Research on Posttraumatic Stress Disorder in the Context of the COVID-19 Pandemic: A Review of Methods and Implications in General Population Samples

Mathilde M. Husky1, Robert H. Pietrzak2,3, Brian P. Marx4 and Carolyn M. Mazure3,5

Abstract
Increasing concern about the mental health sequelae to the COVID-19 pandemic has prompted a surge in research and publications on the prevalence of posttraumatic stress disorder in general population samples in relation to the pandemic. We examined how posttraumatic stress disorder in the context of the COVID-19 pandemic has been studied to date and found three general themes: (1) assessment of posttraumatic stress disorder and posttraumatic stress disorder symptoms relied on self-report measures and often did not determine direct trauma exposure as required by Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition Criterion A to diagnose posttraumatic stress disorder; (2) inadequate assessment of pre-existing mental disorders and co-occurring stress; and (3) the use of cross-sectional designs in most studies, often relying on snowball sampling strategies to conduct online surveys. Notwithstanding these methodological limitations, these studies have reported moderate to severe posttraumatic symptoms in 25.8% of the general population on average in relation to the pandemic (ranging from 4.6% to 55.3%). Opportunities for advancing future research that will inform public health planning are discussed.

Keywords
COVID-19, methods, pandemic, posttraumatic stress disorder, research quality

Received 18 August 2021; Accepted 20 September 2021

Introduction
The spread of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has claimed millions of lives around the world and continues to pose a serious threat. In the context of a disaster of global proportions with potentially life-threatening consequences, researchers have responded to the importance of understanding the mental health sequelae to the COVID-19 pandemic, especially with regard to posttraumatic stress disorder (PTSD). Such studies are essential in ensuring that targeted prevention and treatment interventions and resources can optimally serve the mental health needs of the public. However, as the number of studies focusing on PTSD in the general population around the world continues to soar,1–3 there appears to be considerable variation in the methods used to study the mental health effects of this global health crisis. How this complex, evolving, and enduring experience is operationally defined and how its effects are subsequently interpreted—particularly with regard to COVID-19-related PTSD—has raised concern.4 The remarkably wide range of reported PTSD prevalence among the general population during the pandemic also points to the value of examining how studies are measuring the variables of interest.5

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5),6 diagnosis of PTSD requires exposure to a traumatic event followed by sustained symptoms and impairment. Identifying PTSD during an ongoing pandemic therefore raises the question of how PTSD DSM-5 Criterion A, which requires exposure

1Université de Bordeaux, Bordeaux, France
2National Center for PTSD, VA Connecticut Healthcare System, West Haven, CT, USA
3Yale School of Medicine, New Haven, CT, USA
4National Center for PTSD, VA Boston Healthcare System, and Boston University School of Medicine, Boston, MA, USA
5Department of Psychiatry, Women’s Health Research at Yale, Yale School of Medicine, New Haven, CT, USA

Corresponding Author:
Mathilde M. Husky, Laboratoire de Psychologie EA4139, Université de Bordeaux, 3 ter, place de la Victoire, 33076 Bordeaux, France.
Email: mathilde.husky@u-bordeaux.fr

Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (https://creativecommons.org/licenses/by-nc/4.0/) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access page (https://us.sagepub.com/en-us/nam/open-access-at-sage).
to a traumatic event involving “actual or threatened death, serious injury, or sexual violence,” was conceptualized and assessed for COVID-19 related studies. The DSM-5 further defines four types of qualifying exposure: direct exposure, witnessing it in person, learning it happened to a loved one (in the case of actual or threatened death only if it is violent or accidental), or repeated or extreme exposure to aversive details of the event though not through electronic media unless it is work-related. The DSM-5 further specifies that a life-threatening medical condition is not necessarily traumatic if it does not involve sudden or catastrophic events such as waking up during surgery or anaphylactic shock. With this definition in mind, there has been significant debate regarding whether and how the pandemic can be construed as a traumatic event that meets criterion A, and whether and how exposure to that event can be ascertained especially in general population samples.7–10 Beyond the issue of criterion A, how PTSD symptomatology has been evaluated, and the time frame considered in such assessments has raised concerns.4 In addition, three other concerns arise. First, understanding the mental health impact of the COVID-19 pandemic prompts the question of what other pre-pandemic or co-occurring mental health and stress-related variables are considered when evaluating the pandemic’s effects. Second, as research is being conducted in a rapid manner, convenience samples are often being used to estimate population-level prevalence. This raises the question of participant representativeness regarding age, gender, education, race, ethnicity, and income and may lead to an overestimation of the association between the variables of interest. Third, use of participant “report” of sociodemographic variables also leaves uncertainty of representativeness within a named group. For example, in light of data indicating there are sex- and gender-related differences in response to stress11 as well as in COVID-19-related mortality rates, clarity is needed in the working definition of these terms, yet not routinely provided in the studies reviewed.12 For the purposes of this review, when using the term sex, we are referring to a biological classification, generally as male or female. With regard to gender, we are referring to an internal sense of identity.13

In this review, we sought to understand the methodological approaches used in the rapidly growing literature on COVID-19-related PTSD in the general population and highlight methods and strategies that may help advance the study of PTSD during this ongoing global health crisis. We specifically focused on the assessment of PTSD with respect to exposure to traumatic events, consideration of prior and concurrent stressors and mental health status, and sample selection.

**Study Selection and Data Extraction**

A literature search of published studies on COVID-19 PTSD was conducted on 3 May 2021 using PubMed, PsycARTICLES, and Psychology and Behavioral Sciences Collection. The following search terms were used: “COVID-19” or “pandemic” and “PTSD” or “posttraumatic stress.” Additional filters were applied to identify journal articles published as original research since 2019; pertaining to adults aged 18 years and above; reporting original research rather than a review or commentary; and written either in English or French (as the first author could provide the necessary translation). The initial search yielded 748 references after the removal of duplicates (Figure 1). To be included in the final review, studies had to report the assessment of PTSD symptoms or PTSD in the context of COVID-19 a general population-based sample of adults. Studies that met the following criteria were excluded: (1) no original data were described (i.e., publications providing a review, meta-analysis, commentary, or letter to the editor); (2) the sole focus was on specific populations in which any restriction applied due to reported age, gender, profession (e.g., health care workers and youth), pre-existing medical or psychiatric conditions (e.g., persons with diabetes); SARS-Cov-2 infection status (e.g., persons who developed COVID-19); high-risk groups due to exposure to specific ongoing or past political or military conflicts (e.g., persons in war zones); (3) no measure or report of either PTSD symptoms or PTSD was provided; and (4) an outcome other than PTSD or PTSD symptoms was the focus of the paper (e.g., service utilization and psychometric papers). Using these criteria, the initial screen of study titles followed by a screen of abstracts yielded a list of 91 articles for a full-text screen. The review of full-text articles based on the criteria listed above yielded a final pool of 36 articles examining COVID-19-related PTSD or PTSD symptoms in general population adults 18 years or older. Data extraction focused on the following items: country; study design; sample characteristics; instrument used to assess PTSD or PTSD symptoms.

![Figure 1. Flow diagram of the literature search strategy and review process.](image-url)
including anchoring to a criterion A event; assessment of exposure to other traumatic events; and assessment of prior psychopathology (Table 1).

**PTSD Assessment**

A variety of instruments were used to assess PTSD symptomatology in the COVID-related studies reviewed and, when using the same instruments, a variety of cutoff scores or scoring methods were applied. Whether and how criterion A was addressed differed between studies. In addition, in some studies reporting estimates of the prevalence of PTSD, the duration of symptoms did not always meet the requirements for a PTSD diagnosis, yet in some cases, the studies described their findings as reflecting a diagnosis of PTSD.

Among the most commonly used instruments was the 22-item Impact of Event Scale-Revised (IES-R), which was used in one-third of the studies included in the current review. This self-report measure was designed to assess current subjective distress covering the past 7 days in response to a specific traumatic event. The IES-R yields a score ranging from 0 to 88. The studies included in the review applied various scoring patterns to identify PTSD symptomatology, and when studies used similar cutoffs, the meaning was often interpreted differently. For instance, although several studies used scores of 24, 33, and 37 to identify mild, moderate, and severe symptoms, respectively; others used a score as low as ≥9 to identify mild, ≥26 for moderate, and ≥44 for severe PTSD symptoms. Others applied a single cutoff score of ≥24, ≥33, or ≥35 to identify the presence of “probable PTSD.” Some did not report the specific cutoffs used, and some reported summing mean scores to which a cutoff of ≥5.6 was applied. Considering the heterogeneity with which this instrument was scored across studies, caution is needed when comparing prevalence estimates obtained. Importantly, there was also considerable heterogeneity in the manner in which authors referred to what these estimates reflected—using terms such as “PTSD symptoms,” “posttraumatic stress,” “risk of PTSD,” “partial, probable or definite COVID-19 related PTSD,” “preliminary PTSD,” or “mild, moderate or severe PTSD,” despite the fact that the IES-Revised was not designed to be a diagnostic tool for the assessment of the disorder.

Another widely used instrument was the PTSD Checklist PCL-5, which assesses PTSD symptoms experienced in the past month. The use of cutoff scores tended to be homogeneous, typically ≥31 or ≥33 scores that have been previously validated in military veterans. Some used symptom-criteria either alone or in combination with a cutoff score. Additional versions of the PCL were used, such as the PCL-S-specific stressor version with COVID-19 as the specific stressor, and the PCL-Civilian version PTSD Checklist-Civilian version (PCL-C) and its abbreviated form (PCL-C-2). Other instruments that were used included the Primary Care PTSD Screen for DSM-5, International Trauma Questionnaire (ITQ), Screen for Posttraumatic Stress Symptoms (SPTSS), Global Psychotrauma Screen Posttraumatic Stress Symptoms Subscale (GPS-PTSS), and Acute Stress Disorder Scale (ASDS).

Collectively, the instruments used to assess PTSD symptomatology in the reviewed studies were, for the most part, widely used survey instruments. However, notable heterogeneity was observed regarding the cutoff scores used to determine the presence or absence of PTSD or PTSD symptoms, especially with the IES-R. Furthermore, a number of studies referred to positive screens as indicative of PTSD while they were more likely assessing a form of distress that could not be equated to PTSD as formal diagnostic criteria were not met. Lastly, in the absence of anchoring symptoms to a specific event, it is unclear whether the assessed PTSD symptoms are related to the COVID-19 pandemic or other events. Taken together, these points raise serious questions regarding the value of disorder prevalence rates reported in such circumstances and point to the risk of greatly overestimating the prevalence of PTSD in the general population.

**COVID-19 Pandemic and Criterion A Conceptualization and Assessment**

In the reviewed studies, the methods used to assess criterion A varied considerably. As noted previously, many studies did not specifically report how the scales used to assess PTSD symptomatology were anchored to a qualifying traumatic event. Although it may have been done but omitted in the publication, it remains unclear in these studies whether and how criterion A was defined and met by the index event. Some studies reported anchoring their assessment of PTSD symptomatology to the COVID-19 pandemic. However, some surveys asked respondents to report symptoms in relation to: “COVID-19,” “their experience of the COVID-19 pandemic,” the “COVID outbreak,” or “the impact of COVID-19 on their income and occupation status.” This variability raises the question of the meaning of such terms across respondents. In one study, respondents were asked whether the worst event they had experienced was COVID-19 related (e.g., death of someone close from COVID-19 or COVID-19 infection) and found that only 3.0% of the sample endorsed a COVID-19-related index trauma. Although most of the studies were initiated at the early stages of the outbreak in their respective regions, using broad terms rather than specific COVID-19-related event questions makes it unclear if the definition of criterion A was met. Studies assessing PTSD symptoms without clarifying whether these symptoms are related to a criterion A trauma-qualifying aspect of the COVID-19 pandemic would be subject to potential bias as well.
(e.g., exposure to mass COVID-19 casualties) may lead to an overestimation of the prevalence of PTSD in the general population. Consequently, data provided to public health officials may not be sufficiently informative or may even be misleading. In addition, as the pandemic progresses, a “generic” use of “COVID-19 exposure” as an index event to which PTSD symptoms are anchored may be less informative from a public health standpoint.

**Exposure to Other Stressful Events**

Cumulative exposure to multiple traumatic events increases the risk of subsequent PTSD, particularly events involving interpersonal violence. Furthermore, experiencing prior events increases the likelihood of developing PTSD following subsequent exposure. The majority of adults report exposure to at least one potentially traumatic event in their lifetime, with an estimated average of 3.2 traumatic events per capita. Moreover, additional exposures occurring in the form of adverse childhood experiences are common in the general population. Such adversities are also known to contribute to PTSD risk, as well as the capacity to adjust to subsequent stressful events. Other sources of stress, such as chronic deleterious life conditions and socioeconomic strain, are also associated with poor mental health outcomes.

Considering these factors, and evidence that the cumulative exposure to stress across the lifespan is directly associated with the level of adjustment, understanding the consequences of the COVID-19 pandemic would benefit from consideration of prior stressful experiences and ongoing chronic stressors. In the present review, only 8 studies (22.2%) assessed prior exposure to some form of a stressful event. The remaining studies did not report assessing prior exposure to stressful experiences when examining pandemic-related PTSD or PTSD symptoms. In terms of ongoing stressors, pandemic-related lockdowns have been shown to drive an increase in domestic violence. This increase, although indirectly related to the pandemic, may contribute to the potential risk for PTSD and thus should be addressed in PTSD-related studies. Additional stressors indirectly associated with the pandemic such as loss of income, childcare responsibilities, and relationship strains are likely to have a deleterious impact and deserve attention.

**Pre-existing Psychiatric Conditions**

In general population samples of adults, 50.8% of individuals will have a mental disorder at some point in their life. This is in addition to the 26.2% to 27.0% of individuals affected by at least one disorder in the past 12 months. In the case of PTSD, a history of mental illness prior to exposure to a traumatic event increases one’s probability of developing PTSD with an average effect size of .11. Yet, of the studies included in the current review, only 30.5% considered pre-existing mental health when assessing pandemic-related PTSD symptoms. For example, such studies asked respondents whether they were ever diagnosed with a mental health problem, or had a history of anxiety disorders, mood disorders, or psychosis, experienced prior or current mental illness, or had received prior mental health treatment. These studies have consistently observed that prior mental illness is a strong predictor of PTSD and other mental health problems during the pandemic. In the general population, a portion of those that had PTSD prior to the pandemic likely still had PTSD during the pandemic. Based on estimates from the World Mental Health Surveys, the mean duration of PTSD symptoms is approximately 6 years, although duration varies by type of event, ranging from 1 year (e.g., natural disaster) to over 13 years (e.g., combat exposure).

**Study Design and Sample Characteristics**

All but one of the studies that were reviewed used cross-sectional web-based surveys. Cross-sectional designs in the context of an ongoing pandemic may be useful to describe the status of the general population at a given point in time. However, attributing symptoms to the pandemic is best achieved by comparing pre-pandemic and current data. The reliance on cross-sectional designs also highlights the importance of assessing prior mental health status so as not to conflate pre-existing conditions with ongoing distress. The only longitudinal study included in this review relied on an international sample, covering over 50 countries, and including adults who completed an online survey in April and again in August/September 2020 (n = 1567). At baseline, 51% of the sample was described as at risk for PTSD or presenting with acute stress based on an IES cutoff score of 11. At follow-up, the average acute stress symptom scores had decreased significantly.

In the current review, country-specific sample sizes ranged from n = 107 in Norway to n = 18,147 in Italy. One study involving 20 countries and a total of 733 participants did not report country-specific sample sizes. This also occurred in another study, which surveyed 1567 adults in 50 countries. In some studies, countries were combined due to low sample sizes, for example, Australia and New Zealand and Iraq and Palestine. All studies reported the specific timing of data collection, thereby providing a precise indication of the status of the pandemic in the region at the time of the survey. The spread of the virus and its variants differed markedly across regions of the world and in various areas of any given country at different times, and the manner in which the pandemic was managed by local authorities (https://covid19.who.int) also differed. Thus, it is likely that prevalence estimates of PTSD also varied as a function of local conditions and time since exposures.
Only one study relied on an existing nationally representative research panel from which the researchers extracted their sample, another reported a 95.6% response rate using the JD Health platform, another 4 studies solicited commercial panels to constitute their sample. The latter achieved their sampling using MTurk, Prolific, Qualtrics, Sojump, the JD Health platform, or complemented their convenience sample with such panels to oversample certain groups such as men. Studies relying on research panels designed to reflect the broader population achieved a reported gender and age distribution that was more representative of existing population benchmarks.

Snowball sampling, in which research subjects recruit other subjects, was the most frequently used method to enroll general population study participants. The proportion of women in such samples ranged from 24.9% in Turkey to 91.4% in China, with nearly half of the study samples reporting a proportion of women >70%. In addition, the samples tended to mostly include young adults, though studies often reported mean age rather than the median age. In some cases, the median age was as young as 25 years.

Overall, the majority of studies used convenience samples with a large proportion of women and generally young adults, raising the question of the representativeness of the samples and their relevance with regard to establishing the prevalence of COVID-19-related PTSD in the general population. In addition, while cross-sectional surveys conducted during the pandemic can be informative regarding the level of distress experienced at a particular time, attributing the cause of that distress to the pandemic may overextend the interpretation of the data. In sum, cross-sectional studies that do not assess lifetime mental disorders or that do not assess the exacerbating effects of other traumatic events and secondary stressors that occurred during the pandemic, may run the risk of over- or underestimating the mental health effects of the pandemic in the general population.

**Limitations of the Present Review**

The main limitation of the present review is the risk of omitting studies that may have met the criteria for inclusion. A second limitation is that data extraction was based on data provided in the manuscript only. While two authors were contacted to clarify methods and findings, one did not respond.

**Conclusions**

There is a continuing need to understand the mental health effects of the ongoing COVID-19 pandemic, which has caused substantial loss of life, enormous personal and economic costs for billions of people, and undeniable distress in the general population around the world. We reviewed COVID-19-related studies conducted in general population samples that focused on the assessment of PTSD or PTSD symptoms to examine how this methodologically and conceptually complex task has been undertaken. The reviewed studies demonstrated that a significant portion (mean = 25.8%, median = 23.4%, ranging from 4.6% to 55.3%) of respondents drawn from the general population reported moderate to severe posttraumatic symptomatology, which raises the question of the stress-related burden associated with the ongoing pandemic. However, these findings are hampered by several methodological issues, which if remedied in future research, may help enhance the precision of results and better inform efforts to address the mental health needs of the general population.

We propose five recommendations for future studies. First, although there is value in convenience samples in unco-vering the direction for further research, sole reliance on such samples to determine PTSD prevalence in the general popu-lation is not optimal. Further sampling strategies must ensure that population demographics are well-represented, or that special populations are identified as the focus of inquiry. Second, although cross-sectional studies help detect associations, longitudinal studies are needed to determine potential causal relationships between direct exposures to the events of the pandemic and PTSD or PTSD symptoms. In addition, opportunities for direct comparisons with matched pre-pandemic cohorts should be pursued. Third, the use of online surveys has considerable practical advantages in recruiting subjects. However, particularly for online data collection, a limited survey duration is necessary to help ensure study completion. Yet, additional data need to be gathered that likely require further engagement with participants. For example, data on pre-existing and ongoing psychiatric conditions and stressors, as well as prior exposure to traumatic events are required to identify a COVID-19 related first occurrence of PTSD. Further subject engagement is also likely needed to determine an anchor to an index traumatic event. Fourth, increased clarity is needed in standardizing assessments of PTSD and PTSD symptoms, cutoff scores used to operationalize positive screens, and recognizing whether PTSD or symptoms of this disorder are the targets of the investigation. Although in-person interviews are costly in the context of general population studies, the use of the Clinician-Administered PTSD Scale for DSM-5 to detect COVID-related PTSD, as was done in one study among patients with severe COVID-infection, would significantly improve the assessment of PTSD. Fifth, a robust finding in the PTSD literature is the presence of gender differences in the prevalence of PTSD in the general population with women at increased risk compared to men. The majority of studies included in this review reported that women generally had greater severity of PTSD symptoms; however, others reported an absence of significant gender differences, and some studies indicated that the prevalence of PTSD was higher in men compared to women. Yet, little was discussed regarding how the gender-based findings can be understood, how gender
| Authors            | Country                                                                 | Data collection dates            | Study type                  | Study sample size (gender distribution, and age) | Assessment of exposure to other stressful events | Assessment of prior mental disorders | Assessment of PTSD, cutoff scores, and anchoring to a traumatic event (criterion A) | Prevalence of PTSD or PTSD symptoms in the general population |
|--------------------|--------------------------------------------------------------------------|----------------------------------|-----------------------------|--------------------------------------------------|-------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Kar et al.         | 20 countries                                                            | 29 March–7 April 2020            | Cross-sectional survey      | N = 733                                           | No                                              | No                                  | PC-PTSD-5 cutoff = 3 for probable PTSD                        | 34.1% probable PTSD                                                        |
| Veldhuis et al.    | 50+ countries                                                           | Baseline: 5–19 April 2020; Follow-up: 28 August–11 September 2020 | Longitudinal survey         | N = 1567                                          | No                                              | No                                  | Ever diagnosed with specific mental health issues | 15-item IES Cutoff score = 11 for potential risk for PTSD Criterion A: anchored to COVID-19 | 51% risk for PTSD at baseline |
| Passawanti et al.  | Australia, China, Ecuador, Iran, Italy, Norway, and the United States   | 17–30 April 2020                 | Cross-sectional survey      | N = 1612                                          | No                                              | No                                  | 22-item IES-R Cutoff score = 33 for probable PTSD Criterion A: anchoring not specified | 14.9% mild, 8.5% moderate, and 46.8% severe risk of PTSD                   |
| Goularte et al.    | Brazil                                                                   | 20 May–14 July 2020              | Cross-sectional survey      | N = 1996                                          | No                                              | No                                  | History of the previous psychiatric disorders including anxiety and mood disorders and psychosis | 22-item IES-R Cutoff >5.6 based on "the sum of the average of each domain" indicating "psychological stress" Covering the past two weeks Criterion A: anchoring not specified | 34.2% moderate to severe PTSD symptoms |
| Sommer et al.      | Canada                                                                   | May–July 2020                    | Cross-sectional survey      | N = 1260                                          | Lifetime trauma exposure, instrument not specified | Lifetime trauma exposure, instrument not specified | PC-PTSD-5 Cutoff not specified Criterion A: anchored to COVID-19-related event if it was reported as the worst event | 64.3% PTS among those with COVID-19 as index trauma and 3% of the sample reported COVID-19 items as index trauma (n = 28) |
| Liu et al.         | China                                                                    | 1–10 February 2020               | Cross-sectional survey      | N = 2858                                          | No                                              | No                                  | Presence of "prior psychological problems"                      | PCL-5 Cutoff not specified Criterion A: anchoring not specified            | 19.5% PTSD                                                                      |
| Liu et al.         | China                                                                    | 8–18 June 2020                   | Cross-sectional survey      | N = 1035                                          | No                                              | No                                  | 17-item PCL-C Cutoff = 50 for PTSD Criterion A: anchoring not specified | 13.6% PTSD in general population adults                                   | (continued)                                                                 |
| Authors       | Country                      | Data collection dates       | Study type                        | Study sample size (gender distribution, and age)                                                                 | Assessment of exposure to other stressful events | Assessment of prior mental disorders | Assessment of PTSD, cutoff scores, and anchoring to a traumatic event (criterion A) | Prevalence of PTSD or PTSD symptoms in the general population |
|--------------|------------------------------|-----------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------|
| Luo et al.¹⁸ | China                        | 29 January–11 February 2020 | Cross-sectional survey            | N = 490 general population adults 58.6% women 38.6% ages 18 to 30 years and N = 915 frontline HCW, n = 1659 non-frontline HCW | No                                            | No                                | 22-item IES-R  Cutoff = 9 for mild, 26 for moderate, and 44 for moderately severe PTSD symptoms  Criterion A: anchoring not specified | 4.9% of general population adults “moderately severe” PTSD, 22.4% moderate, 36.9% mild |
| Ren et al.⁸⁴ | China                        | 14 February–29 March 2020   | Cross-sectional survey            | N = 1172 69.3% women median age = 22 years | No                                            | No                                | Started the study with ASDS (n = 714), continued with PCL-5 (n = 458) Cutoff = 33 Criterion A: anchoring not specified | 7.0% clinical PTSD |
| Sun et al.³⁵ | China                        | 30 January–3 February 2020  | Cross-sectional survey            | N = 2091 60.8% women 1.4% under 18 years, 31.5% ages 18 to 29 years | No                                            | No                                | PCL-5 Cutoff ≥ 33, and symptom criteria Criterion A: anchored to COVID-19 | 4.6% score >33, 5.3% met symptom criteria, and 3.3% met both |
| Yang et al.¹⁷| China                        | 6–8 June 2020               | Cross-sectional survey            | N = 15 000 57.1% women 0.7% age <18 years, 6.3% ages 18 to 25 years | No                                            | Presenice or absence of “current mental illness/chronic disease” 22-item IES-R Cutoffs = 9 mild, 26 moderate, 44 severe PTSD Criterion A: anchored to COVID-19 | 20.1% present with moderate to severe PTSD (4.7% severe and 15.4% moderate) and 37.8% mild PTSD |
| Zhang et al.³⁰| China                        | 30 January–3 February 2020  | Cross-sectional survey            | N = 2027 61.2% women Mean age = 35.47 years, SD = 11.32 | No                                            | No                                | PCL-5 Cutoff = 33 Criterion A: anchoring not specified | 4.7% PTSS |
| Shuwiekh et al.²⁹ | Egypt, Kuwait, Jordan, Saudi Arabia, and Iraq | 28 April–25 May 2020        | Cross-sectional survey            | Egypt (N = 255, 78.8% women, mean age = 24.27 years, SD = 6.77), Kuwait (N = 442, 89.6% women, mean age = 27.11 years, SD = 11.29), Jordan (N = 216, 88.4% women, mean age = 28.76 years, SD = 10.67), Saudi Arabia (N = 212, 80.7% women, mean age = 41.25 years, SD = 11.18), Algeria (N = 110, 82.7% women, mean age 40.99 years, SD = 12.47), Iraq and Palestine (N = 139, 55.4% women, mean age = 42.40 years, SD = 13.11) | No                                            | No                                | PCL-5 Cutoff = 31 for probable PTSD Criterion A: anchoring not specified | 36.6% probable PTSD |
| Makhashvili et al.⁴³ | Georgia                        | 25 May–25 June 2020        | Cross-sectional survey            | N = 2088 86.5% women | No                                            | No                                | Adapted ITQ 1 of 2 symptoms from the 3 symptom clusters + | 11.8% of women and 12.5% of men have PTSD |

(continued)
| Authors | Country   | Data collection dates | Study type       | Study sample size (gender distribution, and age) | Assessment of exposure to other stressful events | Assessment of prior mental disorders | Assessment of PTSD, cutoff scores, and anchoring to a traumatic event (criterion A) | Prevalence of PTSD or PTSD symptoms in the general population |
|---------|-----------|-----------------------|------------------|--------------------------------------------------|-----------------------------------------------|------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Kalaitzaki31 | Greece   | 5–30 April 2020       | Cross-sectional survey | N = 1661 75.5% women mean age = 39.5 years, SD = 12.2; (59.4% general population and 40.6% HCW) | No                                             | No                                 | PCL-5 Cutoff = 33 Criterion A: anchored to emotional reactions to COVID-19 | 27.2% PTSD in a general population sample |
| Karaivazoglou et al.16 | Greece | 10 April–4 May 2020   | Cross-sectional survey | N = 1443 72.9% women 28.8% ages 18 to 30 years | No                                             | No                                 | 22-item IES-R Cutoff scores for partial = 24, probable = 33, and definite PTSD = 37 Criterion A: anchored to COVID-19 pandemic | 19.6% partial PTSD, 8.7% probable PTSD, and 36.4% definite PTSD |
| Singh and Khokhar19 | India | Last week of April 2020 | Cross-sectional survey | N = 234 59.4% women mean age 28.59 years, SD = 1047 | No                                             | No                                 | 22-item IES-R Cutoff >24 used to define “PTSD” Criterion A: anchoring not specified | 28.2% PTSD reported based on >24 cutoff, “13.4% with a score from 24 to 32, 8.1% probable diagnosis, and 5.4% high enough to suppress immune system’s functioning” |
| Jowett et al.45 | Ireland | 31 March–5 April 2020 | Cross-sectional survey | N = 1041 51.5% women 11.1% ages 18 to 24 | No                                             | No                                 | Adapted ITQ ≥2 for at least one of two symptoms from each cluster and at least one functional impairment item to be endorsed (≥2). Criterion A: anchored to their experience of the COVID-19 pandemic | 17.7% met criteria for PTSD “with COVID-19 as the stressor” |
| Bonichini and Tremolada30 | Italy | 1–30 April 2020       | Cross-sectional survey | N = 1839 77.7% women mean age = 32.63 years, SD = 13.03 | No                                             | Presence of “precedent pathologies” NOS 22-item IES-R Cutoff = 33 for preliminary PTSD Anchored to COVID-19 | 23.5% PTSD |
| Di Giuseppe et al.34 | Italy | 13–18 March 2020      | Cross-sectional survey | N = 5683 75% women 34% ages 18 to 30 years | No                                             | No                                 | 22-item IES-R Cutoff not specified Criterion A: anchoring not specified | 29.4% clinically significant symptoms of PTSD |
| Favieri et al.44 | Italy | 18–25 March 2020      | Cross-sectional survey | N = 1639 75.8% women 66.4% ages 18 to 29 years | No                                             | No                                 | Adapted PCL-5 (19-item) scores higher than the mean of the sample plus 1.5 SD were indicative of higher PTSD symptomatology | 5.1% PTSD |

(continued)
| Authors                  | Country      | Data collection dates | Study type       | Study sample size (gender distribution, and age) | Assessment of exposure to other stressful events | Assessment of prior mental disorders | Assessment of PTSD, cutoff scores, and anchoring to a traumatic event (criterion A) | Prevalence of PTSD or PTSD symptoms in the general population |
|-------------------------|--------------|-----------------------|------------------|------------------------------------------------|-------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------|
| Rossi et al.⁶¹           | Italy        | 27 March–6 April 2020 | Cross-sectional  | N = 18 147 79.6% women median age = 38          | IADQ adapted to COVID-19                         | Prior mental illness using GPS module | Criterion A: anchored to COVID-19 GPS-PTSS 3 out of 5 symptoms were reported as presentCriterion A: anchoring not specified | 37.14% PTSS                                                   |
| González Ramírez et al.²² | Mexico       | 27 March–2 April 2020 | Cross-sectional  | N = 3932 74.5% women mean age = 33 years       | No                                               | No                                   | 22-item IES-R Cutoff ≥35, + for the subscales of emotional distress, ≤14 for normal, 15 to 20 for “moderate,” and >20 points for “severe distress”Criterion A: anchoring not specified | 27.7% clinically significant PTSD (using total score cutoff) |
| Agberotimi et al.²⁶      | Nigeria      | 20 March–19 April 2020| Cross-sectional  | n = 502 general population adults 45.6% women N = 382 HCW The overall sample mean age = 28.75 years, SD = 8.17 | No                                               | No                                   | 22-item IES-R Cutoff = 24 mild, 33 moderate, 37 severeCriterion A: anchoring not specified | 42.8% in the general population for severe PTS symptoms |
| Bonsaksen et al.³³       | Norway       | 8 April–20 May 2020   | Cross-sectional  | N = 4527 85% women 25.5% ages 18 to 29 years | No                                               | No                                   | PCL-5 Symptom criteria, current symptomsCriterion A: anchored to the COVID-19 outbreak | 12.5% for men and 19.5% for women symptom-defined PTSD |
| Alshehri et al.⁴⁶        | Saudi Arabia | June 2020             | Cross-sectional  | N = 1374 50.95% women 61.9% ages 34 years or younger | No                                               | Presence of prior psychiatric conditions | 17-item PCL-5 Cutoff = 45, + symptom-based scoring (items scoring 3-5 with 1B, 3C, and 2D), + both combinedCriterion A: anchored to their experiences with the COVID-19 pandemic | 22.6% with cutoff 24.8% with symptom criteria, and 19.6% combined |
| Joseph et al.⁸³          | Saudi Arabia | 12 April–10 May 2020  | Cross-sectional  | N = 584 38.2% women 22.6% ages 18 to 24 years | No                                               | No                                   | IES-6 Cutoff ≥7 for “clinical concern” and =9 for probable PTSDCriterion A: anchoring not specified | 51.3% met the level of probable PTSD diagnosis, Overall, 65.5% met levels of clinical concern for PTSD |
| Del Río-Casanova et al.¹⁵ | Spain        | 23–28 March 2020      | Cross-sectional  | N = 3520 74.2% women Mean age = 39.24 years, SD = 12 | No                                               | Antecedents of psychiatric illness | 22-item IES-R Cutoff = 24 mild, 33 moderate, 37 severeCriterion A: anchoring not specified | 19% of women versus 7.4% of men have severe PTS |

(continued)
| Authors                  | Country                  | Data collection dates          | Study type               | Study sample size (gender, distribution, and age) | Study sample size (gender distribution, and age) | Assessment of exposure to other stressful events | Assessment of prior mental disorders | Assessment of PTSD, cutoff scores, and anchoring to a traumatic event (criterion A) | Prevalence of PTSD or PTSD symptoms in the general population |
|-------------------------|--------------------------|-------------------------------|--------------------------|--------------------------------------------------|-------------------------------------------------|----------------------------------------|----------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------|
| Gonzalez-Sanguino et al. | Spain                    | 21–28 March 2020              | Cross-sectional survey   | N = 3480                                        | 75% women, mean age = 37.92 years               | No                                     | Presence or absence of “previous illness” and “mental health” no further details | Cutoff not specified | Criterion A: anchoring not specified | 15.8% with moderate to extreme PTSD symptoms |
| Odriozola-González et al. | Spain                    | 28 March–4 April 2020         | Cross-sectional survey   | N = 3550                                        | 64.9% women, mean age 32.1 years, SD = 14.1, median = 25 | No                                     | Prior MH tx, psychotropic medication intake | Cutoff score not specified | Criterion A: anchoring not specified | 11.5% severe, 35.5% moderate IES-R scores (47.5% presented moderate-to-severe psychological impact) |
| Kakaje et al.           | Syria                    | 6–13 April 2020               | Cross-sectional survey   | N = 5588                                        | 69.6% women, mean age = 26.84 years, SD = 7.81  | No                                     | Distress related to war noises or displacements | Cutoff not specified | Criterion A: anchoring “not linked to a specific event.” | 23.3% met the criteria for probable PTSD |
| Kira et al.             | Turkey                   | 2 October–13 November 2020    | Cross-sectional survey   | N = 262                                         | 29.4% women, Mean age = 28.25 years, SD = 10.35 | No                                     | CTS-S-36 items                              | PCL-5                  | Cutoff = 31 | 33.2% probable PTSD |
| Kolacz et al.           | United States            | 29 March–13 May 2020          | Cross-sectional survey   | N = 1666                                        | 59.7% women, Mean age = 45.87 years, SD = 16.17 | No                                     | Adverse and traumatic experiences scale | Cutoff not specified | Criterion A: anchoring not specified | 27.8% PTSD |
| Murata et al.           | United States            | 27 April–13 July 2020         | Cross-sectional survey   | N = 2007 general population adults             | 73% women, Mean age = 41.8 years, SD = 17.7 | As part of the PC-PTSD                  | LT NSSI, STB                             | PC-PTSD-5                      | Cutoff = 3 | Only 1.3% endorsed COVID-19 as a traumatic event, among adults: 33% PTSD |
| Bridgland et al.        | United States, United Kingdom, Canada, Australia, and New Zealand | 10–21 April 2020              | Cross-sectional survey   | N = 1040 adults                                | 48.8% women, Mean age = 35.7 years, SD = 12.3; USA: n = 260 (41.5% women); Australia and New Zealand: n = 259 (49.0% women); Canada: n = 260 (45.2% women); UK: n = 260 (61.2% women) | No                                     | COVID-19-related events               | Adapted PCL-5 (20-items)           | Cutoff = 33 | 13.2% PTSD |
| Le et al.               | Vietnam                  | April 2020                    | Cross-sectional survey   | N = 1382                                       | 62.0% women                                    | No                                     | Comorbidities, how and what is unclear | Cutoff not specified, only categories “normal, clinical” | 10.3% clinically concerning, 4.6% PTSD, and 7.7% severe PTSD |

(continued)
was defined, and the importance of pre-existing and concurrent stressors that may disproportionately affect more women than men. For example, there is growing evidence that public health measures to reduce the speed of viral progression (e.g., lockdowns, school closures, and working from home) have had a greater effect on women.86

A conceptual question has also become apparent in the review of recent studies attempting to determine the PTSD-related impact of the pandemic. Namely, can the COVID-19 pandemic as a disruptive global experience be construed as direct exposure to a traumatic event in the general population? Based on the traditional use of the DSM-5 criteria, even actual contact with the SARS-CoV-2, testing positive or developing COVID-19 symptoms may not meet criterion A and could be considered non-traumatic stressful events.87 A systematic review of studies examining disaster-related PTSD identified two dimensions for an incident to qualify as a disaster, namely its large scale and significant outcomes.88 Based on this definition, the pandemic can be construed as a disaster. However, even if the pandemic is seen as a natural disaster, exposure requirements are not automatically met in the general population. To meet the current diagnostic conceptualization of PTSD, exposure must be addressed to satisfy criterion A. Consequently, future studies estimating the psychological consequences of the pandemic should carefully consider whether outcomes reflect PTSD or some form of the stress-related condition. Some have suggested considering a new type of pandemic-related stress disorder, such as COVID-19 stress syndrome89 to account for clinically significant distress related to the pandemic. However, other possibilities include considering other existing DSM-5 disorders such as adjustment disorders,7 or other specified trauma- and stressor-related disorders. Relatedly, rather than considering the pandemic as a general traumatic experience in future studies, it may be important to consider multiple stressors that would not have occurred without the pandemic (e.g., loss of a close friend or family member to COVID-19, hospitalization due to severe COVID-19 symptoms, major loss of income due to job closure during COVID-19, homeschooling children, lockdowns, and mandated restrictions in activities). A recent study examining the number of COVID-19-related stressors in relation to posttraumatic stress symptoms and confirmed the usefulness of this approach in general population samples.90 Other major, as well as less severe life stressors, could be assessed as those that either pre-existed the pandemic or judged by a study participant as not directly related to the pandemic (e.g., divorce or separation). This type of approach would allow a more exhaustive picture of individual exposure to various stressors and take the latter into account when measuring associated symptoms.

We identified and discussed the methodological issues arising from research focused on COVID-19-related PTSD and PTSD symptoms in general population samples. As new variants of SARS-CoV-2 spread, signaling an uncertain

Table 1. Continued.

| Authors | Country | Data collection dates | Study sample size (gender distribution, and age) | Study type | Country |
|---------|---------|-----------------------|-------------------------------------------------|------------|---------|
| Husky et al. | United States | 2020 | 1644 adult, 36.4 years, SD = 9.7 | 11 | United States |
end to the pandemic, additional studies with enhanced precision and methodologies are needed to understand the evolving and longer-term prevalence of PTSD and PTSD symptoms globally. We suggest that this will be best achieved by evaluating psychological distress in the context of lifetime psychopathology and lifetime and ongoing exposure to stress and trauma, and by using representative samples and longitudinal or matched-cohort sample approaches. We conclude that the study of PTSD and other stress-related disorders in the context of the ongoing pandemic requires further conceptualization to address both the issue of stressor burden and the complexity of pandemic-specific symptomatology. Within studies of stress, we also suggest that research should seek to identify cognitive styles, personal beliefs, and support systems that can be modified to reduce stress or enhanced to promote resilience during this uniquely difficult time. Such modifiable factors could be integrated into public health efforts to respond to the mental health challenges of this global health crisis.

Declaration of Conflicting Interests
The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding
The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD
Mathilde M. Husky https://orcid.org/0000-0001-5314-1403

References
1. Cénat JM, Blais-Rochette C, Kokou-Kpolou CK, et al. Prevalence of symptoms of depression, anxiety, insomnia, post-traumatic stress disorder, and psychological distress among populations affected by the COVID-19 pandemic: a systematic review and meta-analysis. *Psychiatry Res* 2021;295:113599. doi: 10.1016/j.psychres.2020.113599
2. Xiong J, Lipsitz O, Nasri F, et al. Impact of COVID-19 pandemic on mental health in the general population: a systematic review. *J Affect Disord*. 2020;277:55–64. doi: 10.1016/j.jad.2020.08.001
3. Arora T, Grey I, Östlundh L, et al. The prevalence of psychological consequences of COVID-19: a systematic review and meta-analysis of observational studies. *J Health Psychol* 2020;15:39105320966639. doi: 10.1177/1359105320966639
4. Asmundson GJG, Taylor S. Garbage in, garbage out: the tenuous state of research on PTSD in the context of the COVID-19 pandemic and infodemic. *J Anxiety Disord* 2021;78:102368. doi: 10.1016/j.janxdis.2021.102368
5. Yuan K, Gong Y-M, Liu L, et al. Prevalence of posttraumatic stress disorder after infectious disease pandemics in the twenty-first century, including COVID-19: a meta-analysis and systematic review. *Mol Psychiatry*. 2021. doi: 10.1038/s41380-021-01036-x
6. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Publishing; 2013.
7. Van Overmeire R. The methodological problem of identifying criterion a traumatic events during the COVID-19 era: a commentary on Karatzias et al. (2020). *J Trauma Stress*. 2020;33:864–865. doi: 10.1002/jts.22594
8. Shevlin M, Hyland P, Karatzias T. Is posttraumatic stress disorder meaningful in the context of the COVID-19 pandemic? A response to Van Overmeire’s commentary on Karatzias et al. (2020). *J Trauma Stress*. 2020;33:866–868. doi: 10.1002/jts.22592
9. Horesh D, Brown AD. Traumatic stress in the age of COVID-19: a call to close critical gaps and adapt to new realities. *Psychol Trauma: Theory Res Pract Policy*. 2020;12:331–335. doi: 10.1037/trp0000592
10. Bridgland VME, Moeck EK, Green DM, et al. Why the COVID-19 pandemic is a traumatic stressor. *PLoS One*. 2021;16:e0240146. doi: 10.1371/journal.pone.0240146
11. Olff M. Sex and gender differences in post-traumatic stress disorder: an update. *Eur J Psychotraumatol*. 2017;8:1351204. doi: 10.1080/200080198.2017.1351204
12. Dehingia N, Raj A. Sex differences in COVID-19 case fatality: do we know enough? *Lancet Glob Health*. 2021;9:e14–e15. doi: 10.1016/S2214-109X(20)30464-2
13. NIH Office of Research on Women’s Health. Sex & Gender. https://orwh.od.nih.gov/sex-gender. 2021.
14. Weiss D, Marmar C. The impact of event scale-revised. In: Wilson J, Keane T, eds. *Assessing psychological trauma and PTSD: a handbook for practitioners*. Guilford Press; 1997: 399–411.
15. del Río-Casanova L, Sánchez-Martín M, García-Dantas A, et al. Psychological responses according to gender during the early stage of COVID-19 in Spain. *Int J Environ Res Public Health* 2021;18:3731. doi: 10.3390/ijerph18037311
16. Karaiuzoglu K, Konstantopoulou G, Kalogeroopoulou M, et al. Psychological distress in the Greek general population during the first COVID-19 lockdown. *BJPsych Open* 2021;7:e59. doi: 10.1192/bjpo.2021.17
17. Yang BX, Xia L, Huang R, et al. Relationship between eHealth literacy and psychological status during COVID-19 pandemic: a survey of Chinese residents. *J Nurs Manag* 2021;29:805–812. doi: 10.1111/jonm.13221
18. Luo D, Liu Q, Chen Q, et al. Mental health status of the general public, frontline, and non-frontline healthcare providers in the early stage of COVID-19. *Front Psychiatry* 2021;12:553021. doi: 10.3389/fpsyt.2021.553021
19. Singh SP, Khokhar A. Prevalence of posttraumatic stress disorder and depression in general population in India during COVID-19 pandemic home quarantine. *Asia Pac J Public Health* 2021;33:154–156. doi: 10.1177/1010539520968455
20. Bonichini S and Tremolada M. Quality of life and symptoms of PTSD during the COVID-19 lockdown in Italy. *Int J Environ Res Public Health* 2021;18:4385. doi: 10.3390/ijerph18043858
21. Passavanti M, Argentieri A, Barbieri DM, et al. The psychological impact of COVID-19 and restrictive measures in the world. *J Affect Disord* 2021;283:36–51. doi: 10.1016/j.jad.2021.01.020
22. González Ramirez LP, Martínez Arriaga RJ, Hernández-Gonzalez MA, et al. Psychological distress and signs of posttraumatic stress in response to the COVID-19 health emergency in a Mexican sample. *Psychol Res Behav Manag* 2020;13:589–597. doi: 10.2147/prbm.S259563
23. Le HT, Lai AJX, Sun J, et al. Anxiety and depression among people under the nationwide partial lockdown in Vietnam. Front Public Health. 2020;8:589359. doi: 10.3389/fpubh.2020.589359

24. Di Giuseppe M, Zilcha-Mano S, Prout TA, et al. Psychological impact of coronavirus disease 2019 among Italians during the first week of lockdown. Front Psychiatry. 2020;11:576597. doi: 10.3389/fpsyg.2020.576597

25. Goularte JF, Serafim SD, Colombo R, et al. COVID-19 and mental health in Brazil: psychiatric symptoms in the general population. J Psychiatr Res. 2021;132:32–37. doi: 10.1016/j.jpsychires.2020.09.021

26. Agherotimi SF, Akinsola OS, Oguntayo R, et al. Interactions between socioeconomic status and mental health outcomes in the Nigerian context amid COVID-19 pandemic: a comparative study. Front Psychol. 2020;11:559819. doi: 10.3389/fpsyg.2020.559819

27. Weathers FW, Litz BT, Keane TM, et al. The PTSD checklist for DSM-5 (PCL-5). Scale available from the National Center for PTSD at www.ptsd.va.gov. 2013;10.

28. Kira IA, Alpay EH, Ayna YE, et al. The effects of COVID-19 continuous traumatic stressors on mental health and cognitive functioning: a case example from Turkey. Curr Psychol. 2021;1–12. doi: 10.1007/s12144-021-01743-2

29. Shuwiekh HAM, Kira IA, Sous MSF, et al. The differential mental health impact of COVID-19 in Arab countries. Curr Psychol. 2020;1–15. doi: 10.1007/s12144-020-01148-7

30. Zhang F, Shang Z, Ma H, et al. Epidemic area contact history and sleep quality associated with posttraumatic stress symptoms in the first phase of COVID-19 outbreak in China. Sci Rep. 2020;10:22463. doi: 10.1038/s41598-020-80649-8

31. Kalaitzaki A. Posttraumatic symptoms, posttraumatic growth, and insomnia during COVID-19 pandemic: the role of sense of threat. Global Health. 2020;16:111. doi: 10.1186/s12992-020-00641-9

32. Bovin MJ, Marx BP, Weathers FW, et al. Psychometric properties of the PTSD checklist for diagnostic and statistical manual of mental disorders—fifth edition (PCL-5) in veterans. Psychol Assess. 2016;28:1379–1391. doi: 10.1037/pas0000254

33. Bonsaksen T, Heir T, Schou-Bredal I, et al. Post-traumatic stress disorder and associated factors during the early stage of the COVID-19 pandemic in Norway. Int J Environ Res Public Health. 2021;18:4385. doi: 10.3390/ijerph18084385

34. Liu C, Liu D, Huang N, et al. The combined impact of gender and age on post-traumatic stress symptoms, depression, and insomnia during COVID-19 outbreak in China. Front Public Health. 2020;8:620023. doi: 10.3389/fpubh.2020.620023

35. Sun L, Sun Z, Wu L, et al. Prevalence and risk factors for acute posttraumatic stress disorder during the COVID-19 outbreak. J Affect Disord. 2021;283:123–129. doi: 10.1016/j.jad.2021.01.050

36. Lang AJ, Stein MB. An abbreviated PTSD checklist for use as a screening instrument in primary care. Behav Res Ther. 2005;43(5):585–594. doi: 10.1016/j.brat.2004.04.005

37. Prins A, Bovin MJ, Smolenski DJ, et al. The primary care PTSD screen for DSM-5 (PC-PTSD-5): development and evaluation within a veteran primary care sample. J Gen Intern Med. 2016;31(1):1206–1211. doi: 10.1007/s11606-016-3703-5

38. Cloitre M, Shevlin M, Brewin CR, et al. The international trauma questionnaire: development of a self-report measure of ICD-11 PTSD and complex PTSD. Acta Psychiatr Scand. 2018;138(6):536–546. doi: 10.1111/acps.12956

39. Carlson EB. Psychometric study of a brief screen for PTSD: assessing the impact of multiple traumatic events. Assessment. 2001;8(4):431–441. doi: 10.1177/107319110100800408

40. Off M, Bakker A, Frewen P, et al. Screening for consequences of trauma—an update on the global collaboration on traumatic stress. Eur J Psychotraumatol. 2020;11(1):1752504. doi: 10.1080/20080198.2020.1752504

41. Bryant RA, Moulds ML, Guthrie RM. Acute stress disorder scale: a self-report measure of acute stress disorder. Psychol Assess. 2000;12(1):61–68. doi: 10.1037/1040-3590.12.1.61

42. Veldhuis CB, Nesoff ED, McKown ALW, et al. Addressing the critical need for long-term mental health data during the COVID-19 pandemic: changes in mental health from April to September 2020. Prev Med. 2021;146:106465. doi: 10.1016/j.ypmed.2021.106465

43. Makhashvili N, Javakhishvili JD, Sturua L, et al. The influence of concern about COVID-19 on mental health in the republic of Georgia: a cross-sectional study. Global Health. 2020;16:111. doi: 10.1186/s12992-020-00641-9

44. Favieri F, Forte G, Tambelli R, et al. The Italians in the time of coronavirus: psychosocial aspects of the unexpected COVID-19 pandemic. Front Psychiatry. 2021;12:551924. doi: 10.3389/fpsyg.2021.551924

45. Jowett S, Shevlin M, Hyland P, et al. Posttraumatic stress disorder and persistent somatic symptoms during the COVID-19 pandemic: the role of sense of threat. Psychosom Med. 2021;83:338–344. doi: 10.1097/psy.0000000000000890

46. Alshehri FS, Alatawi Y, Alghamdi BS, et al. Prevalence of post-traumatic stress disorder during the COVID-19 pandemic in Saudi Arabia. Saudi Pharm J. 2020;28:1666–1673. doi: 10.1016/j.sps.2020.10.013

47. Sommer JL, Mota N, Reynolds K, et al. COVID-19 as a traumatic stressor is an indicator of mental health symptomatology. Psychiatry Res. 2021;300:113936. doi: 10.1016/j.psychres.2021.113936

48. Karam EG, Friedman MJ, Hill ED, et al. Cumulative traumas and risk thresholds: 12-month PTSD in the world mental health (WMH) surveys. Depress Anxiety. 2014;31(2):130–142. doi: 10.1002/da.22169

49. Liu H, Petukhova MV, Sampson NA, et al. Association of DSM-IV posttraumatic stress disorder with traumatic experience type and history in the World Health Organization world mental health surveys. JAMA Psychiatry. 2017;74(3):270–281. doi: 10.1001/jamapsychiatry.2016.3783

50. Breslau N, Chilcoat H, Kessler R, et al. Previous exposure to trauma and PTSD effects of subsequent trauma: results from the Detroit area survey of trauma. Am J Psychiatry. 1999;156(6):902–907. doi: 10.1176/appi.156.6.902

51. Kessler R, Aguilar-Gaxiola S, Alonso J, et al. Trauma and PTSD in the WHO world mental health surveys. Eur J Psychotraumatol. 2017;8(Suppl. 5):1353383. doi: 10.1080/2008198.2017.1353383
52. Merrick MT, Ford DC, Ports KA, et al. Prevalence of adverse childhood experiences from the 2011–2014 behavioral risk factor surveillance system in 23 states. *JAMA Pediatr.* 2018;172(11):1038–1044. doi: 10.1001/jamapediatrics.2018.2537

53. Kessler RC, Davis CG, Kendler KS. Childhood adversity and adult psychiatric disorder in the US national comorbidity survey. *Psychol Med.* 1997;27(5):1101–1119. doi: 10.1017/S0033291797005588

54. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: the adverse childhood experiences (ACE) study. *Am J Prev Med.* 1998;14(4):245–258. doi: 10.1016/S0749-3797(98)00017-8

55. Norman RE, Byambaa M, De R, et al. The long-term health consequences of child physical abuse, emotional abuse, and neglect: a systematic review and meta-analysis. *PLoS Med.* 2012;9(11). doi: 10.1371/journal.pmed.1001349

56. Petruccelli K, Davis J, Berman T. Adverse childhood experiences and associated health outcomes: a systematic review and meta-analysis. *Child Abuse Negl.* 2019;97:104127. doi: 10.1016/j.chiabu.2019.104127

57. Hughes K, Bellis MA, Hawkscle KA, et al. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. *Lancet Public Health.* 2017;2:e356–e366. doi: 10.1016/s2468-2667(17)30118-4

58. Hammen CL. Stress and depression: old questions, new approaches. *Annu Rev Clin Psychol.* 2015;4:80–85. doi: 10.1146/j.copsyc.2014.12.024

59. Hammen CL. Stress and depression. *Annu Rev Clin Psychol.* 2005;1:293–319. doi: 10.1146/annurev.clinpsy.1.102803.143938

60. Mazure CM. Life stressors as risk factors in depression. *Clin Psychol: Sci Pract.* 1998;5(3):291–313. doi: 10.1111/j.1468-2850.1998.tb00151.x

61. Rossi R, Socci V, Talevi D, et al. COVID-19 pandemic and lockdown measures impact on mental health among the general population in Italy. *Front Psychiatry* 2020;11:790. doi: 10.3389/fpsyt.2020.00790

62. Kakaje A, Fadel A, Makki L, et al. Mental distress and psychological disorders related to COVID-19 mandatory lockdown. *Front Public Health.* 2021;9:585235. doi: 10.3389/fpubh.2021.585235

63. Kolacz J, Dale LP, Nix EJ, et al. Adversity history predicts self-reported autonomic reactivity and mental health in US residents during the COVID-19 pandemic. *Front Psychiatry* 2020;11:577728. doi: 10.3389/fpsyt.2020.577728

64. Murata S, Rezeppa T, Thoma B, et al. The psychiatric sequelae of the COVID-19 pandemic in adolescents, adults, and health care workers. *Depress Anxiety* 2021;38(2):233–246. doi: 10.1002/da.23120

65. Piquero AR, Jennings WG, Jenison E, et al. Domestic violence during the COVID-19 pandemic - evidence from a systematic review and meta-analysis. *J Crim Justice.* 2021;74(C):101806. doi: 10.1016/j.jcrimjus.2021.101806

66. Kessler RC, Berglund P, Demler O, et al. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Arch Gen Psychiatry.* 2005;62(6):593–602. doi: 10.1001/archpsyc.62.6.593

67. Kessler RC, Aguilar-Gaxiola S, Alonso J, et al. The global burden of mental disorders: an update from the WHO world mental health (WMH) surveys. *Epidemiol Psychiatr Soc.* 2009;18(1):23–33. doi: 10.1017/s1121189x00001421

68. Wittchen HU, Jacobi F. Size and burden of mental disorders in Europe— a critical review and appraisal of 27 studies. *Eur Neuropsychopharmacol.* 2005;15(4):357–376. doi: 10.1016/j.euneph.2005.04.012

69. Brewin CR, Andrews B, Valentine JD. Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol.* 2000;68(5):748–766. doi: 10.1037/0022-006X.68.5.748

70. Odrizola-González P, Planchuelo-Gómez Á, Irurita MJ, et al. Psychological symptoms of the outbreak of the COVID-19 confinement in Spain. *J Health Psychol* 2020;159105320967086. doi: 10.1177/1359105320967086

71. Alonso J, Vilagut G, Mortier P, et al. Mental health impact of the first wave of COVID-19 pandemic on Spanish healthcare workers: a large cross-sectional survey. *Rev Psiquiatr Salud Mental.* 2021;14(2):90–105. doi: 10.1016/j.rpsm.2020.12.001

72. Husky MM, Kovess-Masfety V, Gobin-Bourdet C, et al. Prior depression predicts greater stress during covid-19 mandatory lockdown among college students in France. *Compr Psychiatry.* 2021;107:152234. doi: 10.1016/j.comppsych.2021.152234

73. Kar N, Kar B, Kar S. Stress and coping during COVID-19 pandemic: result of an online survey. *Psychiatry Res* 2021;295:113598. doi: 10.1016/j.psychres.2020.113598

74. Lu P, Li X, Lu L, et al. The psychological states of people after Wuhan eased the lockdown. *PLoS One* 2020;15:e0241173. doi: 10.1371/journal.pone.0241173

75. Weathers FW, Bovin MJ, Lee DJ, et al. The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5): Development and initial psychometric evaluation in military veterans. *Psychol Assess* 2018;30:383–395. doi: 10.1037/pas0000486

76. Janiri D, Carfì A, Kotzalidis GD, et al. Posttraumatic stress disorder in patients after severe COVID-19 infection. *JAMA Psychiatry.* 2021;78(5):567–569. doi: 10.1001/jamapsychiatry.2021.0109

77. Marx BP, Schnurr PP, Friedman MJ. Improving the assessment of COVID-19–associated posttraumatic stress disorder. *JAMA Psychiatry.* 2021;78:795–795. doi: 10.1001/jamapsychiatry.2021.1123

78. Tolin D, Foa E. Sex differences in trauma and posttraumatic stress disorder: a quantitative review of 25 years of research. *Psychol Bull.* 2006;132(6):959–992. doi: 10.1037/0033-2909.132.6.959

79. Kessler R, Chiu W, Demler O, et al. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the national comorbidity survey replication. *Arch Gen Psychiatry.* 2005;62(6):617–627. doi: 10.1001/archpsyc.62.6.617

80. Kessler R, Sonnegå E, Bromet E, et al. Posttraumatic stress disorder in the national comorbidity survey. *Arch Gen Psychiatry.* 1995;52(12):1048–1060. doi: 10.1001/archpsyc.1995.03950240066012
81. Breslau N, Anthony J. Gender differences in the sensitivity to posttraumatic stress disorder: an epidemiological study of urban young adults. *J Abnorm Psychol*. 2007;116(3):607–611. doi: 10.1037/0021-843X.116.3.607

82. Olff M, Langeland W, Draijer N, et al. Gender differences in posttraumatic stress disorder. *Psychol Bull*. 2007;133(2):183–204. doi: 10.1037/0033-2909.133.2.183

83. Joseph R, Lucca JM, Alshayban D, et al. The immediate psychological response of the general population in Saudi Arabia during COVID-19 pandemic: a cross-sectional study. *J Infect Public Health*. 2021;14:276–283. doi: 10.1016/j.jiph.2020.11.017

84. González-Sanguino C, Ausín B, Castellanos M, et al. Mental health consequences during the initial stage of the 2020 Coronavirus pandemic (COVID-19) in Spain. *Brain Behav Immun*. 2020;87:172–176. doi: 10.1016/j.bbi.2020.05.040

85. Ren Y, Qian W, Li Z, et al. Public mental health under the long-term influence of COVID-19 in China: Geographical and temporal distribution. *J Affect Disord*. 2020;277:893–900. doi: 10.1016/j.jad.2020.08.045

86. Power K. The COVID-19 pandemic has increased the care burden of women and families. *Sustainability: Sci Pract Policy*. 2020;16:67–73. doi: 10.1080/15487733.2020.1776561

87. North CS, Surís AM, Pollio DE. A nosological exploration of PTSD and trauma in disaster mental health and implications for the COVID-19 pandemic. *Behav Sci* 2021;11. doi: 10.3390/bs11010007

88. Neria Y, Nandi A, Galea S. Post-traumatic stress disorder following disasters: a systematic review. *Psychol Med*. 2008;38(4):467–480. doi: 10.1017/S0033291707001353

89. Taylor S. COVID Stress syndrome: clinical and nosological considerations. *Curr Psychiatry Rep* 2021;23(4):19. doi: 10.1007/s11920-021-01226-y

90. Abdalla SM, Ettman CK, Cohen GH, et al. Mental health consequences of COVID-19: a nationally representative cross-sectional study of pandemic-related stressors and anxiety disorders in the USA. *BMJ Open* 2021;11(8):e044125. doi: 10.1136/bmjopen-2020-044125