



Deliverable 3.3: Guideline on Types of Families

***MULTIDIMENSIONAL SEISMIC RISK ASSESSMENT COMBINING STRUCTURAL DAMAGES AND
PSYCHOLOGICAL CONSEQUENCES USING EXPLAINABLE ARTIFICIAL INTELLIGENCE***



**Co-funded by the
European Union**



Deliverable Title	Guideline on Types of Families
Deliverable number	3.3
Deliverable Lead:	eCampus
Related Work Package:	WP3: Benchmark structures, EDPs, and representative families
Author(s):	Elena Camisasca, Cristal Sirotich
Dissemination Level:	Public
Due Submission Date:	31/07/23
Actual Submission:	01/08/23
Project Number	101101236
Status	Version 1.0 (31/07/2023)
Reviewed (Authors)	Francesco Focacci (eCampus University) Elisabetta Cattoni (eCampus University)
Start Date of Project:	01/12/22
Duration:	24 months
Abstract	This document is the Guidelines on types of families (D3.3) of the project “Multidimensional Seismic Risk Assessment Combining structural damages and psychological consequences using explainable artificial intelligence (MEDEA)”. It describes the procedures and criteria used to: a) preliminarily classify the representative families with different levels of risk (high/low/No Risk) for the insurgence of PTSD based on socio-demographic and psychological indicators; b) draft a preliminary version of an inventory titled: “Peri-traumatic and post-traumatic factors inventory” which, in the immediate aftermath of an earthquake, could be used by rescuers to identify individuals and families exposed to the most serious and threatening situations strictly associated with the insurgence of PTSD disorder; c) set up the research protocol for the empirical study that will be performed in the pilot areas (WP6).
Status changes history	Version 1.0 (31/07/2023) – First release



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ABBREVIATIONS

MEDEA	Multidimensional Seismic Risk Assessment Combining Structural Damages And Psychological Consequences Using Explainable Artificial Intelligence
eCampus	eCampus University
UniPI	Università di Pisa
MED	Medjimurje County
GZS	Gasilska Zveza Slovenije
ANCI	Associazione Nazionale Comuni Italiani (National association of Italian municipalities)
SISST	Società Italiana per lo studio dello Stress Traumatico (Italian Society for the Study of Traumatic Stress)
XAI	eXplainable Artificial Intelligence
PTSD	Post-Traumatic stress disorder



INTRODUCTION: MEDEA PROJECT

The general objective of the MEDEA project is cross-border disaster risk management through prevention and preparedness in Europe and EU Neighbour Countries. The proposal focuses on reducing the impact of seismic events and improving resilience, i.e., the ability to resist, absorb, accommodate, and recover from the effects of earthquakes in a timely and efficient way. The project pursues this general objective by proposing an intelligent system for multidimensional seismic risk assessment in cross-border areas. The system uses artificial intelligence to estimate the losses caused by an earthquake based on the predicted damage to structures (e.g., buildings), also forecasting the psychological consequences for the individuals involved. Regarding psychological consequences, the project will focus on families and the individual, relational, and contextual factors that could amplify the psychological maladjustment of family members in case of seismic events. The project will consider the possible medium and long-term psychological consequences for the individuals involved in seismic events to help identify the families at risk of psychological maladjustment, thus predicting/preventing the onset of PTSD. Within the MEDEA project, the specific tasks of WP3 were: identifying benchmark structures and selecting and calculating the best EDPs to quantify the effect of seismic actions on structures. Moreover, regarding psychological aspects, the WP3 aims to identify representative families based on socio-demographic/psychological indicators and set up the experimental protocol. The present deliverable describes the procedures and criteria used to detect the representative families based on their socio-demographic and psychological indicators.

BACKGROUND

Natural disasters are the consequences of events triggered by natural hazards that overwhelm local response capacity and generate a severe impact on socioeconomic development and affected population, causing significant loss of life, injured, and infrastructure damage (Hidalgo & Baez, 2019; Inter-Agency Standing Committee [IASC], 2006). Table 1 shows the classification of the natural disaster clusters alongside main types and sub-types (Below, Wirtz, & Guha-Sapir, 2009).

Earthquakes are one of the most destructive and frequent natural disaster – related emergency issues affecting each year millions of people worldwide. From 2000 to 2019, the Emergency Events Database (EM-DAT) recorded 552 earthquakes - ranked at the third place after floods (3254 events) and storms (2043 events) - caused 721,318 deaths, 118 million people affected and \$636 billion in economic losses (Yaghmaei, 2020). From the report of 2022 (Centre for Research on the Epidemiology of Disasters [CRED], 2023), 31 earthquakes recorded worldwide claimed 1626 lives and affected 3,6 million people, with economic losses of \$12.5 billion. The 2022 southeastern Afghanistan earthquake and the 2022 Indonesia earthquake, with 1,036 and 334 fatalities, respectively, stood out, ranking among the top ten deadliest disaster events in 2022. In addition, the 2022 Fukushima earthquake ranked fourth among the top ten economic losses disaster



events, with damages of \$8.8 billion (CRED, 2023).

Table 1 - Natural disaster clusters, primary type and sub-types (Modified from Below et al., 2009, pages 5 to 8).

NATURAL DISASTER CLUSTERS					
-1- Biological	-2- Geophysical	-3- Meteorological	-4- Hydrological	-5- Climatological	-6- Extra-Terrestrial
Epidemic (Viral, Bacterial, Parasitic, Fungal, Prion Infectious Diseases) Insect infestation (Grasshopper, Locust, Worms) Animal stampede	Earthquake (Ground shaking, Tsunami) Volcano (volcanic eruption) Mass movement (dry) (Rockfall, Avalanche, Landslide, Subsidence)	Storm (Tropical storm, Extra-tropical cyclone/Winter storm, Local/Convective storm)	Flood (General river flood, Flash flood, Storm surge/coastal flood) Mass movement (wet) (Rockfall, Avalanche, Landslide, Subsidence)	Extreme temperature (Heatwave, Cold wave, Extreme winter conditions) Drought Wildfire (Forest fire, Land fires)	Meteorit Asteroid

PSYCHOLOGICAL CONSEQUENCES OF SEISMIC EVENTS

Many studies highlighted how the uncontrollable effects and disastrous aftermath of the earthquakes impact on survivors' mental health (see reviews of Beaglehole, Mulder, Boden & Bell, 2019; Cénat, McIntee & Blais-Rochette, 2020; Dai et al., 2016; Kušević, Krstanović & Kroflin, 2021). In particular, these studies showed a wide range of adverse psychological consequences after exposure to a seismic event, including sleep difficulties, distress, depression, suicidal ideations, anxiety, PTSD, and increased alcohol consumption. PTSD is one of the most prevalent psychological consequences in people exposed to disasters (Hong & Efferth, 2016; Tang, Deng, Glik, Dong & Zhang, 2017). Post-traumatic stress disorder (PTSD) is one of the trauma-related disorders involving specific negative symptoms in the aftermath of an exposure to traumatic events. According to the DSM-5 and to the DSM-5-TR, PTSD is organized around four different clusters of symptoms: 1) intrusive symptoms, 2) avoidance, 3) negative cognition and mood; 4) alterations of arousal states. Symptoms must last at least a month for the diagnosis, which is a possible consequence of actual or perceived threatened death, serious injury, or sexual violence (Criterion A) that can be experienced directly, through directly experiencing the event (s) or by witnessing the event (s) occurred to others; or indirectly, by learning that the event (s) happened to a close family member or close friend; or by experiencing repeated or extreme exposure to adverse details of the event (s) (APA, 2013, 2022). On the other hand, according to the ICD-11 (WHO, 2018) the diagnosis includes only three core elements: 1) re-experiencing the traumatic event, as evidenced by intrusive memories, flashbacks, and/or nightmares; 2) avoidance of traumatic reminders, as evidenced by the avoidance of internal and/or external stimuli; and 3) a persistent sense of threat, evidenced by hypervigilance and increased startle. Regarding post-disaster PTSD prevalence across age groups, available findings provide data on children/adolescents or/and adults/elderly separately. Studies



(Liang, Zeng, Liu, Xu, & Liu, 2021; Rezeyat et al., 2020; Tang et al., 2017) showed a significant variability in the prevalence rates of post-disaster PTSD in affected populations. Prevalence rates of PTSD in children and adolescents were approximately of 19.2%, 30.0%, 24.4%, and 20.4%, respectively at the first, the second, the third, and the fourth six-month intervals after the earthquake (Rezeyat et al., 2020). Concerning adults and the elderly, the authors (Tang and colleagues, 2017) indicated prevalence rates from 4% to 67%.

Considering the remarkable variability in the range of post-disaster PTSD rates among earthquake survivors, many studies focused on the understanding of the risk factors of PTSD onset. Some authors (Tortella-Feliu et al., 2019; Trickey, Siddaway, Meiser-Stedman, Serpell, Field, 2012) classified PTSD risk variables into four descriptive categories: 1) socio-demographic factors (e.g., gender); 2) pre-trauma factors (prior to the traumatic experience; e.g., mental health problems); 3) peritraumatic factors (during or in the immediate aftermath of the traumatic experience; e.g., trauma severity); and 4) post-trauma factors (e.g., social support and coping strategies). In the literature, the availability of secondary studies (reviews, systematic reviews, and meta-analyses) is noteworthy to summarize the empirical results about the role of some risk factors in predicting PTSD onset. However, some of these significant secondary studies showed some limitations because they mainly focus on specific age groups (only adults or only elderly, or only children/adolescents) without considering the complexity of compounding effects within family systems (Gordon-Hollingsworth, Yao, Chen, Qian, & Chen, 2015). MEDEA project aims to advance the identification of risk factors by considering the complexity of effects within families and, therefore, by setting up a model of risk with preventive indicators to intervene with families according to their specific level of risk based on demographic and psychological indicators.

AIM AND STRUCTURE OF THE PRESENT DELIVERABLE (D.8)

The general aim of the present deliverable is to indicate procedures and criteria for: 1) the development of a preliminary *classification* of different target families according to their levels of risk (high/low/No Risk) in relation to a potential PTSD onset. Different levels of risk were based on the families' socio-demographic and psychological indicators; b) the development of a ***preliminary version of an Inventory*** entitled: "*Peritraumatic and post-traumatic factors Inventory*" to be potentially used by frontline professionals to identify individuals and families exposed to the most serious and threatening situations - strictly associated with PTSD onset – in the immediate aftermath of an earthquake, ; c) the set up of the research protocol for research to be conducted in the pilot area (see WP6).

Specifically, the ***deliverable is composed of four sections***.

The first Section (1) describes the procedure and the results of a systematic literature review about PTSD risk factors in seismic cases. The systematic review allowed the identification of the most significant risk factors



socio-demographic, pre-traumatic, peri-traumatic, and post-traumatic factors) that may make individuals (of different ages) more or less vulnerable to the onset of PTSD in case of seismic events.

The second Section (2) describes the criteria used to classify target family typologies according to a “high/low/no-risk” model of PTSD onset. This classification was based on: a) the review results; b) the descriptions of the families of: the Italian National Institute of Statistics (ISTAT); of the Statistical Office of the Republic of Slovenia, and also of the Croatian Bureau of Statistics; c) the indications of further literature about the classification of *distal*, *proximal risk factors* and *protective factors* (Baldwin et al., 1990; Di Blasio, 2005; Milani et al., 2020).

The third Section (3) describes the preliminary Inventory titled “*Peri-traumatic and post-traumatic factors Inventory*,” which lists the most significant peri-traumatic and post-traumatic experiences and conditions for the insurgence of PTSD. This Inventory could help the rescuers to identify, monitor and support the most at-risk individuals and families during the immediate aftermath of a seismic event, design preventive interventions, and provide the most effective interventions.

The fourth Section (4) describes the setup of the Research Protocol for the empirical study that will be conducted in the pilot areas of the Medea project (see WP6). The present Research Protocol was approved by the Ethical Commission of e-Campus University (nr. 05/2023), July 2023.

SECTION ONE: THE SYSTEMATIC REVIEW OF PTSD RISK FACTORS

We conducted a systematic review to identify the individual, relational, and contextual factors that could promote the insurgence of PTSD symptoms in case of seismic events across the lifespan. This preliminary analysis of the scientific literature allowed the identification of the most significant risk factors, which, according to the literature, were categorized in terms of socio-demographic, pre-traumatic, peri-traumatic, and post-traumatic factors. The consideration of these identified factors represented a sort of baseline to: a) detect the representative families considered as high/low/no-risk risk of the insurgence of PTSD symptoms; b) to create the preliminary version of the Inventory about the peri and post-traumatic risk factors; c) to set up the research protocol of the empirical study in the pilot areas (WP6).

METHOD

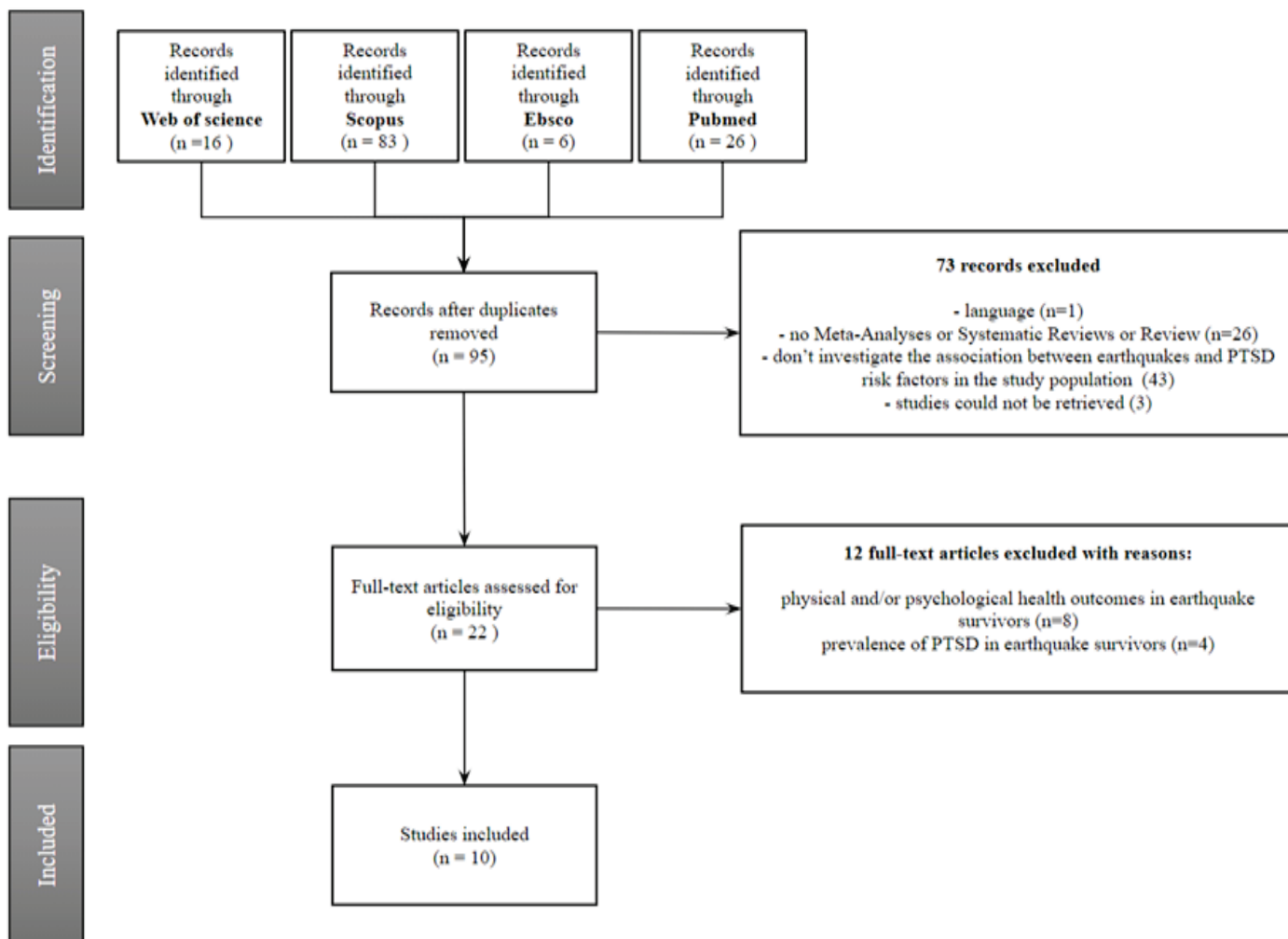
Search Strategy

This systematic review was conducted in March 2023 under the guidance of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page et al., 2021) to identify secondary studies (systematic reviews and meta-analyses) published from 2003 to 2023 that examine or report risk factors for PTSD in children, adolescents, youth, adults and elderly affected by the earthquakes. The electronic databases of



Web of Science, Scopus, Pubmed, and EBSCO (to locate studies in APA PsycArticles and APA PsycInfo) were used for an advanced search using the keywords (“Meta-analysis” or “Systematic review”) AND (“PTSD” or “Post-traumatic stress disorder”) AND (“Earthquake” or “Seismic events”). The flow diagram (Figure 1), which was created according to the PRISMA 2020 statement (Page et al., 2021), describes the steps for the selection process of studies and related exclusion criteria, better explained in Table 2.

Figure 1 - Flow Diagram of the Selection Process



Eligibility Criteria

Studies eligible for this review had to fulfill specific inclusion criteria described in Table 2. Specifically, studies were to be meta-analyses, systematic reviews, or reviews published from 2003 to 2023. They examined or reported PTSD risk factors in children, adolescents, youth or adults, or the elderly affected by earthquakes. In addition, studies could come from any Country, but they had to be written in English.



Table 2 – Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1. Secondary studies (meta-analyses, systematic reviews, or reviews) 2. Study population: 2.1: Children, adolescents, and youth 2.2: Adults 2.3: Elderly 3. Publication criteria: 3.1: Written in English 3.2: Any country 3.3: Published from 2003 to 2023 4. Articles examine or report PTSD risk factors in the study population affected by the earthquake.	1. Primary studies and studies could not be retrieved 2. Outside of the study population: 2.1: Medical workers 2.2: Pregnant or post-partum women 3. Publication criteria: 3.1: Written in Spanish 4. Articles don't strictly investigate the association between earthquakes and PTSD risk factors in the study population.

Definition and categorization of PTSD risk factors

Risk factors are those characteristics, variables, or hazards that precede or increase the likelihood of developing a disorder (Tortella-Feliu et al., 2019). Following the classification used in the analyzed literature (Sayed, Iacoviello, & Charney, 2015; Tang et al., 2017; Tortella-Feliu et al., 2019; Trickey et al., 2012), in the present review, we classified the wide range of different PTSD risk factors into four categories:

- 1) socio-demographic PTSD risk factors (e.g., gender, age, marital status);
- 2) pre-trauma PTSD risk factors (e.g., personal and loved ones' history of mental ill-health, previous trauma);
- 3) peri-trauma PTSD risk factors that occurred during or in the immediate aftermath of the earthquake and include:
 - 3.1: The subjective factors event-related: cognition, emotions, personal responses, and perception related to the earthquake (e.g., having felt fear/scared, peritraumatic distress);
 - 3.2: and the objective factors event-related: direct exposure (e.g., being injured or buried, witnessing someone buried, wounded, dying); indirect exposure (e.g., loved ones injured or dead);
- 4) post-trauma PTSD risk factors, which include the consequences and the long-term responses to earthquakes and include:
 - 4.1: Post-earthquake subjective factors: symptomatology or perception or personal responses after the earthquake (e.g., depression, somatic symptoms, social support, post-traumatic cognition);
 - 4.2: and post-earthquake objective factors (e.g., house damage, job loss after the earthquake).

RESULTS

Study Selection

This search produced 131 articles. Of these identified articles, 95 records were eliminated as duplicates, 73 records were excluded after their abstract evaluation, and 22 full-text articles were assessed for eligibility. Regarding these 22 papers, 12 were excluded based on the appraisal of the full text, and ten were included



for the analysis in this review. We excluded 12 full-text articles because these did not specifically investigate the association between earthquakes and PTSD risk factors in the study population. Their focus was about: physical and/or psychological health outcomes in earthquake survivors (Beaglehole, Mulder, Boden & Bell, 2019; Blanc, J., et al., 2020; Dube, Moffatt, Davison & Bartels, 2018; Kokai, Fujii, Shinfuku & Edwards, 2004; Kušević, Krstanović, & Kroflin, 2021; Lo, Su, & Chou, 2012; Matsumoto, Sakuma, Ueda, Nagao & Takahashi, 2016; Shigemura et al., 2021) prevalence of PTSD in earthquake survivors (Hosseinnejad et al., 2022; Liang, Zeng, Liu, Xu & Liu, 2021; Sepahvand, Hashtjini, Salesi, Sahraei & Jahromi, 2019; Rezayat et al., 2020).

Main Characteristics of the Included Studies

The considered ten secondary studies examined PTSD risk factors in children, adolescents, youth, adults, and elderly victims of earthquakes. These secondary studies were three reviews (Aker, 2006; Farooqui et al., 2017; Kalantar Motamedi et al., 2012), three systematic reviews (Alipour & Ahmadi, 2020; Hong & Efferth, 2016; Liang, et al., 2019), two systematic reviews and meta-analyses (Cénat et al., 2020; Dai et al., 2016), and two meta-analyses (Gordon-Hollingsworth et al., 2015; Tang et al., 2017). These studies came from Europe, America, and Asia and considered different earthquakes, including Wenchuan, Marmara, and Haiti. Considering these ten secondary studies, we examined the cited primary studies that analyzed the PTSD risk factors in earthquake survivors. In addition, primary studies that could not be retrieved were not included in the present study. A total of 109 primary studies were extracted from the 10 included secondary studies, of which 46 primary studies were about children, adolescents, and youth (the age ranged from 2 years to university students), 59 were about adults (community-based studies without a specific age range), and finally, three specifically were about elderly (the age ranged from 60 to > 81 years). Tables 3, 4, and 5 summarize references from secondary and primary studies and the PTSD risk factors identified for the study population. The analysis of each PTSD risk factor is shown in Tables 3.1, 4.1, and 5.5. In the tables, the word earthquake has been abbreviated as EQ.

Results of PTSD Risk Factors in Children, and Youth

The analysis of the 46 primary studies cited in the eight secondary studies allowed the identification of 58 risk factors for PTSD in children, adolescents, and youths. A summary overview of these data is provided in Table 3 and elaborated specifically in Table 3.1.



Table 3- Summary overview of PTSD Risk Factors in Children, and Youth.

58 PTSD RISK FACTORS IN CHILDREN, AND YOUTH		
10 Socio-demographic PTSD risk factors	18 Peri-trauma PTSD risk factors	21 Post-trauma PTSD risk factors
1. Female gender 2. Younger age 3. Older age 4. Ethnic minority 5. Living in rural areas 6. Having siblings 7. Nuclear family 8. Low socioeconomic status 9. Living apart from family 10. Parents without occupation 9 Pre-trauma factors 11. History of mental ill-health 12. Previous trauma 13. Low Intelligence 14. Neuroticism 15. Locus of control (power others locus of control, chance locus of control) 16. Negative coping strategies 17. Absence of religious faith 18. Poor family functioning 19. Family history of mental ill-health	Objective event-related factors a) Direct exposure 20. Being injured during the EQ 21. Being buried/trapped during the EQ 22. Witnessing someone buried, wounded, dying, or traumatic scenes during the EQ 23. Confronted with dead bodies 24. Exposure to threat 25. Unable to escape from the disaster 26. Proximity to the epicenter 27. School location (proximity to the epicenter) b) Indirect exposure 28. Bereavement (loss of family members, classmates, teachers, friends) 29. Family members, classmates, teachers, or friends injured Subjective event-related factors 30. Having felt fear/scared 31. Fear for the safety of close ones 32. Having felt despair or danger 33. Had felt guilt about someone's death or injury 34. Worry about others during the earthquake 35.Peritraumatic distress 36. Extreme parental reaction (wailing, fainting, or panicking) 37. Negative coping strategies	Post-earthquake objective factors 38. Material losses (loss of property, money or destruction of expensive appliances, lost important belongings) 39. House damaged or destroyed 40. Geographic living conditions 41. Living location (shelters) 42. Males with lower levels of attending church-sponsored social events 43. Family member amputated Post-earthquake individual factors 44. Several somatic symptoms (trouble sleeping, headache, and shortness of breath) 45. Deliberation rumination subtype 46. Depression symptoms 47. Sad levels 48. Worry about aftershocks 49. Wept more than three times while watching earthquake news 50. Post-traumatic cognition 51. No utilization of mental health services 52. Who were frequently exposed to news content that was scary 53. Post-earthquake life adversity /adverse life events 54. Absent from school while the school was not closed 55. Visited some affected sites 56. Left city temporarily 57. Time duration (rate of PTSD at time point) 58. Low social support
8 REFERENCES OF SECONDARY STUDIES		
Cénat, McIntee & Blais-Rochette, 2020; Dai et al., 2016; Farooqui et al., 2017; Gordon-Hollingsworth, Yao, Chen, Qian & Chen, 2015; Hong & Efferth, 2016;		Liang, Cheng, Ruzek, & Liu, 2019; Kalantar Motamedi, Sagafinia, Ebrahimi, Shams, & Kalantar Motamedi 2012 Liang, Cheng, Ruzek, & Liu, 2019 Tang, Deng, Glik, Dong, & Zhang, 2017
45 REFERENCES OF PRIMARY STUDIES		
Burnett et al., (2013); Cadichon et al., (2017); Cénat et al., (2015); Chen et al., (2017); Derivois et al., (2014); Ekşi et al., (2007); Fan et al., (2010); Fan et al., (2015); Fan et al., (2011); Fu et al., (2013); Gökçen et al., (2013); Groome et al., (2004);	He et al., (2011); Hou et al., (2011); Hsu et al., (2002); Jia et al., (2015); Jia et al., (2013); Jia et al., (2010). Jin & Li (2015); Jin & Wang (2014); Kadak et al., (2013); Lau et al., (2010); Liu et al., (2010); Liu et al., (2011);	Liu et al., (2010); Liu et al., (2009); Liu et al., (2010); Ma et al., (2011); Pan et al., (2009); Parvaresh et al., (2009) Silvestre (2014); Tian et al., (2014); Wang et al., (2012); Xiang et al., (2010); Ye et al., (2011); Ying, et al., (2012); Ying et al., (2013); Ying et al., (2014); Yu et al., (2010); Zhang et al., (2015); Zhang et al., (2011); Zhang et al., (2012); Zhao et al., (2001); Zheng et al., (2012); Zhu et al., (2011).



Socio-demographic PTSD risk factors

The most documented socio-demographic PTSD risk factors were: female gender, older age or younger age; ethnic minority, living in rural areas, and living away from the family (see Tables 3.1). A few studies also reported: younger age, low socioeconomic status, having unemployed parents, and absence of religious faith (see Table 3.1).

Pre-trauma PTSD risk factors

The most documented pre-trauma PTSD risk factors were: the presence of mental ill, previous trauma, family history of mental ill, external locus of control, and the negative coping strategies (see Tables 3.1). A few studies also reported dysfunctional family functioning, low intelligence, and neuroticism (Table 3.1).

Peri-trauma PTSD risk factors

The most documented peri-trauma PTSD risk factors were: being injured or buried or trapped; witnessing someone buried, wounded, dying or traumatic scenes; bereavement of loved ones (family members, classmates, teachers, friends), injured loved ones (family members, classmates, teachers, friends), and having felt fear/scar, despair or danger (see Tables 3.1).

A few studies also reported event-related subjective factors such as fear for the safety of loved ones, guilt concerning someone's death or injury, worry about others during the earthquake, peritraumatic distress, and extremely negative parents' reactions. Moreover, further event-related objective factors were: exposure to threats to physical integrity, being unable to escape from the disaster, and personal and school proximity to the epicenter (see Table 3.1).

Post-trauma PTSD risk factors

Finally, the most documented post-trauma PTSD risk factors were: material losses (property, money), damaged or destroyed houses, low social support, and post-earthquake adversity or negative life events (see Table 3.1). Few studies also reported additional post-earthquake subjective and objective factors such as: somatic symptoms, depressive symptoms, rumination, post-traumatic cognition, worry about aftershocks, non-use of mental health services, absence from school while the school was not closed, left the city temporarily, visited some affected sites, frequent exposure to scary news contents, geographic living condition, and living in shelters (see Table 3.1).



Table 3.1 - Analysis of PTSD Risk Factor in Children, and Youth

REFERENCES ABOUT THE PTSD RISK FACTORS IN CHILDREN, AND YOUTH				
<u>SOCIO-DEMOGRAPHIC PTSD RISK FACTORS</u>	References of Secondary Studies	Nr primary studies	Total number of cases	PTSD Measurement
1. Female gender	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	22	47563	PCL-C, IES-R, PTSD-SS, CPTSD-RI, KSADS-PL, CRIES, YULE PTSD, Watson interview, PSS-I, PCL-C, CPSS, DSM-IV
2. Younger age	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	5	26933	IES-R, TSCC-A, YULE PTSD, Watson interview, CRIES
3. Older age	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	11	21135	PTSD-SS, CRIES, CPTSD-RI, PCL-C, PTSD-SS, CPSS
4. Ethnic minority	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	5111	PCL-C
5. Living in rural areas	Gordon-Hollingsworth, A. T., et al., 2015	3	5922	PTSD-SS, PCL-C
6. Having siblings	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	2121	PTSD-SS, PCL-C
7. Nuclear family	Tang, B., et al., 2017	1	850	PCL-C
8. Low socio-economic status	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020	1	723	IES-R
9. Not living with parents/living apart from family	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Tang, B., et al., 2017	2	1305	IES-R, YULE PTSD, Watson interview, YULE PTSD, Watson interview
10. Parents without occupation	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Tang, B., et al., 2017	1	872	IES-R
<u>PRE-TRAUMA PTSD RISK FACTORS</u>	References of Secondary Studies	Nr primary studies	Total number of cases	PTSD measurement
11. History of mental ill-health	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	5	4958	CPTS-RI, PSS-I, CPSS, CRIES
12. Previous trauma	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019	2	3502	CPTS-RI, CPSS
13. Low intelligence	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020	1	723	IES-R



14. Neuroticism	Liang, Y., et al., 2019	1	20749	UCLA PTSD
15. Locus of control (power others locus of control, chance locus of control)	Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015	2	6018	PCL-C
16. Negative coping strategies	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Liang, Y., et al., 2019; Tang, B., et al., 2017	4	9869	PCL-C, PTSD-SS
17. No religion	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Tang, B., et al., 2017	1	872	IES-R
18. Poor family functioning	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020	1	723	IES-R
19. Family history of mental ill-health	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016	2	1173	IES-R, CPTS-RI
PERI-TRAUMA PTSD RISK FACTORS	References of Secondary studies	Nr primary studies	Total number of cases	PTSD measurement
20. Being injured during the EQ	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	12	24019	PCL-C, ChIPS, KSADS-PL, CRIES, YULE PTSD, Watson interview, SCID, DSM-IV, CPSS
21. Being buried/trapped during the EQ	Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	7	33565	CRIES, PCL-C, KSADS-PL, UCLA, CPSS
22. Witnessing someone buried, wounded, dying or traumatic scenes during the EQ	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	13	44455	CAPS, PTSD-SS, CRIES, CPTSD-RI, PCL-C, TSCC-A, KSADS-PL, IES-R, SCID
23. Confronting with dead bodies	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016	1	2987	PCL-C
24. Exposure to threat	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020	1	178	IES
25. Unable to escape from the disaster	Liang, Y., et al., 2019	1	20749	Ucla PTSD
26. Proximity to epicenter	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020	1	178	IES
27. School location (proximity to the epicenter)	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	1474	PCL-C
28. Bereavement (loss family member, classmates, teachers, friends)	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	20	52784	PTSD-SS, ChIPS, CPTSD-RI, PCL-C, TSCC-A, KSADS-PL, CRIES, IES-R, YULE PTSD, Watson interview, SCID, PSSI, CPSS
29. Family members, classmates, teachers, or friends injured	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	8	33858	CRIES, KSADS-PL, IES-R, PCL-C, PTSD-SS, CPSS



30. Having felt fear/scared	Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	4	21657	UCLA PTSD, TSCC-A, IES-R, DSM-IV
31. Fear for the safety of close ones	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019	1	3052	CPSS
32. Having felt despair or danger	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	2	23964	CRIES
33. Had felt guilt concerning someone's death or injury	Dai, W., et al., 2016	1	596	CPTSD-RI
34. Worry about other during the EQ	Dai, W., et al., 2016	1	788	CPSS
35. Peritraumatic distress	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Tang, B., et al., 2017	1	872	IES-R
36. Extreme parental reaction (wailing, fainting, or panicking)	Tang, B., et al., 2017	1	160	CAPS
37. Negative coping strategies	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Liang, Y., et al., 2019; Tang, B., et al., 2017	4	9869	PCL-C, PTSD-SS
POST-TRAUMA PTSD RISK FACTORS		Nr primary studies	Total number of cases	PTSD measurement
38. Material losses (property, money, destruction of expensive appliances, important belongings)	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	8	16902	PCL-C, SCID, PTSD-SS, CPTSD-RI, PSS-I
39. House damage or destroyed	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	10	19723	PCL-C, PTSD-SS, KSADS-PL, CRIES, SCID, CPSS
40. Geographic living condition	Dai, W., et al., 2016	1	433	YULE PTSD, Watson interview
41. Living location (shelters)	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019	1	3052	CPSS
42. Males with lower levels of attending church-sponsored social events	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C. (2020)	1	140	PCL-C
43. Family member amputated	Farooqui, M., et al., 2017	1	4042	PCL-C
44. Several somatic symptoms (trouble sleeping, headache, and shortness of breath)	Dai, W., et al., 2016; Tang, B., et al., 2017	1	2299	CRIES



45. Deliberation rumination subtype	Tang, B., et al., 2017	1	850	PCL-C
46. Depression symptoms	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019	1	548	PCL-C
47. Sad levels	Gordon-Hollingsworth, A. T., et al., 2015	1	205	DSM-IV
48. Worry about aftershocks	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	3324	CRIES
49. Wept for more than three times while watching eq news	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	3324	CRIES
50. Post-traumatic cognition	Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	3208	KSADS-PL, CRIES
51. No utilization of mental health services	Gordon-Hollingsworth, A. T., et al., 2015; Kalantar Motamed, M. H., et al., 2012; Tang, B., et al., 2017	1	596	CPTSD-RI
52. Frequently exposure to scary news contents	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	3324	CRIES
53. Post earthquake negative life events	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Gordon-Hollingsworth, A. T., et al., 2015; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	5827	PTSD-SS
54. Absent from school while the school was not closed	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	3324	CRIES
55. Visited some affected sites	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	3324	CRIES
56. Left city temporarily	Dai, W., et al., 2016; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	3324	CRIES
57. Time duration	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	1474	PCL-C
58. Low social support	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Farooqui, M., et al., 2017; Gordon-Hollingsworth, A. T., et al., 2015; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	5	8108	IES-R, PCL-C, PTSD-SS, CPSS, PCL-C, KSADS-PL, CRIES



Results of PTSD Risk Factors *in Adults*

The analysis of the 60 primary studies cited in the nine secondary studies allowed the identification of 80 risk factors for PTSD in adults. A summary of these data is provided in Table 4 and specifically elaborated in Table 4.1.

Socio-demographic PTSD risk factors

The most documented socio-demographic PTSD risk factors were: female gender, older age, low income, unemployed, low education level, marital status (unmarried or living alone, unhappily married, divorced, widowed), minority ethnics (see Table 4.1). A few studies also reported younger age, middle age, no household income, head of the family, farmers, living in rented accommodation, living in the countryside, and the nuclear family (see table 4.1).

Pre-trauma PTSD risk factors

The most documented pre-trauma PTSD risk factors were: the history of mental ill, the presence of previous trauma, maladaptive coping strategies (see Table 4.1). A few studies also reported chronic disease, psychological distress induced by stressful life events in the last month before the earthquake; family/friend/relative history of mental ill, two-week disease prevalence (ill in the previous two weeks) (see table 4.1).

Peri-trauma PTSD risk factors

The most documented peri-trauma PTSD risk factors were: being injured, buried, or trapped; witnessing someone buried, injured, or dying; bereavement (loss of child, family members, friends, neighbors); fear during the earthquake, a higher degree of earthquake exposure, and maladaptive coping strategies (see Table 4.1). Only some studies also reported additional event-related objective factors, such as witnessing horrendous scenes (e.g., touched dead bodies), injured family members or friends, proximity to the epicenter, and damage to the building where the subject was at the time of the earthquake. Again, studies reported other event-related subjective factors, such as peritraumatic distress, guilt concerning someone's death or injury, perceived life threat, symptoms of dissociation, hyper-arousal, and helplessness.

Post-trauma PTSD risk factors

The most documented post-trauma PTSD risk factors were material losses (e.g., livelihood, property, money), damages or destruction of house, temporary or prefabricated houses or shelters, low social support, and participation in rescue work (see Table 4.1). Only some studies also report post-earthquake objective factors



such as physical injuries and surgery, economic issues, displacement, etc. Again, studies reported post-earthquake subjective factors such as poor self-perceived health status, grief due to family loss, lack of sense of control over life, persistent fear of future earthquakes, acute stress disorder in the first four weeks after the earthquake, psychological stress, depression, sleep disturbance, traumatic experiences after the earthquake, and so on (see table 4.1).



Table 4 – Overview of PTSD Risk Factors in Adults

80 PTSD RISK FACTORS FOR ADULT		
19 Socio-demographic PTSD risk factors	19 Peri-trauma PTSD risk factors	34 Post-trauma PTSD risk factors
1. Female gender 2. Younger age 3. Middle age 4. Older age 5. Ethnic minority 6. Ethnic majority 7. Living in rented accommodation 8. Living in the countryside 9. Married 10. Unmarried or living alone 11. Divorced 12. Widowed 13. No household income 14. Low income 15. Unemployed 16. Low education level 17. Farmers 18. Head of the family 19. Nuclear family	<u>Objective event-related factors</u> <u>a) Direct exposure</u> 28. Being injured during the EQ 29. Being buried/trapped during the EQ 30. Witnessing someone buried, wounded or dying during the EQ 31. Witnessing horrendous scenes (e.g. touched dead bodies) during the EQ 32. Damage to the building where the subject was at the time of the EQ 33. Higher degree of EQ exposure 34. Exposure to a high extent of EQ shaking 35. Having been in serious danger 36. Proximity to epicenter <u>Indirect earthquake exposure</u> 37. Bereavement (loss child, family members, friends, neighbors) 38. Family members or friends injured <u>Subjective event-related factors</u> 39. Having felt guilt concerning someone's death or injury 40. Fear during the EQ 41. Perceived life threat 42. Peritraumatic distress 43. Unusual smelling/other perception during the EQ 44. Dissociation, hyper-arousal and helplessness experienced immediately after the EQ 45. Negative coping/maladaptive coping strategies	<u>Post-earthquake objective factors</u> 46. Surgery interventions after the EQ 47. Amputation of an organ due to the earthquake 48. No regular income after the EQ 49. Serious economic difficulties (not related to EQ and/or as consequence of EQ) 50. Job loss after the EQ 51. Receipt of government financial support 52. Material losses (e.g. possessions, livelihood, property, money) 53. House damage or destroyed 54. Loss of Church 55. Areas with the worst destruction 56. Living in temporary/prefabricated house or shelters 57. Displaced after the EQ 58. Relocation within the EQ region 59. Food and water shortages 60. Traumatic experiences after the EQ 61. Receiving mental health support 62. Receiving mental health support one time 63. Having sought medical service 64. Social network change 65. Family members missing 66. Participation in rescue work <u>Post-earthquake subjective factors</u> 67. Poor self-perceived health status 68. Grief due to family loss 69. Lack of sense of control over life 70. Negative subjective feeling of economic status 71. Hopelessness 72. Persistent fear of aftershocks 73. Anticipatory fear of future earthquakes 74. Impairment of working memory backward 75. Acute stress disorder 4 week after EQ 76. Psychological stress after the EQ 77. Depression 78. Sleep disturbance 79. Non drinking 80. Low social support
8 Pre- trauma PTSD risk factors 20. History of mental ill-health 21. Chronic disease 22. Previous trauma 23. Psychological distress induced by stressful life events in the last month prior to EQ 24. Negative affect in personality disorder 25. Two-week disease prevalence (ill in the previous two weeks) 26. Negative coping/maladaptive coping strategies 27. Family/ friend/relative history of mental ill-health		



9 REFERENCES OF SECONDARY STUDIES

- Aker, A. T. (2006)
 Alipour, F., & Ahmadi, S. (2020)
 Cénat, J. M., McIntee, S. E., & Blais-Rochette, C. (2020)
 Dai, W., Chen, L., Lai, Z., Li, Y., Wang, J., & Liu, A. (2016)
 Farooqui, M., Quadri, S. A., Suriya, S. S., Khan, M. A., Ovais, M., Sohail, Z., Shoaib, S., Tohid, H., & Hassan, M. (2017)
 Hong, C., & Efferth, T. (2016)
 Kalantar Motamed, M. H., Sagafinia, M., Ebrahimi, A., Shams, E., & Kalantar Motamed, M. (2012)
 Liang, Y., Cheng, J., Ruzek, J. I., & Liu, Z. (2019)
 Tang, B., Deng, Q., Glik, D., Dong, J., & Zhang, L. (2017))

60 REFERENCES OF PRIMARY STUDIES

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| Ali, M., et al., (2012) | Chou, F. H., et al., (2007) | Lee, C. S., et al., (2009) | Wen, J., et al., (2012). |
| Altindag, A., et al., (2005) | Cofini, V., et al., (2015) | Liu, X., et al., (2012) | Wu, Z., et al., (2014) |
| Armenian, H. K., et al., (2000) | Dell'Osso, L., et al., (2013) | Mesidor, J. K., et al., (2019) | Wu, Z., et al., (2016) |
| Başoğlu, M., et al., (2004) | Feder, A., et al., (2013) | Naeem, F., et al., (2011) | Xu, J., et al., (2011 a) |
| Başoğlu, M., et al., (2002) | Gigantesco, A., et al., (2013) | Priebe, S., et al., (2009) | Xu, J., et al., (2011 b) |
| Blanc, J., et al., (2016) | Guo, J., et al., (2017) | Roncone, R., et al., (2013) | Xu, J., et al., (2016) |
| Cairo, J. B., et al., (2010) | Guo, J., et al., (2015) | Salcioglu, E., et al., (2003) | Yuan, K. C., et al., (2013) |
| Cénat, J. M., et al., (2014) | Guo, J., et al., (2014) | Salcioglu, E., et al., (2018) | Zhang, L.-P., et al., (2015). |
| Cerdá, M., et al., (2013). | Hashmi, S., et al., (2011) | Sezgin, U., et al., (2012) | Zhang, W., et al., (2015) |
| Chan, C. L., et al., (2011) | Jia, Z., et al., (2010) | Tural, Ü., et al., (2004) | Zhang, Y., et al., (2011) |
| Chen, C. H., et al., (2007) | Jin, Y., et al., (2014) | Wang, X., et al., (2000) | Zhang, Z., et al., (2011) |
| Chen, H., et al., (2014) | Kiliç, C., et al., (2003) | Wang, B., et al., (2011) | Zhang, Z., et al., (2012). |
| Cheng, Y., et al., (2014) | Kun, P., et al., (2009) | Wang, L., et al., (2009) | Zhao, G.F., et al., 2009 |
| Cheng, Z., et al., (2015) | Kun, P., et al., (2009) | Wang, L., et al., (2009) | Zhou, X., et al., (2013a) |
| Chou, F. H., et al., (2005) | Kun, P., et al., (2013) | Wang, L., et al., (2016) | Zhou, X., et al., (2013b) |



Table 4.1 - Analysis of PTSD Risk Factor in Adults

REFERENCES ABOUT THE PTSD RISK FACTORS FOR ADULTS				
SOCIO-DEMOGRAPHIC PTSD RISK FACTORS	References of secondary studies	Nr primary studies	Total number of cases	PTSD measurement
1. Female gender	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	38	74331	DTS, TSSC, PCL-C, IES-R, MINI, TALS-SR, PCL-C, HTQ, DSM-IV, Breslau scale, PTSD-SS, LASC, SCID-I/P
2. Younger age	Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	5	7707	IES-R, TALS-SR, PCL-C
3. Middle age	Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	4637	IES-R, PCL-C
4. Older age	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	13	38890	DTS, IES-R, SCID-I/NP, HTQ, DSM-IV, Braslau scale, TSSC, PCL-C, SCID I/P
5. Ethnic minority	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	3899	HTQ, DSM-IV, LASC
6. Ethnic majority	Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	4	3284	PCL-C
7. Living in rented accommodation	Aker, A. T., 2006	1	430	TSSC
8. Living in the countryside	Alipour, F., & Ahmadi, S., 2020.	2	500	PCL-C
9. Married	Aker, A. T., 2006; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	7415	IES-R, DSM-IV, PTSD-SS
10. Unmarried or living alone	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Tang, B., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	16397	DTS, HTQ, DSM-IV, SCID-I/P
11. Divorced	Dai, W., et al., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	11446	HTQ, DSM-IV, PCL-C
12. Widowed	Aker, A. T., 2006; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	12356	HTQ, DSM-IV, PCL-C



13. No household income	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	2892	HTQ, DSM-IV
14. Low income	Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	9	9187	DTS, DSM-IV, MINI, HTQ, PCL-C,
15. Unemployed	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Tang, B., et al., 2017	3	1936	DTS, IES-R
16. Low education level	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	16	39506	TSSC, DTS, IES-R, PCL-C, PTSD-SS, LASC, SCID-I/P, DSM-IV
17. Farmers	Dai, W., et al., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	684	PCL-C
18. Head of the family	Dai, W., et al., 2016; Tang, B., et al., 2017	1	300	DTS
19. Nuclear family	Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017	1	1291	TSSC
PRE-TRAUMA PTSD RISK FACTORS		Nr primary studies	Total number of cases	PTSD measurement
20. History of mental ill-health	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Tang, B., et al., 2017	5	3273	TSSC, DSM-IV
21. Chronic disease	Dai, W., et al., 2016; Tang, B., et al., 2017	1	957	MINI
22. Previous trauma	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Tang, B., et al., 2017	3	2634	TSSC, DSM-IV, PCL
23. Psychological distress induced by stressful live events in the last month prior to EQ	Aker, A. T., 2006; Farooqui, M., et al., 2017; Tang, B., et al., 2017	1	910	DSM-IV
24. Negative affect in personality disorder	Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016; Liang, Y., et al., 2019	1	956	IES-R
25. Two-week disease prevalence (ill in the previous two weeks)	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	3090	PCL-C
26. Negative religious coping or maladaptive coping strategies	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Farooqui, M., et al., 2017; Tang, B., et al., 2017	3	737	DTS, TSSC, SPRINT
27. Family/ friend/relative history of mental ill-health	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Farooqui, M., et al., 2017; Tang, B., et al., 2017	2	2233	DSM-IV
PERI-TRAUMA PTSD RISK FACTORS		Nr primary studies	Total number of cases	PTSD measurement



28. Being injured during the EQ	Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Kalantar Motamedi, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	8	30578	CAPS, DSM-IV, PCL-C, SCID-I/P, IES-R, PCL-C
29. Being buried or trapped during the EQ	Aker, A. T., 2006; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	6	27503	PCL-C, SCID-I/P, TSSC, IES-R
30. Witnessing someone buried, wounded or dying during the EQ	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	8	43910	PCL-C, PDS, IES-R, SCID-I/P
31. Witnessing horrendous scenes (e.g. touched dead bodies) during the EQ	Dai, W., et al., 2016	1	1253	PDS
32. Damage to the building where the subject was at the time of the EQ	Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017	1	1291	TSSC
33. Higher degree of EQ exposure	Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016 Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	3	3232	IES-R, DSM-IV, PCL-C
34. Exposure to a high exten of EQ shaking	Tang, B., et al., 2017	1	196	DSM-IV
35. Having been in serious danger	Farooqui, M., et al., 2017; Tang, B., et al., 2017	1	327	CPL-C
36. Proximity to epicenter	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016	2	3213	IES-R, TALS-SR
37. Bereavement (loss child, family members, friends, neighbors)	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Kalantar Motamedi, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	23	27844	TSSC, IES-R, SCID I/NP, MINI, HTQ, DSM-IV, PDS, PCL-C, PTSD-SS
38. Family members or friends injured	Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Kalantar Motamedi, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	1753	DSM-IV, PTSD-SS
39. Having felt guilt concerning someone's death or injury	Farooqui, M., et al., 2017; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	687	PCL-C
40. Fear during the EQ	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	9	7991	TSSC, PCL-C
41. Perceived life threat	Aker, A. T., 2006; Farooqui, M., et al., 2017; Tang, B., et al., 2017	1	910	DSM-IV
42. Peritraumatic distress	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Tang, B., et al., 2017	2	1522	PCL-S, IES-R



43. Unusual smelling/other perception during the EQ	Aker, A. T., 2006; Farooqui, M., et al., 2017; Tang, B., et al., 2017	1	910	DSM-IV
44. Dissociation, hyper-arousal and helplessness experienced immediately after the EQ	Tang, B., et al., 2017	1	1680	Braslaio scale
45. Negative religious coping or maladaptive coping strategies	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Farooqui, M., et al., 2017; Tang, B., et al., 2017	3	737	DTS, TSSC, SPRINT
POST-TRAUMA PTSD RISK FACTORS		Nr primary studies	Total number of cases	PTSD measurement
46. Operated on after the EQ	Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	14207	SCID I/P
47. Amputation	Tang, B., et al., 2017	1	9556	PCL-C
48. No regular income after the EQ	Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	3090	PCL-C
49. Serious economic difficulties (not necessarily related to eq and/or as consequence of EQ)	Dai, W., et al., 2016; Tang, B., et al., 2017	1	957	MINI
50. Job loss after the EQ	Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Tang, B., et al., 2017	1	1323	DSM-IV TR
51. Receipt of government financial support	Liang, Y., et al., 2019; Tang, B., et al., 2017	1	182	SCID I/NP
52. Material losses (e.g. possessions, livelihood, property, money)	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	5	13171	DSM-IIIIR, PTSD-SS, PCL-C, PDS
53. House damaged or destroyed	Aker, A. T., 2006; Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	7	13716	TSSC, IES-R, DTS, HTQ, DSM-IV
54. Loss of Church	Kalantar Motamed, M. H., et al., 2012; Tang, B., et al., 2017	1	298	PCL-C
55. Person from areas with the worst destruction	Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Tang, B., et al., 2017	1	737	DSM-III R
56. Living in temporary or prefabricated house or shelters	Alipour, F., & Ahmadi, S., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	6	10521	DTS, HTQ, PCL-C
57. Displaced after the EQ	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	2525	PLC-C
58. Relocation within the EQ region	Alipour, F., & Ahmadi, S., 2020	1	541	TSSC
59. Food and water shortages	Kalantar Motamed, M. H., et al., 2012; Tang, B., et al., 2017	1	298	PCL-C



60. Traumatic experiences after the earthquake	Liang, Y., et al., 2019	1	1369	IES-R
61. Receiving mental health support	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	2525	PCL-C
62. Receiving mental health support only one time	Farooqui, M., et al., 2017; Tang, B., et al., 2017	1	565	PCL-C
63. Having sought medical service	Dai, W., et al., 2016; Tang, B., et al., 2017	1	442	MINI
64. Social network change (Respondents or most of their neighbors or relatives move away from their houses)	Tang, B., et al., 2017	1	216	DSM-IV
65. Family members missing	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	2525	PCL-C
66. Participation in rescue work	Aker, A. T., 2006; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Tang, B., et al., 2017	4	12092	TSSC, PCL-C
67. Poor self-perceived health status	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	2	7444	IES-R
68. Grief due to family loss	Tang, B., et al., 2017	1	216	DSM-IV
69. Lack of sense of control over life	Alipour, F., & Ahmadi, S., 2020.	1	541	TSSC
70. Bad subjective feeling of economic status	Alipour, F., & Ahmadi, S., 2020; Farooqui, M., et al., 2017	1	624	SCID-I/P
71. Hopelessness	Tang, B., et al., 2017	1	361	PCL
72. Persistent fear	Tang, B., et al., 2017	1	91	IES-R
73. Anticipatory fear of future EQ	Alipour, F., & Ahmadi, S., 2020	1	541	TSSC
74. Impairment of working memory backward	Tang, B., et al., 2017	1	91	IES-R
75. Acute stress disorder in the first 4 week after the EQ	Tang, B., et al., 2017	1	91	IES-R
76. Psychological stress after the EQ	Alipour, F., & Ahmadi, S., 2020; Farooqui, M., et al., 2017	1	624	SCID-I/P
77. Depression	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	6075	IES-R
78. Sleep disturbance	Tang, B., et al., 2017	1	216	DSM-IV
79. Alcohol use disorder	Dai, W., et al., 2016; Hong, C., & Efferth, T., 2016 ; Liang, Y., et al., 2019; Tang, B., et al., 2017	1	6075	IES-R
80. Low social support	Alipour, F., & Ahmadi, S., 2020; Cénat, J. M., McIntee, S. E., & Blais-Rochette, C., 2020; Dai, W., et al., 2016; Farooqui, M., et al., 2017; Hong, C., & Efferth, T., 2016; Kalantar Motamed, M. H., et al., 2012; Liang, Y., et al., 2019; Tang, B., et al., 2017	18	25421	CAPS, PCL-C, IES-R, DSM-IV TR, SPRINT, DSM-IV, LASC



Results of the PTSD Risk Factors in the *Elderly*

The analysis of the three primary studies cited in the two secondary studies allowed the identification of 12 risk factors for PTSD in elderly people. A summary overview of these data is provided in Table 5 and elaborated specifically in Table 5.1.

Socio-demographic PTSD risk factors

The reported socio-demographic PTSD risk factors were: female gender, older age, low education level, low monthly income, and being widowed (see Table 5.1)

Peri-trauma PTSD risk factors

The reported peri-trauma PTSD risk factors were: being injured, bereavement (spouse, family members, relatives, friends), and having felt fear (see Table 5.1)

Post-trauma PTSD risk factors

The reported post-trauma PTSD risk factors were: low social support, damages of house, loss of livelihood, and interruptions of access to health and psychiatry services (see Table 5.1).

Table 5 - Summary overview of PTSD Risk Factors in Elderly People

12 PTSD RISK FACTORS FOR ELDERLY		
5 Socio-demographic PTSD risk factors 1. Female gender 2. Older age 3. Low education level 4. Low monthly income 5. Being widowed Pre-trauma PTSD risk factors not found	3 Peri-trauma PTSD risk factors <u>Objective event-related factors</u> a) <i>Direct exposure</i> 6. Being injured b) <i>Indirect exposure</i> 7. Bereavement (loss of a spouse, family members, relatives or friends) <u>Subjective event-related factors</u> 8. Having felt fear	4 Post-trauma PTSD risk factors <u>Post-earthquake objective factors</u> 9. House damage 10. Loss of livelihood 11. Interruptions of access to health and psychiatry services <u>Post-earthquake objective factors</u> 12. Low social support
2 REFERENCES OF SECONDARY STUDIES Hong, C., & Efferth, T. (2016) Tang, B., Deng, Q., Glik, D., Dong, J., & Zhang, L. (2017)		
3 REFERENCES OF PRIMARY STUDIES Chen, G., et al., (2012) Hikichi, H., et al., (2016) Zhang, Z., et al., (2012)		



Table 5.1 - Analysis of PTSD risk factor in the Elderly

12 PTSD RISK FACTORS FOR THE ELDERLY				
SOCIO-DEMOGRAPHIC PTSD RISK FACTORS	References of secondary studies	Nr primary studies	Total number of cases	PTSD measurement
1. Female gender	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	287	CAPS
2. Older age >80 years	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	287	CAPS
3. Low education level	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	287	CAPS
4. Low monthly income	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	287	CAPS
5. Being widowed	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	287	CAPS
PRE-TRAUMA PTSD RISK FACTORS	References of secondary studies	Nr primary studies	Total number of cases	PTSD measurement
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PERI-TRAUMA PTSD RISK FACTORS	References of secondary studies	Nr primary studies	Total number of cases	PTSD measurement
6. Being injured	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	2	571	CAPS, CPL-C
7. Bereavement (spouse, family members, relatives, friends)	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	2	3854	CAPS, SQD
8. Having felt fear	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	284	CPL-C
POST-TRAUMA PTSD RISK FACTORS	References of secondary studies	Nr primary studies	Total number of cases	PTSD measurement
9. House damage	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	3567	SQD
10. Loss of livelihood	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	284	CPL-C
11. Interruptions of access to internal medicine and psychiatry services	Tang, B., et al., 2017	1	3567	SQD
12. Low social support	Hong, C., & Efferth, T., 2016; Tang, B., et al., 2017	1	287	CAPS

DISCUSSION

The results of the present review showed several individual, relational, and contextual risk factors that may make individuals and their families vulnerable to the onset of PTSD following an earthquake. These were classified as socio-demographic, pre, peri, and post-traumatic risk factors. A brief summary of the most significant risk factors is indicated below.

Socio-demographic risk factors for PTSD

Many studies showed some socio-demographic risk factors for PTSD. *Female gender* is one of the most



frequent risk factors for PTSD in the three considered age groups (e.g., Jia et al., 2013; Ali et al., 2012; Chen, Shen & Chen, 2012). According to Olff (2017), women are two to three times more likely than men to develop PTSD due to some biological and psychosocial factors. Specifically (Olff, 2017; Tang et al., 2017; Zhou et al., 2013), women appear more sensitive to stress hormones and perceived threats and have a greater propensity to interpret disasters more negatively. Moreover, their traditional role in society exposes them to higher stress. Conversely, the socialization to the gender role promoted a sort of repression of psychological symptoms in boys, while increasing girls' emotional expression (Korol, Green, & Gleser, 1999; Tang, 2017). Regarding *age*, the literature indicated controversial results. Some studies reported both young and older ages as potential risk factors in children, adolescents, youth, and adults, even though more studies reported that older age is a significant risk factor in all three age groups (e.g., Fan et al., 2011; Ali et al., 2012; Chen, G., Shen, H., & Chen, G., 2012). The "older age" during adolescence and the first years of adulthood could be related to greater academic pressure and stress (Liu et al., 2010, Tang et al., 2017). Conversely, during more advanced life stages, the increased vulnerability could be explained by some health problems, inadequate financial resources, absence of personal transportation, and limited social networks (Chen, G., Shen, H., & Chen, G., 2012). In adults, the vulnerability may be due to the increased stress that they may feel in association with their career, the family burden, and elderly relatives (Guo, J., Wang, X., Yuan, J., Zhang, W., Tian, & Qu, Z., 2015).

Further inconsistent results were about marital status, with studies reporting both being unmarried (Ali, M., Farooq, N., Bhatti, M. A., & Kuroiwa, C., 2012), married (Guo et al., 2014), as well as divorced or widowed (Chen, Shen, H., & Chen, 2012; Kun et al., 2013), as risk conditions. In addition, *economic issues* (e.g., no household income, low income, unemployed, low socioeconomic status) also appear to be a significant risk condition for all three age groups (Cénat, J. M., & Derivois, D., 2015; Ali, M., Farooq, N., Bhatti & Kuroiwa, 2012; Chen, G., Shen, H., & Chen, G., 2012). Finally, *the low educational level* has also been documented as a risk factor in adults and older people (Wang et al., 2009; Chen, Shen & Chen, 2012).

Pre-trauma risk factors for PTSD

In all the considered age groups, the most documented pre-trauma PTSD risk factors were: personal and loved ones' history of mental health problems (Cadichon et al., 2017; Gökçen, Sahingöz & Annagür, 2013; Başoğlu et al., 2004; Tural et al., 2004), and the presence of previous traumas (Gökçen, Sahingöz, & Annagür, 2013; Cerdá et al., 2013). Indeed, throughout life, traumatic events could increase the risk of mental disorders (Tang, 2017). Different studies also report negative coping as a common pre-earthquake PTSD risk factor in children, adolescents, youth, and adults (Zheng et al., 2012; Liu, Fu, Jing & Chen, 2016). Conversely, positive coping increases the likelihood of resilience, a knowledge that highlights the importance of integrating coping



training into post-earthquake psychological interventions (Fan et al., 2015).

Peri-trauma PTSD risk factors

The literature also highlights multiple peri-trauma PTSD risk factors. In particular, studies showed that direct exposure to the earthquake is a crucial peri-earthquake PTSD risk factor. For instance, being buried/trapped (Jin & Li, 2015; Zhao et al., 2009) and witnessing someone buried, wounded, or dying during the earthquake (Ma et al., 2011; Zhou et al., 2013a) were significant PTSD risk factors for children, adolescents, youths and adults. Further significant risk factors (in all three age groups) were: being injured during the earthquake (Tian et al., 2014; Cerdá et al., 2013; Zhang et al., 2012) and having *experienced high levels of fear* (Liu et al., 2011; Zhang et al., 2011; Zhang et al., 2012). *Injured persons* are at high risk because of their high exposure to mortal danger and the additional stress and rehabilitation connected to an ongoing injury. In addition, the severity of the injuries could bring amputations of organs and disability, which can reduce the quality of life (Tang et al., 2017). Other studies showed that *having injured loved ones* (e.g., family members, classmates, teachers, or friends) could be another PTSD risk factor (Ma, et al., 2011; Cerdá et al., 2013). Moreover, *bereavement of loved ones* is reported as a significant PTSD risk factor in all three age groups (Liu et al., 2011; Cheng et al., 2015; Chen, Shen, & Chen, 2012).

Post-trauma PTSD risk factors

Finally, several studies identified some PTSD risk factors during the post-earthquake period. Adequate *social support* plays an essential role in protecting the mental health of the survivors (Alipour & Ahmadi, 2020; He, Xu, & Wu, 2013). *Low social support* was therefore identified as a risk factor for PTSD (Fan et al., 2015; Zhao et al., 2009; Chen, Shen & Chen, 2012), as well as damages to the *house damages* and material losses (e.g., possessions, livelihood, property, money) (Wang et al., 2012; Liu et al., 2016; Kun et al., 2009; Zhang et al., 2011; Hikichi et al., 2016; Zhang et al., 2012). In addition, economic difficulties were also identified as PTSD risk factors for adults, such as the absence of a regular income and job loss after the earthquake and severe economic difficulties not necessarily related to the earthquake (Kun et al., 2009; Kun et al., 2013; Cerdá et al., 2013; Gigantesco et al., 2013). *Unemployment and damage to the houses* could alter survivors' ability to care for their families. Therefore, the implementation of social interventions, such as income-generating activities to facilitate a return to work is crucial (Tang et al., 2017). Other studies also showed that participation in rescue work was a further important PTSD risk factor (Salcioglu, Basoglu & Livanou, 2003; Başoğlu et al., 2000). Rescues could have additional exposure to stressful, intense situations, and could feel intense anxiety, feelings of helplessness, desperation, self-blame, and guilt resulting from the impossibility of saving people or loved ones. Again, they may feel frustration and anger toward the local and national



government authorities for their potential delayed response in rescue efforts (Salcioglu, Basoglu & Livanou, 2003).

Conclusion

The systematic review allowed the identification of some significant individual, relational, and contextual risk factors that may make individuals and families vulnerable to the onset of PTSD following an earthquake. The above-cited results were used as an essential *baseline* in order to

1. Realize a preliminary *classification* of the representative families with different levels of risk (high-low-no-risk) - for the insurgence of PTSD. The distinct levels of risk were based on their socio-demographic and psychological indicators;
2. Realize a *preliminary version of an Inventory* titled: "*Peri-traumatic and post-traumatic factors Inventory*," which, in the immediate aftermath of an earthquake, could help rescuers to effectively identify individuals and families at risk of the insurgence of PTSD disorder;
3. Set up the research protocol for the empirical study that will be realized in the pilot areas (WP6).



SECTION 2: THE IDENTIFICATION OF TARGET FAMILIES BASED ON DIFFERENT LEVELS OF RISK

In the present section, we reported the procedures used for preliminary identification of the representative families of the Medea research project.

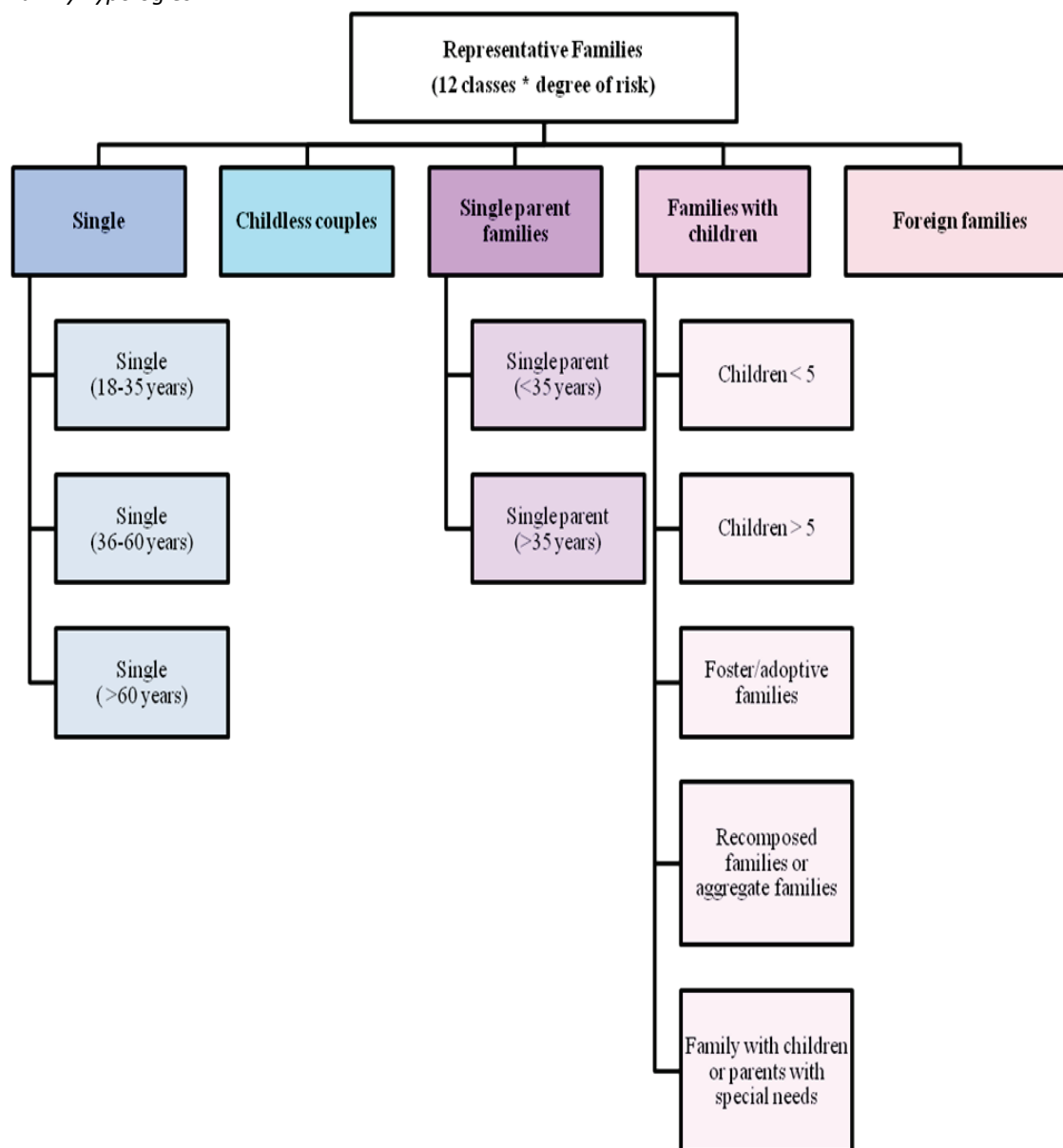
Precisely, we followed the subsequent criteria and procedures for the identification and description of the typology of the representative families in terms of *distinct levels of risk* (high/low/no-risk) of PTSD:

1. *First*, we considered the results of the systematic review of PTSD risk factors (see Section 1). This review constituted a significant *baseline* for the preliminary identification of the risk factors of the representative families.
2. *Second*, we considered the descriptions of the families and the data of the following: *the Italian National Institute of Statistics (ISTAT); the Republic of Slovenia Statistical Office, and The Croatian Bureau of Statistics*. This description also allowed us to detect a typology of families that could be found in all three Nationalities of the Medea project.
3. *Third*, we took into consideration further indications of the literature, specifically those of the "*Process-Oriented Model*" (Cummings, Davies, & Campbell, 2000, Di Blasio, 2005) and the *Distinction between the Distal and Proximal Factors* (Baldwin, Baldwin, & Cole, 1990).
4. *Fourth*, consistent with these further indications of the literature, we classified the most significant PTSD risk factors (identified by the systematic review, Section 1) as *distal and proximal factors*.
5. *Fifth*, thanks to the joint consideration of the identified family typologies and of the classification of distal and proximal PTSD risk factors, we detected the representative families with *distinct levels of risk* (high/low/no- risk) of PTSD in case of seismic events.

Family Typologies

By considering the data and the descriptions of the families of the Italian National Institute of Statistics, the Republic of Slovenia Statistical Office, and also of the Croatian Bureau of Statistics, we selected 12 kinds of families (see Figure 2). This typology of families could be found in the three Nationalities (Italy, Croatia, and Slovenia) of Medea project partners.

Figure 2. -Family Typologies



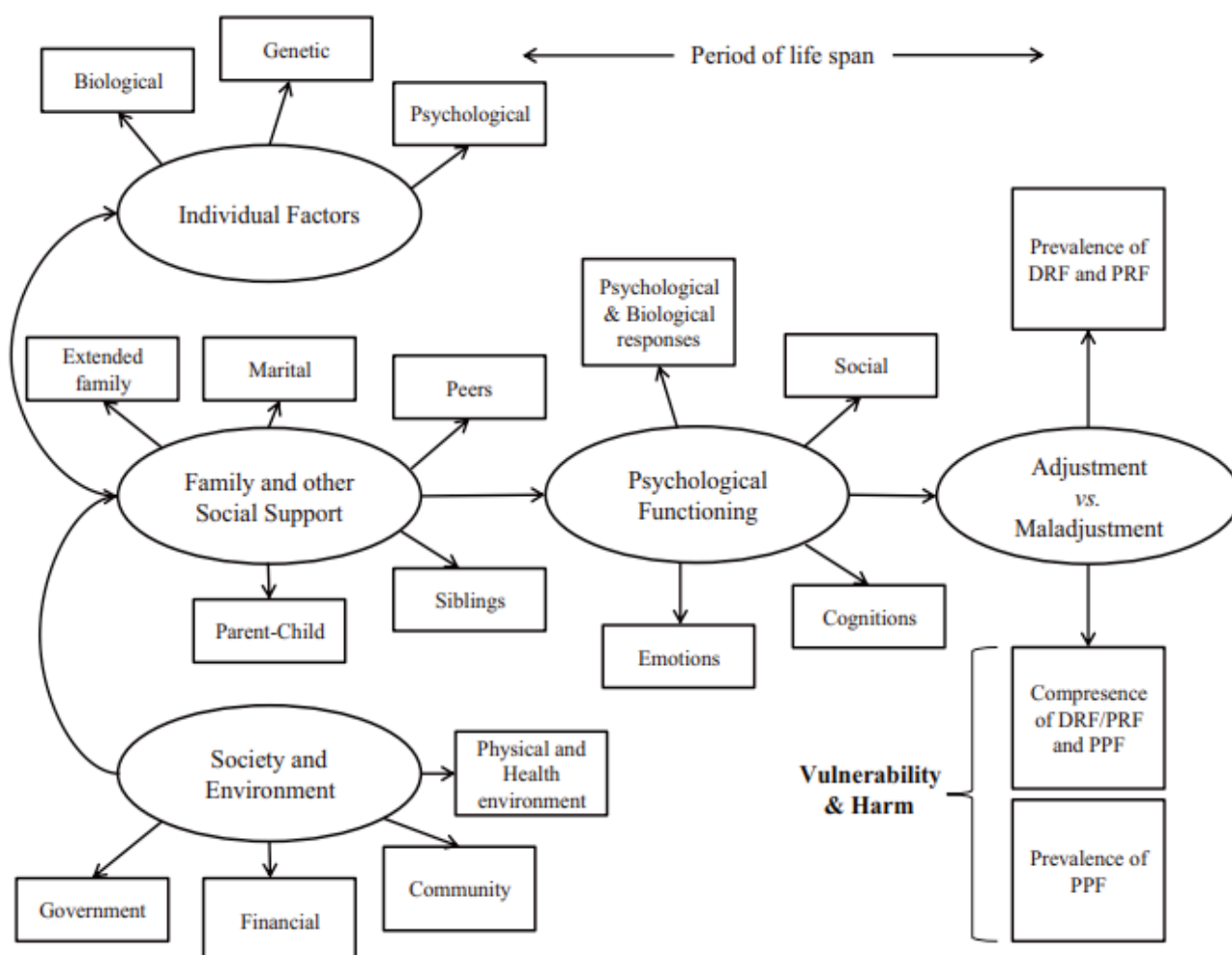
THE PROCESS-ORIENTED MODEL AND THE DISTAL AND PROXIMAL FACTORS

In the literature of developmental psychopathology, the Process Oriented Model (Cummings, Davies, & Campbell, 2000, Di Blasio, 2005) posits that human development is characterized by mutual influences between different factors and environments, which lead to adaptive or potentially maladaptive patterns. This model (see Figure 3) has been modified and articulated by Di Blasio, 2005 to fit the family violence literature and the risk assessment about parenting behaviors (Di Blasio, 2005; Milani, Miragoli, Grumi, Di Blasio, 2019; 2020). The model's left side highlights the contribution of genetic, biological, and psychological factors of individuals, which interact with family functioning, and environmental factors in determining parental attitudes toward offspring. The central part of the model focuses on the "here-and-now" psychological



functioning that mediates between contextual factors and adaptive/maladaptive trajectories. The right side of the model presents the outcomes of the process: social competence on one side and maladjustment on the other. Social competence is a developmental outcome related to families with a preponderance of proximal protective factors. In these instances, parents can express positive parenting and buffer the impact of eventual adverse events (e.g., loss of job, death of a relative). On the other hand, maladaptive outcomes can be characterized by those instances when parents are not able to buffer the effects of adverse events – or personal difficulties – and expose their children to situations of vulnerability or clear harm via a significant prevalence of distal and proximal risk factors (Milani et al., 2020).

Figure 3. - The Process Oriented Model



Therefore, according to this model, high-risk conditions are not necessarily equivalent to maladaptive outcomes. In fact, it is often difficult to assign a “clear-cut” score of damaging potential to many life events, due to the complexity of the mutual interaction of the factors in play. Thus, to better discriminate those



factors that directly *influence* the developmental trajectories and those that are indirect, we could refer to the significant distinction by Baldwin, Baldwin, & Cole (1990) between distal and proximal factors. The term “*Distal*” is used because these factors are supposed to have an indirect effect on adjustment/maladjustment and can be thought of as a humus on which more proximate events and factors build their influence. Proximal factors have a direct influence on family processes and can overturn frail points of balance, often exacerbating covert tensions and conflicts. Distal risk factors (e.g. chronic poverty, low educational level) imply a condition of vulnerability but exert an indirect influence on parental practices and children’s developmental trajectory, while proximal factors have a direct influence on the parent-child relationship. Proximal factors include both risk and protective factors: risk factors (e.g. parental psychopathology, parental substance abuse) exacerbate vulnerability induced by distal factors, increasing the probability that the situation evolve into a harm for the child; on the contrary, protective factors (e.g., self-esteem, desire to improve oneself) are proximal resources that may buffer the negative impact of distal and proximal risk factors.

THE DISTAL AND PROXIMAL RISK FACTORS FOR THE ONSET OF PTSD IN SEISMIC CASES

Thanks to the consideration of the literature about the “*Process-Oriented Model*” (Cummings, Davies, & Campbell, 2000, Di Blasio, 2005) and the *Distinction between the Distal and Proximal Factors* (Baldwin, Baldwin, & Cole, 1990; Di Blasio & Camisasca, 2005; Milani et al., 2019; 2020), we further classified the risk factors associated to the onset of PTSD, in case of seismic events. Specifically, by considering two distinct developmental stages (children/adolescent and Youths/Adults/Elderly) we classified the most significant PTSD risk factors (identified by the systematic review, Section 1) as distal or proximal factors which could have *indirect or direct* influences on the onset of PTSD. See the following figures (4 and 5) for the categorization of PTSD distal and proximal risk factors by considering children/adolescents or youths/adults/elderly.



Figure 4. -Children and Adolescents: Distal and Proximal Factors for PTSD

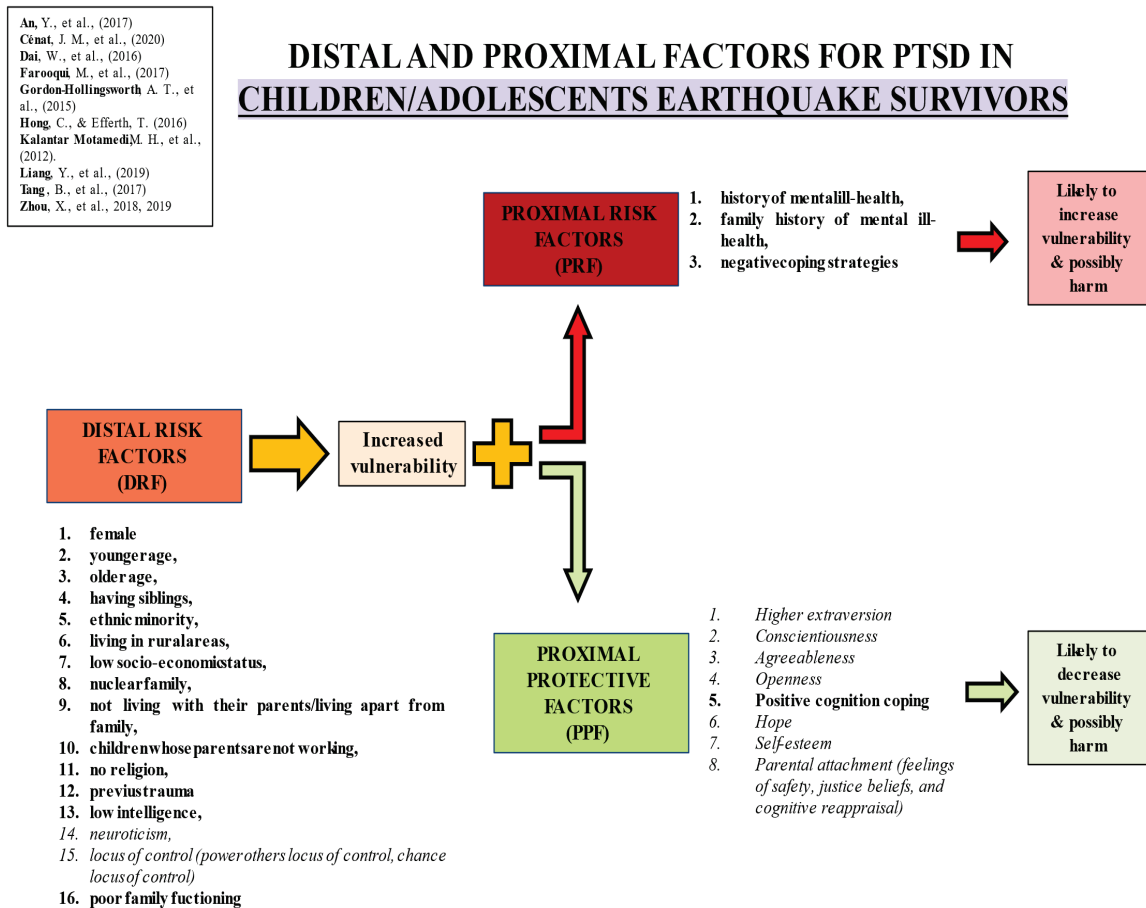
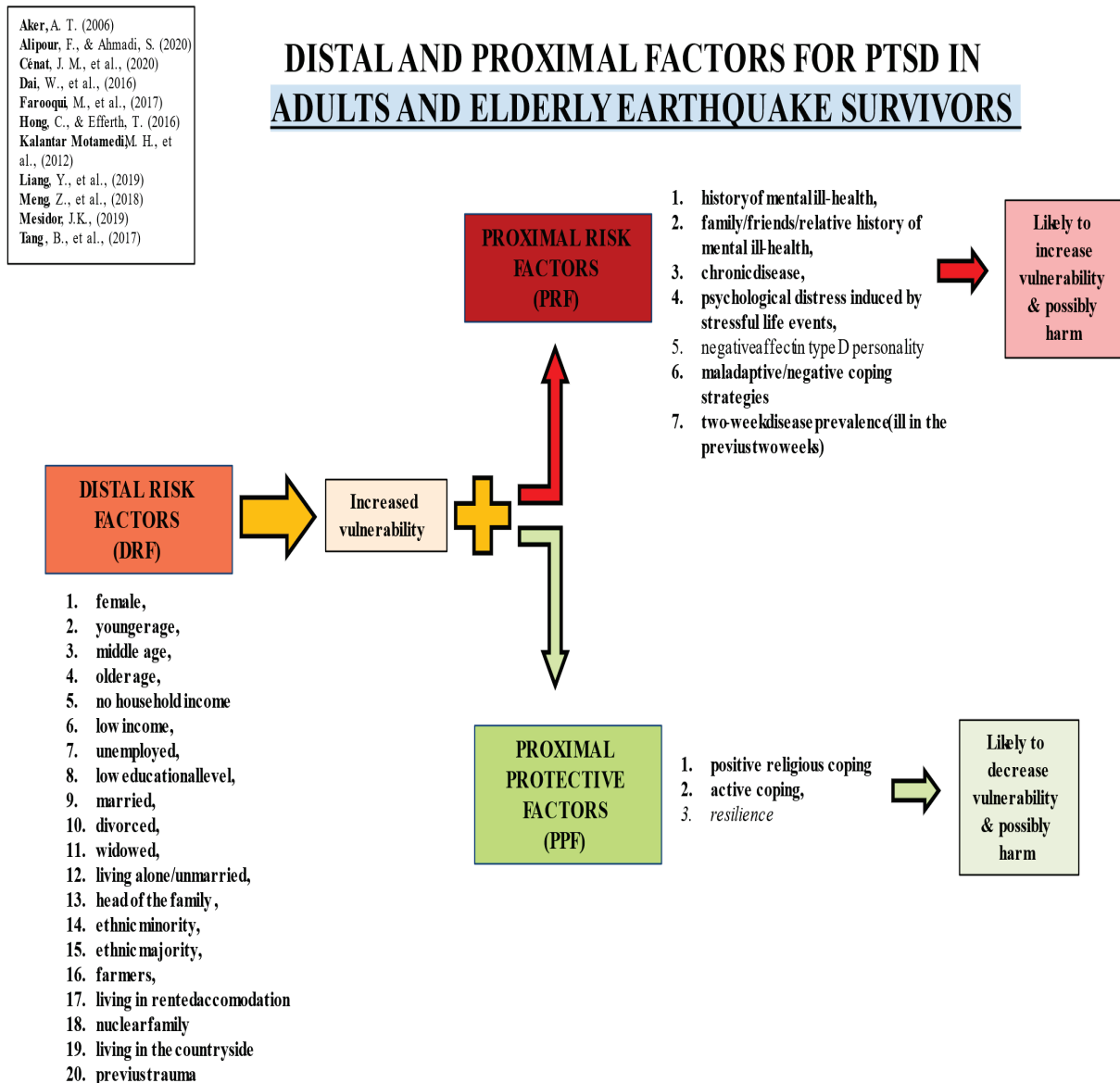




Figure 5. -Youths, Adults and Elderly: Distal and Proximal Factors for PTSD

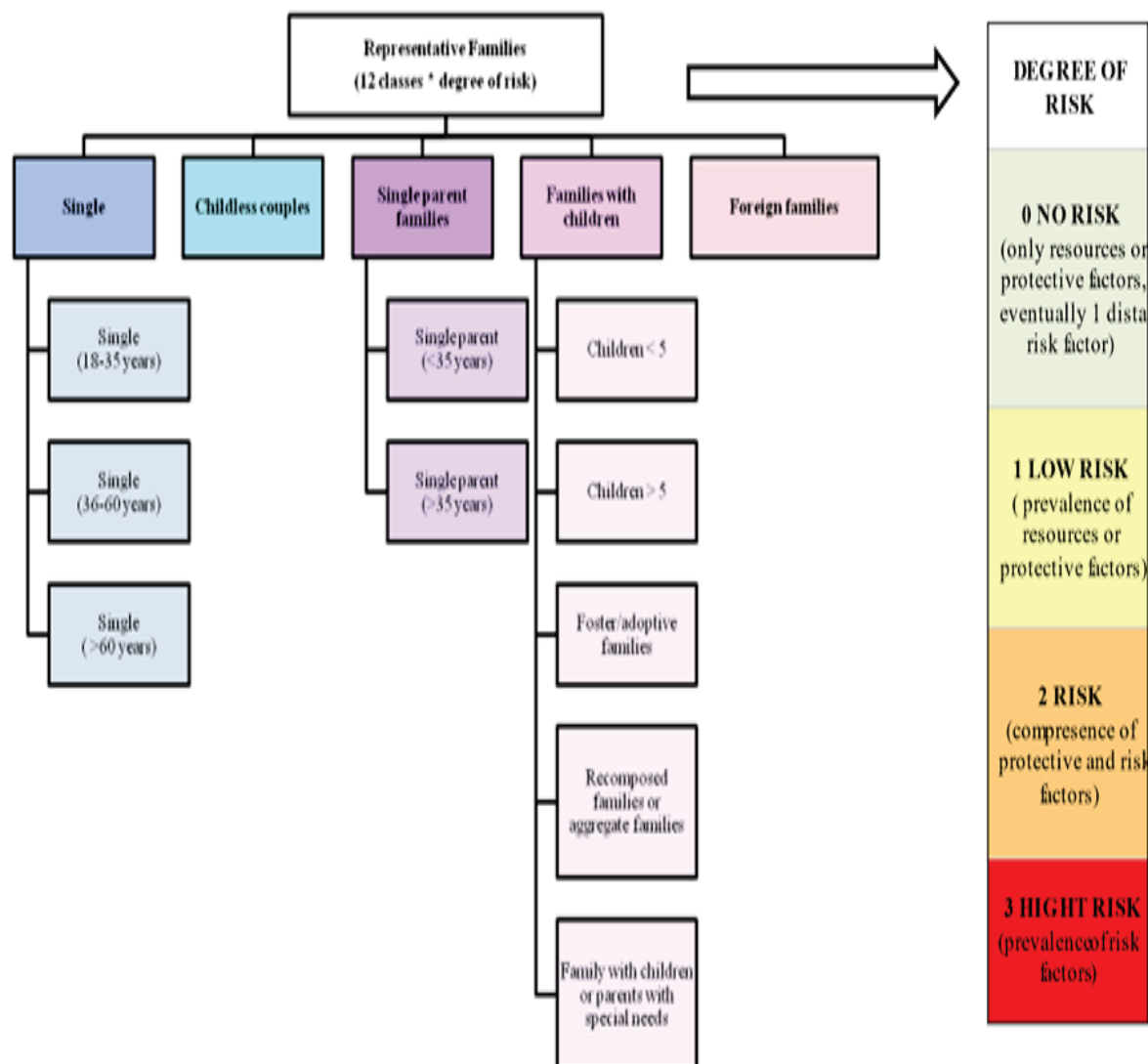




THE IDENTIFICATION OF THE TARGET FAMILIES

Thanks to the joint consideration of the typology of families and of the *distal and proximal* PTSD risk factors, we identified the representative families with distinct levels of risk for the insurgence of PTSD in case of seismic events. More specifically, by considering the possible presence of distal and proximal risk factors and the presence of resources and protective factors, each typology of the family was classified (see Figure 6) based on a distinct degree of risk (from no risk to high).

Figure 6.- The Representative (Target Families)



Moreover, for each representative families, we indicated the most significant risk and protective factors that were detected through the sistematic review (see Section 1).



The Representative (Target) Families and Their Degree of Risk

1 SINGLE	1 SINGLE				DEGREE OF RISK
	RESOURCES - 0.5	PROTECTIVE FACTORS -1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1	
	1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. divorced, 10. widowed, 11. living alone/unmarried, 12. ethnic minority, 13. ethnic majority, 14. farmers 15. living in rented accommodation 16. nuclear family 17. living in the countryside 18. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor) 1 LOW RISK (prevalence of resources or protective factors) 2 RISK (compresence of protective and risk factors) 3 HIGHT RISK (prevalence of risk factors)



2 CHILDLESS COUPLES	2 CHILDLESS COUPLES				DEGREE OF RISK
	RESOURCES - 0.5	PROTECTIVE FACTORS -1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1	
2 CHILDLESS COUPLES	1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. married, 10. divorced, 11. widowed, 12. ethnic minority, 13. ethnic majority, 14. farmers 15. living in rented accommodation 16. living in the countryside 17. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)
					1 LOW RISK (prevalence of resources or protective factors)
					2 RISK (compreence of protective and risk factors)
					3 HIGHT RISK (prevalence of risk factors)



3 SINGLE PARENT FAMILY	3 SINGLE PARENT FAMILY				DEGREE OF RISK
	RESOURCES - 0.5	PROTECTIVE FACTORS -1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1	
	1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. divorced, 10. widowed, 11. living alone/unmarried, 12. head of the family 13. ethnic minority, 14. ethnic majority, 15. farmers 16. living in rented accommodation 17. living in the countryside 18. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor) 1 LOW RISK (prevalence of resources or protective factors) 2 RISK (compresence of protective and risk factors) 3 HIGHT RISK (prevalence of risk factors)



4 FAMILY WITH CHILDREN					DEGREE OF RISK
PARENT	PARENT/RESOURCES -0,5	PARENT/PROTECTIVE FACTORS -1	PARENT/DISTAL RISK FACTOR + 0,5	PARENT/PROXIMAL RISK FACTORS +1	
4 FAMILY WITH CHILDREN	1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. married, 10. divorced, 11. widowed, 12. head of the family 13. ethnic minority, 14. ethnic majority, 15. farmers 16. living in rented accomodation 17. nuclear family 18. living in the countryside 19. previous trauma	1. history of mental ill- health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previuos two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)
					1 LOW RISK (prevalence of resources or protective factors)
					2 RISK (compresence of protective and risk factors)
					3 HIGHT RISK (prevalence of risk factors)



CHILD ADOLESCENT	CHILD- ADOLESCENT/RESOURCES -0,5	CHILD ADOLESCENT /PROTECTIVE FACTORS - 1	CHILD ADOLESCENT /DISTAL RISK FACTOR + 0,5	CHILD- ADOLESCENT /PROXIMAL RISK FACTORS +1	DEGREE OF RISK
4 FAMILY WITH CHILDREN	1. High income, 2. high educational levels, 3. male	1. Higher extraversion 2. Conscientiousness 3. Agreeableness 4. Openness 5. Positive cognition coping 6. Hope 7. Self-esteem 8. Parental attachment (feelings of safety, justice beliefs, and cognitive reappraisal)	1. female 2. younger age, 3. older age, 4. having siblings, 5. ethnic minority, 6. living in rural areas, 7. low socio-economic status, 8. nuclear family, 9. not living with their parents/living apart from family, 10. children whose parents are not working, 11. no religion, 12. previous trauma, 13. low intelligence, 14. neuroticism, 15. locus of control (power others locus of control, chance locus of control) 16. poor family functioning	1. history of mental ill-health, 2. family history of mental ill-health, 3. negative coping strategies	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)
					1 LOW RISK (prevalence of resources or protective factors)
					2 RISK (compresence of protective and risk factors)
					3 HIGHT RISK (prevalence of risk factors)



5 FOREIGN FAMILY	5 FOREIGN FAMILY				DEGREE OF RISK
	RESOURCES - 0.5	PROTECTIVE FACTORS -1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1	
	1. High income, 2. high educational levels, 3. male	1. positive religious coping was the strongest predictor 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. married, 10. divorced, 11. widowed, 12. head of the family 13. ethnic minority, 14. ethnic majority, 15. farmers 16. living in rented accommodation 17. nuclear family 18. living in the countryside 19. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor) 1 LOW RISK (prevalence of resources or protective factors) 2 RISK (presence of protective and risk factors) 3 HIGH RISK (prevalence of risk factors)



SECTION 3: THE PRELIMINARY INVENTORY OF PERI-TRAUMATIC AND POST-TRAUMATIC PTSD RISK FACTORS

INTRODUCTION

In the present section, we introduce the preliminary version of the *Inventory* about the most significant *peri-traumatic and post-traumatic* events and conditions which could promote the insurgence of PTSD disorder. The peritraumatic and post-traumatic experiences and conditions (included in the Inventory) indicated in the Inventory were identified thanks to the work of the systematic literature review (see Section 1). The accurate knowledge, and consideration of these factors could help rescues to detect, monitor and support the individuals at more risk for the insurgence of PTSD disorder.

This preliminary Inventory contains two sections: one for children and adolescents and the other one for adults and elderly. The listed peri-traumatic and post-traumatic experiences and conditions were: the personal and the close ones' exposure to the seismic events, the post-seismic events living conditions, the post-seismic events cognitions, behaviors, and perceived social support.

PERI-TRAUMATIC AND POST-TRAUMATIC FACTORS INVENTORY FOR CHILDREN AND ADOLESCENTS	
1	<u>EXPERIENCES DURING AND AFTER THE EARTHQUAKE</u> 1. Self-exposure to Traumatic Events € Buried or trapped € Personal injury € Severe personal injury € Hospitalized € Operated € Amputated € None/Other 1.2: Having been in serious danger during the earthquake? € 0 = No € 1=Slightly € 2 = Markedly € 3 = Extremely 1.3: Intensity of your fear during the earthquake € 0= No fear at all € 1= Slight fear € 2= Marked fear € 3= Extremely severe fear 1.4: Fear for the safety of close ones during the earthquake (o worry?) € 0= No fear at all € 1= Slight fear



	€ 2= Marked fear € 3= Extremely severe fear 1.5: How anxious/fearful have you been lately thinking about other possible earthquakes in the near future? € 0 = Not anxious/fearful at all € 1 = Slightly anxious/fearful € 2 = Markedly anxious/fearful € 3 = Extremely anxious/fearful 1.6: How much control do you have over your life at present? € 0 = Not at all in control / Feeling very helpless € 1 = Slightly in control € 2 = Markedly in control € 3 = Completely in control / Not feeling helpless at all 1.7: Participation in rescue work after the earthquake € Yes € No 1.8: How close were you to the epicenter during the earthquake? € Within 50 km € 50 to 100 km € More than 100 km 1.9: Did you experience seismic tremors? € No € Yes 1.10: Where were you during the earthquake? € In a building € In my house € On the street € In a transport vehicle € Other 1.11: Current worries 0 = No € 1= Slightly € 2 = Markedly € 3 = Extremely
2	<u>EXPOSURE OF FAMILY MEMBERS AND /OR CLOSE ONES</u> 2.1: Did any of your close ones die in the earthquake? € No € My mother € My father € My brothers/sisters € My relatives € My friends € My teachers € My classmate € My neighbors € Other _____



	2.2: Did any of your close ones injured in the earthquake? – € No € My mother € My father € My brothers/sisters € My relatives € My friends € My teachers € My classmate € My neighbors € Other _____ 2.3: Did any of your close ones have these consequences due to the earthquake? € Buried or trapped € Hospitalized € Amputated € Operated € Disabled € Other consequences? € No consequence
3	WITNESSED THE DEATH OF SOMEONE: € No € Yes, my mother € Yes, my father € Yes, my sisters or brothers € Yes, close relatives € Yes, friends € Yes, my teachers, € Yes, my classmates € Yes, my neighbors € Yes, strangers € Yes, other _____
4	WITNESSED INJURY of SOMEONE: € No € Yes, my mother € Yes, my father € Yes, my sisters or brothers € Yes, close relatives € Yes, friends € Yes, my teachers, € Yes, my classmates € Yes, my neighbors € Yes, strangers € Yes, other _____
5	WITNESSED A COLLAPSE OF: € buildings € own house € other _____ € None



6	MISSING DUE TO THE EARTHQUAKE ☐ No ☐ Yes, my mother ☐ Yes, my father ☐ Yes, my sisters or brothers ☐ Yes, close relatives ☐ Yes, friends ☐ Yes, my teachers, ☐ Yes, my classmates ☐ Yes, my neighbors ☐ Yes, other _____
7	HOUSE DAMAGE ☐ completely destroyed, ☐ partially destroyed, ☐ mildly damaged, ☐ not damaged at all
8	CURRENT LIVING CONDITION ☐ My usual house ☐ A new house ☐ A tent ☐ Temporary shelter ☐ Other _____ 8.2: OVERNIGHT OUTDOOR AFTER EARTHQUAKE ☐ Yes, < 6 night ☐ Yes, > 6 nights ☐ No
9	SCHOOL 9.1: Absence from school since the earthquake EVEN IF THE SCHOOL was not closed ☐ Yes ☐ No 9.2: School closed $\geq$ six days after the earthquake ☐ Yes ☐ No
10	Visiting affected areas after the earthquake ☐ Yes ☐ No Did your parents participate in the rescue work? ☐ Yes ☐ No
11	At Risk behaviors ☐ Smoking ☐ Excessive Alcohol ☐ Substance misuse ☐ None ☐ Altro?



12	OTHER EXPERIENCES AFTER THE EARTHQUAKE 12.1: Perceived sense of security and support by parents € Yes € No 12.2: Perceived sense of security and support obtained from relatives € Yes € No 12.3: Perceived sense of security and support obtained from teachers € Yes € No 12.4: Perceived mutual support among peers € Yes € No 12.5: Exposure to touching content about the earthquake in news reports € Yes € No 12.6: Exposure to encouraging content about the earthquake in news reports € Yes € No
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PERI-TRAUMATIC AND POST-TRAUMATIC FACTORS INVENTORY FOR ADULTS AND ELDERLY

1	<u>PERSONAL EXPERIENCES DURING AND AFTER THE EARTHQUAKE</u> 1.1: Personal exposure to Traumatic Events € Buried or trapped € Personal injury € Severe personal injury € Hospitalized € Operated € Amputated € None/Other 1.2: Having been in serious danger during the earthquake? € 0 = No € 1= Slightly € 2 = Markedly € 3 = Extremely 1.3: Intensity of your fear during the earthquake € 0= No fear at all € 1= Slight fear € 2= Marked fear € 3= Extremely severe fear 1.4: Fear for the safety of close ones during the earthquake € 0= No fear at all € 1= Slight fear € 2= Marked fear € 3= Extremely severe fear 1.5: How anxious and fearful have you been lately thinking about possible earthquakes shortly?
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	€ 0 = Not anxious/fearful at all € 1 = Slightly € 2 = Markedly € 3 = Extremely anxious/fearful 1.6: How much control do you have over your life at present? € 0 = Not at all in control / Feeling very helpless € 1 = Slightly in control € 2 = Markedly in control € 3 = Completely in control / Not feeling helpless at all 1.7: Participation in rescue work after the earthquake € Yes € No 1.8: How close were you to the epicenter during the earthquake? € Within 50 km € 50 to 100 km € More than 100 km 1.9: Did you experience seismic tremors? € No € Yes 1.10: Where were you during the earthquake? € In a building € In my house € On the street € In a transport vehicle € Other _____ 1.11 Current worries € 0 = No € 1= Slightly € 2 = Markedly € 3 = Extremely
2	<u>CLOSE ONE'S EXPOSURE</u> 2.1: Did any of your close ones die in the earthquake? € No € My mother € My father € My brothers/sisters € My son/sons € My partner € My close relatives € My friends € My colleagues € My neighbors € Other _____ 2.2: Did any of your close ones injured in the earthquake? € No € My mother € My father



	€ My brothers/sisters € My son/sons € My partner € My close relatives € My friends € My colleagues € My neighbors € Other _____ 2.3: Did any of your close ones have these consequences due to the earthquake? € Buried or trapped € Hospitalized € Amputated € Operated € Disabled € None
3	WITNESSED THE DEATH OF SOMEONE: € No € My mother € My father € My brothers/sisters € My sons € My partner € My close relatives € My friends € My colleagues € My son's teachers € Strangers Other _____
4	WITNESSED INJURY TO SOMEONE: € No € My mother € My father € My brothers/sisters € My sons € My partner € My close relatives € My friends € My colleagues € My neighbors € Strangers € Other _____
5	WITNESSED A COLLAPSE OF: € Buildings € Own house € Other _____ € No



6	DID ANY OF YOUR CLOSE ONES MISSING DUE TO THE EARTHQUAKE? € No € My mother € My father € My brothers/sisters € My sons € My partner € My close relatives € My friends € My colleagues € My neighbors € Other _____
7	HOUSE DAMAGE € completely destroyed € partially destroyed € mildly damaged € no damage
8	CURRENT LIVING CONDITION € My usual house € A new house € A tent € Temporary shelter € Other STAYING OUTDOORS OVERNIGHT AFTER THE EARTHQUAKE € Yes < 6 nights € Yes > 6 nights € No
9	VISITING AFFECTED AREAS AFTER THE EARTHQUAKE € Yes € No
10	UNHEALTHY BEHAVIORS AT-RISK € Smoking € Alcohol € Drug € None
11	EXPERIENCES AFTER THE EARTHQUAKE 11.1: Perceived sense of security obtained from close relatives at a post-earthquake time period € Yes € No 11.2: Perceived sense of social support at a post-earthquake time period € Yes € No



	11.3: Exposure to touching content about the earthquake in news reports
€	Yes
€	No
	11.4: Exposure to encouraging content about the earthquake in news reports
€	Yes
€	No

SECTION FOUR: RESEARCH PROTOCOL: "Seismic events and post-traumatic consequences: Early identification of at Risk Families"

The present section describes the Research Protocol for the empirical study that will be conducted in the pilot areas of the Medea project (see WP6). The present Research Protocol **was approved by the Ethical Commission** of e-Campus University (nr. 05/2023), in July 2023.

AIMS OF THE PRESENT RESEARCH

The research aims to identify individual and relational factors that could promote or hinder the resilience of individuals and families involved in seismic events. More specifically, based on the literature review (see section 1), the present study aims to understand and detect the most significant and less explored factors which could make individuals and families resilient or vulnerable to the insurgence of depressive, anxious, and post-traumatic symptoms. To this aim, the research will focus non-only socio-demographic and individual risk factors but also relational and family functioning factors which could be associated with the onset of PTSD symptoms in case of seismic events. The Medea intelligent system will use the psychological results of the research for multidimensional seismic risk assessment in cross-border areas. This system will use artificial intelligence to estimate the losses caused by an earthquake based on the predicted damage to structures (e.g., buildings), also forecasting the psychological consequences for the individuals involved. Indeed, the system will have a knowledge base (KB) containing reference structures and families represented using technical and psychological parameters. These serve as a representative set of the structures and families in existing areas. The KB also contains the effects of reference seismic actions on reference structures and families, measured using Engineering Demand Parameters (EDPs) and psychological parameters. Concerning an earthquake that has occurred or may occur in existing areas where the knowledge of structures(families) may also be incomplete, the system associates existing structures(families) to similar reference structures(families) of the KB based on available data. The system then combines analytical/numerical methods with eXplainable Artificial Intelligence (XAI) models to estimate the damage to structures, the losses, and the psychological consequences for the individuals involved. The system will also help identify/support families at risk of psychological consequences in the medium/long term, e.g., low-income families, those who have already experienced traumatic events, or with children affected by disability. The

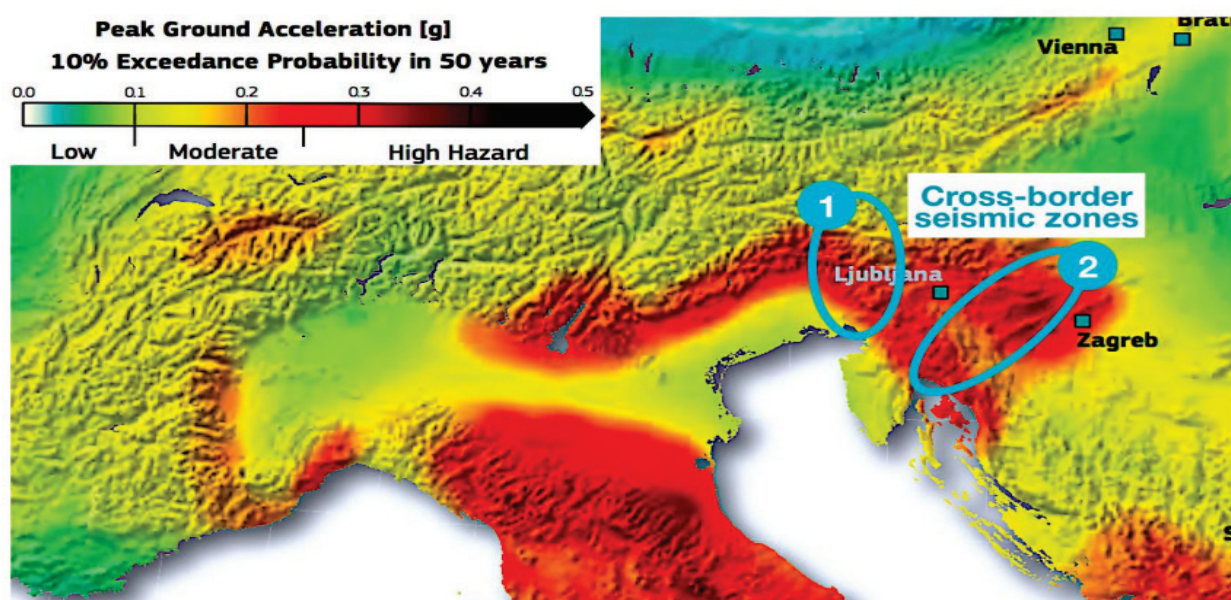


study results will therefore help create intervention guidelines for operators and psychologists involved in rescue operations. These guidelines aim to achieve early identification and support of the most vulnerable individuals and families. Such lines guide will be produced in collaboration with the Italian Society for the Study of Stress Traumatic (SISST) and with the Stella Maris Foundation (FSM).

PARTICIPANTS, PROCEDURE AND MEASURES

Participants will be the representative families described in Section 2 (see the following Tables) composed of adults (18-80 years) and children (aged 4-17). Participants will be recruited thanks to the collaboration of Associazione Nazionale Comuni Italiani (ANCI), the Head of Civil Protection Service in Medjimurje country (Croatia), and Gasilska Zveza Slovenije (GZS, Fire Brigade Association of Slovenia), partners of Medea project.

Figure /. The Pilot Areas of the Empirical Study



Procedure

In the first phase of the research, all participants will be asked for their personal consent to participate in the research. In addition, both parents and/or legal representatives of minor participants will be asked for further consent for children's participation. In the second phase of the research, some self-report measures will be administered to the participants online to ensure maximum protection and safety of participants e



allow participation in complete harmony with the work and daily commitments of the families. More specifically, adults having obtained the LINK to access can complete the questionnaires with total autonomy. Children and adolescents will receive the LINK from their parents to fill the measures.

Measures for Youths, Adults and Elderly

- 1. Socio-demographic Inventory** for evaluating socio-demographic factors, family composition, and health conditions. *Non vedo l'esposizione ad eventi traumatici*
- 2. Posttraumatic Stress Disorder Checklist (PC-PTSD-5; Prins et al., 2016)** to assess the vulnerability to the onset of PTSD symptoms.
- 3. Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet & Farley, 1988, Italian validation of Di Fabio & Busoni, 2008)** to assess the perceived social support.
- 4. Brief Assessment of Family Functioning Scale (BAFFS; Mansfield, Keitner & Sheeran, 2019)** to assess the quality of family functioning.
- 5. Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski, Kraaij & Spinhoven, 2001; Italian translation of Ubbiali, Donati, Chiorri, & Hampton)** to assess the cognitive and emotional strategies to regulate emotions
- 6. World Health Organisation-Five Well-Being (WHO-5; World Health Organization, 1998, Italian translation of the World Health Organization),** to assess the general psychological well-being
- 7. Brief Cope (Carver, 1997, Italian validation by Bongelli et al., 2022)** to assess the coping strategies.

In addition, if adults are parents of children aged 4- 17 years, they also will fill the following measures:

- 8. Coparenting Relationship Scale (CRS; Feinberg, Brown, & Kan, 2012, Italian validation by Camisasca et al., in press)** to assess the quality of the co-parenting relationship.
- 9. Parenting Stress Index – Short Form (PSI-SF; Abidin, 1995, Italian validation by Guarino, Di Blasio, D'Alessio, Camisasca & Serantoni, 2008)** to assess parenting stress
- 10. Child Behavior Checklist – only PTSD items (CBCL 4/18; Achenbach, 1991; Italian validation by Frigerio, 2001)** to assess children's vulnerability to PTSD symptoms.

Measures for Children and Adolescents

- 1. Socio-demographic Inventory** for evaluating socio-demographic factors, and health conditions.
- 2. Child Revised Impact of Event Scale (CRIES-8 Children and War Foundation, 1998, Italian translation by Gravante, 2010)** to assess the vulnerability to the onset of PTSD symptoms
- 3. Lum Emotional Availability of Parents (LEAP; Lum & Phares, 2005; Italian version by Babore, Candelori &**



Picconi, 2012) to assess their perceptions about parents' availability

4. **Cognitive Emotion Regulation Questionnaire** (CERQ; Garnefski, Kraaij & Spinhoven, 2001; Italian translation of Ubbiali, Donati, Chiorri, & Hampton) to assess the cognitive and emotional strategies to regulate emotions

5. **Coparenting Relationship Scale for children/adolescents** (CRS-C; CRS-A Camisasca & Feinberg, 2020) to assess the children's perceptions of their parents' co-parenting relationship.

6. **Children's coping strategies checklist-revision1** (CCSC-R1; Ayers & Sandler, 1999, Italian validation by Camisasca, Caravita, Milani & Di Blasio, 2012) to assess coping strategies

7. **World Health Organisation-Five Well-Being** (WHO-5; World Health Organization, 1998, Italian translation of the World Health Organization), to assess the general psychological well-being.



THE REPRESENTATIVE FAMILIES AND THE RESEARCH PROTOCOL (TARGET FAMILIES)

1 SINGLE				DEGREE OF RISK	RESEARCH PROTOCOL
RESOURCES -0.5	PROTECTIVE FACTORS -1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1		1. Inventory of socio-demographic and mental health factor
1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. divorced, 10. widowed, 11. living alone/unmarried, 12. ethnic minority, 13. ethnic majority, 14. farmers 15. living in rented accommodation 16. nuclear family 17. living in the countryside 18. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)	2. PC-PTSD-5 (Posttraumatic Stress Disorder Checklist)
				1 LOW RISK (prevalence of resources or protective factors)	3. MSPSS (Multidimensional scale of perceived social support)
					4. Brief family functioning scale
				2 RISK (compresence of protective and risk factors)	5. Cognitive Emotion Regulation Questionnaire (CERQ)
				3 HIGH RISK (prevalence of risk factors)	6. Psychological Well-being (WHO-5)
					7. Brief Cope



2 CHILDLESS COUPLES				DEGREE OF RISK	RESEARCH PROTOCOL
RESOURCES -0.5	PROTECTIVE FACTORS -1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1		1. Inventory of socio-demographic and mental health factor
1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. married, 10. divorced, 11. widowed, 12. ethnic minority, 13. ethnic majority, 14. farmers 15. living in rented accommodation 16. living in the countryside 17. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)	2. PC-PTSD-5 (Posttraumatic Stress Disorder Checklist) 3. MSPSS (Multidimensional scale of perceived social support)
				1 LOW RISK (prevalence of resources or protective factors)	4. Brief family functioning scale 5. Cognitive Emotion Regulation Questionnaire (CERQ)
				2 RISK (compresence of protective and risk factors)	6. Psychological Well-being (WHO-5)
				3 HIGHT RISK (prevalence of risk factors)	7. Brief Cope



SINGLE PARENT FAMILY				DEGREE OF RISK	RESEARCH PROTOCOL
RESOURCES -0.5	PROTECTIVE FACTORS -1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1		1. Inventory of socio-demographic and mental health factor
1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. divorced, 10. widowed, 11. living alone/unmarried, 12. head of the family 13. ethnic minority, 14. ethnic majority, 15. farmers 16. living in rented accommodation 17. living in the countryside 18. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)	2. PC-PTSD-5 (Posttraumatic Stress Disorder Checklist)
					3. MSPSS (Multidimensional scale of perceived social support)
					4. Brief family functioning scale
					5. Cognitive Emotion Regulation Questionnaire (CERQ)
				1 LOW RISK (prevalence of resources or protective factors)	6. Psychological Well-being (WHO-5)
					7. Brief Cope
				2 RISK (compresence of protective and risk factors)	8. CRS (Coparenting relationship scale)
					9. Parenting stress index
				3 HIGHT RISK (prevalence of risk factors)	10. CBCL (child behaviour checklist) - PTSD



4 FAMILY WITH CHILDREN				DEGREE OF RISK	RESEARCH PROTOCOL
PARENT/RESOURCES - 0,5	PARENT/PROTECTIVE FACTORS -1	PARENT/DISTAL RISK FACTOR + 0,5	PARENT/PROXIMAL RISK FACTORS +1		1. Inventory of socio-demographic and mental health factor
1. High income, 2. high educational levels, 3. male	1. positive religious coping 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. married, 10. divorced, 11. widowed, 12. head of the family 13. ethnic minority, 14. ethnic majority, 15. farmers 16. living in rented accommodation 17. nuclear family 18. living in the countryside 19. previous trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previous two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)	2. PC-PTSD-5 (Posttraumatic Stress Disorder Checklist)
					3. MSPSS (Multidimensional scale of perceived social support)
					4. Brief family functioning scale
				1 LOW RISK (prevalence of resources or protective factors)	5. Cognitive Emotion Regulation Questionnaire (CERQ)
					6. Psychological Well-being (WHO-5)
				2 RISK (compresence of protective and risk factors)	7. Brief Cope
					8. CRS (Coparenting relationship scale)
				3 HIGHT RISK (prevalence of risk factors)	9. Parenting stress index
					10. CBCL (child behaviour checklist) - PTSD



CHILD- ADOLESCENT/RESOURCES -0,5	CHILD ADOLESCENT /PROTECTIVE FACTORS -1	CHILD ADOLESCENT /DISTAL RISK FACTOR + 0,5	CHILD- ADOLESCENT /PROXIMAL RISK FACTORS +1	DEGREE OF RISK	RESEARCH PROTOCOL FOR CHILDREN AND ADOLESCENTS
1. High income, 2. high educational levels, 3. male	1. Higher extraversion 2. Conscientiousness 3. Agreeableness 4. Openness 5. Positive cognition coping 6. Hope 7. Self-esteem 8. Parental attachment (feelings of safety, justice beliefs, and cognitive reappraisal)	1. female 2. younger age, 3. older age, 4. having siblings, 5. ethnic minority, 6. living in rural areas, 7. low socio-economic status, 8. nuclear family, 9. not living with their parents/living apart from family, 10. children whose parents are not working, 11. no religion, 12. previus trauma, 13. low intelligence, 14. neuroticism, 15. locus of control (power others locus of control, chance locus of control) 16. poor family fuctioning	1. history of mental ill-health, 2. family history of mental ill- health, 3. negative coping strategies	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)	1. Inventory of socio-demographic and mental health factor
				1 LOW RISK (prevalence of resources or protective factors)	2. CRIES 8 (Child revised impact of event scale)
					3. LEAP (Lum emotional availability from parents)
				2 RISK (compresence of protective and risk factors)	4. Cognitive Emotion Regulation Questionnaire (CERQ)
					5. CRS-C (Coparenting relationship scale for children)
				3 HIGHT RISK (prevalence of risk factors)	6. Children's coping strategies checklist
					7. Psychological Well-being (WHO-5)



5 FOREIGN FAMILY				DEGREE OF RISK	RESEARCH PROTOCOL
RESOURCES -0.5	PROTECTIVE FACTORS - 1	DISTAL RISK FACTORS 0,5	PROXIMAL RISK FACTORS +1		1. Inventory of socio-demographic and mental health factor
1. High income, 2. high educational levels, 3. male	1. positive religious coping was the strongest predictor 2. active coping, 3. resilience	1. female 2. younger age, 3. middle age, 4. older age, 5. no household income 6. low income, 7. unemployed, 8. low educational level, 9. married, 10. divorced, 11. widowed, 12. head of the family 13. ethnic minority, 14. ethnic majority, 15. farmers 16. living in rented accomodation 17. nuclear family 18. living in the countryside 19. previus trauma	1. history of mental ill-health, 2. family/friends/relative history of mental ill-health, 3. chronic disease, 4. psychological distress induced by stressful life events, 5. negative affect in type D personality 6. maladaptive/negative coping strategies 7. two-week disease prevalence (ill in the previus two weeks)	0 NO RISK (only resources or protective factors, eventually 1 distal risk factor)	2. PC-PTSD-5 (Posttraumatic Stress Disorder Checklist)
					3. MSPSS (Multidimensional scale of perceived social support)
					4. Brief family functioning scale
				1 LOW RISK (prevalence of resources or protective factors)	5. Cognitive Emotion Regulation Questionnaire (CERQ)
					6. Psychological Well-being (WHO-5)
				2 RISK (compresence of protective and risk factors)	7. Brief Cope
					8. CRS (Coparenting relationship scale)
				3 HIGHT RISK (prevalence of risk factors)	9. Parenting stress index
					10. CBCL (child behaviour checklist) - PTSD



REFERENCES

- Aker A. T. (2006). 1999 Marmara Depremleri: Epidemiyolojik Bulgular ve Toplum Ruh Sağlığı Uygulamaları Üzerine Bir Gözden Geçirme [1999 Marmara earthquakes: a review of epidemiologic findings and community mental health policies]. *Türk psikiyatri dergisi = Turkish journal of psychiatry*, 17(3), 204–212.
- Ali, M., Farooq, N., Bhatti, M. A., & Kuroiwa, C. (2012). Assessment of prevalence and determinants of posttraumatic stress disorder in survivors of earthquake in Pakistan using Davidson Trauma Scale. *Journal of affective disorders*, 136(3), 238–243. <https://doi.org/10.1016/j.jad.2011.12.023>
- Alipour, F., & Ahmadi, S. (2020). *Social support and Posttraumatic Stress Disorder (PTSD) in earthquake survivors: a systematic review. Social Work in Mental Health*, 1–14. doi:10.1080/15332985.2020.1795045
- Altindag, A., Ozen, S., & Sir, A. (2005). One-year follow-up study of posttraumatic stress disorder among earthquake survivors in Turkey. *Comprehensive psychiatry*, 46(5), 328–333. <https://doi.org/10.1016/j.comppsy.2005.01.005>.
- American Psychiatric Association (2013; 2022). Manuale diagnostico e statistico dei disturbi mentali, Quinta edizione (DSM-5; DSM5-TR). Trad. it. Raffaello Cortina, Minano 2014.
- Armenian, H. K., Morikawa, M., Melkonian, A. K., Hovanesian, A. P., Haroutunian, N., Saigh, P. A., Akiskal, K., & Akiskal, H. S. (2000). Loss as a determinant of PTSD in a cohort of adult survivors of the 1988 earthquake in Armenia: implications for policy. *Acta psychiatrica Scandinavica*, 102(1), 58–64. <https://doi.org/10.1034/j.1600-0447.2000.102001058.x>
- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: Author.
- Başoğlu, M., Kiliç, C., Salcioğlu, E., & Livanou, M. (2004). Prevalence of posttraumatic stress disorder and comorbid depression in earthquake survivors in Turkey: an epidemiological study. *Journal of traumatic stress*, 17(2), 133–141. <https://doi.org/10.1023/B:JOTS.0000022619.31615.e8>
- Başoğlu, M., Salcioğlu, E., & Livanou, M. (2002). Traumatic stress responses in earthquake survivors in Turkey. *Journal of traumatic stress*, 15(4), 269–276. <https://doi.org/10.1023/A:1016241826589>
- Below, R., Wirtz, A., & Guha-Sapir, D. (2009). *Disaster category classification and peril terminology for operational purposes* (No. UCL-Université Catholique de Louvain).
- Blanc, J., Rahill, G. J., Laconi, S., & Mouchenik, Y. (2016). *Religious Beliefs, PTSD, Depression and Resilience in Survivors of the 2010 Haiti Earthquake. Journal of Affective Disorders*, 190, 697–703. doi:10.1016/j.jad.2015.10.046
- Burnett, H. J., Jr., & Helm, H. W., Jr. (2013). Relationship between posttraumatic stress disorder, resilience, and religious orientation and practices among university student earthquake survivors in Haiti. *International Journal of Emergency Mental Health and Human Resilience*, 15(2-3), 97–104.
- Cadichon, J. M., Lignier, B., Cénat, J.-M., & Derivois, D. (2017). *Symptoms of PTSD Among Adolescents and Young Adult Survivors Six Years after the 2010 Haiti Earthquake. Journal of Loss and Trauma*, 22(8), 646–659. doi:10.1080/15325024.2017.1360585
- Cairo, J. B., Dutta, S., Nawaz, H., Hashmi, S., Kasl, S., & Bellido, E. (2010). The prevalence of posttraumatic stress disorder among adult earthquake survivors in Peru. *Disaster medicine and public health preparedness*, 4(1), 39–46.
- Cénat, J. M., & Derivois, D. (2014). Assessment of prevalence and determinants of posttraumatic stress disorder and depression symptoms in adults survivors of earthquake in Haiti after 30 months. *Journal of affective disorders*, 159, 111–117. <https://doi.org/10.1016/j.jad.2014.02.025>
- Cénat, J. M., & Derivois, D. (2015). Long-term outcomes among child and adolescent survivors of the 2010 Haitian earthquake. *Depression and anxiety*, 32(1), 57–63. <https://doi.org/10.1002/da.22275>
- Cénat, J. M., McIntee, S. E., & Blais-Rochette, C. (2020). Symptoms of posttraumatic stress disorder, depression, anxiety and other mental health problems following the 2010 earthquake in Haiti: A systematic



- review and meta-analysis. *Journal of affective disorders*, 273, 55–85. <https://doi.org/10.1016/j.jad.2020.04.046>
- Cerdá, M., Paczkowski, M., Galea, S., Nemethy, K., Péan, C., & Desvarieux, M. (2013). Psychopathology in the aftermath of the Haiti earthquake: a population-based study of posttraumatic stress disorder and major depression. *Depression and anxiety*, 30(5), 413–424. <https://doi.org/10.1002/da.22007>
- Chan, C. L., Wang, C. W., Qu, Z., Lu, B. Q., Ran, M. S., Ho, A. H., Yuan, Y., Zhang, B. Q., Wang, X., & Zhang, X. (2011). Posttraumatic stress disorder symptoms among adult survivors of the 2008 Sichuan earthquake in China. *Journal of traumatic stress*, 24(3), 295–302. <https://doi.org/10.1002/jts.20645>
- Chen, C. H., Tan, H. K., Liao, L. R., Chen, H. H., Chan, C. C., Cheng, J. J., Chen, C. Y., Wang, T. N., & Lu, M. L. (2007). Long-term psychological outcome of 1999 Taiwan earthquake survivors: a survey of a high-risk sample with property damage. *Comprehensive psychiatry*, 48(3), 269–275. <https://doi.org/10.1016/j.comppsy.2006.12.003>
- Chen, H., Chen, Y., Au, M., Feng, L., Chen, Q., Guo, H., Li, Y., & Yang, X. (2014). The presence of post-traumatic stress disorder symptoms in earthquake survivors one month after a mudslide in southwest China. *Nursing & health sciences*, 16(1), 39–45. <https://doi.org/10.1111/nhs.12127>
- Chen, X., Xu, J., Li, B., Li, N., Guo, W., Ran, M. S., Zhang, J., Yang, Y., & Hu, J. (2017). The Role of Personality and Subjective Exposure Experiences in Posttraumatic Stress Disorder and Depression Symptoms among Children Following Wenchuan Earthquake. *Scientific reports*, 7(1), 17223. <https://doi.org/10.1038/s41598-017-17440-9>
- Cheng, Y., Wang, F., Wen, J., & Shi, Y. (2014). Risk factors of post-traumatic stress disorder (PTSD) after Wenchuan earthquake: a case control study. *PloS one*, 9(5), e96644. <https://doi.org/10.1371/journal.pone.0096644>
- Cheng, Z., Ma, N., Yang, L., Agho, K., Stevens, G., Raphael, B., Cui, L., Liu, Y., Yan, B., Ma, H., & Yu, X. (2015). Depression and posttraumatic stress disorder in temporary settlement residents 1 year after the Sichuan earthquake. *Asia-Pacific journal of public health*, 27(2), NP1962–NP1972. <https://doi.org/10.1177/1010539513485971>
- Chou, F. H., Su, T. T., Chou, P., Ou-Yang, W. C., Lu, M. K., & Chien, I. C. (2005). Survey of psychiatric disorders in a Taiwanese village population six months after a major earthquake. *Journal of the Formosan Medical Association = Taiwan yi zhi*, 104(5), 308–317.
- Chou, F. H., Wu, H. C., Chou, P., Su, C. Y., Tsai, K. Y., Chao, S. S., Chen, M. C., Su, T. T., Sun, W. J., & Ou-Yang, W. C. (2007). Epidemiologic psychiatric studies on post-disaster impact among Chi-Chi earthquake survivors in Yu-Chi, Taiwan. *Psychiatry and clinical neurosciences*, 61(4), 370–378. <https://doi.org/10.1111/j.1440-1819.2007.01688.x>
- Cofini, V., Carbonelli, A., Cecilia, M. R., Binkin, N., & di Orio, F. (2015). Post traumatic stress disorder and coping in a sample of adult survivors of the Italian earthquake. *Psychiatry research*, 229(1-2), 353–358. <https://doi.org/10.1016/j.psychres.2015.06.041>
- CRED (2022) Disasters in numbers. Brussels: CRED; 2023
- Dai, W., Chen, L., Lai, Z., Li, Y., Wang, J., & Liu, A. (2016). The incidence of post-traumatic stress disorder among survivors after earthquakes: a systematic review and meta-analysis. *BMC psychiatry*, 16, 188. <https://doi.org/10.1186/s12888-016-0891-9>
- Dell'Osso, L., Carmassi, C., Massimetti, G., Stratta, P., Riccardi, I., Capanna, C., Akiskal, K. K., Akiskal, H. S., & Rossi, A. (2013). Age, gender and epicenter proximity effects on post-traumatic stress symptoms in L'Aquila 2009 earthquake survivors. *Journal of affective disorders*, 146(2), 174–180. <https://doi.org/10.1016/j.jad.2012.08.048>
- Derivois, D., Mérisier, G. G., Cénat, J.-M., & Castelot, V. (2014). *Symptoms of Posttraumatic Stress Disorder and Social Support Among Children and Adolescents After the 2010 Haitian Earthquake*. *Journal of Loss and Trauma*, 19(3), 202–212. doi:10.1080/15325024.2013.789759



- Di Blasio, P. (Ed.). (2005). *Tra rischio e protezione: la valutazione delle competenze parentali*. Unicopli. Milano
- Di Blasio, P. & Camisasca E. (2005) Protocollo sui fattori di rischio e fattori protettivi nella valutazione delle competenze parentali. In Di Blasio, P. (Ed.). (2005). *Tra rischio e protezione: la valutazione delle competenze parentali*. Unicopli. Milano
- Ekşi, A., Braun, K. L., Ertem-Vehid, H., Peykerli, G., Saydam, R., Toparlak, D., & Alyanak, B. (2007). Risk factors for the development of PTSD and depression among child and adolescent victims following a 7.4 magnitude earthquake. *International journal of psychiatry in clinical practice*, 11(3), 190–199. <https://doi.org/10.1080/13651500601017548>
- Fan, F., Liu, W. M., Zheng, Y. H., & Cui, M. M. (2010). Mental health problems and correlates among adolescents 6 months after exposed to the Wenchuan earthquake. *Chinese Journal of Clinical Psychology*, 18(1), 56–59. Retrieved from <http://www.cnki.com.cn/Article/CJFDTOTAL-ZLCY201001020.htm>.
- Fan, F., Long, K., Zhou, Y., Zheng, Y., & Liu, X. (2015). Longitudinal trajectories of post-traumatic stress disorder symptoms among adolescents after the Wenchuan earthquake in China. *Psychological medicine*, 45(13), 2885–2896. <https://doi.org/10.1017/S0033291715000884>
- Fan, F., Zhang, Y., Yang, Y., Mo, L., & Liu, X. (2011). Symptoms of posttraumatic stress disorder, depression, and anxiety among adolescents following the 2008 Wenchuan earthquake in China. *Journal of traumatic stress*, 24(1), 44–53. <https://doi.org/10.1002/jts.20599>
- Farooqui, M., Quadri, S. A., Suriya, S. S., Khan, M. A., Ovais, M., Sohail, Z., Shoaib, S., Tohid, H., & Hassan, M. (2017). Posttraumatic stress disorder: a serious post-earthquake complication. *Trends in psychiatry and psychotherapy*, 39(2), 135–143. <https://doi.org/10.1590/2237-6089-2016-0029>
- Feder, A., Ahmad, S., Lee, E. J., Morgan, J. E., Singh, R., Smith, B. W., Southwick, S. M., & Charney, D. S. (2013). Coping and PTSD symptoms in Pakistani earthquake survivors: purpose in life, religious coping and social support. *Journal of affective disorders*, 147(1-3), 156–163. <https://doi.org/10.1016/j.jad.2012.10.027>
- Fu, Y., Chen, Y., Wang, J., Tang, X., He, J., Jiao, M., Yu, C., You, G., & Li, J. (2013). Analysis of prevalence of PTSD and its influencing factors among college students after the Wenchuan earthquake. *Child and adolescent psychiatry and mental health*, 7(1), 1. <https://doi.org/10.1186/1753-2000-7-1>
- Gigantesco, A., Mirante, N., Granchelli, C., Diodati, G., Cofini, V., Mancini, C., Carbonelli, A., Tarolla, E., Minardi, V., Salmaso, S., & D'Argenio, P. (2013). Psychopathological chronic sequelae of the 2009 earthquake in L'Aquila, Italy. *Journal of affective disorders*, 148(2-3), 265–271. <https://doi.org/10.1016/j.jad.2012.12.006>
- Goenjian, A. K., Pynoos, R. S., Steinberg, A. M., Najarian, L. M., Asarnow, J. R., Karayan, I., Ghurabi, M., & Fairbanks, L. A. (1995). Psychiatric comorbidity in children after the 1988 earthquake in Armenia. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34(9), 1174–1184. <https://doi.org/10.1097/00004583-199509000-00015>
- Gökçen, C., Sahingöz, M., & Annagür, B. B. (2013). Does a non-destructive earthquake cause posttraumatic stress disorder? A cross-sectional study. *European child & adolescent psychiatry*, 22(5), 295–299. <https://doi.org/10.1007/s00787-012-0348-8>
- Gordon-Hollingsworth, A. T., Yao, N., Chen, H., Qian, M., & Chen, S. (2015). Understanding the Impact of Natural Disasters on Psychological Outcomes in Youth from Mainland China: a Meta-Analysis of Risk and Protective Factors for Post-Traumatic Stress Disorder Symptoms. *Journal of child & adolescent trauma*, 11(2), 205–226. <https://doi.org/10.1007/s40653-015-0051-2>
- Groome, D., & Soureti, A. (2004). *Post-traumatic stress disorder and anxiety symptoms in children exposed to the 1999 Greek earthquake*. *British Journal of Psychology*, 95(3), 387–397. doi:10.1348/0007126041528149
- Guo, J., He, H., Qu, Z., Wang, X., & Liu, C. (2017). Post-traumatic stress disorder and depression among adult survivors 8 years after the 2008 Wenchuan earthquake in China. *Journal of affective disorders*, 210, 27–34. <https://doi.org/10.1016/j.jad.2016.12.009>
- Guo, J., Wang, X., Yuan, J., Zhang, W., Tian, D., & Qu, Z. (2015). The symptoms of posttraumatic stress disorder and depression among adult earthquake survivors in China. *The Journal of nervous and mental disease*,



203(6), 469–472. <https://doi.org/10.1097/NMD.0000000000000310>

Guo, J., Wu, P., Tian, D., Wang, X., Zhang, W., Zhang, X., & Qu, Z. (2014). Post-traumatic stress disorder among adult survivors of the Wenchuan earthquake in China: a repeated cross-sectional study. *Journal of anxiety disorders*, 28(1), 75–82. <https://doi.org/10.1016/j.janxdis.2013.12.001>

Hashmi, S., Petraro, P., Rizzo, T., Nawaz, H., Choudhary, R., Tessier-Sherman, B., Kasl, S., & Nawaz, H. (2011). Symptoms of anxiety, depression, and posttraumatic stress among survivors of the 2005 Pakistani earthquake. *Disaster medicine and public health preparedness*, 5(4), 293–299. <https://doi.org/10.1001/dmp.2011.81>

He, J., Xu, S. S., Zhu, Z. H., Wang, L., & Wang, W. Z. (2011). A study of symptoms of the post-traumatic stress disorder and its related factors in adolescents after the Wenchuan earthquake. *Chinese Journal of Clinical Psychology*.

Hidalgo, J., & Baez, A. A. (2019). Natural Disasters. *Critical care clinics*, 35(4), 591–607. <https://doi.org/10.1016/j.ccc.2019.05.001>

Hong, C., & Efferth, T. (2016). Systematic review on post-traumatic stress disorder among survivors of the Wenchuan earthquake. *Trauma, Violence, & Abuse*, 17(5), 542–561. <https://doi.org/10.1177/1524838015585313>

Hou, F. S., Li, T., Li, J., Hu, X. Q., Liu, Z. Y., & Yuan, P. (2011). The effects of demographic features on differences in sensitivity between PCL-C and SCL-90 scores in a follow-up study in secondary school students in the Wenchuan earthquake region. *Biomedical and environmental sciences : BES*, 24(6), 642–648. <https://doi.org/10.3967/0895-3988.2011.06.008>

Hsu, C. C., Chong, M. Y., Yang, P., & Yen, C. F. (2002). Posttraumatic stress disorder among adolescent earthquake victims in Taiwan. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41(7), 875–881. <https://doi.org/10.1097/00004583-200207000-00022>

Inter-Agency Standing Committee. (2006). *Protecting persons affected by natural disasters: IASC operational guidelines on human rights and natural disasters*. Inter-Agency Standing Committee (IASC).

Jia, X., Ying, L., Zhou, X., Wu, X., & Lin, C. (2015). *The Effects of Extraversion, Social Support on the Posttraumatic Stress Disorder and Posttraumatic Growth of Adolescent Survivors of the Wenchuan Earthquake*. *PLOS ONE*, 10(3), e0121480. doi:10.1371/journal.pone.0121480

Jia, Z., Shi, L., Duan, G., Liu, W., Pan, X., Chen, Y., & Tian, W. (2013). *Traumatic experiences and mental health consequences among child survivors of the 2008 Sichuan earthquake: a community-used follow-up study*. *BMC Public Health*, 13(1). doi:10.1186/1471-2458-13-104

Jia, Z., Tian, W., He, X., Liu, W., Jin, C., & Ding, H. (2010). Mental health and quality of life survey among child survivors of the 2008 Sichuan earthquake. *Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation*, 19(9), 1381–1391. <https://doi.org/10.1007/s11136-010-9703-8>

Jia, Z., Tian, W., Liu, W., Cao, Y., Yan, J., & Shun, Z. (2010). Are the elderly more vulnerable to psychological impact of natural disaster? A population-based survey of adult survivors of the 2008 Sichuan earthquake. *BMC public health*, 10, 172. <https://doi.org/10.1186/1471-2458-10-172>

Jin, Y., & Li, J. (2015). Prospective Study of Posttraumatic Stress in Adolescents 6 and 24 Months After the 2010 Yushu Earthquake in China. *The Journal of nervous and mental disease*, 203(9), 679–683. <https://doi.org/10.1097/NMD.0000000000000351>

Jin, Y., & Wang, G. (2014). Individual Risk Factors for PTSD in Adolescents from the 2010 Earthquake in Yushu: The Predictor Effect of Rumination. *Journal of psychiatry*, 17. <https://doi.org/10.4172/2378-5756.1000144>

Jin, Y., Xu, J., Liu, H., & Liu, D. (2014). Posttraumatic stress disorder and posttraumatic growth among adult survivors of Wenchuan earthquake after 1 year: prevalence and correlates. *Archives of psychiatric nursing*, 28(1), 67–73. <https://doi.org/10.1016/j.apnu.2013.10.010>

Kadak, M. T., Nasiroğlu, S., Boysan, M., & Aydın, A. (2013). Risk factors predicting posttraumatic stress



- reactions in adolescents after 2011 Van earthquake. *Comprehensive psychiatry*, 54(7), 982–990. <https://doi.org/10.1016/j.comppsy.2013.04.003>
- Kalantar Motamed, M. H., Sagafinia, M., Ebrahimi, A., Shams, E., & Kalantar Motamed, M. (2012). Major earthquakes of the past decade (2000-2010): a comparative review of various aspects of management. *Trauma monthly*, 17(1), 219–229. <https://doi.org/10.5812/traumamon.4519>
- Kiliç, C., & Ulusoy, M. (2003). Psychological effects of the November 1999 earthquake in Turkey: an epidemiological study. *Acta psychiatrica Scandinavica*, 108(3), 232–238. <https://doi.org/10.1034/j.1600-0447.2003.00119.x>
- Kun, P., Chen, X., Han, S., Gong, X., Chen, M., Zhang, W., & Yao, L. (2009). Prevalence of post-traumatic stress disorder in Sichuan Province, China after the 2008 Wenchuan earthquake. *Public health*, 123(11), 703–707. <https://doi.org/10.1016/j.puhe.2009.09.017>
- Kun, P., Han, S., Chen, X., & Yao, L. (2009). Prevalence and risk factors for posttraumatic stress disorder: a cross-sectional study among survivors of the Wenchuan 2008 earthquake in China. *Depression and anxiety*, 26(12), 1134–1140. <https://doi.org/10.1002/da.20612>
- Kun, P., Tong, X., Liu, Y., Pei, X., & Luo, H. (2013). What are the determinants of post-traumatic stress disorder: age, gender, ethnicity or other? Evidence from 2008 Wenchuan earthquake. *Public health*, 127(7), 644–652. <https://doi.org/10.1016/j.puhe.2013.04.018>
- Lau, J. T., Yu, X., Zhang, J., Mak, W. W., Choi, K. C., Lui, W. W., Zhang, J., & Chan, E. Y. (2010). Psychological distress among adolescents in Chengdu, Sichuan at 1 month after the 2008 Sichuan earthquake. *Journal of urban health : bulletin of the New York Academy of Medicine*, 87(3), 504–523. <https://doi.org/10.1007/s11524-010-9447-3>
- Lee, C. S., Chang, J. C., Liu, C. Y., Chang, C. J., Chen, T. H., Chen, C. H., & Cheng, A. T. (2009). Acculturation, psychiatric comorbidity and posttraumatic stress disorder in a Taiwanese aboriginal population. *Social psychiatry and psychiatric epidemiology*, 44(1), 55–62. <https://doi.org/10.1007/s00127-008-0405-2>
- Liang, Y., Cheng, J., Ruzek, J. I., & Liu, Z. (2019). Posttraumatic stress disorder following the 2008 Wenchuan earthquake: A 10-year systematic review among highly exposed populations in China. *Journal of affective disorders*, 243, 327–339. <https://doi.org/10.1016/j.jad.2018.09.047>
- Liu, D., Fu, L., Jing, Z., & Chen, C. (2016). Post-Traumatic Stress Disorder and Its Predictors Among Tibetan Adolescents 3 Years After the High-Altitude Earthquake in China. *Archives of psychiatric nursing*, 30(5), 593–599. <https://doi.org/10.1016/j.apnu.2016.01.005>
- Liu, M., Wang, L., Shi, Z., Zhang, Z., Zhang, K., & Shen, J. (2011). Mental health problems among children one-year after Sichuan earthquake in China: a follow-up study. *PloS one*, 6(2), e14706. <https://doi.org/10.1371/journal.pone.0014706>
- Liu, W. M., Fan, F., Zheng, Y. H., & Cui, M. M. (2010). Posttraumatic stress symptoms and related factors among adolescents in Dujiangyan district 6 months after the earthquake. *Chinese Mental Health Journal*, 24(9), 647–651
- Liu, X. X., Xiong, G. Y., Ma, D. C., Dong, Y. Q., Ye, Y. L., Zhang, X., & Yuan, P. (2009). Relationship between post-traumatic stress disorder and perceived social support among middle school students in Wenchuan earthquake-stricken. *Chinese Journal of Epidemiology*, 30(10), 1017–1020
- Liu, X., Ma, X., Hu, X., Qiu, C., Wang, Y., Wang, Q., Zhang, W., Zhang, J., & Li, T. (2012). A risk score for predicting post-traumatic stress disorder in adults in a Chinese earthquake area. *The Journal of international medical research*, 40(6), 2191–2198. <https://doi.org/10.1177/030006051204000617>
- Liu, Z. Y., Yang, Y. F., Ye, Y. L., Zeng, Z. Q., Xiang, Y. J., & Yuan, P. (2010). One-year follow-up study of post-traumatic stress disorder among adolescents following the Wen-Chuan earthquake in China. *Bioscience trends*, 4(3), 96–102.
- Ma, X., Liu, X., Hu, X., Qiu, C., Wang, Y., Huang, Y., Wang, Q., Zhang, W., & Li, T. (2011). Risk indicators for post-traumatic stress disorder in adolescents exposed to the 5.12 Wenchuan earthquake in China. *Psychiatry*



- research, 189(3), 385–391. <https://doi.org/10.1016/j.psychres.2010.12.016>
- Mesidor, J. K., & Sly, K. F. (2019). *Religious coping, general coping strategies, perceived social support, PTSD symptoms, resilience, and posttraumatic growth among survivors of the 2010 earthquake in Haiti. Mental Health, Religion & Culture*, 1–14. doi:10.1080/13674676.2019.158025
- Milani, L., Miragoli, S., Grumi, S., & Di Blasio, P. (2019). A multi-method assessment of risk and protective factors in family violence: Comparing Italian and immigrant families. In N. Balvin, & D. J. Christie (Eds.). *Children and Peace: From Research to Action* (pp. 3–23). Berlin: Springer.
- Milani, L., Grumi, S., Camisasca, E., Miragoli, S., Traficante, D., & Di Blasio, P. (2020). Familial risk and protective factors affecting CPS professionals' child removal decision: A decision tree analysis study. *Children and Youth Services Review*, 109, 104687. <https://doi.org/10.1016/j.childyouth.2019.104687>
- Naeem, F., Ayub, M., Masood, K., Gul, H., Khalid, M., Farrukh, A., Shaheen, A., Waheed, W., & Chaudhry, H. R. (2011). Prevalence and psychosocial risk factors of PTSD: 18 months after Kashmir earthquake in Pakistan. *Journal of affective disorders*, 130(1-2), 268–274. <https://doi.org/10.1016/j.jad.2010.10.035>
- Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: a systematic review. *Psychological medicine*, 38(4), 467–480. <https://doi.org/10.1017/S0033291707001353>
- Olf M. (2017). Sex and gender differences in post-traumatic stress disorder: an update. *European Journal of Psychotraumatology*, 8(sup4), 1351204. <https://doi.org/10.1080/20008198.2017.1351204>
- Page, M. J., Moher, D., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hrobjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., McGuinness, L.A., Stewart, L.A., Thomas, J., Tricco, A.C., Welch, V.A., Whiting, P., & McKenzie, J. E. (2021). PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *bmj*, 372. <https://doi.org/10.1136/bmj.n160>
- Pan, X., Liu, W., Deng, G., Liu, T., Yan, J., Tang, Y., Dong, W., Cui, Y., & Xu, M. (2015). Symptoms of posttraumatic stress disorder, depression, and anxiety among junior high school students in worst-hit areas 3 years after the Wenchuan earthquake in China. *Asia-Pacific journal of public health*, 27(2), NP1985–NP1994. <https://doi.org/10.1177/1010539513488625>
- Parvaresh, N., & Bahramnezhad, A. (2009). Post-traumatic stress disorder in bam-survived students who immigrated to Kerman, four months after the earthquake. *Archives of Iranian medicine*, 12(3), 244–249
- Pino, O., Pelosi, A., Artoni, V., & Mari, M. (2021). Post-Traumatic Outcomes among Survivors of the Earthquake in Central Italy of August 24, 2016. A Study on PTSD Risk and Vulnerability Factors. *The Psychiatric quarterly*, 92(4), 1489–1511. <https://doi.org/10.1007/s11126-021-09908-9>
- Priebe, S., Grappasonni, I., Mari, M., Dewey, M., Petrelli, F., & Costa, A. (2009). Posttraumatic stress disorder six months after an earthquake: findings from a community sample in a rural region in Italy. *Social psychiatry and psychiatric epidemiology*, 44(5), 393–397. <https://doi.org/10.1007/s00127-008-0441-y>
- Roncone, R., Giusti, L., Mazza, M., Bianchini, V., Ussorio, D., Pollice, R., & Casacchia, M. (2013). Persistent fear of aftershocks, impairment of working memory, and acute stress disorder predict post-traumatic stress disorder: 6-month follow-up of help seekers following the L'Aquila earthquake. *SpringerPlus*, 2(1), 636. <https://doi.org/10.1186/2193-1801-2-636>
- Salcioglu, E., Basoglu, M., & Livanou, M. (2003). Long-term psychological outcome for non-treatment-seeking earthquake survivors in Turkey. *The Journal of nervous and mental disease*, 191(3), 154–160. <https://doi.org/10.1097/01.NMD.0000054931.12291.50>
- Salcioglu, E., Ozden, S., & Ari, F. (2018). The role of relocation patterns and psychosocial stressors in posttraumatic stress disorder and depression among earthquake survivors. *The Journal of Nervous and Mental Disease*, 206(1), 19–26. doi:10.1097/NMD.0000000000000627
- Sayed, S., Iacoviello, B. M., & Charney, D. S. (2015). Risk factors for the development of psychopathology following trauma. *Current psychiatry reports*, 17(8), 612. <https://doi.org/10.1007/s11920-015-0612-y>
- Sezgin, U., & Punamäki, R. L. (2012). Earthquake trauma and causal explanation associating with PTSD and



- other psychiatric disorders among South East Anatolian women. *Journal of affective disorders*, 141(2-3), 432–440. <https://doi.org/10.1016/j.jad.2012.03.005>
- Silvestre, G., Anacr on, P., Th odore, M., Silvestre, E., Garcia-Dubus, E., (2014). Risk factors for posttraumatic stress disorder in Haitian students. *Psychology* 05, 849–858. <https://doi.org/10.4236/psych.2014.58096>
- Tang, B., Deng, Q., Glik, D., Dong, J., & Zhang, L. (2017). A meta-analysis of risk factors for post-traumatic stress disorder (PTSD) in adults and children after earthquakes. *International journal of environmental research and public health*, 14(12), 1537. <https://doi.org/10.3390/ijerph14121537>
- Tian, Y., Wong, T. K., Li, J., & Jiang, X. (2014). Posttraumatic stress disorder and its risk factors among adolescent survivors three years after an 8.0 magnitude earthquake in China. *BMC public health*, 14, 1073. <https://doi.org/10.1186/1471-2458-14-1073>
- Tortella-Feliu, M., Fullana, M. A., P  rez-Vigil, A., Torres, X., Chamorro, J., Littarelli, S. A., Solanes, A., Ramella-Cravaro, V., Vilar, A., Gonz  lez-Parra, J. A., Andero, R., Reichenberg, A., Mataix-Cols, D., Vieta, E., Fusar-Poli, P., Ioannidis, J. P. A., Stein, M. B., Radua, J., & Fern  ndez de la Cruz, L. (2019). Risk factors for posttraumatic stress disorder: An umbrella review of systematic reviews and meta-analyses. *Neuroscience and biobehavioral reviews*, 107, 154–165. <https://doi.org/10.1016/j.neubiorev.2019.09.013>
- Trickey, D., Siddaway, A. P., Meiser-Stedman, R., Serpell, L., & Field, A. P. (2012). A meta-analysis of risk factors for post-traumatic stress disorder in children and adolescents. *Clinical psychology review*, 32(2), 122–138. <https://doi.org/10.1016/j.cpr.2011.12.001>
- Tural, U., Co  kun, B., Onder, E., Corap  o  lu, A., Yildiz, M., Kesepara, C., Karakaya, I., Aydin, M., Erol, A., Torun, F., & Aybar, G. (2004). Psychological consequences of the 1999 earthquake in Turkey. *Journal of traumatic stress*, 17(6), 451–459. <https://doi.org/10.1007/s10960-004-5793-9>
- Wang, B., Ni, C., Chen, J., Liu, X., Wang, A., Shao, Z., Xiao, D., Cheng, H., Jiang, J., & Yan, Y. (2011). Posttraumatic stress disorder 1 month after 2008 earthquake in China: Wenchuan earthquake survey. *Psychiatry research*, 187(3), 392–396. <https://doi.org/10.1016/j.psychres.2009.07.001>
- Wang, L., Zhang, Y., Shi, Z., & Wang, W. (2009). Symptoms of posttraumatic stress disorder among adult survivors two months after the Wenchuan earthquake. *Psychological reports*, 105(3 Pt 1), 879–885. <https://doi.org/10.2466/PRO.105.3.879-885>
- Wang, L., Zhang, Y., Wang, W., Shi, Z., Shen, J., Li, M., & Xin, Y. (2009). Symptoms of posttraumatic stress disorder among adult survivors three months after the Sichuan earthquake in China. *Journal of Traumatic Stress*, 22(5), 444–450. <https://doi.org/10.1002/jts.20439>
- Wang, W., Fu, W., Wu, J., Ma, X. C., Sun, X. L., Huang, Y., Hashimoto, K., & Gao, C. G. (2012). Prevalence of PTSD and depression among junior middle school students in a rural town far from the epicenter of the Wenchuan earthquake in China. *PloS one*, 7(7), e41665. <https://doi.org/10.1371/journal.pone.0041665>
- Wang, X., Gao, L., Shinfuku, N., Zhang, H., Zhao, C., & Shen, Y. (2000). *Longitudinal Study of Earthquake-Related PTSD in a Randomly Selected Community Sample in North China*. *American Journal of Psychiatry*, 157(8), 1260–1266. doi:10.1176/appi.ajp.157.8.1260
- Wang, Z., & Xu, J. (2016). A Cross-Sectional Study on Risk Factors of Posttraumatic Stress Disorder in Shidu Parents of the Sichuan Earthquake. *Journal of Child and Family Studies*, 25(9), 2915–2923. doi:10.1007/s10826-016-0454-1
- Wen, J., Shi, Y. K., Li, Y. P., Yuan, P., & Wang, F. (2012). Quality of life, physical diseases, and psychological impairment among survivors 3 years after Wenchuan earthquake: a population based survey. *PloS one*, 7(8), e43081. <https://doi.org/10.1371/journal.pone.0043081>
- Wu, Z., Xu, J., & He, L. (2014). Psychological consequences and associated risk factors among adult survivors of the 2008 Wenchuan earthquake. *BMC psychiatry*, 14, 126. <https://doi.org/10.1186/1471-244X-14-126>
- Wu, Z., Xu, J., & Sui, Y. (2016). Posttraumatic stress disorder and posttraumatic growth coexistence and the risk factors in Wenchuan earthquake survivors. *Psychiatry research*, 237, 49–54. <https://doi.org/10.1016/j.psychres.2016.01.041>



- Xiang, Y.-J., Xiong, G.-Y., Dong, Y.-Q., Ma, D.-C., Liu, Z.-Y., Liu, X.-X., & Yuan, P. (2010). Prevalence of post-traumatic stress disorder symptoms among middle school students after Wenchuan earthquake. *Chinese Mental Health Journal*, 17-20. Retrieved from: <https://pesquisa.bvsalud.org/portal/resource/pt/wpr-404930>
- Xu, J., & Song, X. (2011a). Posttraumatic stress disorder among survivors of the Wenchuan earthquake 1 year after: prevalence and risk factors. *Comprehensive psychiatry*, 52(4), 431–437. <https://doi.org/10.1016/j.comppsy.2010.08.002>
- Xu, J., & Song, X. (2011b). A cross-sectional study among survivors of the 2008 Sichuan earthquake: prevalence and risk factors of posttraumatic stress disorder. *General hospital psychiatry*, 33(4), 386–392. <https://doi.org/10.1016/j.genhosppsy.2011.05.004>
- Xu, J., Wang, Z., & Sun, Y. (2016). *Indelible Grief: Prevalence and Risk Factors for Posttraumatic Stress Disorder in Shidu Parents 6 Years After the Wenchuan Earthquake*. *Current Psychology*, 36(3), 675–682. doi:10.1007/s12144-016-9456-9
- Yaghmaei, N. (Ed.). (2020). *Human Cost of Disasters: An Overview of the Last 20 Years, 2000-2019*. UN Office for Disaster Risk Reduction.
- Ye, Y., Liu, Y., Chen, M., Zhang, J., Yang, C., Liu, X., Yuan, P. (2011). Trajectory and the related factors of PTSD in secondary school students after earthquake. *Chinese Journal of School Health*, 32(2), 166–167. Retrieved from <http://www.cqvip.com/QK/96360A/201102/36835481.html>.
- Ying, L. H., Wu, X. C., Lin, C. D., & Chen, C. (2013). Prevalence and predictors of posttraumatic stress disorder and depressive symptoms among child survivors 1 year following the Wenchuan earthquake in China. *European child & adolescent psychiatry*, 22(9), 567–575. <https://doi.org/10.1007/s00787-013-0400-3>
- Ying, L., Wu, X., Lin, C., & Jiang, L. (2014). Traumatic severity and trait resilience as predictors of posttraumatic stress disorder and depressive symptoms among adolescent survivors of the Wenchuan earthquake. *PloS one*, 9(2), e89401. <https://doi.org/10.1371/journal.pone.0089401>
- Ying, L.-H., Wu, X.-C., & Lin, C.-D. (2012). *Longitudinal linkages between depressive and posttraumatic stress symptoms in adolescent survivors following the Wenchuan earthquake in China: A three-wave, cross-lagged study*. *School Psychology International*, 33(4), 416–432. doi:10.1177/0143034311421271
- Yu, X. N., Lau, J. T., Zhang, J., Mak, W. W., Choi, K. C., Lui, W. W., Zhang, J., & Chan, E. Y. (2010). Posttraumatic growth and reduced suicidal ideation among adolescents at month 1 after the Sichuan Earthquake. *Journal of affective disorders*, 123(1-3), 327–331. <https://doi.org/10.1016/j.jad.2009.09.019>
- Yuan, K. C., Ruo Yao, Z., Zhen Yu, S., Xu Dong, Z., Jian Zhong, Y., Edwards, J. G., & Edwards, G. D. (2013). Prevalence and predictors of stress disorders following two earthquakes. *The International journal of social psychiatry*, 59(6), 525–530. <https://doi.org/10.1177/0020764012453233>
- Korol, M.; Green, B.L.; Gleser, G.C. Children's responses to a nuclear waste disaster: PTSD symptoms and outcome prediction. *J. Am. Acad. Child Adolesc. Psychiatry* 1999, 38, 368–375
- Zhang, J., Zhu, S., Du, C., & Zhang, Y. (2015). Posttraumatic stress disorder and somatic symptoms among child and adolescent survivors following the Lushan earthquake in China: A six-month longitudinal study. *Journal of psychosomatic research*, 79(2), 100–106. <https://doi.org/10.1016/j.jpsychores.2015.06.001>
- Zhang, L. P., Zhao, Q., Luo, Z. C., Lei, Y. X., Wang, Y., & Wang, P. X. (2015). Prevalence and risk factors of posttraumatic stress disorder among survivors five years after the "Wenchuan" earthquake in China. *Health and quality of life outcomes*, 13, 75. <https://doi.org/10.1186/s12955-015-0247-z>
- Zhang, W., Duan, G., Xu, Q., Jia, Z., Bai, Z., Liu, W., Pan, X., & Tian, W. (2015). A Cross-sectional Study on Posttraumatic Stress Disorder and General Psychiatric Morbidity Among Adult Survivors 3 Years After the Wenchuan Earthquake, China. *Asia-Pacific journal of public health*, 27(8), 860–870. <https://doi.org/10.1177/1010539515602089>
- Zhang, W., Jiang, X., Ho, K. W., & Wu, D. (2011). The presence of post-traumatic stress disorder symptoms in adolescents three months after an 8.0 magnitude earthquake in southwest China. *Journal of clinical nursing*, 20(21-22), 3057–3069. <https://doi.org/10.1111/j.1365-2702.2011.03825.x>



- Zhang, Y., & Ho, S. M. (2011). Risk factors of posttraumatic stress disorder among survivors after the 512 Wenchuan earthquake in China. *PloS one*, 6(7), e22371. <https://doi.org/10.1371/journal.pone.0022371>
- Zhang, Z., Ran, M. S., Li, Y. H., Ou, G. J., Gong, R. R., Li, R. H., Fan, M., Jiang, Z., & Fang, D. Z. (2012). Prevalence of post-traumatic stress disorder among adolescents after the Wenchuan earthquake in China. *Psychological medicine*, 42(8), 1687–1693. <https://doi.org/10.1017/S0033291711002844>
- Zhang, Z., Shi, Z., Wang, L., & Liu, M. (2011). One year later: Mental health problems among survivors in hard-hit areas of the Wenchuan earthquake. *Public health*, 125(5), 293–300. <https://doi.org/10.1016/j.puhe.2010.12.008>
- Zhang, Z., Wang, W., Shi, Z., Wang, L., & Zhang, J. (2012). Mental health problems among the survivors in the hard-hit areas of the Yushu earthquake. *PloS one*, 7(10), e46449. <https://doi.org/10.1371/journal.pone.0046449>
- Zhao, C. Z., Li, J. F., Wang, M. S., Fan, Q. L., Zhang, F., Zhang, H. B., & Wang, X. D. (2001). Prevalence and correlated factors of PTSD in adolescents 17 months after earthquake. *Chinese Mental Health Journal*, 15(3), 145–147. Retrieved from <https://caod.oriprobe.com/articles/3419813/Prevalence and Correlated Factors of PTSD in Adole.htm>
- Zhao, G.F., Yang, Y.C., Zhang, Q., Zhang, S.S., Deng, H., Zhu, Y., et al., (2009). Prevalence and related factors for PTSD in community residents after the Wenchuan earthquake. *Chin. Ment. Health J.* 23, 478–483.
- Zheng, Y., Fan, F., Liu, X., & Mo, L. (2012). *Life Events, Coping, and Posttraumatic Stress Symptoms among Chinese Adolescents Exposed to 2008 Wenchuan Earthquake, China*. *PLoS ONE*, 7(1), e29404. doi:10.1371/journal.pone.0029404
- Zhou, X., Kang, L., Sun, X., Song, H., Mao, W., Huang, X., Zhang, Y., & Li, J. (2013a). Prevalence and risk factors of post-traumatic stress disorder among adult survivors six months after the Wenchuan earthquake. *Comprehensive psychiatry*, 54(5), 493–499. <https://doi.org/10.1016/j.comppsy.2012.12.010>
- Zhou, X., Kang, L., Sun, X., Song, H., Mao, W., Huang, X., Zhang, Y., & Li, J. (2013b). Risk factors of mental illness among adult survivors after the Wenchuan earthquake. *Social psychiatry and psychiatric epidemiology*, 48(6), 907–915. <https://doi.org/10.1007/s00127-012-0596-4>
- Zhu, C. Z., Situ, M. J., Zhang, Y., Fang, H., Jing, L. S., Wang, D., & Huang, Y. (2011). Influence factors of post-traumatic stress disorder (PTSD) and depression symptoms in children and adolescents after Wenchuan earthquake in China. *Chinese Journal of Preventive Medicine*, 45(6), 531–536
- World Health Organization. (2018). International Statistical Classification of Diseases and related Health Problems (11th Revision).