**Table 1. Summary of included studies**

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| **Exposed-non-exposed studies** | **Disaster type, location, year** | **Timing of outcome measurement** | **Study population** | **Sample  size** | **Relevant Outcome measure** | **Findings for outcome measure closest to 1 year post disaster** | **Quality assessment** |
| Aslam1 | Earthquake, Pakistan, 2005 | >1 year | Purposive sampling through approaches to schools, colleges, government, and private organisations | 300 exposed, 300 controls | DASS subscales, IES | Depression exposed mean 17.8 SD 7.9 control 10.4 SD 4.7  Anxiety mean 16.6 SD 6.4 control 9.7 SD 4.6  Stress exposed mean 19.6 SD 7.4 control 10.1 SD 4.1  IES exposed mean 35.2 SD 9.7 control mean 17.6 SD 7.4 | Low |
| Bodvarsdottir2 | Earthquake, Iceland, 2000 | 3 months | Random sample of adults | 52 exposed, 29 controls | HTQ symptom questions, TSC subscores | HTQ total mean exposed 33.19 SD 7.34 control 24.20 SD 3.90  TSC depression mean exposed 15.42 SD 5.67 control 14.75 SD 3.94  TSC anxiety mean exposed 11.43 SD 3.49 control 11.25 SD 3.49 | Low |
| Bravo3, Canino4 | Floods, Puerto Rico, 1985 | 2 years | Previous participants of an island wide mental health survey and probability sampling of new participants | 77 exposed, 298 controls | DIS/DS | New onset depressive disorders 7.8% exposed 4.4% control  New onset alcohol abuse/dependence 5.2% exposed 3.4% control  New onset panic disorder 2.6% exposed 2.0% control  New onset depressive symptoms exposed mean 0.31 SD 1.5 control mean  -0.15 SD 1.46  New onset alcoholic symptoms exposed mean 0.08 SD 2.04, control mean  -1.0 SD 1.49  New onset panic symptoms exposed mean 0.05 SD 2.24 control mean 0.18 SD 2.74 | High |
| Cao5 | Earthquake, China, 1988 | 5 months | Inclusive sampling techniques supported by local government officials | 1294 exposed, 908 controls | GHQ-28 | Caseness exposed 50.3% , caseness control 36.2% | Low |
| **Table 1: Continued** | | | | | | | |
| **Exposed-non-exposed studies** | **Disaster type, location, year** | **Timing of outcome measurement** | **Study population** | **Sample  size** | **Relevant Outcome measure** | **Findings for outcome measure closest to 1 year post disaster** | **Risk of bias (quality) assessment** |
| Catapano6 | Landslide, Italy, 1998 | 13-16 months | Random sample of residents in high risk zone for future damage/landslides | 272 exposed, 72 controls | GHQ-30, Self-Rating Scale for Post-Traumatic Stress Disorder | GHQ-30 mean exposed 8.6 SD 6.8 GHQ-30 mean control 5.2 SD 5.5  Caseness exposed 59%, caseness control 35%  27.6% PTSD exposed, 1.4% control | Medium |
| Chan7 | Earthquake, China, 1998 | 1 year | Residents from Sichuan province | 138 exposed, 86 controls | DASS subscales | Depression mean exposed 22.31 SD 8.66 control 5.52 SD 4.42  Anxiety Mean exposed 25.46 SD 8.66 control 6.86 SD 6.09  Stress mean exposed 27.52 SD 9.56 control 9.51 SD 6.59 | Low |
| Dell’Osso8 | Earthquake, Italy, 2009 | 10 months | Residents from affected town | 946 exposed, 551 controls | TALS-SR | Significant main effect of exposure (Pillai's trace 0.146, F(4,531)=22.663 p<0·001) | Low |
| Fergusson9 | Earthquakes, New Zealand, 2010,2011 | 20-24 months | Existing birth cohort aged 35 at time of assessment | 543 exposed, 409 controls | Selected components of the CIDI, and the DIS | Major depression exposed 15%, control 8%  PTSD exposed 3·5%, control 1.7%  Other anxiety disorder exposed 18.9%, control 11.5% | High |

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| **Table 1: Continued** | | | | | | | | |
| **Exposed-non-exposed studies** | **Disaster type, location, year** | **Timing of outcome measurement** | | **Study population** | **Sample  size** | **Relevant Outcome measure** | **Findings for outcome measure closest to 1 year post disaster** | **Risk of bias (quality) assessment** |
| Heir10 | Tsunami, Southeast Asia 2004 | 6 months | | Norwegian nationals returning from disaster-stricken areas | 720 exposed, 120 controls | GHQ-28, PTSS-10, IES | GHQ-28 mean score, items by 4-point scale: not exposed 0·64 (0.39-0.89) non danger exposed 0.85 (0.57-1.10) danger exposed 0.93 (0.64-1.39)  PTSS-10 mean score, items by 7-point scale: not exposed 0.20 (0.00-0.70) non danger exposed 1.00 (0.40-2.13) danger exposed 1.80 (0.78-2.90)  IES-R mean score, items by 5-point scale: not exposed 0.18 (0.00-0.63) non danger exposed 0.93 (0.41-1.64) danger exposed 1.45 (0.86-1.95) | Low |
| Norris11 | Hurricane, United States of America, 1989 | 13-14 months | | Selective sampling of hurricane exposed areas to provide balanced ethnic, age, and gender proportions | 461 exposed, 469 controls | 4 subscales of the BSI | Data for exposed group appear limited to those with higher degrees of exposure therefore means not reported | Low |
| Papanikolaou12, Papanikolaou13 | Wildfires, Greece, 2007 | 6 months | | Multistage sampling of residents in affected villages | 409 exposed, 391 controls | SCL-90-R used to derive the Global Severity Index (GSI) (a measure of symptoms and severity) and caseness | GSI exposed 55.4 SD 11.4 GSI control 53.2 SD 9.9  Caseness exposed 43.2%, caseness control 29.8% | Medium |
| Ramachandran14 | Tsunami, Southeast Asia, 2004 | 5-6 months | | Alternate blocks of houses approached by volunteers in exposed coastal villages | 1463 exposed, 1398 controls | HTQ | 61.3% had a stress score above the median value compared with 35.8% in the control population | High |
| Rotton15 | Hurricane, United States of America, 1992 | 36-120 days | | College students studying psychology enrolled in campuses exposed to the disaster | 97 exposed, 60 controls | CES-D, PSS | MANOVA found non-significant results for all the measures of psychological distress | Low |
| Sattler16 | Earthquake, United States of America, 1994 | | 1 month | College students enrolled in a community college | 203 exposed, 98 controls | IES, BDI | IES exposed mean 19.36 SD 17.60 unexposed mean 8.29 SD 10.63  No significant differences between groups for BDI | Low |
| **Table 1: Continued** | | | | | | | | |
| **Exposed-non-exposed studies** | **Disaster type, location, year** | **Timing of outcome measurement** | | **Study population** | **Sample  size** | **Relevant Outcome measure** | **Findings for outcome measure closest to 1 year post disaster** | **Risk of bias (quality) assessment** |
| Shore17, Shore18, Shore19 | Volcanic eruption, United States of America, 1980 | | 38-42 months | Combination of selective and randomised sampling of exposed residents | 548 exposed, 477 controls | DIS, subscales of the SCL-90 | Percentage with new onset depression, generalised anxiety disorder, or PTSD high exposed group 20.7%, low exposed group 7.7%, control group 5.2%. No significant differences found for the four subscales of the SCL-90 between groups (depression, hostility, anxiety, and somatization) | Medium |
| Solomon20 | Flood, United States of America, 1982 | | 11-19 months | Existing participants in the NIMH Epidemiological Catchment Area (ECA) study | 75 exposed, 325 controls | DIS/DS | MANCOVA controlling for the effects of prior symptomatology reported number of symptoms (least square means):  Alcohol abuse exposed 0.38, control 0.20  Depression exposed 0.62, control 0.23  Somatization exposed 0.63, control 0.32  Posttraumatic stress 0.37, control -0.04  Generalised anxiety 0.30, control 0.16 | Medium |
| Wahlstrom21 | Tsunami, Southeast Asia, 2004 | | 14 months | Swedish residents returning from Southeast Asia | 1463 exposed, 12045 controls | GHQ-12 | Odds ratios reported according to different levels of exposure. Significant findings for high degrees of tsunami exposure but not for lesser degrees of exposure. Overall sample results not calculated. | Medium |

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| **Table 1: Continued** | | | | | | | |
| **Pre-post studies** | **Disaster type, location, year** | **Timing of outcome measurement** | **Study population** | **Sample  size** | **Relevant Outcome measure** | **Findings for outcome measure closest to 1 year post disaster** | **Risk of bias (quality) assessment** |
| Amstadter22, Brown23, Stratton24 | Typhoon, Vietnam, 2006 | 11 weeks | Random sample of residents aged >18 | 797 | SRQ20 | Pre-typhoon 4.29 SD 4.29; post-typhoon 4.79 SD 4.62 | High |
| Bei25 | Floods, Australia, 2010-2011 | 4·6 months | Community dwelling older adults (mean age 71) | 274 | CES-D, GAI, SF-12 | Email correspondence: CES-D pre 8.49 SD 8.56 CES-D post 9.21 SD 8.82, GAI pre 2.94 SD 5.01 GAI post 2.74 SD 4.53, SF12 mental pre 53.26 SD8.97 SF12 mental post 52.45 SD 9.49 | Low |
| Vu26 | Hurricane, United States of America 2005 | 1 and 2 years | Representative sample of Vietnamese Immigrants | 80 | SF-36 Mental Component Summary (MCS) | SF-36 MCS pre 49 SD 7·0 SF-36 MCS post 45.1 SD 11.4 | Medium |
| Brown27 | Hurricanes, United States of America, 2005 | 1-4 months, and 6-11 months | Random sample of older adults | 59 | SF-36 Mental Component Summary (MCS) | MCS pre 57.1 SD 6.2 MCS post MCS 57.8 SD 6.5 | Medium |
| Chan28, Chan29, Lowe30, Fussell31, Green32 Paxson33 | Hurricanes, United States of America, 2005 | 1 and 4 years | Female low income attendees of community college | 386 | K6 mean scores used to measure General Psychological Distress (GPD) and summed to derive the presence of probable mental illness (score greater 7) and severe mental illness (score greater than 12) | GPD pre 5.56 SD 4.1 GPD post 6.68 SD 5.21  Percentage with probable mental illness pre 24%, post 36%  Percentage with severe mental illness pre 6.5% post 13% | Medium |
| Dobalian34, Heslin35 | Earthquake, United States of America, 1994 | 1-3 months | Cohort of male veterans | 1144 | SF-36: MHI | \*MHI pre 8.93 SD 3.07 post 11.94 SD 3.21 | Medium |
| |  | | --- | | Heo36 | | Flood, South Korea, 2006 | 18 months | Residents of small village | 67 | SF-36 | SF-36 mental health score did not change | Medium |
| Kessler37 | Hurricane, United States of America, 2005 | 5-7 months | National Comorbidity Survey-Replication sample and representative sample of hurricane survivors | 826 pre, 1043 post | K6 used to define probable mild-moderate (score greater than 7) and probable serious mental disorder (score greater than 12) | Serious mental pre 6.1% Serious mental post 11.3%  Mental illness pre 15.7% Mental illness post 31.2% | Low | |

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| **Table 1: Continued** | | | | | | | |
| **Pre-post studies** | **Disaster type, location, year** | **Timing of outcome measurement** | **Study population** | **Sample  size** | **Relevant Outcome measure** | **Findings for outcome measure closest to 1 year post disaster** | **Risk of bias (quality) assessment** |
| Knight38 | Earthquake, United States of America, 1994 | 9-14 months | Participants in longstanding multi-generational study | 107 | CES-D | Mean of three CES-D pre-earthquakes 9.93 SD 6.2, Mean CES-D post 11.20 SD 9.23. | High | |
| Nolen-Hoeksema39 | Earthquake, United States of America, 1989 | 7 weeks | Undergraduates undergoing a psychology course | 41 | IDD | Mean IDD pre 9.51 SD 6.36 Mean IDD post 9.58 SD 5.96 | Low | |
| Phifer40 | Flood, United States of America, 1984 | 15-18 months | Existing participants in study of older (>55 years) adults | 198 | CES-D, trait half of the State-Trait Anxiety Scale (STAS) | Flood exposure was associated with increases in depression F(1, 184) = 8.03 p<0.05, beta = 0.17. Flood exposure was associated with increases in anxiety F(1,185) = 7.21 p<0·08, beta = 0.15 | Medium | |
| Ullman41 | Earthquake, United States of America, 1994 | 2 months | Existing participants in a longitudinal cohort study | 225 | Items from a modified form of the Hopkins Symptom Checklist were used to create depression, panic, and anxiety scales, IES | There were small significant main effects for panic and depression as a function of time. Anxiety did not differ from pre-earthquakes levels as a function of time | Medium | |

**\*SF-36 scores reverse scored when needed.**

Reference List

1 Aslam N, Tarq N. Trauma, depression, anxiety, and stress among individuals living in earthquake affected and unaffected areas. *Pak J Psychol Res* 2010; **25**: 131-148.

2 Bodvarsdottir I, Elklit A. Psychological reactions in Icelandic earthquake survivors. *Scand J Psychol* 2004; **45**: 3-13.

3 Bravo M, Rubio-Stipec M, Canino GJ, Woodbury MA, Ribera JC. The psychological sequelae of disaster stress prospectively and retrospectively evaluated. *Am J Community Psychol* 1990; **18**: 661-680.

4 Canino G, Bravo M, Rubio-Stipec M, Woodbury M. The impact of disaster on mental health: Prospective and retrospective analyses. *Int J Ment Health* 1990; **19**: 51-69.

5 Cao H, McFarlane AC, Klimidis S. Prevalence of psychiatric disorder following the 1988 Yun Nan (China) earthquake-the first 5-month period. *Soc Psychiatry Psychiatr Epidemiol* 2003; **38**: 204-212.

6 Catapano F, Malafronte R, Lepre F, Cozzolino P, Arnone R, Lorenzo E, et al. Psychological consequences of the 1998 landslide in Sarno, Italy: a community study. *Acta Psychiatr Scand* 2001; **104**: 438-442.

7 Chan RC, Xu T, Huang J, Wang Y, Zhao Q, Shum DH, et al. Extending the utility of the Depression Anxiety Stress scale by examining its psychometric properties in Chinese settings. *Psychiatry Res* 2012; **200**: 879-883.

8 Dell'Osso L, Carmassi C, Massimetti G, Stratta P, Riccardi I, Capanna C, et al. Age, gender and epicenter proximity effects on post-traumatic stress symptoms in L'Aquila 2009 earthquake survivors. *J Affect Disord* 2013; **146**: 174-180.

9 Fergusson DM, Horwood LJ, Boden JM, Mulder RT. Impact of a major disaster on the mental health of a well-studied cohort. *JAMA Psychiatry* 2014; **71**: 1025-1031.

10 Heir T, Sandvik L, Weisaeth L. Hallmarks of posttraumatic stress: symptom Z-scores in a tsunami-affected tourist population. *Psychopathology* 2009; **42**: 157-164.

11 Norris FH, Uhl GA. Chronic Stress as a Mediator of Acute Stress - the Case of Hurricane Hugo. *J Appl Soc Psychol* 1993; **23**: 1263-1284.

12 Papanikolaou V, Leon GR, Kyriopoulos J, Levett J, Pallis E. Surveying the ashes: experience from the 2007 Peloponnese wildfires six months after the disaster. *Prehosp Disaster Med* 2011; **26**: 79-89.

13 Papanikolaou V, Adamis D, Mellon RC, Prodromitis G. Psychological distress following wildfires disaster in a rural part of Greece: a case-control population-based study. *Int J Emerg Ment Health* 2011; **13**: 11-26.

14 Ramachandran A, Snehalatha C, Yamuna A, Bhaskar AD, Simon M, Vijay V, et al. Stress and undetected hyperglycemia in southern Indian coastal population affected by tsunami. *J Assoc Physicians India* 2006; **54**: 109-112.

15 Rotton J, Dubitsky SS, Milov A, White SM, Clark MC. Distress, elevated cortisol, cognitive deficits, and illness following a natural disaster. *J Environ Psychol* 1997; **17**: 85-98.

16 Sattler DN. Family Resources, Family Strains, and Stress Following the Northridge Earthquake. *Stress Trauma and Crisis* 2006; **9**: 187-202.

17 Shore JH, Tatum EL, Vollmer WM. Psychiatric reactions to disaster: the Mount St. Helens experience. *Am J Psychiatry* 1986; **143**: 590-595.

18 Shore JH, Tatum EL, Vollmer WM. Evaluation of mental effects of disaster, Mount St. Helens eruption. *Am J Public Health* 1986; **76**: 76-83.

19 Shore JH, Vollmer WM, Tatum EL. Community patterns of posttraumatic stress disorders. *J Nerv Ment Dis* 1989; **177**: 681-685.

20 Solomon SD, Regier DA, Burke JD. Role of Perceived Control in Coping with Disaster. *J Soc Clin Psychol* 1989; **8**: 376-392.

21 Wahlstrom L, Michelsen H, Schulman A, Backheden M. Psychological distress and sick leave in Swedish survivors of the 2004 tsunami: a comparison with a population sample. *J Nerv Ment Dis* 2009; **197**: 918-922.

22 Amstadter AB, Acierno R, Richardson LK, Kilpatrick DG, Gros DF, Gaboury MT, et al. Posttyphoon prevalence of posttraumatic stress disorder, major depressive disorder, panic disorder, and generalized anxiety disorder in a Vietnamese sample. *J Trauma Stress* 2009; **22**: 180-188.

23 Brown RC, Trapp SK, Berenz EC, Bigdeli TB, Acierno R, Tran TL, et al. Pre-typhoon socioeconomic status factors predict post-typhoon psychiatric symptoms in a Vietnamese sample. *Soc Psychiatry Psychiatr Epidemiol* 2013; **48**: 1721-1727.

24 Stratton KJ, Aggen SH, Richardson LK, Berenz EC, Tran TL, Trung LT, et al. Using the SRQ-20 factor structure to examine changes in mental distress following typhoon exposure. *Psychol Assess* 2014; **26**: 528-538.

25 Bei B, Bryant C, Gilson KM, Koh J, Gibson P, Komiti A, et al. A prospective study of the impact of floods on the mental and physical health of older adults. *Aging Ment Health* 2013; **17**: 992-1002.

26 Vu L, Vanlandingham MJ. Physical and mental health consequences of Katrina on Vietnamese immigrants in New Orleans: a pre- and post-disaster assessment. *J Immigr Minor Health* 2012; **14**: 386-394.

27 Brown JS, Cherry KE, Marks LD, Jackson EM, Volaufova J, Lefante C, et al. After Hurricanes Katrina and Rita: gender differences in health and religiosity in middle-aged and older adults. *Health Care Women Int* 2010; **31**: 997-1012.

28 Chan CS, Rhodes JE. Religious coping, posttraumatic stress, psychological distress, and posttraumatic growth among female survivors four years after Hurricane Katrina. *J Trauma Stress* 2013; **26**: 257-265.

29 Chan CS, Rhodes JE, Perez JE. A prospective study of religiousness and psychological distress among female survivors of Hurricanes Katrina and Rita. *Am J Community Psychol* 2012; **49**: 168-181.

30 Lowe SR, Chan CS, Rhodes JE. Pre-hurricane perceived social support protects against psychological distress: a longitudinal analysis of low-income mothers. *J Consult Clin Psychol* 2010; **78**: 551-560.

31 Fussell E, Lowe SR. The impact of housing displacement on the mental health of low-income parents after Hurricane Katrina. *Soc Sci Med* 2014; **113**: 137-144.

32 Green G, Lowe SR, Rhodes JE. What can multiwave studies teach us about disaster research: an analysis of low-income Hurricane Katrina survivors. *J Trauma Stress* 2012; **25**: 299-306.

33 Paxson C, Fussell E, Rhodes J, Waters M. Five years later: recovery from post traumatic stress and psychological distress among low-income mothers affected by Hurricane Katrina. *Soc Sci Med* 2012; **74**: 150-157.

34 Dobalian A, Stein JA, Heslin KC, Riopelle D, Venkatesh B, Lanto AB, et al. Impact of the Northridge earthquake on the mental health of veterans: results from a panel study. *Disaster Med Public Health Prep* 2011; **5 Suppl 2**: S220-226.

35 Heslin KC, Stein JA, Dobalian A, Simon B, Lanto AB, Yano EM, et al. Alcohol problems as a risk factor for postdisaster depressed mood among U.S. veterans. *Psychol Addict Behav* 2013; **27**: 207-213.

36 Heo JH, Kim MH, Koh SB, Noh S, Park JH, Ahn JS, et al. A prospective study on changes in health status following flood disaster. *Psychiatry Investig* 2008; **5**: 186-192.

37 Kessler RC, Galea S, Jones RT, Parker HA. Mental illness and suicidality after Hurricane Katrina. *Bull World Health Organ* 2006; **84**: 930-939.

38 Knight BG, Gatz M, Heller K, Bengtson VL. Age and emotional response to the Northridge earthquake: a longitudinal analysis. *Psychol Aging* 2000; **15**: 627-634.

39 Nolen-Hoeksema S, Morrow J. A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta Earthquake. *J Pers Soc Psychol* 1991; **61**: 115-121.

40 Phifer JF, Norris FH. Psychological symptoms in older adults following natural disaster: nature, timing, duration, and course. *J Gerontol* 1989; **44**: S207-217.

41 Ullman JB, Newcomb MB. I felt the earth move: A prospective study of the 1994 Northridge earthquake. Historical and geographical influences on psychopathology. In *Historical and geographical influences on psychopathology* (ed P Cohen, C Slomkowski, I Robins): 217-246. Lawrence Erlbaum Associates, 1999.