Social Capital and Mental Health in Post-disaster/Conflict Contexts: A systematic review

Pia Noel, Cliodhna Cork and Ross G. White

Pia Noël, MSc

Corresponding author

University of Edinburgh

c/o Dr. Sumeet Jain

2.30 Chrystal MacMillan Building

15a George Square, Edinburgh EH8 9LD, UK

+44 7960 097173

Pia.noel@ed.ac.uk

Cliodhna Cork, MSc

University of Glasgow

Cliodhnacork@gmail.com

Dr. Ross G. White

University of Liverpool

Ross.white@liverpool.ac.uk

**Abstract**

Social capital (SC) has been highlighted as an important factor for post-disaster/conflict mental health outcomes. However, the heterogeneous nature of the construct makes it difficult to get a clear picture of the evidence concerning the association between SC indices and psychological health. This review examines how SC is conceptualized and measured, and the relationships with other variables, in quantitative empirical studies investigating the associations between SC and mental health in post-disaster contexts. Primary data studies looking at this association in civilian populations were included. Four electronic databases were searched with terms relating to ‘mental health’, ‘social capital’, ‘post-disaster’ and ‘post-conflict’. Bibliographic mining, cited reference searching and personal contact with experts were also conducted. Fifteen studies were included: twelve in post-natural disaster contexts, three in conflict-affected settings. Findings supported an inverse association between individual cognitive SC and posttraumatic stress disorder (PTSD), anxiety and depression and a positive association between ecological cognitive SC and mental wellbeing. Individual structural SC in the form of community networks may be psychologically protective. However, most of the evidence was cross-sectional, limiting conclusions about causal relationships. More clarity and consistency is needed in the conceptualization and measurement of SC in order to inform post-disaster mental health interventions.

Keywords: Social capital, mental health, post-disaster, post-conflict, review

**Introduction**

Social capital (SC) as ‘the features of social life – networks, norms and trust – that enable participants to act together more effectively to pursue shared objectives’ 1(p664), has drawn attention from social scientists, policy makers and international institutions for its claimed contribution to health inequalities 2. However, much contention surrounds the concept’s definition and measurement, making it difficult to get a clear picture of the evidence base.

The evidence on associations between SC and the mental health of communities and individuals is mixed. On one hand, higher levels of SC have been associated with emotional health3, lower incidence of psychosis 4, lower rates of binge drinking in college5 and less psychiatric morbidity6. However, an interdisciplinary review highlighted that SC could be an asset or a liability depending on socioeconomic and cultural factors7. In a collectivist society, for example, where reciprocity amongst community members is an injunctive norm, high SC may be harmful to an individual’s psychological health if, due to financial constraints, the individual cannot adhere to the social norm.

The understanding of SC and its impact has been shaped according to three particular points of focus: 1) who has SC, 2) what is SC and 3) in relation to whom does a person/group have SC. In the literature, SC is used both as an individual attribute and an ecological construct (i.e. as being a property of groups) and has two components: ‘structural social capital’ (SSC) referring to a behavior/activity (e.g. rules, procedures and roles, as reflected by civic participation) and ‘cognitive social capital’ (CSC) as an attitude/perception (e.g. norms, values, beliefs such as trust)8. Both SSC and CSC can refer to linkages and perceptions in relation to people who are similar to each other called ‘bonding social capital’, or to people that are different labeled ‘bridging social capital’9. Finally, taking into account the vertical power differentials in social relations, SC occurring ‘across explicit formal or institutionalized power or authority gradients in society’ is called ‘linking social capital’10(p655).

The multi-faceted nature of the concept has made reaching a consensus on how best to measure SC challenging. Aldrich11 has identified four quantitative measurement approaches: attitudes, behaviors, participation in activities and field experiments. Within each category, a variety of proxies have assisted the measurement. To measure CSC, proxies such as individuals’ trust in others and perceived social support have been used. Proxies used in the measurement of SSC include the individual’s level of participation in local/voluntary organizations or the social support received from neighbors and their community networks. Ecological measures of cognitive social capital (ECSC) are aggregates of individual responses to similar questions at different group levels (e.g. post-code). Ecological structural social capital (ESSC) measures include per capita data on participation in voluntary organizations or voting rates within a given community12.

Different types of SC may exert different effects on health. A review examining the link between SC and mental illness revealed a potential inverse association between levels of individual cognitive social capital (ICSC) and mental disorders, while the evidence for individual structural social capital (ISSC) and ecological SC (both cognitive and structural) was deemed inadequate for any firm conclusions13. However, later evidence suggested that both ECSC and ESSC could positively influence mental health 14. Looking across cultures, De Silva and colleagues15 found that whilst ICSC was associated with a reduced likelihood of maternal common mental disorders in four countries (Peru, Ethiopia, Vietnam and India), findings concerning SSC (both individual and ecological) were mixed and context specific.

Until recently, most evidence looking at SC and mental health has been cross-sectional, making it hard to determine a causal relationship. However, an updated review based on cohort studies reported strong evidence that high CSC may help prevent common mental disorders16. The evidence concerning ISSC and ESC remained ambiguous, pointing towards potential negative consequences of strong levels of SC17,18.

Research in post-disaster mental health pays increasing attention to SC11,19. A disaster is ‘an occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community’20(p3). On average, 68,000 people die and millions of people are affected by natural disasters annually21. Additionally, in 2015 alone, there were more than 167,000 fatalities worldwide due to armed conflicts22. Disasters can have a profound impact on the social fabric of communities23 and the combined impact of collective traumas on communities may be greater than the sum of its individual parts24. Unsurprisingly, rates of general disability, and psychopathology specifically, greatly increase in the aftermath of disaster25 and conflict situations26 due to the onset of mental health difficulties27, the exacerbation of pre-existing conditions28 and stressful material and social conditions29.

Despite the acknowledged impact of social factors, mental health programs in post-disaster settings have focused, predominantly, on war trauma and PTSD, targeting the individual, rather than social relationships. Recently, more attention is accorded to social approaches and community-level resources, for example, socio-therapy interventions30.

SC expands the social determinants of mental health to encompass quantity and quality of social relationships16 and has been hypothesized as a missing link to disaster recovery31. However, no systematic review of the evidence concerned with the association between SC and post-disaster mental health has yet been conducted. This review complements a recent review on the association between SC and common mental disorders16 by focusing on studies in the context of disasters. Specifically, this review aimed to synthesize how SC has been conceptualized and measured in post-disaster literature; what dimensions of SC have been studied in these settings; how indices of SC are associated with mental health outcomes in post-disaster/conflict contexts and what methodological limitations are present in current literature. An improved understanding about SC and post-disaster mental health may foster the development of more targeted interventions aiming to enhance post-disaster recovery, alleviating mental health difficulties and promoting mental wellbeing.

# Methods

## Reporting

This review followed the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) Statement 32 and was registered with PROSPERO (registration number: CRD42016041607).

## Information sources

A multi-pronged approach was used to identify quantitative studies investigating the association between SC and post-disaster/conflict mental health outcomes. A systematic search was undertaken in May 2016 using four electronic databases: Medline, Embase, CINALH and PsychINFO. Bibliographic mining and cited reference searches were also carried out. Experts in the field were contacted for study recommendations.

## Search Strategy

Terms relating to ‘mental health’ (e.g. ‘psychology’, ‘mental disorders’, ‘psychological stress’), ‘social capital’ (e.g. ‘social ties’, ‘social networks’, ‘collective efficacy’), ‘post-disaster’ and ‘post-conflict’ were used for the search. All search terms previously used in systematic reviews relating to mental health and SC were included for consistency and completeness. Additional terms relating to the lack of SC (e.g. ‘social exclusion’ ‘social isolation’) were included to flag potential sources of references. The complete search strategy can be found in Appendix 1 (supplementary online material).

## Study selection

To be included in this review, studies had to have been published in peer-reviewed journals, used quantitative methods, and reported primary data looking at the direct association between SC and mental health (and/or mental well-being) outcomes in post-disaster/conflict settings. Papers investigating mental health of veterans, first responders, relief or humanitarian workers were excluded. Only papers reporting mental health/well-being outcomes of civilian survivors assessed with standardized measures were considered for inclusion. Studies recruiting participants who had been exposed to a disaster but were no longer in the setting were also excluded, as distress induced by relocation/resettlement was not the focus of the review. Further, studies that had employed measures assessing aspects of SC were considered for inclusion whether or not they explicitly identified these measures as assessing SC. The list of measures recognized as assessing aspects of SC is consistent with previous systematic reviews on SC 13,16 (see Appendix 2 of supplementary online material). Finally, papers published in English, French, Spanish or Catalan were considered for inclusion. There was no date or quality restriction for consideration.

After duplicated articles were removed, two independent researchers (P.N and C.C) completed the screening of titles and abstracts. Discrepancies were resolved through discussion. Then, full-text articles were assessed for eligibility.

## Data extraction and analysis

A data extraction form was created and was used to gather data from the studies, including: author(s) and year of publication, study design, location and sample characteristics, aspect(s) of SC measured and tools utilized, mental health outcome(s) investigated, tools used to measure it and main findings.

The risk of bias and overall quality of individual studies was evaluated using the National Institute of Health quality assessment tool for observational cohort and cross-sectional studies 33. The assessment was included in the narrative synthesis of the results.

# Results

## Study selection

*Figure 1* portrays the results of the literature search. In total, 871 articles were initially identified, 111 full-text articles screened, and 15 articles included. Details of the included studies are presented in Table 1.

## Included studies: Overview

### Studies in post-disaster contexts relating to natural causes

Twelve post-disaster studies were included. Based on World Health Organization (WHO) regions, seven studies were located in the Western Pacific Region: one in Australia 34; five in Japan 35–39 and one in Taiwan40; two studies were located in the region of the Americas: Peru 41 and Texas, U.S.A 42; two in the Europe region: England 43,44 and one in the Eastern Mediterranean Region: Pakistan 45.

Eleven data sets were unique, and two studies shared a data set43,44. The total sample of these studies was 26,829 (Median= 804, IQR= 4091 – 300). All but two studies focused on adults. McDermott and colleagues34 focused on children (8 to 13 years old) and Hikichi and colleagues35 on senior adults (65+). Nine studies were cross-sectional34,36,38,39,43–47 and three longitudinal 35,37,42.

The median length of time between the disaster and the data collection was 21 months (IRQ= 7.5 – 33) for the cross-sectional studies and 2 months (IRQ= -7 – 12) for the longitudinal studies. The median for the last follow-up period was 30 months post-disaster (IRQ= 60-19).

### Studies in post-disaster contexts relating to conflict

Of the three studies in post-conflict settings, one was located in the WHO African Region: Nigeria 48 and two in the WHO European Region: Croatia 49 and Kosovo 50. The time elapsed between the conflict and the study ranged from 7 months 49 to 11 years 50. The total data set was 3,295 (Median= 993 IQR= 2202 - 100).All studies focused on adults and were cross-sectional.

## Key features of studies in post-disaster contexts relating to natural causes

### Mental health conceptualizations and measures

Two studies looked at positive mental health conceptualized as ‘mental health wellness’ 42 and ‘quality of life’ 40. Two studies conceptualized mental health difficulties as ‘psychological distress’ 37,38 and one as ‘mental health problems’ 39. The rest of the studies focused on specific diagnoses: five studies looked exclusively at PTSD 34,35,41,44,45 and two investigated PTSD but also included depression 42 and anxiety 43. Finally, only one study explored ‘depressive reaction’ 36. The most commonly used measures were the Kessler Psychological Distress Scale, the PTSD Checklist-Civilian version (PCL-C) and the Patient Health Questionnaire (PHQ).

### Social capital conceptualizations and measures

Four of 12 studies self-defined as investigating SC 41,43–45. The rest had conceptualizations appropriate for inclusion: four studies assessed ‘social network’ 37–40, one measured ‘social cohesion’ 35, one looked at ‘collective efficacy’42, another at ‘social ties’ 36 and ‘social connectedness’ 34.

Nine studies measured individual level SC 34,36–40,43,45,47 and three ecological SC35,42,44. Three studies used the Social Capital Assessment Tool (SCAT) 41,43,51. The rest used distinct measures.

### Association between SC and mental health variables

#### Individual social capital (ISC)

##### Individual Cognitive Social Capital (ICSC)

Studies investigating ICSC showed an inverse relationship between CSC and PTSD 43. In fact, in post-disaster Peru, the prevalence of chronic PTSD was found to be 83% higher in individuals with low CSC47. These findings were further supported by a more recent study where pre-disaster individual perceptions of social cohesion were associated with a lower risk of developing severe PTSD symptoms post-disaster 35.

##### Individual Structural Social Capital (ISSC)

Findings concerning ISSC were mixed. The two studies that were explicit about studying SSC did not find any significant association with PTSD43,47. However, Wind and colleagues43 found SSC to be positively related to experiencing more anxiety.

Four studies focused on community networks, a dimension of SSC, and post-disaster mental health outcomes. Nakamura and colleagues37 assessed the association between the presence of social networks and the prevalence rates of psychological distress for 5 consecutive years (2005 to 2009) in earthquake survivors. While general prevalence rates gradually decreased from 2005 (51%) to 2008 (30.1%), the trend did not hold for individuals reporting infrequent social contact. Further analysesidentified social contactwith neighbors as anindependent factor relating to psychological distress: individuals with comparatively poor social contact were almost three times more likely to experience psychological distress. Their results were corroborated by a study in which individuals that ‘lack a social network’ (i.e. scored below 12 points on the Lubben Social Network Scale) were found to be 1.3 times more likely to experience moderate mental health problems (5-12 scores on K6) and 1.8 times more likely to experience severe mental health problems (13+ scores on K6) 39. Several studies also investigated the impact of change in the strength of networks pre and post disaster on psychological health. Changes in frequency of contact negatively influenced mental health aspects of quality of life 40 and increased the risk of psychological distress: individuals who loose or reduce contact with community are 7 times more likely to experience psychological distress 38.

Community networks have also been quantified looking at the presence or absence and quantity of ‘informal social ties’. Matsubara and colleagues36 used the presence of cohabiters as an indicator of social ties among survivors of the 2011 Japan Earthquake. The presence of cohabiters was a potentially protective factor against a depressive reaction post-earthquake. Compared to people living alone, people living with 1 to 6 cohabiters were 1.64 times more unlikely to have a depressive reaction. The depressive reaction was negatively correlated with the number of cohabiters.

##### Combined cognitive and structural SC

Finally, two studies focused on ISC without making a distinction between cognitive and structural components; instead they used measures that had aspects of both. In speaking of a ‘generic social capital’, Ali and colleagues45 found that a high SC score was the strongest predictor against the development of PTSD in earthquake victims compared to ten other independent variables. Individuals with comparatively low SC scores were 1.12 times more likely to experience PTSD. Similarly, studying children, McDermott and colleagues34 captured two SSC components (i.e. contact and participation) and two CSC components in a single factor named ‘child connectedness’. Less connected children had a greater number and more severe PTSD symptoms and were four times more likely to develop PTSD. In sum, these studies found that adults and children with higher SC were comparatively less likely to experience PTSD symptoms in the aftermath of a disaster.

#### Ecological social capital (ESC)

Three studies measured ESC: two cross-sectional35,44 and one longitudinal 42. ‘Community’ was operationalized as post-code areas44, as administrative units wherein residents are organized for disaster response drills 35 and as census blocks 42. Two studies uniquely studied CSC 35,42 while one investigated both cognitive and structural components44. However, although beneficial for mental health, the results concerning ESSC were indirect and therefore were not a point of focus of the current review. Consequently, all the results concerning ESC are ECSC.

ECSC was negatively associated with posttraumatic stress (PTS): individuals living in communities with high levels of CSC presented fewer posttraumatic symptoms44. These findings were corroborated by Hikichi and colleagues35. In a longitudinal study focusing on mental well-being, Lowe and colleagues42 measured social cohesion, trust and perception of informal social control (named ‘collective efficacy’). Building on the concept of resilience, they looked at mental health wellness (resilience across multiple mental health conditions) and general wellness (resilience across mental health, physical health and role functioning) in adult Hurricane Ike survivors in order to identify predictors of wellness. Higher ‘collective efficacy’ was associated with higher likelihood of mental and general wellness, suggesting that these ‘collective efficacy’ components of CSC might be important resources in promoting mental well-being post-disaster.

## Key features of studies in post-disaster contexts relating to conflict

### Mental health conceptualizations and measures

No study assessed mental well-being; the focus instead was on different forms of mental distress. Kunovich and Hodson49 studied ‘war-related distress’ [assessed by 15-items derived from DSM-IV 52], a specific form of posttraumatic stress. Beiser et al 48 focused solely on PTSD [as assessed by the CIDI (Composite International Diagnostic Interview) 53] and Nakayama and colleagues 50 assessed levels of depression and anxiety [assessed by the Hospital Anxiety and Depression Scale 54]. Every study used a different mental health assessment measure (see Appendix 3 of supplementary online material).

### Social capital conceptualizations and measures

Beiser and colleagues48 conceptualized SC as consisting of the following four components: economic security, feeling safe, feeling part of a moral/social order and social support. Kunovich and Hodson49 measured ‘social integration’ operationalized as the participation in organizations, the frequency of social activities, and the existence of close personal relationships. Nakayama and colleagues50 looked at ‘social networks’, which they viewed as being imbued with components of ‘trust in others (social cohesion), social connections, social support and social integration’ and as being the mean by which people can access or achieve SC within communities. They explicitly mention their aim to also assess ‘bridging social networks’ (i.e. to measure contact with strangers).

The measures used were variegated across studies and none used the same assessment tool. Beiser and colleagues48 used a scale with one item on economic security, one item on feelings of security, 5 items on disrupted moral and social order and 14 items on perceived social support. Kunovich and Hodson49 measured three types of social integration: organizational membership, frequency of social activities and existence of close relationships. Finally, Nakayama and colleagues50 used a 3-item scale to measure social network depth.

### Association between social capital and mental health variables

The three cross-sectional studies in post-conflict contexts conceptualized and measured SC at the individual-level: Two focused on ISSC 49,50 and one on ICSC 48.

#### Individual Cognitive Social Capital (ICSC)

Beiser et al.’s48 study in Nigeria found that, seven to eight years after the peak of episodes of violence, three of four of the SC elements were significantly correlated with higher levels of PTSD: feelings of being unsafe, a disrupted moral order and the lack of social support. They were all independent predictors of PTSD.

#### Individual Structural Social Capital (ISSC)

Nakayama and colleagues50 found a relationship between community networks and mental health in post-conflict Kosovo. Individuals who maintained less frequent contact with their friends were more than twice as likely to experience feelings of depression and anxiety. This association did not hold for contacts with relatives or strangers.

Kunovich and Hodson49 explored the relationship between ‘social integration’ and war-related distress in Croatia. The concept of ‘social integration’ encompassed three components of SCS: organizational memberships, frequency of social activities and existence of close personal relationships. Some support for positive direct effects of social integration on distress was found, however there were also negative consequences. For instance, belonging to *informal* organizations such as sports clubs was found to be beneficial. However, being a member of *formal* organizations such as church and unions was harmful for mental health.Participating in social activities was positive for mental health.

## Quality assessment

As a whole, the body of evidence reviewed was of moderate quality, with the exception of one study of high quality47. All but three studies were cross-sectional. Despite the weakness of the design, all studies were transparent about their research questions and provided a clear statement of their objectives. Adequate information about their population eligibility criteria was provided and outcome measures were defined, valid, reliable and implemented across all study participants. Potential confounding variables were measured and adjusted to take into account their impact on the relationship under investigation. Both the sampling techniques used and the participation rate in all the studies (at least 50% of all eligible participants) suggest the samples were adequately representative. However, whilst the independent variables were also well defined throughout, the measures used were not standardized and the validity and reliability of the items used was not consistently reported. Finally, a common limitation was the absence of a sample size justification limiting the assessment of potential type II errors (see online supplementary appendix 4 and 5 for study-by-study quality assessment).

# Discussion

SC helps conceptualize and measure the social world. While efforts have been made to clarify the evidence base surrounding SC and mental illness 13,16, the current systematic review sought to synthesize and evaluate research studies that specifically explored SC and mental health in post-disaster contexts. Fifteen studies met the inclusion criteria. Findings revealed a gap in the evidence concerning post-disaster child mental health, with the majority of the studies focused on adult populations. As previously noted 29, the predominance of PTSD research in post-disaster mental health research was evident in this review. Additionally, there was a relative neglect of investigations on indicators of mental well being compared to mental ill health. Although future efforts aimed at supporting recovery from mental ill health in post-disaster settings will be important, so will be the efforts aimed at promoting mental well-being in these contexts. Finally, the overwhelming majority of the studies were cross-sectional in design, limiting concluding causal remarks.

Referring back to the three particular points of focus by which the understanding of SC has generally been shaped (i.e. *who* has SC, *what* is SC and *in relation to whom* does a person/group have SC) over 80% of the studies reviewed conceptualized and measured SC as an individual construct, and most focused on the behavioral (i.e. structural) component of SC. The predominant relational component of SC explored (i.e. bonding, bridging or linking) was less clear. Only one study explicitly distinguished between bonding and bridging SC. Despite the predominant focus on SSC, there was a high heterogeneity in the tools employed to measure and assess SC, making comparisons across studies difficult. This review has also identified a shortage of standard, valid and reliable tools, aside from the SCAT 12.

This review provides evidence of negative associations that ICSC has with PTSD, depression and anxiety in post-disaster contexts, in accordance with previous research 16. No study found a positive association between ICSC and mental distress. Furthermore, no studies investigated the relationship between ICSC and mental well-being. Conversely, there is evidence of a positive association between elements of ECSC such as perceptions of social cohesion, trust and informal social control and mental wellness, as well as an inverse relationship with posttraumatic stress. These ecological-level SC findings point to the importance of social context on psychological health. However, different mental health problems might not share the same pattern of association with SC indices 55 highlighting the need for future research to focus on these differential associations. Further, the findings of the review suggest the potential benefit of promoting particular aspects of CSC including trust, social cohesion and social support for war-affected individuals. Future research is required to causally test this to determine whether interventions supporting individuals and communities to restore a sense of moral and social order are essential in mitigating the risk of PTSD in post-conflict settings. Supporting previous research, the evidence reviewed around ISSC was more mixed. While some evidence suggests no association between ISSC and PTSD, there is also evidence of a positive association between ISSC and anxiety and a negative association between components of ISSC and more general conceptualizations of ‘psychological distress’ or ‘mental health problems’ in post-disaster settings.

Disasters disrupt daily routines for individuals and communities, including their social network patterns. Evidence of a negative association between ISSC and mental distress was predominantly found in relation to indices assessing these community networks. The evidence suggests that a social network protects against psychological distress in post-disaster/conflict settings. Also, it flags an association between the harmful impact of a disaster on a social network (in terms of reduced frequency of contact) and increased psychological pain and reduced quality of life. Understanding the fact that it is essential, for mental health, to be able to preserve, post disaster/conflict, one’s relationship with a social network may be important to guide interventions in these contexts. Particularly in war-affected contexts, specific types of networks may be beneficial for psychological health, such as frequency of contact with friends 50 or being part of *informal* organizations (such as sports teams), while belonging to *formal* organizations such as church or unions may have the opposite effect 49. These findings highlight the importance of differentiating between bonding, bridging and linking in SC research.

Together, these findings constitute the first step to understanding the state of the evidence surrounding SC and post-disaster mental health. While the associations identified are important, the high level of heterogeneity in SC’s conceptualizations and measurements as well as the predominant cross-sectional design of the studies included in the review do not allow for any causal conclusions. The review itself is not without shortcomings. First, there is a need to reflect on how indices associated with SC might overlap with related constructs such as ‘sense of community’, ‘community attachment’ as research on these concepts may be relevant to this area of research. Here a conscientious effort was made, not only to include all search terms used in previous systematic reviews on SC, but also to complete the search with other methods of identification. Second, only studies published in peer-reviewed journals were included. The exclusion of unpublished papers and grey literature may have left the findings of this review susceptible to issues relating to publication bias. Third, the focus on quantitative rather than qualitative methods of investigation may have limited the understanding that may have emerged from the narrative accounts of people living in post-disaster contexts. Finally, only studies looking at a direct association between SC and post-disaster mental health were included potentially obscuring important mechanisms between SC and mental health.

Notwithstanding its limitations, the current review identified methodological and conceptual issues future research should be aware of. Firstly, in order to allow for comparisons across studies, future research should use standardized assessment tools, e.g. SCAT. Additionally, future SC assessment tools would benefit from making a distinction between bonding, bridging and linking SC, as indications for important differences in their effect on mental health were highlighted here. Secondly, more research efforts focusing on SC and post-disaster child mental health are required as findings from adult samples may not be generalizable. Thirdly, there are potential avenues of research that are not trauma-focused. For example, looking at how SC may help mitigate the generally difficult socio-economic conditions contributing to mental distress in disaster/conflict settings. In order for the evidence to be able to confidently inform interventions, research designs that permit causal inferences to be made. Finally, there is a need to address and synthesize the evidence and insights from qualitative research. Unfortunately, our capacity to anticipate and/or prevent disasters will continue to be frustratingly poor, and these events will continue to impact the lives of millions of people. It is imperative for research endeavors to focus on better understanding important processes of change that can help individuals and communities to cope with these events.

References

1. Putnam RD. Bowling alone: Americas´s declining social capital. *J Democr*. 1995;6:65-78. doi:10.1353/jod.1995.0002.

2. Henderson S, Whiteford H, Group TWB, et al. Social capital and mental health. *Lancet (London, England)*. 2003;362(9383):505-506. doi:10.1016/S0140-6736(03)14150-5.

3. Rose R. How much does social capital add to individual health? *Soc Sci Med*. 2000;51(9):1421-1435. doi:10.1016/S0277-9536(00)00106-4.

4. Kirkbride JB, Boydell J, Ploubidis GB, et al. Testing the association between the incidence of schizophrenia and social capital in an urban area. *Psychol Med*. 2008;38(8):1083-1094. doi:10.1017/S0033291707002085.

5. Weitzman ER, Kawachi I. Giving means receiving: The protective effect of social capital on binge drinking on college campuses. *Am J Public Health*. 2000;90(12):1936-1939. doi:10.2105/AJPH.90.12.1936.

6. McCulloch A. Social environments and health: cross sectional national survey. *BMJ*. 2001;323(7306):208-209. doi:10.1136/bmj.323.7306.208.

7. Almedom AM. Social capital and mental health: An interdisciplinary review of primary evidence. *Soc Sci Med*. 2005;61(5):943-964. doi:10.1016/j.socscimed.2004.12.025.

8. Uphoff N, Wijayaratna CM. Demonstrated benefits from social capital: The productivity of farmer organizations in Gal Oya, Sri Lanka. *World Dev*. 2000;28(11):1875-1890. doi:10.1016/S0305-750X(00)00063-2.

9. Putnam RD. *Making Democracy Work. Civil Traditions in Modern Italy*.; 1993. doi:10.2307/2620793.

10. Szreter S, Woolcock M. Health by association? Social capital, social theory, and the political economy of public health. *Int J Epidemiol*. 2004;33(4):650-667. doi:10.1093/ije/dyh013.

11. Aldrich DP. *Building Resilience: Social Capital in Post-Disaster Recovery*. University of Chicago Press; 2012.

12. De Silva MJ, Harpham T, Tuan T, Bartolini R, Penny ME, Huttly SR. Psychometric and cognitive validation of a social capital measurement tool in Peru and Vietnam. *Soc Sci Med*. 2006;62(4):941-953. doi:10.1016/j.socscimed.2005.06.050.

13. De Silva MJ. Social capital and mental illness: a systematic review. *J Epidemiol Community Heal*. 2005;59:619-627. doi:10.1136/jech.2004.029678.

14. Hamano T, Fujisawa Y, Ishida Y, Subramanian S V., Kawachi I, Shiwaku K. Social capital and mental health in Japan: A multilevel analysis. *PLoS One*. 2010;5(10). doi:10.1371/journal.pone.0013214.

15. De Silva MJ, Huttly SR, Harpham T, Kenward MG. Social capital and mental health: A comparative analysis of four low income countries. *Soc Sci Med*. 2007;64(1):5-20. doi:10.1016/j.socscimed.2006.08.044.

16. Ehsan AM, De Silva MJ. Social capital and common mental disorder: a systematic review. *J Epidemiol Community Health*. 2015;69(10):1021-1028. doi:10.1136/jech-2015-205868.

17. Mitchell MJ, Witman M, Taffaro C. Reestablishing mental health services in St. Bernard Parish, Louisiana, following Hurricane Katrina. *Prof Psychol Res Pract*. 2008;39(1):66-76. doi:10.1037/0735-7028.39.1.66.

18. Whitley R, McKenzie K. Social capital and psychiatry: review of the literature. *Harv Rev Psychiatry*. 2005;13(2):71-84. doi:10.1080/10673220590956474.

19. Scholte WF, Ager AK. Social capital and mental health: connections and complexities in contexts of post conflict recovery. *Intervention*. 2014;12(2):210-218. doi:10.1097/WTF.0000000000000038.

20. World Health Organization E and HA (WHO/EHA). Disasters & emergencies: Definitions (Training Package). 2002. http://apps.who.int/disasters/repo/7656.pdf\n\n.

21. CRED. *The Human Cost of Natural Disasters: A Global Perspective*.; 2015.

22. Armed Conflict Database. https://acd.iiss.org/.

23. Gordon R. The social system as site of disaster impact and resource for recovery. *Aust J Emerg Manag*. 2004;19(4).

24. Kleinman, A; Das, V; Lock M. *Social Suffering*. University of California Press; 1997.

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

26. Murthy RS, Lakshminarayana R. Mental health consequences of war: a brief review of research findings. *World Psychiatry*. 2006;5(1):25-30.

27. Kar N, Bastia BK. Post-traumatic stress disorder, depression and generalised anxiety disorder in adolescents after a natural disaster: a study of comorbidity. *Clin Pract Epidemiol Ment Health*. 2006;2:17. doi:10.1186/1745-0179-2-17.

28. Milligan G, McGuinness T. Mental health needs in a post-disaster environment. *J Psychosoc Nurs Ment Heal Serv*. 2009;47(9):23-30. doi:10.3928/02793695-20090731-01.

29. Miller KE, Rasmussen A. War exposure, daily stressors, and mental health in conflict and post-conflict settings: Bridging the divide between trauma-focused and psychosocial frameworks. *Soc Sci Med*. 2010;70(1):7-16. doi:10.1016/j.socscimed.2009.09.029.

30. Jansen S, White R, Hogwood J, et al. The ???treatment gap??? in global mental health reconsidered: Sociotherapy for collective trauma in Rwanda. *Eur J Psychotraumatol*. 2015;6. doi:10.3402/ejpt.v6.28706.

31. Nakagawa Y, Shaw R. Social Capital: A Missing Link to Disaster Recovery. *Int J Mass Emerg Disasters*. 2004;22(1):5-34. doi:10.1017/CBO9781107415324.004.

32. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Int J Surg*. 2010;8(5):336-341. doi:10.1016/j.ijsu.2010.02.007.

33. Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies - NHLBI, NIH. https://www.nhlbi.nih.gov/health-pro/guidelines/in-develop/cardiovascular-risk-reduction/tools/cohort.

34. McDermott BM, Berry H, Cobham VE. Social connectedness: A potential aetiological factor in the development of child post-traumatic stress disorder. *Aust N Z J Psychiatry*. 2012;46(2):109-117. doi:10.1177/0004867411433950.

35. Hikichi H, Aida J, Tsuboya T, Kondo K, Kawachi I. Can community social cohesion prevent posttraumatic stress disorder in the aftermath of a disaster? A natural experiment from the 2011 Tohoku Earthquake and Tsunami. *Am J Epidemiol*. 2016;183(10):902-910. doi:10.1093/aje/kwv335.

36. Matsubara C, Murakami H, Imai K, et al. Prevalence and Risk Factors for Depressive Reaction among Resident Survivors after the Tsunami following the Great East Japan Earthquake, March 11, 2011. *PLoS One*. 2014;9(10). doi:10.1371/journal.pone.0109240.

37. Nakamura K, Kitamura K, Someya T. Psychological recovery 5 years after the 2004 Niigata-Chuetsu earthquake in Yamakoshi, Japan. *J Epidemiol*. 2014;24(2):125-131. doi:10.2188/jea.JE20130097.

38. Oyama M, Nakamura K, Suda Y, Someya T. Social network disruption as a major factor associated with psychological distress 3 years after the 2004 Niigata-Chuetsu earthquake in Japan. *Environ Health Prev Med*. 2012;17(2):118-123. doi:10.1007/s12199-011-0225-y.

39. Yokoyama Y, Otsuka K, Kawakami N, et al. Mental health and related factors after the Great East Japan earthquake and tsunami. *PLoS One*. 2014;9(7). doi:10.1371/journal.pone.0102497.

40. Chou FH-C, Chou P, Su TT-P, et al. Quality of life and related risk factors in a Taiwanese village population 21 months after an earthquake. *Aust N Z J Psychiatry*. 2004;38(5):358-364. doi:10.1111/j.1440-1614.2004.01364.x.

41. Flores EC, Carnero AM, Bayer AM. Social capital and chronic post-traumatic stress disorder among survivors of the 2007 earthquake in Pisco, Peru. *Soc Sci Med*. 2014;101:9-17 9p. doi:10.1016/j.socscimed.2013.11.012.

42. Lowe SR, Joshi S, Pietrzak RH, Galea S, Cerdá M. Mental health and general wellness in the aftermath of Hurricane Ike. *Soc Sci Med*. 2015;124:162-170. doi:10.1016/j.socscimed.2014.11.032.

43. Wind TR, Fordham M, Komproe IH. Social capital and post-disaster mental health. *Glob Health Action*. 2011;4. doi:10.3402/gha.v4i0.6351.

44. Wind TR, Komproe IH. The mechanisms that associate community social capital with post-disaster mental health: A multilevel model. *Soc Sci Med*. 2012;75(9):1715-1720. doi:10.1016/j.socscimed.2012.06.032.

45. Ali M, Farooq N, Bhatti MA, Kuroiwa C. Assessment of prevalence and determinants of posttraumatic stress disorder in survivors of earthquake in Pakistan using Davidson trauma scale. *J Affect Disord*. 2012;136(3):238-243. doi:10.1016/j.jad.2011.12.023.

46. Chou FHC, Chou P, Su TTP, et al. Quality of life and related risk factors in a Taiwanese Village population 21 months after an earthquake. *Aust N Z J Psychiatry*. 2004;38(5):358-364. doi:10.1111/j.1440-1614.2004.01364.x.

47. Flores EC, Carnero AM, Bayer AM. Social capital and chronic post-traumatic stress disorder among survivors of the 2007 earthquake in Pisco, Peru. *Soc Sci Med*. 2014;101:9-12. doi:10.1016/j.socscimed.2013.11.012.

48. Beiser M, Wiwa O, Adebajo S. Human-initiated disaster, social disorganization and post-traumatic stress disorder above Nigeria’s oil basins. *Soc Sci Med*. 2010;71(2):221-227 7p. doi:10.1016/j.socscimed.2010.03.039.

49. Kunovich RM, Hodson R. Civil War, Social Integration and Mental Health in Croatia. *J Health Soc Behav*. 1999;40(4):323-343. doi:10.2307/2676329.

50. Nakayama R, Koyanagi A, Stickley A, et al. Social networks and mental health in post-conflict Mitrovica, Kosova. *BMC Public Health*. 2014;14(1):1169. doi:10.1186/1471-2458-14-1169.

51. Wind TR, Komproe IH. The mechanisms that associate community social capital with post-disaster mental health: A multilevel model. *Soc Sci Med*. 2012;75(9):1715-1720. doi:10.1016/j.socscimed.2012.06.032.

52. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (4th Ed.)*.; 1994.

53. WHO. *Composite International Diagnostic Interview (CIDI)*.; 1997.

54. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand*. 1983;67(6):361-370. doi:10.1111/j.1600-0447.1983.tb09716.x.

55. McKenzie K, Whitley R, Weich S. Social capital and mental health. *Br J Psychiatry*. 2002;181(4):280-283. doi:10.1192/bjp.181.4.280.