

# World Journal of *Clinical Cases*

*World J Clin Cases* 2023 February 6; 11(4): 719-978



**MINIREVIEWS**

- 719 Development and refinement of diagnostic and therapeutic strategies for managing patients with cardiogenic stroke: An arduous journey  
*Fan ZX, Liu RX, Liu GZ*
- 725 Portal vein aneurysm-etiology, multimodal imaging and current management  
*Kurtcehajic A, Zerem E, Alibegovic E, Kunosic S, Hujdurovic A, Fejzic JA*

**ORIGINAL ARTICLE****Clinical and Translational Research**

- 738 CD93 serves as a potential biomarker of gastric cancer and correlates with the tumor microenvironment  
*Li Z, Zhang XJ, Sun CY, Fei H, Li ZF, Zhao DB*

**Retrospective Study**

- 756 Chest computed tomography findings of the Omicron variants of SARS-CoV-2 with different cycle threshold values  
*Ying WF, Chen Q, Jiang ZK, Hao DG, Zhang Y, Han Q*
- 764 Major depressive disorders in patients with inflammatory bowel disease and rheumatoid arthritis  
*Haider MB, Basida B, Kaur J*
- 780 Selective laser trabeculoplasty as adjunctive treatment for open-angle glaucoma *vs* following incisional glaucoma surgery in Chinese eyes  
*Zhu J, Guo J*
- 788 Efficacy of transvaginal ultrasound-guided local injections of absolute ethanol for ectopic pregnancies with intrauterine implantation sites  
*Kakinuma T, Kakinuma K, Matsuda Y, Yanagida K, Ohwada M, Kaijima H*

**Clinical Trials Study**

- 797 Efficacy of incremental loads of cow's milk as a treatment for lactose malabsorption in Japan  
*Hasegawa M, Okada K, Nagata S, Sugihara S*

**Observational Study**

- 809 Transdiagnostic considerations of mental health for the post-COVID era: Lessons from the first surge of the pandemic  
*Goldstein Ferber S, Shoal G, Rossi R, Trezza V, Di Lorenzo G, Zalsman G, Weller A, Mann JJ*
- 821 Effect of patient COVID-19 vaccine hesitancy on hospital care team perceptions  
*Caspi I, Freund O, Pines O, Elkana O, Ablin JN, Bornstein G*

**Randomized Clinical Trial**

- 830 Improvement of inflammatory response and gastrointestinal function in perioperative of cholelithiasis by Modified Xiao-Cheng-Qi decoction  
*Sun BF, Zhang F, Chen QP, Wei Q, Zhu WT, Ji HB, Zhang XY*

**CASE REPORT**

- 844 Metagenomic next-generation sequencing for pleural effusions induced by viral pleurisy: A case report  
*Liu XP, Mao CX, Wang GS, Zhang MZ*
- 852 *Clostridium perfringens* gas gangrene caused by closed abdominal injury: A case report and review of the literature  
*Li HY, Wang ZX, Wang JC, Zhang XD*
- 859 Is lymphatic invasion of microrectal neuroendocrine tumors an incidental event?: A case report  
*Ran JX, Xu LB, Chen WW, Yang HY, Weng Y, Peng YM*
- 866 *Pneumocystis jirovecii* diagnosed by next-generation sequencing of bronchoscopic alveolar lavage fluid: A case report and review of literature  
*Cheng QW, Shen HL, Dong ZH, Zhang QQ, Wang YF, Yan J, Wang YS, Zhang NG*
- 874 Identification of 1q21.1 microduplication in a family: A case report  
*Huang TT, Xu HF, Wang SY, Lin WX, Tung YH, Khan KU, Zhang HH, Guo H, Zheng G, Zhang G*
- 883 Double pigtail catheter reduction for seriously displaced intravenous infusion port catheter: A case report  
*Liu Y, Du DM*
- 888 Thyroid storm in a pregnant woman with COVID-19 infection: A case report and review of literatures  
*Kim HE, Yang J, Park JE, Baek JC, Jo HC*
- 896 Computed tomography diagnosed left ovarian venous thrombophlebitis after vaginal delivery: A case report  
*Wang JJ, Hui CC, Ji YD, Xu W*
- 903 Preoperative 3D reconstruction and fluorescent indocyanine green for laparoscopic duodenum preserving pancreatic head resection: A case report  
*Li XL, Gong LS*
- 909 Unusual presentation of systemic lupus erythematosus as hemophagocytic lymphohistiocytosis in a female patient: A case report  
*Peng LY, Liu JB, Zuo HJ, Shen GF*
- 918 Polyarteritis nodosa presenting as leg pain with resolution of positron emission tomography-images: A case report  
*Kang JH, Kim J*
- 922 Easily misdiagnosed complex Klippel-Trenaunay syndrome: A case report  
*Li LL, Xie R, Li FQ, Huang C, Tuo BG, Wu HC*

- 931 Benign lymphoepithelial cyst of parotid gland without human immunodeficiency virus infection: A case report  
*Liao Y, Li YJ, Hu XW, Wen R, Wang P*
- 938 Epithelioid trophoblastic tumor of the lower uterine segment and cervical canal: A case report  
*Yuan LQ, Hao T, Pan GY, Guo H, Li DP, Liu NF*
- 945 Treatment of portosystemic shunt-borne hepatic encephalopathy in a 97-year-old woman using balloon-occluded retrograde transvenous obliteration: A case report  
*Nishi A, Kenzaka T, Sogi M, Nakaminato S, Suzuki T*
- 952 Development of Henoch-Schoenlein purpura in a child with idiopathic hypereosinophilia syndrome with multiple thrombotic onset: A case report  
*Xu YY, Huang XB, Wang YG, Zheng LY, Li M, Dai Y, Zhao S*
- 962 Three cases of jejunal tumors detected by standard upper gastrointestinal endoscopy: A case series  
*Lee J, Kim S, Kim D, Lee S, Ryu K*
- 972 Omental infarction diagnosed by computed tomography, missed with ultrasonography: A case report  
*Hwang JK, Cho YJ, Kang BS, Min KW, Cho YS, Kim YJ, Lee KS*

**ABOUT COVER**

Editorial Board Member of *World Journal of Clinical Cases*, Sahand Samieirad, DDS, MS, MSc, Associate Professor, Oral and Maxillofacial Surgery Department, Mashhad Dental School, Mashhad University of Medical Sciences, Mashhad 9178613111, Iran. samieerads@mums.ac.ir

**AIMS AND SCOPE**

The primary aim of *World Journal of Clinical Cases* (*WJCC*, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

*WJCC* mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

**INDEXING/ABSTRACTING**

The *WJCC* is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2022 Edition of Journal Citation Reports® cites the 2021 impact factor (IF) for *WJCC* as 1.534; IF without journal self cites: 1.491; 5-year IF: 1.599; Journal Citation Indicator: 0.28; Ranking: 135 among 172 journals in medicine, general and internal; and Quartile category: Q4. The *WJCC*'s CiteScore for 2021 is 1.2 and Scopus CiteScore rank 2021: General Medicine is 443/826.

**RESPONSIBLE EDITORS FOR THIS ISSUE**

Production Editor: *Si Zhao*; Production Department Director: *Xu Guo*; Editorial Office Director: *Jin-Lei Wang*.

**NAME OF JOURNAL**

*World Journal of Clinical Cases*

**ISSN**

ISSN 2307-8960 (online)

**LAUNCH DATE**

April 16, 2013

**FREQUENCY**

Thrice Monthly

**EDITORS-IN-CHIEF**

Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku

**EDITORIAL BOARD MEMBERS**

<https://www.wjnet.com/2307-8960/editorialboard.htm>

**PUBLICATION DATE**

February 6, 2023

**COPYRIGHT**

© 2023 Baishideng Publishing Group Inc

**INSTRUCTIONS TO AUTHORS**

<https://www.wjnet.com/bpg/gerinfo/204>

**GUIDELINES FOR ETHICS DOCUMENTS**

<https://www.wjnet.com/bpg/GerInfo/287>

**GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH**

<https://www.wjnet.com/bpg/gerinfo/240>

**PUBLICATION ETHICS**

<https://www.wjnet.com/bpg/GerInfo/288>

**PUBLICATION MISCONDUCT**

<https://www.wjnet.com/bpg/gerinfo/208>

**ARTICLE PROCESSING CHARGE**

<https://www.wjnet.com/bpg/gerinfo/242>

**STEPS FOR SUBMITTING MANUSCRIPTS**

<https://www.wjnet.com/bpg/GerInfo/239>

**ONLINE SUBMISSION**

<https://www.f6publishing.com>



Observational Study

# Transdiagnostic considerations of mental health for the post-COVID era: Lessons from the first surge of the pandemic

Sari Goldstein Ferber, Gal Shoval, Rodolfo Rossi, Viviana Trezza, Giorgio Di Lorenzo, Gil Zalsman, Aron Weller, J John Mann

**Specialty type:** Medicine, research and experimental

**Provenance and peer review:** Invited article; Externally peer reviewed.

**Peer-review model:** Single blind

**Peer-review report's scientific quality classification**

Grade A (Excellent): 0  
Grade B (Very good): 0  
Grade C (Good): C, C  
Grade D (Fair): 0  
Grade E (Poor): 0

**P-Reviewer:** Di Meglio L, Italy; Nithiyaraj E, India

**Received:** September 4, 2022

**Peer-review started:** September 4, 2022

**First decision:** October 30, 2022

**Revised:** November 28, 2022

**Accepted:** January 16, 2023

**Article in press:** January 16, 2023

**Published online:** February 6, 2023



**Sari Goldstein Ferber, Aron Weller,** Department of Psychology, Bar Ilan University, Ramat Gan 5290002, Israel

**Gal Shoval,** Department of Neuroscience, Princeton University, Princeton NJ 08544, United States

**Gal Shoval, Gil Zalsman,** Geha Mental Health Center, Petah Tiqva, Israel and Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv 77096, Israel

**Rodolfo Rossi,** Department of Systems Medicine, University of Rome Tor Vergata, Rome 00133, Italy

**Viviana Trezza,** Department of Science, Rome Tre University, Rome 00154, Italy

**Giorgio Di Lorenzo,** Department of Psychiatry, Rome University Tor Vergata, Rome 00179, Italy and IRCCS—Fondazione Santa Lucia, Rome 00179, Italy

**Gil Zalsman, J John Mann,** Division of Molecular Imaging and Neuropathology, Department of Psychiatry, Columbia University, NY, 10032, United States

**Corresponding author:** Sari Goldstein Ferber, PhD, Additional Professor, Department of Psychology, Bar Ilan University, Geha St, Ramat Gan 5290002, Israel. [sari.goldstein@biu.ac.il](mailto:sari.goldstein@biu.ac.il)

## Abstract

### BACKGROUND

The Coronavirus disease 19 (COVID-19)-related psychiatric burden partly results from prolonged social stress world-wide. Studies have examined the psychiatric impact of COVID-19 on Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM 5) and International Classification of Diseases 11<sup>th</sup> Revision (ICD-11) categories, implicating multiple diagnoses, complicating clinical management.

### AIM

To verify whether COVID-19-related psychopathology spans multiple DSM-5 and ICD-11 diagnoses, but not in a random pattern. Consequently, empirical analysis of the multiple associated symptoms will better describe COVID-19-related psychopathology.

## METHODS

We conducted a bi-national study during the first surge of the pandemic: an Italian sample ( $n = 21217$ , studied March-April 2020); and three representative longitudinal samples from Israel ( $n = 1276$ , 1189, and 1432 respectively, studied May-July 2020). Data in Italy were collected by a national internet-based survey with an initially approached sample of about one million persons and in Israel by the Israeli Central Bureau of Statistics using probability-based national representative sampling. Data analysis focused on the frequency and patterns of reported multiple mental health symptoms.

## RESULTS

Combinations with all symptoms were more prevalent than combinations with fewer symptoms, with no majorities-minorities differences in both countries, demonstrating the generalizability of the transdiagnostic pattern of mental health issues in both nations. A history of previous mental disorder (Italian study) and an increase in symptom prevalence over time (Israel study) were associated with an increased number of symptoms. Conclusions: Based on finding correlated symptom diversity spanning conventional diagnostic categories, we suggest that the pattern of mental health issues associated with the COVID-19 pandemic is transdiagnostic.

## CONCLUSION

The findings have implications for improving prevention and treatment of COVID-19 related psychopathology and for post-pandemic times in conditions resulting from multiplicity of stressors with mixed symptomatology in the clinical picture.

**Key Words:** Post-COVID-19; Diagnosis; Stress; Mental disorders; Transdiagnosis; Reactive psychiatric disorders

©The Author(s) 2023. Published by Baishideng Publishing Group Inc. All rights reserved.

**Core Tip:** The unique clinical picture that characterizes the reaction to the pandemic as shown in our findings may raise broader thoughts on diagnostic considerations regarding a new category beyond pandemic mental health symptomatology. This suggested category as outlined in our recently published review in the World Journal of Psychiatry may involve transdiagnostic criteria resulting from multiplicity of stressors. This type of condition may be apparent in the post-coronavirus disease (COVID) era although not recognized to date. Our findings showing this type of complex transdiagnostic symptomatology in two countries indicate a need for a new understanding of the COVID-19 pandemic's psychopathological consequences in the post-COVID era.

**Citation:** Goldstein Ferber S, Shoval G, Rossi R, Trezza V, Di Lorenzo G, Zalsman G, Weller A, Mann JJ. Transdiagnostic considerations of mental health for the post-COVID era: Lessons from the first surge of the pandemic. *World J Clin Cases* 2023; 11(4): 809-820

**URL:** <https://www.wjgnet.com/2307-8960/full/v11/i4/809.htm>

**DOI:** <https://dx.doi.org/10.12998/wjcc.v11.i4.809>

## INTRODUCTION

Prolonged stressful situations erode coping capacity[1,2]. The pervasive and persistent stress of the Coronavirus disease 19 (COVID-19) pandemic resulted in psychopathology afflicting millions worldwide. The unique impact of the pandemic on mental health is still pervasive and a significant burden on society[3], including the difficulties in diagnosis[4], which span diagnostic boundaries in Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) and International Classification of Diseases 11<sup>th</sup> Revision (ICD-11) defined disorders[5,6]. Past pandemics have raised similar concerns regarding mental health[7,8]. This highlights the concern regarding multiple diagnoses being given to a single patient and excessive use of the term "comorbidity", with confusing implications for prevention and treatment[9].

A debate about diagnosis has commenced[10-13] and a transdiagnostic approach has been suggested by previous studies[12,14,15]. To examine the transdiagnostic hypothesis, we conducted two independent studies of psychiatric data collected during the first surge of the COVID-19 pandemic, one in Italy and one in Israel. We further hypothesized that the resultant pattern of symptom complexity will be robust enough to be detected in two different countries with different survey methodologies.

## MATERIALS AND METHODS

### **Study 1: A Representative Sample of the Israeli Population - Three Surveys.**

**Methods:** The Israeli Central Bureau of Statistics (CBS) collected data on mental health at three different time points during the early months of the COVID-19 pandemic: 1<sup>st</sup> survey: 26/4/-1/5/2020; and 2<sup>nd</sup> survey: 11-14/5/2020; 3<sup>rd</sup> survey: 12-16/7/2020. Informed consent was obtained verbally, and this was a prerequisite for continuing with the survey questions. The survey was conducted under the Ethical Code, a section on the CBS ethical requirements and commitments, which is part of the Israeli Law of Statistics 1972 regulating the CBS functions. This study complies with the Declaration of Helsinki.

The sampling sought to represent all the Israeli population age 21 years and above except for dispersed rural Bedouins in the South and institutionalized individuals.

The 1<sup>st</sup> survey sample included 2,279 people, of whom 56% responded by phone. The 2<sup>nd</sup> survey sample included 2,271 people of whom 52% responded by phone. The 3<sup>rd</sup> survey sample included 2,291 people of whom 62.5% responded by phone. The Arab minority participants were 15.1% of the sample in the 1<sup>st</sup> survey, 15.3% in the 2<sup>nd</sup>, and 17.7% in the 3<sup>rd</sup> survey.

Sample characteristics: Gender and age distributions (see [Table 1](#)).

To correct for potential non-responder biases, respondent distributions were weighted by the CBS according to their known gender, age, and geographical distributions in the Israeli general population. CBS also tested for data reliability in their standard methods.

**Mental health outcome measures:** In the 1<sup>st</sup> survey, 3 mental health symptoms were assessed: Perceived depression, perceived anxiety and perceived loneliness. In the 2<sup>nd</sup> and 3<sup>rd</sup> surveys, an additional symptom was added: COVID-19-related phobia.

**Data analysis:** From these reports, we calculated the proportion of people that reported suffering from a combination of 2, 3, or 4 symptoms. We compared these proportions over the three surveys to assess progression over the ongoing pandemic. To test statistically whether there was a change in the proportion of people that suffer from a combination of symptoms, we used a 2-sample equality of proportions test. We compared the estimated proportion of people suffering from at least 2, 3, or 4 symptoms to that observed in previous surveys (i.e., Survey 2 *vs* Survey 1, and Survey 3 *vs* Survey 1 and 2).

In addition, we identified the most common combination of 3 symptoms (in the 2<sup>nd</sup> and 3<sup>rd</sup> surveys).

The major ethnic minority group in Israel is Israeli Arab and the majority group is Israeli Jew. We compared the two groups on the relative proportions of 3- and 4-combined symptoms.

To understand the associations between the four mental health symptoms studied, we performed a Pearson product-moment correlation matrix for them in each survey, separately.

Bonferroni corrections for multiple comparisons were conducted.

### **Study 2: A survey in Italy during the peak of the COVID-19 pandemic**

**Study Design:** This cross-sectional web-based observational study is a part of a long-term project monitoring mental health outcomes in the general population. The survey was anonymous, and confidentiality was assured. Three weeks after the beginning of the lockdown in Italy, the survey was conducted using convenient sampling. Every person living in Italy  $\geq 18$  years was eligible. The study was approved by the local Institutional Review Board (IRB) at the University of L'Aquila. Online written consent was obtained from all participants. Participants could terminate the survey at any time as approved by the IRB. This study complies with the Declaration of Helsinki.

**Sampling strategy and online questionnaire dissemination:** An online questionnaire was presented to the Italian population between March 25<sup>th</sup> and April 7<sup>th</sup>. The investigated timeframe corresponded to Italy's first contagion peak (<https://who.sprinklr.com/>). This general population questionnaire was disseminated using sponsored adverts on Facebook®. The questionnaire asked participants to re-share the questionnaire link. Using the Facebook Ads app, it was estimated that the number of link clicks was about 100,000, and the advertisement reached one million people.

**Sample characteristics:** The demographic characteristics of the sample are presented in [Table 2](#). Briefly, about 80% were women, 48% were 40 years old or older, 2.5% were foreigners and 28% reported previous psychiatric history.

**Outcome Measures:** The following psychometric scales were used and covered the previous two weeks: The Global Psychotrauma Screen (GPS) post-traumatic stress symptoms (PTSS) subscale (GPS-PTSS)[16, 17]: The validated version of PTSS was used. PTSS were considered of clinical relevance if more than 3 out of five 5 symptoms were reported as present.

The 9-item Patient Health Questionnaire (PHQ-9)[18], using the cut-off for severe depression symptoms at  $\geq 15$ . The validated version of this questionnaire was used.

The 7-item Generalized Anxiety Disorder scale (GAD-7)[19], using the cut-off for severe anxiety symptoms at  $\geq 15$ . The validated version of this scale was used.

**Table 1 Gender and age distributions of the Israeli samples**

Gender distribution		
Survey 1		
Gender	Count	Frequency
Men	541	47.10%
Women	607	52.90%
Survey 2		
Gender	Count	Frequency
Men	528	46.70%
Women	602	53.30%
Survey 3		
Gender	Count	Frequency
Men	684	48.75%
Women	719	51.25%
Age-group distribution		
Survey 1		
Age	Count	Frequency
21-44	509	44.30%
45-64	351	30.60%
65 +	288	25.10%
Survey 2		
Age	Count	Frequency
21-44	507	44.90%
45-64	345	30.50%
65 +	278	24.20%
Survey 3		
Age	Count	Frequency
21-44	664	47.30%
45-64	419	29.90%
65 +	320	22.80%

GPS- Post-Traumatic Stress Disorder-Negative Affect (PTSD-NA): 11 items, including symptoms related to disturbances in self-organization, anxiety, depression, self-harm, substance abuse, and other physical, emotional, or social problems. This cluster of symptoms is related to the Disturbance in Self Organization dimension of Complex PTSD.

The 10-item Perceived Stress Scale (PSS)[20], using quartiles such that the upper quartile was separated from the rest.

**Data analysis:** We analyzed the frequency of all combinations of symptoms, to determine the most frequent combinations of 3, 4, and 5 symptoms. We also identified the pattern of the most prevalent combination of symptoms. In addition, we used proportion tests to compare Italians and foreigners, and separately people with and without previous psychiatric history, on the frequency of reporting a combination of 3, 4, and 5 symptoms. Bonferroni corrections for multiple comparisons were conducted.

## RESULTS

### Study 1 The Israeli surveys

The Pearson correlations between pairs of symptoms were significant in all 3 surveys; see [Table 3](#).

**Table 2 Gender, age, nationality, and previous psychiatric history distributions of the Italian sample**

Gender	Frequency	Percentage
Men	4122	19.40%
Women	17095	80.60%
Age	Frequency	Percentage
20-39	10894	51.30%
40-64	10118	47.70%
65-74	180	0.85%
75 +	25	0.10%
Foreign	Frequency	Percentage
Foreigner	516	2.40%
Italian	20701	97.60%
Psychiatric history	Frequency	Percentage
No	15160	71.40%
Yes	6075	25.88%

**Table 3 The association between the three symptoms in the Israeli sample**

	Loneliness	Depression	Anxiety
<b>Survey 1</b>			
Loneliness	1		
Depression	0.6364 <sup>1</sup>	1	
Anxiety	0.5027 <sup>1</sup>	0.581 <sup>1</sup>	1
<b>Survey 2</b>			
Loneliness	1		
Depression	0.6364 <sup>1</sup>	1	
Anxiety	0.5027 <sup>1</sup>	0.577 <sup>1</sup>	1
Phobia	0.1638 <sup>1</sup>	0.1684 <sup>1</sup>	0.3145 <sup>1</sup>
<b>Survey 3</b>			
Loneliness	1		
Depression	0.7172192 <sup>1</sup>	1	
Anxiety	0.4570808 <sup>1</sup>	0.5448582 <sup>1</sup>	1
Phobia	0.1467067 <sup>1</sup>	0.1770808 <sup>1</sup>	0.3177728 <sup>1</sup>

<sup>1</sup>P < 0.0001.

**Analysis of symptom patterns:** Table 4 shows that in the 1<sup>st</sup> survey, 22.1% (95%CI: 19.7-24.5) reported all three symptoms, Depression, Loneliness, and Anxiety, significantly more than those reporting the most frequent 2-symptom pattern (Depression and Anxiety; 6.4%, 95%CI: 4.9-7.8;  $P < 0.001$ ).

In the 2<sup>nd</sup> survey, 13.3% reported three symptoms and an additional 20.1% reported all four symptoms, totaling about one-third of the population. The prevalence of the four-symptom combination (95%CI: 17.8-22.4) was greater than the most prevalent 3-symptom combination (Phobia, Anxiety and Depression, 5.58%, 95%CI: 4.2-6.9,  $P < 0.001$ ).

In the 3<sup>rd</sup> survey, 12.8% reported three symptoms, and an additional 24.3%, reported all four symptoms. The prevalence of the four-symptom combination (95%CI: 21.8-26.3) was greater than the most prevalent 3-symptom combination (Phobia, Anxiety and Depression, 7.32%, 95%CI: 6.0-8.7,  $P < 0.001$ ).

**Table 4** Frequency of reported symptoms in all three Israeli surveys

Number of symptoms	Count	Frequency
<b>Survey 1</b>		
0	512	44.6%
1	239	20.8%
2	143	12.5%
3	254	22.1%
<b>Survey 2</b>		
0	175	15.5%
1	359	31.8%
2	219	19.4%
3	150	13.3%
4	227	20.1%
<b>Survey 3</b>		
0	159	11.3%
1	396	28.2%
2	328	23.4%
3	179	12.8%
4	341	24.3%

**Analysis of quantitative progression of symptom complexity over time:** Survey 2 produced a significantly greater prevalence of 2 or 3 combined symptoms, compared to Survey 1 ( $P < 0.0001$  and  $P < 0.001$ , respectively).

Survey 3 produced a greater prevalence of 4 combined symptoms, compared to Survey 2 ( $P < 0.01$ ), attesting to the increase in the prevalence of a complex of symptoms over time.

The frequency of 3 and 4 combined complaints in the Arab compared with the Jewish sub-populations did not differ in any of the 3 surveys (data not shown).

### **Study 2 Italian general population**

All Pearson correlations between pairs of symptoms were significant ( $P < 0.001$ ; Table 5).

**Analysis of symptom patterns:** Table 6 presents all combinations of symptoms reported in the Italian sample. The most frequent 3-symptom combination was PTSS, Depression, and PTSD-NA (3.3%), compared to the other 3-symptom combinations. The most frequent 4-symptom combination was Anxiety, PTSS, Depression, and PTSD-NA (3.2%), compared to the other 4-symptom combinations. The prevalence of the 5-symptom combination, Anxiety, Perceived stress, PTSS, Depression, and PTSD-NA (9.0%, 95%CI: 8.5-9.3) was greater than of the most prevalent 3- (95%CI: 3.0-3.5) and 4-symptom combinations (95%CI: 2.9-3.4,  $P < 0.001$ ).

This combination of prevalence was comparable in Italians and foreigners. In addition, there were no differences detected between Italians and foreigners in the most frequent symptom combinations.

A proportion test was performed to compare Italians and foreigners that suffered from a combination of three symptoms: 11.3% of Italians (2332 out of 20701) and 14.9% of foreigners (77 out of 516) experienced 3 symptoms. There was a higher rate in foreigners ( $P = 0.0119$ ).

Nine point three percent of Italians (1918 out of 20701) and 10.7% of foreigners (55 out of 516) experienced four symptoms. There was no significant difference between the two populations' proportions,  $P = 0.3173$ .

Nine percent of Italians (1860 out of 20701) and 8.9% of foreigners (46 out of 516) experienced five symptoms. There was no significant difference between the two populations' proportions,  $P$  value = 1.

**Quantitative analysis of the prevalence of symptom complexity: The role of psychiatric history:** A psychiatric history, compared to no psychiatric history, increased the likelihood of multiple symptoms, with an identical pattern of symptom combinations as described above.

Specifically, regarding the differences between people with psychiatric history (PH) and without PH (NoPH) - a history of psychiatric symptoms (Table 7), proportion tests were performed to compare the groups.

**Table 5 Correlations between the mental health features in the Italian sample (n = 21217)**

Mental health issue	Anxiety	Perceived stress	PTSS	Depression	PTSD-NA
Anxiety	1				
Perceived stress	0.522	1			
PTSS	0.3521	0.3423	1		
Depression	0.5866	0.4867	0.3301	1	
PTSD-NA	0.2097	0.213	0.3636	0.2228	1

Note: All correlations:  $P < 0.001$ . PTSS: Post-traumatic stress symptoms; PTSD-NA: Post-traumatic stress disorder-negative affect.

**Table 6 Italian sample**

Combination	Count	Frequency	Percentage
None	0	3500	16.5%
PTSD-NA	1	6725	31.7%
Depression	1	147	0.7%
Perceived stress	1	59	0.3%
Anxiety	1	22	0.1%
Depression, PTSD-NA	2	771	3.6%
PTSS, PTSD-NA	2	2995	14.1%
Perceived stress, PTSD-NA	2	424	2.0%
Perceived stress, Depression	2	31	0.2%
Anxiety, PTSD-NA	2	202	1.0%
Anxiety, Depression	2	45	0.2%
Anxiety, Perceived stress	2	8	0.0%
PTSS, Depression, PTSD-NA	3	693	3.3%
Perceived stress, Depression, PTSD-NA	3	292	1.4%
Perceived stress, PTSS, PTSD-NA	3	586	2.8%
Anxiety, Depression, PTSD-NA	3	357	1.7%
Anxiety, PTSS, PTSD-NA	3	301	1.4%
Anxiety, Perceived stress, PTSD-NA	3	137	0.7%
Anxiety, Perceived stress, Depression	3	43	0.2%
Perceived stress, PTSS, Depression, PTSD-NA	4	480	2.3%
Anxiety, PTSS, Depression, PTSD-NA	4	657	3.2%
Anxiety, Perceived stress, Depression, PTSD-NA	4	537	2.5%
Anxiety, Perceived stress, PTSS, PTSD-NA	4	281	1.3%
Anxiety, Perceived stress, PTSS, Depression, PTSD-NA	5	1906	9.0%

PTSS: Post-traumatic stress symptoms; PTSD-NA: Post-traumatic stress disorder-negative affect.

Thirteen point three percent of PH (805 out of 6057) and 10.6% of NoPH (1604 out of 15160) experienced 3 symptoms. There is a significant difference between the two populations' proportions,  $P$  value  $< 0.0001$ .

Twelve point nine percent of PH (782 out of 6057) and 7.9% of NoPH (1191 out of 15160) experienced 4 symptoms. There is a significant difference between the two populations' proportions,  $P$  value  $< 0.0001$ .

**Table 7** The most frequent symptom combinations per number of symptoms, for people with and without Psychiatric history

Combination	Count	Frequency	Percentage
<b>Psychiatric history</b>			
PTSS, Depression, PTSD-NA	3	257	4.2%
Anxiety, PTSS, Depression, PTSD-NA	4	291	4.8%
Anxiety, Perceived stress, PTSS, Depression, PTSD-NA	5	885	14.6%
<b>No Psychiatric history</b>			
Perceived stress, PTSS, PTSD-NA	3	439	2.9%
Anxiety, PTSS, Depression, PTSD-NA	4	384	2.5%
Anxiety, Perceived stress, PTSS, Depression, PTSD-NA	5	1021	6.7%

PTSS: Post-traumatic stress symptoms; PTSD-NA: Post-traumatic stress disorder-negative affect.

Fourteen point six percent of PH (885 out of 6057) and 6.7% of NoPH (1021 out of 15160) experienced 5 symptoms. There is a significant difference between the two populations' proportions,  $P$  value < 0.0001.

## DISCUSSION

We report evidence from studies in two different countries, on the presentation of complex symptomatology that crosses diagnostic boundaries, during the first surge of the COVID-19 pandemic. The complex of symptoms that we found correlated in severity. This suggests a common relationship or a single overarching disorder. This offers an alternative and perhaps more complete characterization of psychopathology compared with employing multiple diagnoses for the same patient[9]. Moreover, this pattern is observed within each of the two countries studied, despite different survey methods, and is found within ethnic subpopulations of both countries, attesting to the generalizability of the pattern. The more the number of symptoms or diagnostic categories reported, the greater the proportion of subjects with past psychiatric history, suggesting that the identified complex of symptoms is related to psychiatric vulnerability. The greater proportion of subjects reporting this pattern over time indicates a cumulative effect of prolonged stress conditions driving individuals towards this more complex combination of symptoms.

Because our findings span different diagnostic categories, we propose that this argues for the need for a broader, transdiagnostic perspective[4,21,22]. We note that even prior to the pandemic others suggested a transdiagnostic approach for better treatment[23-26]. Given these earlier considerations, the current study may support the implementation of the treatment and organizational guidelines published by the WPA[27]. Thus, our large binational study provides more robust support for a new perspective, termed by some researchers "COVID Stress Syndrome"[12,28], which crosses DSM 5 and ICD 11 boundaries. In addition, transdiagnostic considerations may be helpful for post-COVID-19 concerns, if multiple stressors are identified as triggers and complex symptomatology characterizes the clinical picture.

### **"Transdiagnostic" in the context of the COVID-19 pandemic**

We searched the literature using Reference Citation analysis, PubMed and Google Scholar, focusing on the term "transdiagnostic" in the context of the COVID-19 pandemic. For the term "transdiagnostic" we identified 1284 references from 2019 to 2022. For the same years, in PubMed, 84 references were identified by the search "transdiagnostic and COVID-19". In Google Scholar, with the same terms and range of years, 5670 references were identified. In reviewing the literature found, we conclude that the "transdiagnostic" term is very popular and used in a too general manner, not specifying exactly which symptoms are associated with a more accurate diagnosis. From our literature search it appears that the term "transdiagnostic" is used for conventional categories (DSM-5 and ICD-11) and for non-conventional (other psychological) phenotypes too, making it hard to understand what the term truly means. Most of the transdiagnostic research papers that uses diagnosis for treatment intervention, relate to the association between depression and anxiety, *e.g.*[29], which is a known comorbidity and not directly related particularly to the COVID-19 mental health symptomatology. In our search we found just a few papers that diagnose three associated symptoms or more[15,30-33], as in our study.

It seems from the literature that the traditional approach of developing programs for prevention and treatment derived from an accurate specific research-based diagnosis as uniquely shown in our research

is not included in most papers that used the “transdiagnostic” perspective. Additionally, unlike the methodology and rationale for the present study, general use of this term is related to treatment, not necessarily explained and derived from an accurate, transdiagnostic, research-based new diagnosis or a group of symptoms that span conventional categories[34,35] as shown in our findings.

Moreover, the transdiagnostic approach is presented in the literature with the promise to unravel better prevention and treatment of mental health disorders. The novelty of our current paper lies in analyzing the COVID-19 situation with its multiplicity of stressors to identify a more accurate diagnosis spanning more than 2 or 3 conventional categories. In our search, a few cutting-edge papers were found, in which associations between conventional categories were investigated with sound methodology *e.g.* [29,31,32]. The benefit of these cutting-edge papers is in showing the long-term impact of the COVID-19 pandemic on mental health. The identification of such a long-term effect emphasizes the relevance of our paper at this time, in learning lessons from the first surge towards the post-pandemic era. We note however, that these cutting-edge papers, too, focus on treatment, and not on the investigation of a more accurate diagnosis of the mental health reaction during the COVID-19 epidemic, as we suggest in the present paper.

### **Limitations**

One limitation of our bi-national research is that we did not assess the full range of the possible neuropsychiatric spectrum, including neuropsychiatric symptoms and patterns evident in individuals recovering from infection. This extended transdiagnostic approach is discussed in our recent review published in the *World Journal of Psychiatry*, suggesting a neuropsychiatric syndrome, Complex Stress Reaction Syndrome, combining emotional-psychological symptoms (Type A) with neuropsychiatric (the non-systemic portion of Long-COVID) symptoms (Type B)[4]. Although the Israeli sample size is modest compared to the Italian sample, the Israeli data were collected by national probability-based representative sampling. We note that the fact that two differently designed studies in two different countries show similar results is a strength of this study and not a limitation. While the data analyzed are from the first surge of the pandemic, the pattern of results provides a novel perspective on diagnostic considerations in the post-COVID era.

## **CONCLUSION**

In sum, our data and the literature suggest multiple symptoms that characterize the mental health reaction to the pandemic, and that the clinical picture during the first surge of the pandemic was transdiagnostic in terms of DSM/ICD diagnostic systems. This occurred more frequently in individuals with prior psychiatric illness and with the continued duration of the pandemic. This unique clinical picture that characterizes the reaction to the pandemic may raise broader thoughts on diagnostic considerations regarding a new category beyond pandemic mental health symptomatology[4]. This suggested category may involve transdiagnostic criteria resulting from multiplicity of stressors. This type of condition may be apparent in the post-COVID era although not recognized to date. Our findings indicate a need for an empirical unbiased approach for reaching a true understanding of the COVID-19 pandemic’s psychopathologic consequences in the post-COVID era. Further international studies are essential. Accordingly, we are currently conducting a multi-national study, based on the present empirical paper’s findings. This understanding needs to be extended to encompass psychopathology more comprehensively including neuropsychiatric effects. Without a more complete diagnosis, the treatment plan and organizational modifications cannot be complete.

## **ARTICLE HIGHLIGHTS**

### **Research background**

From early stages of the COVID-19 pandemic up to the current post-COVID era there are accumulating reports of a mix clinical picture of the related mental health symptomatology.

### **Research motivation**

We hypothesized that the clinical picture of the COVID-19 related mental health symptomatology span several conventional diagnostic categories and therefore there is a growing risk for misdiagnosing suffering individuals thus reducing the option of developing more accurate research-based programs for prevention and treatment.

### **Research objectives**

To show that the association between 3 or more symptoms from different conventional diagnostic categories are more prevalent.

### Research methods

Three consecutive representative samples in Israel has been compared to a very large sample in Italy for 3 or more associated symptoms from different conventional categories using proportion analyses.

### Research results

The most frequent 4-symptom combination was Anxiety, post-traumatic stress symptoms (PTSS), Depression, and Post-Traumatic Stress Disorder-Negative Affect (PTSD-NA) (3.2%), compared to the other 4-symptom combinations. The prevalence of the 5-symptom combination, Anxiety, Perceived stress, PTSS, Depression, and PTSD-NA (9.0%, 95%CI: 8.5-9.3) was greater than that of the most prevalent 3- (95%CI: 3.0-3.5) and 4-symptom combinations (95%CI: 2.9-3.4,  $P < 0.001$ ) In Italy.

The prevalence of the four-symptom combination (95%CI: 21.8-26.3) was greater than that of the most prevalent 3-symptom combination (Phobia, Anxiety and Depression, 7.32%, 95%CI: 6.0-8.7,  $P < 0.001$ ) in Israel with an increase over time.

### Research conclusions

We report evidence from studies in two different countries, on the presentation of complex symptomatology that crosses diagnostic boundaries, during the first surge of the COVID-19 pandemic. The complex of symptoms that we found correlated in severity. This suggests a common relationship or a single overarching disorder that we termed previously Complex Stress Reaction Syndrome. This offers an alternative and perhaps more complete characterization of psychopathology compared with employing multiple diagnoses for the same patient. Moreover, this pattern is observed within each of the two countries studied, despite different survey methods, and is found within ethnic subpopulations of both countries, attesting to the generalizability of the pattern.

### Research perspectives

Further international studies are essential. Accordingly, we are currently conducting a multi-national study, based on the present empirical paper's findings. This understanding needs to be extended to encompass psychopathology more comprehensively including neuropsychiatric effects. Without a more complete diagnosis, the treatment plan and organizational modifications cannot be complete.

---

## ACKNOWLEDGEMENTS

The authors thank Tal Kozlovski for statistical analyses. The Israeli data were collected by Nurit Dobrin and Avishai Cohen from the Israeli Central Bureau of Statistics with the support of Timna Ferber.

---

## FOOTNOTES

**Author contributions:** Goldstein Ferber S and Mann JJ contributed to conceptualization; Di Lorenzo G, Rossi R and Trezza V verified the Italian data; Weller A and Goldstein Ferber S verified the Israeli data; Weller A, Goldstein Ferber Trezza V, Di Lorenzo G and Rossi R contributed to data curation; Weller A, Goldstein Ferber Trezza V, Di Lorenzo G and Rossi R contributed to formal analysis; Zalsman G and Shoval G contributed to investigation; Trezza V, Di Lorenzo G, Rossi R, Goldstein Ferber S and Mann JJ contributed to methodology; Weller A, Goldstein Ferber S, Di Lorenzo G, and Rossi R contributed to project administration; Zalsman G, Shoval G, Mann JJ, Weller A, Goldstein Ferber S, Trezza V, Rossi R, and Di Lorenzo G contributed to validation; Goldstein Ferber S contributed to writing - original draft; Mann JJ, Trezza V, Rossi R, Di Lorenzo G, Zalsman G, Shoval G, Weller A and Goldstein Ferber S contributed to writing, review & editing; All authors contributed substantially to the final version of the manuscript.

**Institutional review board statement:** The Israeli representative samples were obtained according to the Israel Law of Statistics. The Italian study was reviewed and approved by the University of L'Aquila Institutional Review Board.

**Informed consent statement:** Informed consent was obtained in Israel verbally by a telephone call, and in Italy by an online click for virtual recruitment to this internet-based study.

**Conflict-of-interest statement:** All the authors report no relevant conflicts of interest for this article.

**Data sharing statement:** No additional data are available.

**STROBE statement:** The authors have read the STROBE Statement—checklist of items, and the manuscript was prepared and revised according to the STROBE Statement—checklist of items.

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license

their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

**Country/Territory of origin:** Israel

**ORCID number:** Sari Goldstein Ferber [0000-0001-6843-3695](https://orcid.org/0000-0001-6843-3695).

**S-Editor:** Liu GL

**L-Editor:** A

**P-Editor:** Liu GL

## REFERENCES

- 1 **Lazarus R**, Folkman S. Stress, Appraisal, and Coping. Encyclopedia of Behavioral Medicine. Springer, New York, NY. 2013. Available from: [https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1005-9\\_215](https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1005-9_215)
- 2 **Ding Y**, Dai J. Advance in Stress for Depressive Disorder. *Adv Exp Med Biol* 2019; 1180: 147–178. [PMID: 31784962 DOI: [10.1007/978-981-32-9271-0\\_8](https://doi.org/10.1007/978-981-32-9271-0_8)]
- 3 **Malik P**, Patel K, Pinto C, Jaiswal R, Tirupathi R, Pillai S, Patel U. Post-acute COVID-19 syndrome (PCS) and health-related quality of life (HRQoL)-A systematic review and meta-analysis. *J Med Virol* 2022; 94: 253–262. [PMID: 34463956 DOI: [10.1002/jmv.27309](https://doi.org/10.1002/jmv.27309)]
- 4 **Goldstein Ferber S**, Shoval G, Zalsman G, Weller A. Does COVID-19 related symptomatology indicate a transdiagnostic neuropsychiatric disorder? *World J Psychiatry* 2022; 12: 1004-1015 [PMID: 36158308 DOI: [10.5498/wjp.v12.i8.1004](https://doi.org/10.5498/wjp.v12.i8.1004)]
- 5 **Rossi R**, Succi V, Pacitti F, Di Lorenzo G, Di Marco A, Siracusano A, Rossi A. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. *JAMA Netw Open* 2020; 3: e2010185 [PMID: 32463467 DOI: [10.1001/jamanetworkopen.2020.10185](https://doi.org/10.1001/jamanetworkopen.2020.10185)]
- 6 **Gao J**, Zheng P, Jia Y, Chen H, Mao Y, Chen S, Wang Y, Fu H, Dai J. Mental health problems and social media exposure during COVID-19 outbreak. *PLoS One* 2020; 15: e0231924 [PMID: 32298385 DOI: [10.1371/journal.pone.0231924](https://doi.org/10.1371/journal.pone.0231924)]
- 7 **Perrin PC**, McCabe OL, Everly GS Jr, Links JM. Preparing for an influenza pandemic: mental health considerations. *Prehosp Disaster Med* 2009; 24: 223-230 [PMID: 19618359 DOI: [10.1017/S1049023X00006853](https://doi.org/10.1017/S1049023X00006853)]
- 8 **Troyer EA**, Kohn JN, Hong S. Are we facing a crashing wave of neuropsychiatric sequelae of COVID-19? *Brain Behav Immun* 2020; 87: 34-39 [PMID: 32298803 DOI: [10.1016/j.bbi.2020.04.027](https://doi.org/10.1016/j.bbi.2020.04.027)]
- 9 **Maj M**. "Psychiatric comorbidity": an artefact of current diagnostic systems? *Br J Psychiatry* 2005; 186: 182-184 [PMID: 15738496 DOI: [10.1192/bjp.186.3.182](https://doi.org/10.1192/bjp.186.3.182)]
- 10 **Xiang YT**, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, Ng CH. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry* 2020; 7: 228-229 [PMID: 32032543 DOI: [10.1016/S2215-0366\(20\)30046-8](https://doi.org/10.1016/S2215-0366(20)30046-8)]
- 11 **Brooks SK**, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 2020; 395: 912-920 [PMID: 32112714 DOI: [10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)]
- 12 **Taylor S**, Landry CA, Paluszek MM, Fergus TA, McKay D, Asmundson GJG. COVID stress syndrome: Concept, structure, and correlates. *Depress Anxiety* 2020; 37: 706-714 [PMID: 32627255 DOI: [10.1002/da.23071](https://doi.org/10.1002/da.23071)]
- 13 **Hossain MM**, Tasnim S, Sultana A, Faizah F, Mazumder H, Zou L, McKyer ELJ, Ahmed HU, Ma P. Epidemiology of mental health problems in COVID-19: a review. *F1000Res* 2020; 9: 636 [PMID: 33093946 DOI: [10.12688/f1000research.24457.1](https://doi.org/10.12688/f1000research.24457.1)]
- 14 **Spencer-Laith D**, Eustis EH, Barlow DH, Farchione TJ. The Impact of COVID-19 Related Social Distancing on Mental Health Outcomes: A Transdiagnostic Account. *Int J Environ Res Public Health* 2022; 19 [PMID: 35682179 DOI: [10.3390/ijerph19116596](https://doi.org/10.3390/ijerph19116596)]
- 15 **Kachadourian L**, Murrugh J, Kaplan C, Kaplan S, Feingold J, Feder A, Charney D, Southwick S, Peccoralo L, DePiero J, Ripp J, Pietrzak R. A prospective study of transdiagnostic psychiatric symptoms associated with burnout and functional difficulties in COVID-19 frontline healthcare workers. *J Psychiatr Res* 2022; 152: 219-224 [PMID: 35753241 DOI: [10.1016/j.jpsychires.2022.05.034](https://doi.org/10.1016/j.jpsychires.2022.05.034)]
- 16 **Olf M**, Bakker A, Frewen P, Aakvaag H, Ajdukovic D, Brewer D, Elmore Borbon DL, Cloitre M, Hyland P, Kassam-Adams N, Knefel M, Lanza JA, Lueger-Schuster B, Nickerson A, Oe M, Pfaltz MC, Salgado C, Seedat S, Wagner A, Schnyder U; Global Collaboration on Traumatic Stress (GC-TS). Screening for consequences of trauma - an update on the global collaboration on traumatic stress. *Eur J Psychotraumatol* 2020; 11: 1752504 [PMID: 32489523 DOI: [10.1080/20008198.2020.1752504](https://doi.org/10.1080/20008198.2020.1752504)]
- 17 **Rossi R**, Succi V, Talevi D, Niolu C, Pacitti F, Di Marco A, Rossi A, Siracusano A, Di Lorenzo G, Olf M. Trauma-spectrum symptoms among the Italian general population in the time of the COVID-19 outbreak. *Eur J Psychotraumatol* 2021; 12: 1855888 [PMID: 34992741 DOI: [10.1080/20008198.2020.1855888](https://doi.org/10.1080/20008198.2020.1855888)]
- 18 **Spitzer RL**, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. *JAMA* 1999; 282: 1737-1744 [PMID: 10568646 DOI: [10.1001/jama.282.18.1737](https://doi.org/10.1001/jama.282.18.1737)]
- 19 **Spitzer RL**, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* 2006; 166: 1092-1097 [PMID: 16717171 DOI: [10.1001/archinte.166.10.1092](https://doi.org/10.1001/archinte.166.10.1092)]
- 20 **Cohen S**, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983; 24: 385-396 [PMID: 6668417 DOI: [10.1111/j.1559-1816.1983.tb02325.x](https://doi.org/10.1111/j.1559-1816.1983.tb02325.x)]

- 21 **Ferber SG**, Weller A, Maor R, Feldman Y, Harel-Fisch Y, Mikulincer M. Perceived social support in the social distancing era: the association between circles of potential support and COVID-19 reactive psychopathology. *Anxiety Stress Coping* 2022; **35**: 58-71 [PMID: [34652983](#) DOI: [10.1080/10615806.2021.1987418](#)]
- 22 **Ferber SG**, Shoval G, Zalsman G, Mikulincer M, Weller A. Between Action and Emotional Survival During the COVID-19 era: Sensorimotor Pathways as Control Systems of Transdiagnostic Anxiety-Related Intolerance to Uncertainty. *Front Psychiatry* 2021; **12**: 680403 [PMID: [34393847](#) DOI: [10.3389/fpsyt.2021.680403](#)]
- 23 **McEvoy PM**, Hyett MP, Shihata S, Price JE, Strachan L. The impact of methodological and measurement factors on transdiagnostic associations with intolerance of uncertainty: A meta-analysis. *Clin Psychol Rev* 2019; **73**: 101778 [PMID: [31678816](#) DOI: [10.1016/j.cpr.2019.101778](#)]
- 24 **Gillett CB**, Bilek EL, Hanna GL, Fitzgerald KD. Intolerance of uncertainty in youth with obsessive-compulsive disorder and generalized anxiety disorder: A transdiagnostic construct with implications for phenomenology and treatment. *Clin Psychol Rev* 2018; **60**: 100-108 [PMID: [29426573](#) DOI: [10.1016/j.cpr.2018.01.007](#)]
- 25 **Fernandez KC**, Jazaieri H, Gross JJ. Emotion regulation: a transdiagnostic perspective on a new RDoC domain. *Cognit Ther Res* 2016; **40**: 426-440 [PMID: [27524846](#) DOI: [10.1007/s10608-016-9772-2](#)]
- 26 **Einstein DA**. Extension of the Transdiagnostic Model to Focus on Intolerance of Uncertainty: A Review of the Literature and Implications for Treatment. *Clin Psychol (New York)* 2014; **21**: 280-300 [PMID: [25400336](#) DOI: [10.1111/cpsp.12077](#)]
- 27 **Carpiniello B**, Tusconi M, Zanalda E, Di Sciascio G, Di Giannantonio M; Executive Committee of The Italian Society of Psychiatry. Psychiatry during the Covid-19 pandemic: a survey on mental health departments in Italy. *BMC Psychiatry* 2020; **20**: 593 [PMID: [33327940](#) DOI: [10.1186/s12888-020-02997-z](#)]
- 28 **Paluszek MM**, Asmundson AJN, Landry CA, McKay D, Taylor S, Asmundson GJG. Effects of anxiety sensitivity, disgust, and intolerance of uncertainty on the COVID stress syndrome: a longitudinal assessment of transdiagnostic constructs and the behavioural immune system. *Cogn Behav Ther* 2021; **50**: 191-203. [PMID: [33576712](#) DOI: [10.1080/16506073.2021.1877339](#)]
- 29 **Heckendorf H**, Lehr D, Boß L. Effectiveness of an Internet-Based Self-Help Intervention versus Public Mental Health Advice to Reduce Worry during the COVID-19 Pandemic: A Pragmatic, Parallel-Group, Randomized Controlled Trial. *Psychother Psychosom* 2022; **91**: 398-410 [PMID: [35051939](#) DOI: [10.1159/000521302](#)]
- 30 **Guzick AG**, Leong AW, Dickinson EM, Schneider SC, Zopatti K, Manis J, Meinert AC, Barth AM, Perez M, Campo DM, Weinzimmer SA, Cepeda SL, Mathai D, Shah A, Goodman WK, Salloum A, Kennedy S, Ehrenreich-May J, Storch EA. Brief, parent-led, transdiagnostic cognitive-behavioral teletherapy for youth with emotional problems related to the COVID-19 pandemic. *J Affect Disord* 2022; **301**: 130-137 [PMID: [35031335](#) DOI: [10.1016/j.jad.2022.01.034](#)]
- 31 **Ehrenreich-May J**, Halliday ER, Karlovich AR, Gruen RL, Pino AC, Tonarely NA. Brief Transdiagnostic Intervention for Parents With Emotional Disorder Symptoms During the COVID-19 Pandemic: A Case Example. *Cogn Behav Pract* 2021; **28**: 690-700 [PMID: [34629841](#) DOI: [10.1016/j.cbpra.2021.01.002](#)]
- 32 **Muñoz-Navarro R**, Cano Vindel A, Schmitz F, Cabello R, Fernández-Berrocal P. Emotional Disorders During the COVID-19 Outbreak in Spain: The Role of Sociodemographic Risk Factors and Cognitive Emotion Regulation Strategies. *Health Educ Behav* 2021; **48**: 412-423 [PMID: [34008452](#) DOI: [10.1177/10901981211014101](#)]
- 33 **Warren AM**, Zolfaghari K, Fresnedo M, Bennett M, Pogue J, Waddimba A, Zvolensky M, Carlbring P, Powers MB. Anxiety sensitivity, COVID-19 fear, and mental health: results from a United States population sample. *Cogn Behav Ther* 2021; **50**: 204-216 [PMID: [33595414](#) DOI: [10.1080/16506073.2021.1874505](#)]
- 34 **Cassielo-Robbins C**, Rosenthal MZ, Ammirati RJ. Delivering Transdiagnostic Treatment Over Telehealth During the COVID-19 Pandemic: Application of the Unified Protocol. *Cogn Behav Pract* 2021; **28**: 555-572 [PMID: [34108830](#) DOI: [10.1016/j.cbpra.2021.04.007](#)]
- 35 **Amici P**. Intolerance of Uncertainty: From Transdiagnostic Model to Clinical Management. *Psychiatr Danub* 2021; **33**: 22-25 [PMID: [34559773](#)]



Published by **Baishideng Publishing Group Inc**  
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA  
**Telephone:** +1-925-3991568  
**E-mail:** [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)  
**Help Desk:** <https://www.f6publishing.com/helpdesk>  
<https://www.wjgnet.com>

