



Uncertainty as a Predictor of Psychological Reaction to the Earthquake and the COVID-19 Pandemic in Psychiatric Patients

Igor Marinić¹, Lana Skorić¹, Terezija Buljan², Daniel Milošević³,
Lana Mužinić Marinić¹

¹Department of Psychiatry, Dubrava University Hospital, Zagreb, Croatia, ²Verso Altima d.o.o., Zagreb, Croatia, ³Youth Health Center, Health Center Zagreb East, Zagreb, Croatia

Keywords

Uncertainty; COVID-19; earthquakes; psychiatry

Abstract

Aim: The aim of the study was to investigate the factors that influence the stress reaction after the pandemic and the earthquake in people with mental health disorders.

Subjects and methods: This study was conducted on 105 participants who were treated as outpatient patients at the Department for Psychiatry of Clinical Hospital Dubrava, Croatia. Data was collected using sociodemographic factors questionnaire, questionnaire regarding information about damage to their homes due to the earthquake, vaccination status, and recovery from COVID-19, the Croatian version of The Depression, Anxiety, and Stress Scale, The Impact of Events Scale and The Intolerance of Uncertainty Scale - Short Version. **Results:** The main results of the study are that significant positive predictors of the intensity of stress reactions to the COVID-19 pandemic are more pronounced intolerance of uncertainty, higher levels of anxiety, and older age, while a significant positive predictor of the intensity of stress reactions to the earthquake is more pronounced intolerance of uncertainty. **Conclusion:** Psychiatric patients are at increased risk for stress-induced reactions. Intolerance of uncertainty proved to be a significant pre-

dictor of the intensity of the stress reaction for COVID-19 pandemic and earthquake. Understanding which groups of the population are most sensitive to the possibility of developing psychological symptoms and disorders is important for providing adequate professional support to vulnerable groups after such events.

Copyright © 2025 KBCSM, Zagreb
e-mail: apr.kbcm@gmail.com • www.http://apr.kbcm.hr

Introduction

In March 2020, the Republic of Croatia was, like the rest of the world, impacted by the coronavirus pandemic (SARS-CoV-2). Alongside the effects of the pandemic, Croatia also faced significant natural disasters within the same year. That March, Zagreb was hit by an earthquake, magnitude 5.5 on the Richter scale, and in December 2020, Sisak and Petrinja followed, with a magnitude 6.2 earthquake [1,2]. Both the pandemic and the earthquakes were recognized as adverse events that left numerous and varied consequences on the population, particularly regarding mental health. It is well known that after natural disasters and pandemics, the psychological condition of those affected often worsens with a noticeable increase in stress levels and the development of disorders, particularly depressive and post-traumatic

stress disorders [3-5]. Research regarding the impact of these events on individuals from the Republic of Croatia reveals impaired mental health and an increase in symptoms of stress, anxiety, and depression [6,7].

Although there are differences between a pandemic and a natural disaster, there are also certain similarities. Some phenomena observed as similarities during a pandemic and a natural disaster include a sudden change in everyday life, a feeling of uncertainty about the future, and limited resources. Additionally, there is fear for personal well-being, increased use of the media, and the spread of misinformation [8]. The previously mentioned common dimension of uncertainty plays an important role in how an individual perceives life-threatening situations such as earthquakes or pandemics. Specifically, this research construct is known as intolerance of uncertainty [9].

Uncertain situations are those for which we do not know the outcomes, and there is a range of possibilities for how they might play out: positively, neutrally, or negatively. According to Freeston and associates, intolerance of uncertainty is defined as an individual's tendency to feel upset about unknown elements of a situation regardless of the outcome, whether positive or negative [9]. The emphasis in this definition is on the unfamiliarity and uncertainty of the situation and the aversive reaction that occurs as a result. Freeston states that the greater the individual's intolerance of uncertainty, the greater their aversiveness towards the situation and their perception of it as uncertain and threatening. This combination in real situations that are genuinely uncertain and contain a real threat leads to the distress of uncertainty, which manifests as worry and anxiety [9].

In these situations, individuals will try to engage in behaviours that reduce distress and the experience of aversiveness caused by uncertainty. These behaviours may or may not lead to relief and often reinforce intolerance of uncertainty. Thus, intolerance of uncertainty includes cognitive, emotional, and behavioural components in response to an uncertain situation. A higher level of intolerance to uncertainty or a tendency to react negatively in unclear and uncertain situations has been identified as a risk factor for mental health difficulties [10].

A particularly vulnerable group during dual unfavourable events like these, are patients who are being treated for diseases and mental health disorders, specifically those with psychiatric diagnoses [11,12]. Gobbi and associates found numerous negative consequences affecting psychiatric patients to a significantly greater extent compared to the rest of the population [13]. In a sample of over two thousand psychiatric patients, more than two-thirds scored significantly higher on self-assessment measures of depression, post-traumatic stress disorder, and general psychological disturbances. Favreau and associates reported worsening of anxiety and depressive symptoms and sleep related problems in psychiatric pa-

tients during the coronavirus pandemic [14]. Similarly, Hao and associates found higher levels of stress, anxiety, depression, and insomnia in psychiatric patients during lockdown compared to a control group of healthy subjects, while Setyaningrum and associates indicate that gender may play role as protective factor for stress levels in COVID-19 [15,16]. Li and associates also detected severe or extremely severe levels of anxiety, depression and stress present in the population of psychiatric patients during pandemic [17].

During the COVID-19 pandemic, there was a change in the organization of mental health services to provide psychological and psychiatric help as efficiently as possible to those who needed it due to the stress caused by the pandemic. Special attention was directed towards the needs of the more vulnerable population, such as patients who had previously had mental health disorders and were under psychiatric treatment [18]. There has also been an increase in the use of digital technologies, including telemedicine, to enable better availability of psychiatric services during the pandemic [19].

Regarding the earthquake and its connection with adverse mental health outcomes, Šagud and associates found higher levels of depression, stress, and fear in psychiatric patients than in a control group of healthy participants, particularly among those with depressive and anxiety disorders [12]. Post-traumatic stress disorder (PTSD) is mentioned as the most common outcome after experiencing a natural disaster like an earthquake, resulting in impaired mental health [20,21]. Cénat and associates reported similar findings after the devastating earthquake in Haiti, where survivors exhibited symptoms of PTSD, higher levels of depression, and anxiety [22].

The previously presented research findings clearly indicate the unfavourable outcomes that occur after disasters such as pandemics and earthquakes, with depression, stress, and anxiety being particularly prominent.

The aim of the study was to investigate the factors that influence the stress reaction after the pandemic and the earthquake in people with mental health disorders.

Subjects and Methods

This study lasted from September 2021 to June 2022, at the Department for Psychiatry of Clinical Hospital Dubrava, Croatia. Participants were psychiatric patients who participated in the study during regular outpatient check-ups. Written informed consent was taken from participants, after the purpose and content of the research was explained to them. The Ethics Committee of Clinical Hospital Dubrava, following the Helsinki Declaration standards, approved the study.

The sample size in this study was 105 people. The study involved filling out digital versions of the questionnaires, as fol-

Table 1. Descriptive Data of analysed Variables (N = 105)

	Min	Max	M	SD	α
Impact of Event (COVID-19)	15.00	60.00	35.60	10.91	0.90
Impact of Event (Earthquake)	15.00	56.00	37.50	10.71	0.89
Intolerance of Uncertainty	16.00	60.00	40.44	11.55	0.92
Depression	0.00	21.00	9.98	6.56	0.90
Anxiety	0.00	21.00	8.33	5.83	0.86
Stress	0.00	21.00	10.58	5.90	0.89

lowing: 1) Sociodemographic factors (age, gender, place of residence, education, employment); 2) Information about damage to their homes due to the earthquake, vaccination status, and recovery from COVID-19; 3) the Croatian version of The Depression, Anxiety, and Stress Scale, which consists of 21 items and includes three subscales of 7 items each: depression ($\alpha = 0.91$), anxiety ($\alpha = 0.86$), and stress ($\alpha = 0.89$); 4) The Impact of Events Scale for assessing stress reactions to severe or traumatic events, which consists of 15 items that include PTSD symptoms [23-25]. This questionnaire was used to assess stress reactions to the earthquake ($\alpha = 0.89$) and the COVID-19 pandemic ($\alpha = 0.90$), as specified in the instructions; and 5) The Intolerance of Uncertainty Scale - Short Version, which measures the tendency to regard the possibility of a negative event as unacceptable and threatening, regardless of the probability of that event occurring ($\alpha = 0.92$) [26].

Results

Study was conducted on 105 patients from the Department for Psychiatry of Clinical Hospital Dubrava in Zagreb. The respondents' ages ranged from 29 to 79 years ($M = 54.41$, $SD = 0.09$). Among the participants, 44 were men (41.9 %) and 61 were women (58.1 %), all citizens of Croatia. Regarding employment status, 34.3 % were

employed, 22.9 % were on sick leave, 15.2 % were unemployed, and 29.5 % were retired. Regarding educational attainment, 26.7 % had higher education, 64.8 % had completed secondary school, and 9.5 % had completed primary school or less. These data provide insight into the demographic and social characteristics of the sample, enabling a better understanding of the context in which the respondents were examined and the potential impact of these factors on their stress reactions and psychological characteristics.

The results of the descriptive analysis of the analysed variables (Table 1) provide insight into the stress reactions and psychological characteristics of the participants. The average score on the Impact of Events Scale (COVID-19 questionnaire) was 37.50 ($SD = 10.91$), while the average score on the Impact of Events Scale (earthquake questionnaire) was 35.60 ($SD = 10.9$). The average score on the Intolerance of Uncertainty Scale was 40.44 ($SD = 11.55$). Additionally, the average scores on the Depression, Anxiety, and Stress subscales were 9.98 ($SD = 6.56$), 8.33 ($SD = 5.82$), and 10.57 ($SD = 5.58$).

Correlations between Variables

Pearson's and Spearman's correlation coefficients were used to examine the existence of statistically significant relationships between variables (Table 2). There is a statisti-

Table 2. Intercorrelation Matrix of analysed Variables

	2	3	4	5	6	7	8
1. IES (Earthquake)	0.68**	0.28**	0.26*	0.33**	0.45**	-0.19	0.07
2. IES (Covid-19)		0.42**	0.42**	0.36**	0.52**	-0.14	0.25*
3. Depression			0.81**	0.88**	0.58**	-0.11	0.02
4. Anxiety				0.83**	0.46**	-0.0	0.02
5. Stress					0.58**	-0.05	0.02
6. Intolerance of Uncertainty						-0.09	0.08
7. Gender							0.06
8. Age							1

** $p < 0.01$; * $p < 0.05$

Table 3. Predictive Contribution of Intolerance of Uncertainty, Depression, Anxiety, Stress, and Age to Subjective Distress caused by the COVID-19 Pandemic

	Unstandardized coefficients		Standardized coefficients	t	p
	B	SE	β		
Intolerance of Uncertainty	0.40	0.10	0.42	3.96	0.00
Anxiety	0.63	0.31	0.34	2.05	0.04
Depression	0.18	0.32	0.11	0.56	0.58
Stress	-0.48	0.36	-0.26	-1.32	0.191
Age	0.27	0.10	0.23	2.64	0.01

R = 0.607. R² = 0.368. adj. R² = 0.332; p < 0.01; **p < 0.01; *p < 0.05

cally significant positive correlation between the intensity of the participants' stress reaction to the earthquake and the intensity of the stress reaction to the COVID-19 pandemic ($r = .68, p < 0.01$). The intensity of the stress reaction to the earthquake is positively related to intolerance of uncertainty ($r = 0.45, p < 0.01$), stress ($r = 0.33, p < 0.01$), depression ($r = 0.28, p < 0.01$), and anxiety ($r = 0.26, p < 0.05$). Similarly, the intensity of the stress reaction to the COVID-19 pandemic is positively related to intolerance of uncertainty ($r = 0.52, p < 0.01$), anxiety ($r = 0.42, p < 0.01$), depression ($r = 0.42, p < 0.01$), stress ($r = 0.36, p < 0.01$), and participants' age ($r = 0.25, p < 0.05$).

Multiple regression analysis

The multiple regression analysis was employed to examine the predictive contributions of various variables in explaining the subjective distress caused by both the COVID-19 pandemic and the earthquake. The results, detailed in Table 3 and Table 4, illustrate the contributions of intolerance of uncertainty, depression, anxiety, stress, and age in explaining the variance in subjective distress caused by these events.

The results reveal that 33.2 % of the variance in the subjective distress caused by the COVID-19 pandemic can be explained by the predictors included in the model. Intolerance of uncertainty ($\beta = 0.42, p < 0.01$), anxiety ($\beta = 0.34, p < 0.05$), and age ($\beta = 0.23, p < 0.01$) were identified as significant positive predictors of subjective distress related to the COVID-19 pandemic. This suggests that a higher levels of intolerance of uncertainty, greater anxiety, and older age are associated with more pronounced subjective distress caused by the pandemic. Depression and stress, although considered in the analysis, did not emerge as significant predictors in this model.

The regression analysis explained 19.7 % of the variance in the criterion variable of subjective distress caused by the earthquake. Intolerance of uncertainty ($\beta = 0.44, p < 0.01$) emerged as the only significant positive predictor of this subjective distress. These results indicate that higher intolerance of uncertainty contributes to more pronounced subjective distress in response to an earthquake.

Table 4. Predictive Contribution of Intolerance of Uncertainty, Stress, Anxiety, and Depression to Subjective Distress caused by the Earthquake

	Unstandardized coefficients		Standardized coefficients	t	p
	B	SE	β		
Intolerance of Uncertainty	0.40	0.11	0.44	3.77	0.00
Stress	0.54	0.38	0.31	1.42	0.16
Anxiety	0.18	0.32	0.01	0.06	0.96
Depression	-0.40	0.34	-0.25	-1.19	.24

R = 0.482, R² = 0.233, adj. R² = 0.197; p < 0.01

Discussion

The main results of the current research are as follows: significant positive predictors of the intensity of stress reactions to the COVID-19 pandemic are more pronounced intolerance of uncertainty, higher levels of anxiety, and older age, while a significant positive predictor of the intensity of stress reactions to the earthquake is more pronounced intolerance of uncertainty. Our results suggest that intolerance of uncertainty can be a significant predictor of the intensity of the stress reaction for both events. Pandemic and earthquake can be identified as uncertain catastrophic events that lead to adverse mental health symptoms. Del Valle and associates show that intolerance of uncertainty was significant during the coronavirus pandemic for the occurrence of psychopathological symptoms [27]. Specifically, it significantly influenced the occurrence of anxiety and depressive symptoms, which is in accordance with the results of our study. A longitudinal study by the same research group indicates an increase in anxiety and depressive symptoms during the pandemic [28]. Research by Rettie and Daniels shows that individuals with pre-existing mental health problems have more difficulty coping with uncertainty, often resorting to maladaptive coping strategies, which exacerbate their distress [29]. Similarly, individuals who express a greater fear of the COVID-19 virus also experience higher levels of distress. Increased intolerance of uncertainty intensifies the impact of fear of the COVID-19 virus on symptoms of depression, stress, and anxiety [30].

This study contributes to the body of knowledge concerning the reactions of people who have experienced two catastrophic events in a short period and are in outpatient psychiatric treatment. Our research has shown a statistically significant positive correlation between the intensity of the participants' stress reaction to the earthquake and the intensity of the stress reaction to the COVID-19 pandemic. For people with mental health disorders, it is necessary to consider that increased stress can contribute to the destabilization of the clinical condition and the worsening of existing psychiatric disorders [31-33]. Intolerance of uncertainty is a risk factor for the intensity of the experience of a stressful situation, and the intensity of the stress reaction is more significant in people who tolerate uncertainty less. Considering the importance of intolerance to uncertainty, it is important to work on skills and strategies for dealing with uncertainty in vulnerable people. Cognitive behavioural and other psychotherapeutic approaches can be used to strengthen tolerance for uncertainty [34].

In our research, older age was a positive predictor of the intensity of the stress reaction to the COVID-19 pandemic. That is in line with other studies, which indicate that people in older age groups, as well as younger

people, are more sensitive to the development of psychological symptoms during catastrophic events [35,36]. Therefore, it would be sensible to plan age-targeted interventions in pandemic or other catastrophic events. Psychiatric patients are at increased risk for stress-induced reactions. In times of pandemics and other catastrophic events, access to health services, including the opportunities provided by modern technology, should be ensured. Reduced availability of the health care system, delayed start of treatment for mental disorders, and accumulation of symptoms can have adverse effects on the mental health of people after catastrophic events [37,38]. Understanding which groups of the population are most sensitive to the possibility of developing psychological symptoms and disorders is important, especially given the complexity of the response after catastrophic events, so that specific populations can be adequately prioritized and adequate support provided if treatment is necessary. It is also necessary to work preventively on strengthening resilience and developing protective skills in people who have an increased risk of developing psychological symptoms and disorders [39]. Given that the research did not include a control group of people who were not psychiatrically treated, the results cannot be generalized. These results can be the basis for further research of tolerance of uncertainty as a predictor of reaction to significant stressful events both in psychiatric patients and in the general population.

In conclusion, in clinical psychiatric and psychological treatment, it is important to recognize people with lower skills in dealing with uncertainty since they are more sensitive to the intensity of the reaction to highly stressful events. The results of the current research are also significant in a practical sense in that they indicate symptoms that require special attention during catastrophic events, such as pandemics and earthquakes, but also suggest sensitive populations with whom it is necessary to work preventively to reduce the intensity of stress reactions or deterioration of the existing psychological state or improved the person's capacities in the event of such events. Further research into factors of sensitivity and resilience to catastrophic events is needed. This would contribute to therapeutic approaches and preventive measures to reduce the consequences of such events on mental health.

Acknowledgements

None.

Conflict of interest

None to declare.

Funding Sources

None.

References

1. Tondi E, Blumetti AM, Čičak M, Di Manna P, Galli P, Invernizzi C, et al. "Conjugate" coseismic surface faulting related with the 29 December 2020, Mw 6.4, Petrinja earthquake (Sisak-Moslavina, Croatia). *Sci Rep.* 2021;11:9150.
2. Markušić S, Stanko D, Korbar T, Belić N, Penava D, Kordić B. The Zagreb (Croatia) M5.5 Earthquake on 22 March 2020. *Geosciences.* 2020;10:252.
3. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) Epidemic among the general population in China. *Int J Environ Res Public Health.* 2020;17:1729.
4. Beaglehole B, Mulder RT, Frampton CM, Boden JM, Newton-Howes G, Bell CJ. Psychological distress and psychiatric disorder after natural disasters: systematic review and meta-analysis. *Br J Psychiatry.* 2018;213:716-22.
5. Salari N, Hosseini-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Global Health.* 2020;16:57.
6. Prizmić-Larsen Z, Tadić Vujčić M, Lipovčan Kaliterna LJ. Fear of COVID-19 and fear of earthquake: multiple distressing events and well-being in Croatia. *Psychol Rep.* 2023;332941231156813.
7. Juric Vukelic D, Brajkovic L, Kopilas V. Effects of COVID-19 Pandemic and earthquake on the mental health of adults in Croatia. *AJAP.* 2022;11:62-9.
8. Esterwood E, Saeed SA. Past Epidemics, Natural Disasters, COVID19, and Mental Health: learning from history as we deal with the present and prepare for the future. *Psychiatr Q.* 2020;91:1121-33.
9. Freeston M, Tiplady A, Mawn L, Bottesi G, Thwaites S. Towards a model of uncertainty distress in the context of Coronavirus (COVID-19). *Cogn Behav Therap.* 2020;13:e31.
10. Andrews JL, Li M, Minihan S, Songco A, Fox E, Ladouceur CD, et al. The effect of intolerance of uncertainty on anxiety and depression, and their symptom networks, during the COVID-19 pandemic. *BMC Psychiatry.* 2023;23:261.
11. Neelam K, Duddu V, Anyim N, Neelam J, Lewis S. Pandemics and pre-existing mental illness: a systematic review and meta-analysis. *Brain Behav Immun Health.* 2021;10:100177.
12. Šagud M, Bajs Janović M, Vuksan Ćusa Z, Jakić N, Bagarić Krakan L, Begić D, et al. Depression and stress levels in patients with different psychiatric disorders during concurrent early-phase COVID-19 pandemic and earthquake in Croatia. *BMC Psychiatry.* 2023;23:798.
13. Gobbi S, Beata Plomecka M, Ashraf Z, Radziński P, Neckels R, Lazzeri S, et al. Worsening of preexisting psychiatric conditions during the COVID-19 Pandemic. *Front Psychiatry.* 2020;11:581426.
14. Favreau M, Hillert A, Osen B, Gärtner T, Hunatschek S, Riese M, et al. Psychological consequences and differential impact of the COVID-19 pandemic in patients with mental disorders. *Psychiatry Res.* 2021;302:114045.
15. Hao F, Tan W, Jiang L, Zhang L, Zhao X, Zou Y, et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. *Brain Behav Immun.* 2020;87:100-6.
16. Setyaningrum RH, Hafizah I, Sudiyanto A, Probandari A, Lestari E. Risk and protective factors of stress level in COVID-19 Survivors. *Arch Psychiatry Res.* 2024;60:23-30.
17. Li JTS, Lee CP, Tang WK. Changes in mental health among psychiatric patients during the COVID-19 Pandemic in Hong Kong—a cross-sectional study. *Int J Environ Res Public Health.* 2022;19:1181.
18. Škrobo M, Peitl V, Silić A, Matošić A, Vidrih B, Karlović D. Electroconvulsive therapy during the COVID-19 Pandemic. *Arch Psychiatry Res.* 2021;57:187-90.
19. Adamlje J, Jendricko T. Experience in online therapy during the COVID-19 pandemic and its influence on events in the group. *Psihoterapija.* 2020;34:292-326.
20. Tang B, Deng Q, Glik D, Dong J, Zhang L. A Meta-analysis of risk factors for Post-Traumatic Stress Disorder (PTSD) in adults and children after earthquakes. *Int J Environ Res Public Health.* 2017;14:1537.
21. Farooqui M, Quadri SA, Suriya SS, Khan MA, Ovais M, Sohail Z, et al. Posttraumatic stress disorder: a serious post-earthquake complication. *Trends Psychiatry Psychother.* 2017;39:135-43.
22. Cénat JM, McIntee SE, Blais-Rochette C. Symptoms of posttraumatic stress disorder, depression, anxiety and other mental health problems following the 2010 earthquake in Haiti: A systematic review and meta-analysis. *J Affect Disord.* 2020;273:55-85.
23. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the beck depression and anxiety inventories. *Behav Res Ther.* 1995;33:335-43.
24. Horowitz M, Wilner N, Alvarez W. Impact of event scale: a measure of subjective stress. *Psychosom Med.* 1979;41:209-18.
25. Ljubotina D, Muslić L. Convergent validity of four instruments for measuring posttraumatic stress disorder. *Rev Psychol.* 2003;10:11-22.
26. Carleton RN, Sharpe D, Asmundson GJG. Anxiety sensitivity and intolerance of uncertainty: requisites of the fundamental fears? *Behav Res Ther.* 2007;45:2307-16.
27. del Valle MV, Andrés ML, Urquijo S, Yerro-Avincetto M, López-Morales H, Canet-Juric L. Intolerance of uncertainty over COVID-19 pandemic and its effect on anxiety and depressive symptoms. *RIP/IJP.* 2020;54:e1335.
28. Del-Valle MV, López-Morales H, Andrés ML, Yerro-Avincetto M, Gelpi Trudo R, Urquijo S, et al. Intolerance of COVID-19-related uncertainty and depressive and anxiety symptoms during the pandemic: a longitudinal study in Argentina. *J Anxiety Disord.* 2022;86:102531.
29. Rettie H, Daniels J. Coping and tolerance of uncertainty: predictors and mediators of mental health during the COVID-19 pandemic. *Am Psychol.* 2021;76:427-37.
30. Gullo S, Gelo OCG, Bassi G, Lo Coco G, Lagetto G, Esposito G, et al. The role of emotion regulation and intolerance to uncertainty on the relationship between fear of COVID-19 and distress. *Curr Psychol.* 2022;1-12.
31. World Health Organization (WHO). Mental health and climate change: policy brief [Internet]. Geneva (CH): WHO; 2022. [updated 2022; cited 2024 Jul 16]. Available from: <https://apps.who.int/iris/handle/10665/354104>
32. Berry HL, Bowen K, Kjellstrom T. Climate change and mental health: a causal pathways framework. *Int J Public Health.* 2010;55:123-32.
33. Goldmann E, Galea S. Mental health consequences of disasters. *Annu Rev Public Health.* 2014;35:169-83.
34. Miller ML, McGuire JF. Targeting intolerance of uncertainty in treatment: a meta-analysis of therapeutic effects, treatment moderators, and underlying mechanisms. *J Affect Disord.* 2023;341:283-95.
35. Spencer G, Thompson J. Children and young people's perspectives on disasters – mental health, agency and vulnerability: a scoping review. *IJDRR.* 2024;108:104495.
36. Phraknoi N, Sutanto J, Hu Y, Goh YS, Lee CEC. Older people's needs in urban disaster response: a systematic literature review. *IJDRR.* 2023;96:103809.
37. Clemens V, von Hirschhausen E, Fegert JM. Report of the intergovernmental panel on climate change: implications for the mental health policy of children and adolescents in Europe – a scoping review. *Eur Child Adolesc Psychiatry.* 2022;31:701-13.
38. Dodgen D, Donato D, Kelly N, La Greca A, Morganstein J, Reser J, et al. Ch. 8: Mental Health and well-being, the impacts of climate change on human health in the United States: a scientific assessment [Internet]. U.S. Global Change Research Program; 2016 [updated 2016; cited 2024 Jul 12]. Available from: <https://health2016.globalchange.gov/downloads#mental-health-and-well-being>
39. Mužinić Marinić L. The Impact of climate change on mental health. *Soc Psih.* 2023;51:161-75.