.75 (8.43)	$F_1 = 1.07$	.30
Acute COVID-19 characteristics					
Intensive care unit admission	65 (17.1; 13.4-21.2)	42 (15.8; 11.6-20.7)	23 (20.0; 13.1-28.5)	$\chi^2_1 = 1.00$	.31
Oxygen therapy	189 (49.6; 44.5-54.7)	134 (50.4; 44.2-56.5)	55 (47.8; 38.4-57.3)	$\chi^2_1 = 0.20$	.64
Noninvasive ventilation	43 (11.3; 8.3-15.0)	25 (9.4; 6.2-13.6)	18 (15.7; 9.6-23.8)	$\chi^2_1 = 3.20$	.07
Mechanical ventilation	29 (7.7; 5.2-10.8)	16 (6.0; 3.5-9.6)	13 (11.4; 6.2-18.7)	$\chi^2_1 = 3.24$	.07
Delirium/agitation[b]	36 (9.4; 6.7-12.8)	17 (6.4; 3.8-10.0)	19 (16.5; 10.3-24.6)	$\chi^2_1 = 9.63$	.002
Hospitalization	309 (81.1; 76.8-85.0)	217 (81.6; 76.5-86.2)	92 (80.0; 71.3-86.8)	$\chi^2_1 = 0.13$	.71
Length of hospital stay (if applicable), mean (SD), d	18.41 (17.27)	17.71 (15.04)	20.00 (21.53)	$F_1 = 1.09$	.29
Post-COVID characteristics					
Time since symptom onset, mean (SD), d	96.81 (44.30)	94.56 (42.56)	102.01 (47.88)	$F_1 = 2.28$	.13
Persistent COVID-19 symptoms					
None	75 (19.7; 15.8-24.0)	63 (23.7; 18.7-29.3)	12 (10.4; 5.5-17.5)		
1 or 2	135 (35.4; 30.6-40.5)	104 (39.1; 33.2-45.2)	31 (27.0; 19.1-36.0)	$\chi^2_2 = 22.03$	<.001
≥3	171 (44.9; 39.8-50.0)	99 (37.2; 31.4-43.3)	72 (62.6; 53.1-71.5)		

Abbreviations: BMI, body mass index; CTQ, childhood trauma questionnaire; PTSD, posttraumatic stress disorder.

[a] Body mass index calculated as weight in kilograms divided by height in meters squared.

[b] Assessed through the Confusion Assessment Method (CAM).

Figure. Posttraumatic Stress Disorder (PTSD) After COVID-19 Infection and Other Collective Traumatic Events



MERS indicates Middle East respiratory syndrome; SARS, severe acute respiratory syndrome.

interdisciplinary medical and psychiatric assessment, detailed elsewhere,[2] which included data on demographic, clinical, psychopathological, and COVID-19 characteristics. Trained psychiatrists diagnosed PTSD using the criterion-standard Clinician-Administered PTSD Scale for *DSM-5* (CAPS-5), reaching a Cohen κ interrater reliability of 0.82. To meet PTSD criteria, in addition to traumatic event exposure (criterion A), patients must have had at least 1 *DSM-5* criterion B and C symptom and at least 2 criterion D and E symptoms. Criteria F and G must have been met as well. Additional diagnoses were made through the Structured Clinical Interview for *DSM-5*. Participants provided written informed consent, and the study was approved by the Università Cattolica and Fondazione Policlinico Gemelli IRCCS Institutional Ethics Committee.

Data for patients with and without PTSD were compared with the χ^2 test for nominal variables and one-way analysis of variance for continuous variables. Factors significantly associated with PTSD were subjected to a binary logistic regression. *P* values were 2-tailed, and significance was set at a *P* value less than .05. Analyses were performed using R version 4 0.0 (The R Foundation).

Results | From April 21 to October 15, 2020, the postacute care service assessed 381 White patients who had recovered from COVID-19 infection within 30 to 120 days, 166 (43.6%) of whom were women. The mean (SD; range) age was 55.26 (14.86; 18-89). During acute COVID-19 illness, most patients were hospitalized (309 of 381 [81.1%]), with a mean (SD) length of hospital stay of 18.41 (17.27) days.

PTSD was found in 115 participants (30.2%). In the total sample, additional diagnoses were depressive episode (66 [17.3%]), hypomanic episode (3 [0.7%]), generalized anxiety disorder (27 [7.0%]), and psychotic disorders (1 [0.2%]). Patients with PTSD were more frequently women (64 [55.7%]), reported higher rates of history of psychiatric disorders (40 [34.8%]) and delirium or agitation during acute illness (19 [16.5%]), and presented with more persistent medical symptoms in the post-illness stage (more than 3 symptoms, 72 [62.6%]) (**Table**). Logistic regression specifically identified sex ($Wald_1 = 4.79$; $P = .02$), delirium or agitation ($Wald_1 = 5.14$; $P = .02$), and persistent medical symptoms ($Wald_2 = 12.46$; $P = .002$) as factors associated with PTSD.

Discussion | This cross-sectional study found a PTSD prevalence of 30.2% after acute COVID-19 infection, which is in line with findings in survivors of previous coronavirus illnesses[1] compared with findings reported after other types of collective traumatic events (**Figure**).[3-5] Associated characteristics were female sex, which has been extensively described as a risk factor for PTSD,[1,3,5] history of psychiatric disorders, and delirium or agitation during acute illness. In the PTSD group, we also found more persistent medical symptoms, often reported by patients after recovery from severe COVID-19.[6]

This study had limitations, including the relatively small sample size and cross-sectional design, as PTSD symptom rates may vary over time. Furthermore, this was a single-center study that lacked a control group of patients attending the emergency department for other reasons. Further longitudinal studies are needed to tailor therapeutic interventions and prevention strategies.

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Author Contributions: Dr Janiri had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
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Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: Janiri, Kotzalidis, Sani.
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Supervision: Kotzalidis, Bernabei, Landi, Sani.

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Additional Information: The members of the Gemelli Against COVID-19 Post-Acute Care Study Group are listed in reference 2.

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COMMENT & RESPONSE

Errors in a Response Rate and in Effect Sizes in Study of Psilocybin-Assisted Therapy for Major Depressive Disorder

To the Editor On behalf of our coauthors, we regret to report that we have discovered calculation errors in some of the reported effects in our Original Investigation, "Effects of Psilocybin-Assisted Therapy on Major Depressive Disorder: A Randomized Clinical Trial,"[1] that was published in *JAMA Psychiatry* on November 4, 2020.

These calculation errors were detected when we began conducting analyses for a follow-up study. This resulted in a full reanalysis of all data in our study. During this process, we discovered an error in the response rate for the overall sample, which was marginally higher than reported (67% should have been 71%), and several errors in effect sizes and their confidence intervals. Importantly, the corrections for these errors do not affect the direction, significance, or interpretation of the results or our conclusions.

Thus, we have requested that our article be corrected.[2] In the main article, these include corrections to the Abstract Results, Results, and Figure captions. In the Supplement, there are corrections to eTables and eFigures.

We sincerely regret that these errors occurred. We have conducted a careful rereview of the entire article text and analyses and we confirm that no other errors have been identified.

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1. Davis AK, Barrett FS, May DG, et al. Effects of psilocybin-assisted therapy on major depressive disorder: a randomized clinical trial. *JAMA Psychiatry*. Published online November 4, 2020. doi:10.1001/jamapsychiatry.2020.3285

2. Errors in effect sizes and confidence intervals. Correction. *JAMA Psychiatry*. Published online February 10, 2021. doi:10.1001/jamapsychiatry.2020.4714

CORRECTION

Errors in Response Rate, Effect Sizes, and Confidence Intervals: In the Original Investigation titled "Effects of Psilocybin-Assisted Therapy on Major Depressive Disorder: A Randomized Clinical Trial,"[1] published online on November 4, 2020, there was an error in the response rate for the overall sample, which was marginally higher than reported (67% should have been 71%), and errors in several Cohen *d* and 95% CI values in the Abstract Results, Results section, and captions for Figures 3 and 4. There are additional corrections in eTables 1 and 2 and eFigures 1 to 9 in the Supplement. A Letter of Explanation[2] has been published that explains the errors. This article was corrected online.

1. Davis AK, Barrett FS, May DG, et al. Effects of psilocybin-assisted therapy on major depressive disorder: a randomized clinical trial. *JAMA Psychiatry*. Published online November 4, 2020. doi:10.1001/jamapsychiatry.2020.3285

2. Davis AK, Griffiths RR. Errors in a response rate and in effect sizes in study of psilocybin-assisted therapy for major depressive disorder. *JAMA Psychiatry*. Published online February 10, 2021. doi:10.1001/jamapsychiatry.2020.4638

Error in Figure: In the Original Investigation titled "Association Between Antidepressant Drug Use and Hip Fracture in Older People Before and After Treatment Initiation,"[1] published online January 2, 2019, and in the February 1, 2019, issue, there was an error in the Figure. In the x-axis of panel A, the values given respectively as "100" and "200" should have been "200" and "100." This article was corrected online.

1. Brännström J, Lövheim H, Gustafson Y, Nordström P. Association between antidepressant drug use and hip fracture in older people before and after treatment initiation. *JAMA Psychiatry*. 2019;76(2):172-179. doi:10.1001/jamapsychiatry.2018.3679

Data Errors in Table: In the Original Investigation titled "Association of Antidepressant Use With Adverse Health Outcomes: A Systematic Umbrella Review," published in the December 2019 issue of *JAMA Psychiatry*,[1] 2 numbers were incorrectly presented in Table 3. In the Retrospective and Prospective Cohort Studies section of the table, the odds ratio for the random effects measure to effect size for suicide attempt and completion in adults from Barbui et al,[80] 2009, should have been "0.53." In the Studies Adjusted for Confounding by Indication section of the same table, the upper limit of the 95% CI for suicide attempt and completion in children and adolescents from Barbui et al,[80] 2009, should have been "3.41." This article was corrected online.

1. Dragioti E, Solmi M, Favaro A, et al. Association of antidepressant use with adverse health outcomes: a systematic umbrella review. *JAMA Psychiatry*. 2019;76(12):1241-1255. doi:10.1001/jamapsychiatry.2019.2859

Error in Figure 3: The Original Investigation titled "Association of History of Psychopathology With Accelerated Aging at Midlife,"[1] published online February 17, 2021, was corrected to add a missing data point for self-reported hearing difficulties in Figure 3A. This article was corrected online.

1. Wertz J, Caspi A, Ambler A, et al. Association of history of psychopathology with accelerated aging at midlife. *JAMA Psychiatry*. Published online February 17, 2021. doi:10.1001/jamapsychiatry.2020.4626