



Predictors of traumatic experiences among individuals experiencing pandemic-related stressors: a cross-sectional study in Europe during the COVID-19 crisis

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Abstract

The COVID-19 pandemic is a manifestation of trauma exposure that could eventuate in psychological distress, anxiety, depression, and various mental health disturbances, especially in people who have experienced an additional stressor such as a traumatic event. This cross-sectional study assessed the relationship between pandemic-related stressors, post-traumatic stress disorder (PTSD), the risk for severe or life-threatening symptoms, and resilience among individuals with a traumatic history amidst the coronavirus disease. This study is part of a longitudinal pan-European research, the ADJUST study. The present study consisted of 14,106 participants. The questionnaires utilized included: sociodemographics, health aspects, the Criterion A section of the PTSD Checklist for DSM-5 (PCL-5), the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5), the Pandemic Stressor Scale (PaSS), and the Resilience Evaluation Scale (RES). For the analysis, descriptive statistics and logistic regression analysis were applied. 29% of the respondents reported a traumatic history. Fear of infection, burden of infection, crisis management and communication, restricted activity, risk for severe or life-threatening symptoms of the coronavirus disease, PTSD, and resilience were the predictive factors in the trauma-exposed population. This research provides insights into the stressors that individuals with a traumatic background might experience through the COVID-19 pandemic. Future interventions and worldwide health policies should target trauma-exposed populations to enhance psychological health amidst COVID-19 and other stressful events.

Keywords Trauma · Pandemic stressors · Post-traumatic stress disorder · Resilience · COVID-19

Introduction

The coronavirus outbreak has become a worldwide health crisis with various ramifications for individuals and societies. Recent research has documented that the COVID-19 virus is a potential stressor leading to severe psychological disturbances (Campion et al., 2020). Restrictions and austerity measures, social isolation, job and financial loss, uncertainty, fear of the future, hospitalization, bereavement of loved ones, and stigma of infection and contamination are only some COVID-related stressors. Although fear and stress are usual responses to an unanticipated event, such

as COVID-19, research suggests that a pandemic could be a traumatic experience for some people that could eventuate in psychological distress, anxiety, depression, and PTSD (Boyras & Legros, 2020).

PTSD follows the occurrence or witness of stressful events such as sexual or physical assault, a natural disaster, an accident, or war and includes physical harm or threat to oneself or others and characterizes fear, avoidance, intrusion, increased arousal, and avoidance (Dutheil et al., 2021). COVID-19 is a more stressful event than an environmental disaster (e.g., fire or flooding) mainly because of the prolonged stressors with uncertainty threat to health, personal, family, and social life (Lei et al., 2021). For example, researchers indicated that the virus is a distressing experience that might bring on PTSD directly (e.g., through

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infection), secondarily (e.g., via T.V. news), as well as through imagining future trauma (e.g., hospitalization), suggesting that the pandemic itself could be a precipitator of PTSD symptomatology (Bridgland et al., 2021).

The COVID-19 disease has highlighted many stressors emerging during the global health crisis. Beyond the physical health impact, individuals may face direct exposure to the virus, witness the suffering and death of others, endure traumatic medical interventions, experience fear of infection, grapple with social isolation, and confront stigmatization (Fiorillo & Gorwood, 2020; Lahav, 2020). These stressors may act as potential triggers for trauma-related populations, exacerbating the psychological distress experienced by their history of trauma.

Recent research suggests this mental distress is allied with trauma-related symptomatology and has impacted the general population. A meta-analysis, for example, indicated 27% of PTSD in trauma-exposed populations during COVID-19 (Qiu et al., 2021). Another study reported a high incidence of stress, anxiety and depression in various research findings (Salari et al., 2020).

Individuals with a traumatic past, such as life-threatening or severe injuries, are more vulnerable to subsequent potential experiences of trauma and show a variety of harmful responses to trauma (Kessler et al., 2018). The elevated post-traumatic stress symptomatology could explain this heightened vulnerability following trauma exposure. Following the "sensitization" theory, people with a traumatic past may overreact to added stressors owing to increased sensitivity to stress or low competencies in handling adverse events (Kessler et al., 2018).

Indeed, a research study claimed that the COVID-19 virus could elicit or worsen symptomatology related to prior traumatic experiences (Liu et al., 2020). A recent study, for example, assessed the cumulative traumatic history (e.g., early childhood traumas or survivors of natural disasters) in 745 participants and indicated that PTSD symptomatology was more robust in individuals with a traumatic history (Ashby et al., 2021). Another international study with 12,817 participants found that exposure to trauma before age 17 was a notable risk factor for suicidal ideation, psychological perturbations, depression, PTSD, and major worries about physical well-being (Płomecka et al., 2020).

During contagious diseases, the psychological effects can vary among individuals. Research suggests that an adverse condition, such as increased vulnerability to the disease, can intensify the psychological impact (Lee et al., 2007; Sun et al., 2021). Moreover, specific populations (such as individuals with traumatic experiences) may face a more significant disparity in exposure levels and the nature of stressors they encounter due to COVID-19. However, there is still no evidence of which stressors might be more critical for individuals with a traumatic history during the pandemic.

Apart from prior traumatic experiences, exposure to traumatic occurrences amidst the pandemic is similarly a dominant risky condition for psychological health disturbances. Given those trauma-related events, such as domestic violence, raised through the pandemic crisis (Rhodes et al., 2020), an additional stressor is fostered in affected individuals and their psychological support. Additionally, the prolonged personal and community restrictions and severe financial setbacks may trigger family conflict, violence, and abuse and deteriorate intrafamilial relationships (Abdo et al., 2020; Brooks et al., 2020; Wang et al., 2020).

Traumatic experiences during this health crisis related to PTSD in 22,883 students worldwide as research suggested (Wathelet et al., 2021). Furthermore, people that experienced distress through COVID-19 showed more elevated symptoms of adjustment disorder than those who experienced prior trauma (Lotzin et al., 2021). These research findings underline the necessity to target specific trauma-exposed populations during the pandemic and detect specific factors that might lead to adverse psychological ramifications.

However, not all individuals develop adverse symptomatology in response to a traumatic event. People differ in their resilience styles and other protection dynamics, so they might experience the COVID-19 pandemic differently. For many, the distress is short-term and will not upsurge to "trauma". The distress will persist for others, leading to mental health suffering (Griffin, 2020). Connor and Davidson (2003) noted that resilience is the ability to adapt well following exposure to adversities from traumatic experiences such as childhood abuse, natural disasters, and pandemics. High levels of resilience, for example, could facilitate adaptive responses following trauma exposure and tolerating negative emotions which may lead to better psychological health (Connor & Davidson, 2003).

Considering the pandemic, evidence suggests that high self-reported resilience relates to improved emotional health (Kimhi et al., 2020; Song et al., 2021), and low resilience links to a high risk of psychological burden and severe stress (Kinser et al., 2021; Ye et al., 2020). Individuals who show elevated resilience during the pandemic tend to adopt more coping behaviors and show low-stress levels (Vannini et al., 2021). Subsequently, resilience may be a protective factor in developing psychological distress following a traumatic event.

Considering all the above, this research examines the association concerning pandemic-related stressors, PTSD, and resilience in individuals with traumatic histories. The researchers sought to identify the most significant predictors in the traumatized population through the COVID-19 disease. This research is essential as it provides valuable insights for developing targeted interventions, preventive strategies, and support systems that can effectively cater to the specific needs of this vulnerable population. By

understanding the factors contributing to the experiences of individuals with a traumatic background during the pandemic, appropriate measures can be implemented to mitigate the negative impact and promote their psychosocial health.

Methods

Participants and procedure

This study is part of the ADJUST study, a longitudinal analysis conducted by the European Society for Traumatic Stress Studies (ESTSS; please see Lotzin et al., 2021). Participants of this study were employed from 11 European countries. Participants could participate if they were 18 years or older, had verbal and written competencies in their respective languages, and were eager to contribute.

Information was collected online through the first wave of ADJUST study between the summer and autumn of 2020 (please see Lotzin et al., 2021, for more information). Self-administered measures were given to the respondents. Participants got provided with thorough information regarding the aims, a consent form, and data management. Further details on withdrawals from the study were also given. In the end, participants were written debriefed. For thorough knowledge about the recruitment approach of all countries, please see Lotzin et al., 2021.

Measures

Sociodemographics and health

Sociodemographics included age, gender, and education. Health had self-constructed questions about the perceived susceptibility to severe or potentially fatal symptoms of the coronavirus disease and the history of mental health disorders. (Table 1).

Trauma exposure

Trauma exposure was measured using the Criterion A section of the PTSD Checklist for DSM-5 (PCL-5). Participants were asked to indicate if they had experienced traumatic events, such as severe accidents, disasters, or abuse. Trauma exposure was examined separately for the phase before and during the pandemic. The PCL-5 has shown strong psychometric properties in past research (Blevins et al., 2015).

Table 1 Sociodemographics and health ($N=14106$)

Characteristic	No trauma exposure ($N=9520$)	Trauma exposure ($N=4586$)
Age	M(SD)	M(SD)
Mean	42,89 (15,21)	43,79 (14,35)
Range	18–96	18–89
Gender	n(%)	n(%)
Male	3267 (34,3%)	1216 (26,5%)
Female	6228 (65,4%)	3345 (72,9%)
Other	25 (0,3%)	25 (0,5%)
Education		
Completed studies	5593 (58,8%)	2857 (62,3%)
At risk for severe COVID-19		
No	7475 (78,5%)	3312 (72,2%)
Yes	2045 (21,5%)	1274 (27,8%)
Diagnosis of mental disorder		
No	7983 (83,9%)	3165 (69%)
Yes, recovered	971 (10,2%)	834 (18,2%)
Yes, currently affected	566 (5,9%)	587 (12,8%)

PTSD symptoms

PTSD symptoms were measured by the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5; Prins et al., 2016). The PC-PTSD-5 is a self-administered 5-item screening measure to detect individuals with probable PTSD. Participants answered dichotomous questions (0 = no; 1 = yes) regarding how the traumatic experiences impacted them within the past month. The PC-PTSD-5 total sums up the scores of all items. A cut-off point of > 3 suggests a high risk for PTSD. The PC-PTSD-5 has shown strong psychometric properties in past research (Prins et al., 2016).

The burden of pandemic stressors

A self-constructed questionnaire, the Pandemic Stressor Scale (PaSS), developed by Lotzin et al. (2022), was utilized to evaluate the influence of pandemic-related stressors. The PaSS is a 30-item questionnaire and measures the burden experienced in nine areas: restricted social contact, problems with childcare, work-related problems, fear of infection, restricted activity, crisis management and communication, restricted access to resources, difficult housing conditions, and burden of infection. For more information about the scoring and psychometric properties of this questionnaire please see Lotzin et al. (2022).

Resilience

Resilience was evaluated by the Resilience Evaluation Scale (RES; van der Meer et al., 2018). This 9- item measure was developed to assess psychological resilience after adversities (e.g., “I have confidence in myself”). Participants were asked to answer how they respond to challenging situations in a 5-point Likert-scale. The RES has indicated good psychometric properties (van der Meer et al., 2018).

Data analysis

The data analysis for this study utilized the statistical software SPSS version 28. Descriptive statistics were employed to examine the sociodemographics and health information of the respondents. Logistic regression analysis detected the critical predictors of trauma through the pandemic.

Results

Sociodemographics and health

This research consisted of 14,106 participants. 9520 (60,1%) participants reported no trauma exposure, while 4586 (29%) endorsed a history of experiencing traumatic events. Most of the participants were females and highly educated. Most participants in the trauma exposure group reported that they were susceptible to severe or potentially fatal symptoms of the coronavirus disease and had a history of a psychological disorder (Table 1).

Predictors of traumatic history

Logistic regression using the enter method was chosen for this analysis selection method (Table 2 and Fig. 1). The analysis model included several independent variables

hypothesized to be associated with the presence or absence of a traumatic history. These variables were: restricted social contact, problems with childcare, work-related problems, fear of infection, restricted activity, crisis management and communication, restricted access to resources, difficult housing conditions, the burden of infection, the risk for severe or life-threatening symptoms of the coronavirus disease, PTSD, and resilience. Each of these variables was considered as a potential predictor of traumatic experiences.

The dependent variable in this research was a binary variable indicating the presence or absence of a traumatic history, including 2431 individuals without trauma and 2431 individuals with trauma. Specific criteria were set. The criteria used were PIN (0,05), POUT (0,10), ITERATE (20), and CUT (0,5). The Hosmer and Lemeshow test was non-significant, and no multicollinearity was found.

The regression model produced statistically significant results, as indicated by the chi-square test statistic ($\chi^2(12) = 820,67, p < 0.001$). This suggests that the model was significantly associated with the outcome variable. Upon examining the regression coefficients and their associated p-values, several variables significantly differentiated individuals with traumatic experiences from those without trauma. These variables include fear of infection, burden of infection, crisis management and communication, restricted activity, risk for severe or life-threatening symptoms of the coronavirus disease, PTSD, and resilience.

Nagelkerke's R^2 suggested that the included independent variables could account for approximately 11% of the variation in the outcome. Furthermore, the model achieved a correct classification rate of 70%, indicating that it accurately classified 70% of the cases. There was also a substantial difference between the two values (Cox & Snell and Nagelkerke). Overall, the model explained a modest amount of variation in the outcome and demonstrated moderate accuracy in classifying cases.

Table 2 Logistic regression analysis of the significant predictive factors upon the presence of trauma

Predictive factors	B	B (S.E.)	Exp(B)	95% C.I.for EXP(B)		Sig	Wald
				Lower	Upper		
(Constant)	-1,121	0,125	0,32			<0.001	80,21
PS Fear of infection	0,173	0,037	1,18	1,10	1,27	<0.001	21,59
PS Burden of infection	0,251	0,030	1,77	1,73	1,82	<0.001	69,26
PS Crisis management and communication	0,106	0,031	1,90	1,84	1,95	<0.001	11,57
PS Restricted activity	0,122	0,035	1,88	1,82	1,94	<0.001	12,37
Risk for severe or life-threatening symptoms of the coronavirus disease?(ref no)							
Yes	0,179	0,053	1,19	1,07	1,32	<0.001	11,44
PC-PTSD-5 Total	0,405	0,016	1,49	1,45	1,54	<0.001	644,58
RES Total	0,012	0,004	1,01	1,00	1,01	<0.001	10,19

$R^2 = 0.08$ (Cox & Snell), 0.13 (Nagelkerke)

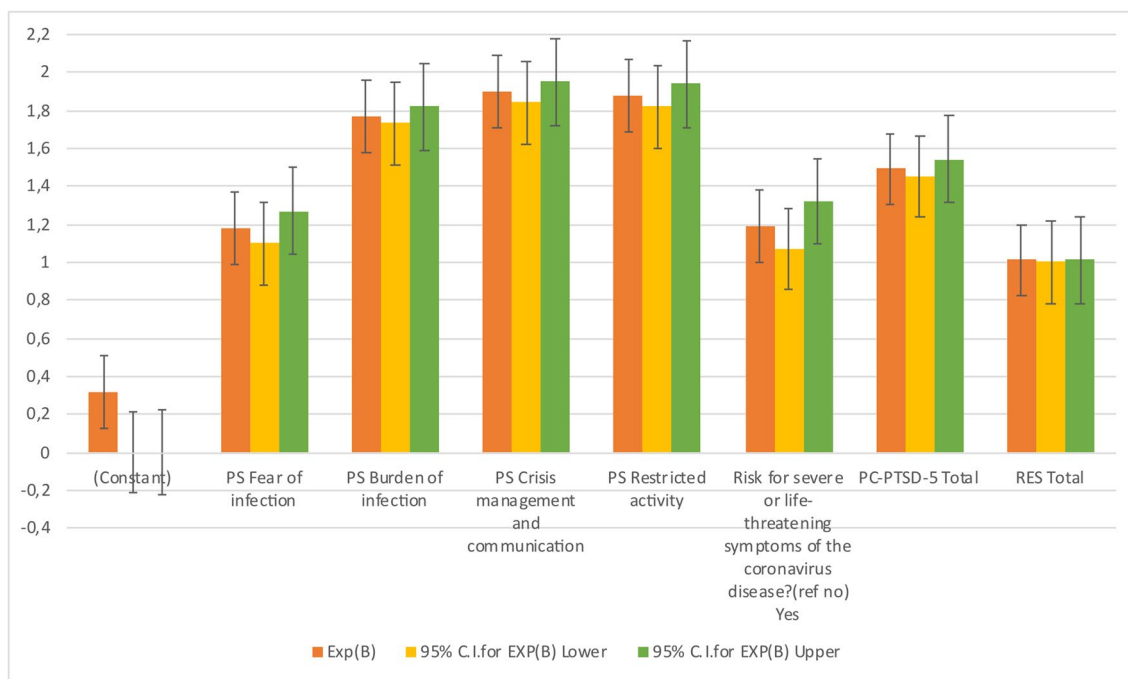


Fig. 1 Logistic regression analysis of the significant predictive factors upon the presence of trauma. *Note: Error bars show standard errors*

Discussion

This study focused on adults from 11 European countries who had a history of traumatic experiences and aimed to identify predictors of COVID-19 pandemic stressors, the risk for severe or life-threatening COVID-19 symptoms, PTSD, and resilience in this specific population. The findings revealed that four out of the nine domains of pandemic stressors were positively associated with being in the trauma group. These domains included fear of infection, the burden of infection, crisis management/communication, and restricted physical activity. Additionally, the risk for severe or life-threatening COVID-19 symptoms, PTSD, and resilience were significant predictors of a traumatic history in this population.

Fear and the burden of infection were associated with being in the traumatized group. Fear plays a vital role as a biological defense mechanism and is heightened during a pandemic, contributing to increased stress and anxiety in healthy populations and individuals with pre-existing psychological issues (Shigemura et al., 2020). Tragically, people died because they were reluctant to seek medical help out of fear of getting infected (Bansal et al., 2021). The unpredictable nature of the virus poses an additional risk factor for traumatized populations. People with childhood traumas and symptoms of PTSD are more inclined to experience heightened fear, stress, and helplessness during

the pandemic, leading to increased mental health problems (Fishere & Bartoli, 2022).

Additionally, it has been suggested that losing loved ones, challenges related to funeral rituals, and increased exposure to the virus can lead to intensified distress and higher PTSD (Boyraz & Legros, 2020). The emotional toll on individuals who have lost relatives and friends during the pandemic may lead to adverse feelings and long-standing psychological effects (Dubey et al., 2020).

Additionally, this research suggested that people with traumatic experiences could have additional stress during a crisis due to the challenges posed by crisis management and communication. Their reduced trust in others and negative beliefs about people, resulting from their traumatic experiences (Bell et al., 2019), can be exacerbated by ineffective governmental management, including inadequate information dissemination. Public trust seems essential in fostering healthy behaviors and compliance with preventive measures among the general population (Bargain & Aminjonov, 2020). Therefore, addressing the psychological distress of individuals with traumatic experiences and building trust through effective communication and management strategies are essential for promoting overall well-being and adherence to preventive measures during crises.

Restricted physical activity was also associated with being in the traumatized group. Previous research has shown that exercise promotes health, happiness, and better

psychological well-being (Ai et al., 2021). Physical exercise is a coping mechanism that effectively decreases mood-related disorders during the pandemic (Ai et al., 2021). Therefore, incorporating regular physical activity can positively influence people's psychological well-being, helping them cope with the challenges posed by the crisis.

Another study finding recommends that traumatized populations face more distress through the COVID-19 virus and are vulnerable to severe or life-threatening symptoms. It has been suggested that certain underlying health conditions, such as cardiovascular, renal, liver, diabetes, autoimmune diseases, and obesity, link to an elevated risk of experiencing worsened or severe COVID-19 symptoms (McCoy et al., 2020). This heightened risk of severe illness may increase distress and anxiety for traumatized populations. Individuals with trauma and comorbid health conditions need targeted support to moderate the virus's effects on their well-being.

In this research, PTSD emerged as a predictive factor for participants who reported a traumatic history. Previous studies have consistently indicated that traumatized populations have a greater risk of PTSD and mood-related disorders (Ashby et al., 2021; Płomecka et al., 2020; Wathélet et al., 2021).

From one perspective, traumatic experiences before the pandemic may include adverse events and stress during childhood. Individuals who experienced traumatic events in their youth may have prolonged consequences on their neurobiological systems (e.g., front-limbic circuitry), which responds to weaker emotion regulation and increases stress reactivity. This alteration in neurobiological reaction to stress may lead to vulnerability to trauma and psychological disorders (De Bellis & Zisk, 2014; Herringa, 2017).

Conversely, individuals exposed to traumatic events may experience "retraumatization" when facing another traumatic event, such as the COVID-19 pandemic. Retraumatization significantly exacerbates pre-existing symptomatology (Schock et al., 2015). Such individuals may also perceive more stressful potential upcoming traumatic events such as COVID-19 and report suffering from fear and adverse emotions (Fishere & Bartoli, 2022), exacerbating or relapsing previous symptomatology.

In addition, patients with pre-existing psychiatric illnesses are significantly more prone to developing infectious diseases (Xiong et al., 2020). They face a considerable chance of adverse psychosomatic outcomes through a possibly fatal pandemic like COVID-19. Limited vigilance, weakened danger awareness, and reduced worry about their hygiene raise their susceptibility to infections (Yao et al., 2020). Thus, recognizing and addressing the needs of individuals with a traumatic history and providing appropriate support and interventions are crucial for mitigating the psychological impact of trauma in both pre-pandemic and pandemic contexts.

Resilience was positive associated with having traumatic experiences. Previous findings emphasized that resilience promotes psychological health amidst the pandemic (Kimhi et al., 2020; Song et al., 2021). Resilient people possess adaptive coping strategies and can manage COVID-19 stressors effectively (Sampogna et al., 2021). In contrast, traumatic experiences involve disempowerment and detachment from others (Herman, 1992), which can lead to maladaptive responses to stress. For resilient individuals, is more likely to get psychological help from their social networks, including family, friends, peers, and teachers (Feder et al., 2009).

This unexpected finding might be interpreted within the background of this research, which focused on the COVID-19 pandemic. This worldwide crisis had unexpected challenges and stressors, affecting individuals worldwide. The unique circumstances brought about by the pandemic created an environment where resilience was essential to handle the traumatic events and uncertainties concerning the virus. In this context, individuals who had experienced trauma might have developed enhanced resilience due to their prior exposure to adversity, allowing them to manage better the additional stressors posed by the pandemic. Especially individuals who have successfully coped with past traumatic experiences may develop a higher level of resilience to stress. Thus, effectively dealing with stressful or traumatic events can strengthen people's capacity to cope with future stressors (Feder et al., 2013).

Strengths and limitations

This research has advantages, such as the large sample size encompassing 11 European countries and using established measures to assess pandemic stressors, PTSD, trauma exposure, and resilience. Nonetheless, there are also weaknesses to consider. Firstly, the cross-sectional design employed in the study prevents drawing causal relationships. Secondly, reliance on self-report measures instead of clinical evaluations may introduce subjectivity and potential reporting biases. Additionally, the study's sample consisted of self-selected participants from the general population, which could result in an overrepresentation of individuals with significant distress, thereby limiting the generalizability of the results. The data was collected online, potentially excluding illiterate or disadvantaged individuals lacking internet access. Lastly, the data was collected during the summer and autumn of 2020. Therefore, it might only be possible to partially capture the heightened psychological burden experienced during the pandemic's peak when many countries implemented lockdown measures between March and April.

Conclusions

The findings emphasize the association between various stressors related to the pandemic, including fear of infection, the burden of infection, crisis management/communication challenges, restricted physical activity, a heightened risk for severe or life-threatening COVID-19 symptoms, PTSD, and a history of trauma.

This research contributes to understanding the challenges individuals with traumatic backgrounds faced through the pandemic. The findings call for support services and policies to highlight the unique needs of this population and alleviate the psychological impact of trauma in both pre-pandemic and pandemic contexts. By addressing these concerns, we can enhance the well-being and resilience of traumatized individuals and promote their overall recovery and adaptation during times of crisis.

The study highlights the importance of addressing the psychological distress experienced by people with traumatic backgrounds during unanticipated events like the COVID-19 virus. Effective communication, trust-building, and appropriate support systems are crucial for promoting overall well-being. Psychological trauma treatments could be valuable tools as they have been proven quite effective in treating psychological trauma (McGowan et al., 2021). Future longitudinal assessments in different cultural backgrounds and additional innovative methodologies, such as psychophysiological measures and machine learning (Schultebraucks et al., 2021), could expand such findings and enable prevention and therapies for supporting trauma-exposed populations during pandemics and related events.

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Authors' contributions CL conceptualized the study in cooperation with all members of ADJUST consortium. All authors recruited study participants and contributed to the data management of the respective site. AL coordinated the data management. CL and XH designed the data analysis and CL conducted the data analysis. CL drafted the manuscript; all authors revised the draft and approved the final version of the manuscript.

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Data availability The detailed sociodemographic information of the dataset does not fully protect the anonymity of the respondents. For this reason, the entire dataset cannot be made publicly available. Excerpts of the data can be provided upon reasonable request by the first author and if approved by all co-authors.

Declarations

Ethics The study was registered in a study registry before its start (OSF registry, <https://doi.org/10.17605/OSF.IO/8XHYG>). Each country obtained ethical approval of the study: Ethics Committee of the University of Vienna, 00554. Ethics Committee of the University of Urbino 'Carlo Bo', 34, 22/07/2020. Ethics Committee of the Department of Psychology, Faculty of Humanities and Social Sciences, University of Zagreb, 21 May 2020. Ethics Review Board of the Faculty of Social and Behavioural Sciences, Utrecht University, 20–360. Iliia State University Faculty of Arts and Science Research Ethics Committee, 12/06/2020. Local Psychological Ethics Committee at the Centre for Psychosocial Medicine, LPEK-0149. Social Sciences Ethics Review Board (SSERB), University of Nicosia, SSERB 00109. The Swedish Ethical Review Authority, 2020–03217. Vilnius University Ethics Committee of Research in Psychology, 44. Ethics Committee of the Faculty of Psychology, University of Warsaw, 6/7/2020. Ethics Committee of the Medical Faculty, University of Porto and Centro Hospitalar São João, Porto, CE 201–20. The National Ethical Review Board in Sweden, 2020–03217.

Inform consent Informed consent was obtained from all individual participants.

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