

Chapter 2.6

The current state of evidence mapping: Mapping the evidence and systematic reviews

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Learning objectives

To understand the importance of the following when considering the current state of the evidence and systematic reviews as a source of information for research in health emergency and disaster risk management (Health EDRM):

- Essential elements of Health EDRM as they pertain to various stages of the emergency management continuum.
- Current level of research and available evidence to standardize the application and practice of these essential elements in Health EDRM.
- Optimal modalities for generating additional evidence for elements currently deemed deficient.
- Barriers and difficulties in conducting systematic reviews and research during emergencies and disasters.

Introduction (1)

Natural hazards have severe implications for human and economic costs. This has been especially the case in the past two decades.

Health EDRM research has an important role to play in reducing economic losses from disasters. Public health impacts of disasters include:

- Direct and indirect mortality and morbidity, trauma, injuries and disability.
- Damage to health infrastructure and over-burdening of health systems.
- Disruption to regular practices, communications and resources.

Introduction (2)

Health EDRM must take an all-hazards approach and look at multi-sectoral perspectives so that evidence is systematically generated and validated to support a whole-of-society and risk-based approach.

During humanitarian interventions, information and data come from compromised health systems, which results in:

- Unreliable and sometimes invalid data.
- Inability to monitor trends to determine intervention effects, prioritize reliably and efficiently allocate resources.
- Difficulty in knowing whether the humanitarian situation is improving.

Role of systematic reviews

- When evidence is generated for region-specific issues, it might be difficult to know if it can be applied in other settings.
- Systematic reviews bring together multiple studies of the same topic which can help to determine this generalizability.
- Systematic reviews make it easier for people to compare and contrast studies and their findings.
- Sometimes, they allow for the combination of the results of the studies to provide a more powerful answer.

Status:	Essential element of Health EDRM programmes:
Operational and fully standardized	Water and sanitation
	Nutrition
	Communicable diseases/surveillance/EWARS
	Essential medicines
	Partners/cluster coordination
	Humanitarians accountability
	Surveillance
	EWARS/Outbreak investigation and control
Not fully operational	Assessments
	Sexual reproductive health
	Human rights and protection
	Mental health
	Education and training (humanitarian services providers)
	Emergency preparedness
	Risk prevention and mitigation
	Hazards/vulnerability analyses
	Emergency risk communication
	Sexual harassment in humanitarian programmes and service delivery (staff and services' beneficiaries)
Seriously deficient	Psychosocial first aid
	All-hazards approach
	Real-time evaluation
	Health systems resilience/recovery
	Operational readiness
Absent/Missing	Ethics of research in health emergencies and disasters
	Inter-sectoral coordination (health sector with others)
	International Health Regulations (IHR 2005)
	Disaster and development paradigm and linkages

How well are health response topics supported by evidence

The table provides an overview of the level of evidence that currently (2021) support health response topics which are currently supported by evidence.

The categories are adapted from a paper published by the WHO Regional Office for the Eastern Mediterranean (EMRO).

Rationale for systematic reviews

Systematic reviews can help to identify the most efficient and effective practices during different phases of the disaster management cycle.

Systematic reviews provide standardized summaries of existing studies, which help to allow evidence-based practices to be applied in humanitarian settings.

They also help identify gaps in practices, establish standardized methods of data collection and seek out methods for information dissemination.



What are systematic reviews? (1)

Systematic reviews are

- Robust studies that use existing research to answer a research question.
- A way of establishing the overall balance of empirical evidence on a topic or policy.
- Used to identify what is generalizable and what is context specific.



What are systematic reviews? (2)

There are three main approaches for systematic reviews:

1. Quantitative synthesis, using statistical analyses (meta-analysis) to combine the results of studies.
2. Narrative systematic reviews, using a narrative approach to present the findings of quantitative studies.
3. Qualitative synthesis, to bring other qualitative research studies.

Two sources of methodological guidance that should be considered are Cochrane and the Joanna Briggs Institute.

Key steps in a systematic review

The table lists the key steps for a systematic review.

Process	Factors to consider	Common Tools and Resources
Defining the question	Specify the inclusion and exclusion criteria: population, intervention, exposure, outcome, methodology, time of publication, time of data collection, language, geographic location, etc.	PICO mnemonic: Problem/Patient/Population Intervention/Exposure Comparator Outcomes
Conduct the literature review	A search criterion: Search dates, language, location, study designs, synonyms, integrate/controlled vocabulary Information source (Chapters 3.7 and 6.2): Databases, funding agencies, trial registries, citation lists Paywalls Unpublished or grey literature Reference management	General: CENTRAL; EMBASE; EM-BIB; Google Scholar; MEDLINE; PubMed; PsycINFO; Scopus; Web of Science Disaster specific: DisDAT; EM-DAT; ReliefWeb Reference management: EndNote; Mendeley; RefWorks; Zotero
Apply inclusion and exclusion criteria	Remove duplicates Apply specific to titles and abstracts Obtain full articles for those potentially eligible Further apply criteria to the full articles	PRISMA flow chart ENTREQ ConQual COREQ JBI Review's Manual Cochrane Handbook (14)
Create data abstraction and analysis	Critically appraise the studies: internal validity; study methods; participant number, reliability, (comparison) interventions Analysis: effect measure, significance, certainty (such as confidence intervals, p-value), pooled estimates, subgroup analysis (if appropriate)	AGREE II (appraisal) R SAS SPSS STATA Qualitative tools
Presentation and findings	Risk of Biases within study Directness of evidence Heterogeneity Publication bias Journal, conference, oral presentations	GRADE Framework (Grading of Recommendations, Assessment, Development and Evaluations)

Case study: *Cochrane and the Cochrane Database of Systematic Reviews (CDSR)*

Cochrane is an internationally recognized organization and a leader in the production of high-quality systematic reviews. Its primary focus is to promote evidence-based decision-making in health. The five main types of Cochrane Reviews are:

1. Intervention reviews.
2. Diagnostic test accuracy reviews.
3. Prognosis reviews.
4. Qualitative evidence synthesis.
5. Methodology reviews.

They are all available at www.CochraneLibrary.com

Statistical meta-analysis

Meta-analysis involves data-pooling and statistical synthesis of the results of independent studies. It seeks to maximize statistical power and precision and control bias. It requires the included studies to be as similar (homogeneous) as possible, in terms of:

- Population (or sub-groups).
- Interventions or exposures.
- Comparators.
- Outcome measures.

Forest plots

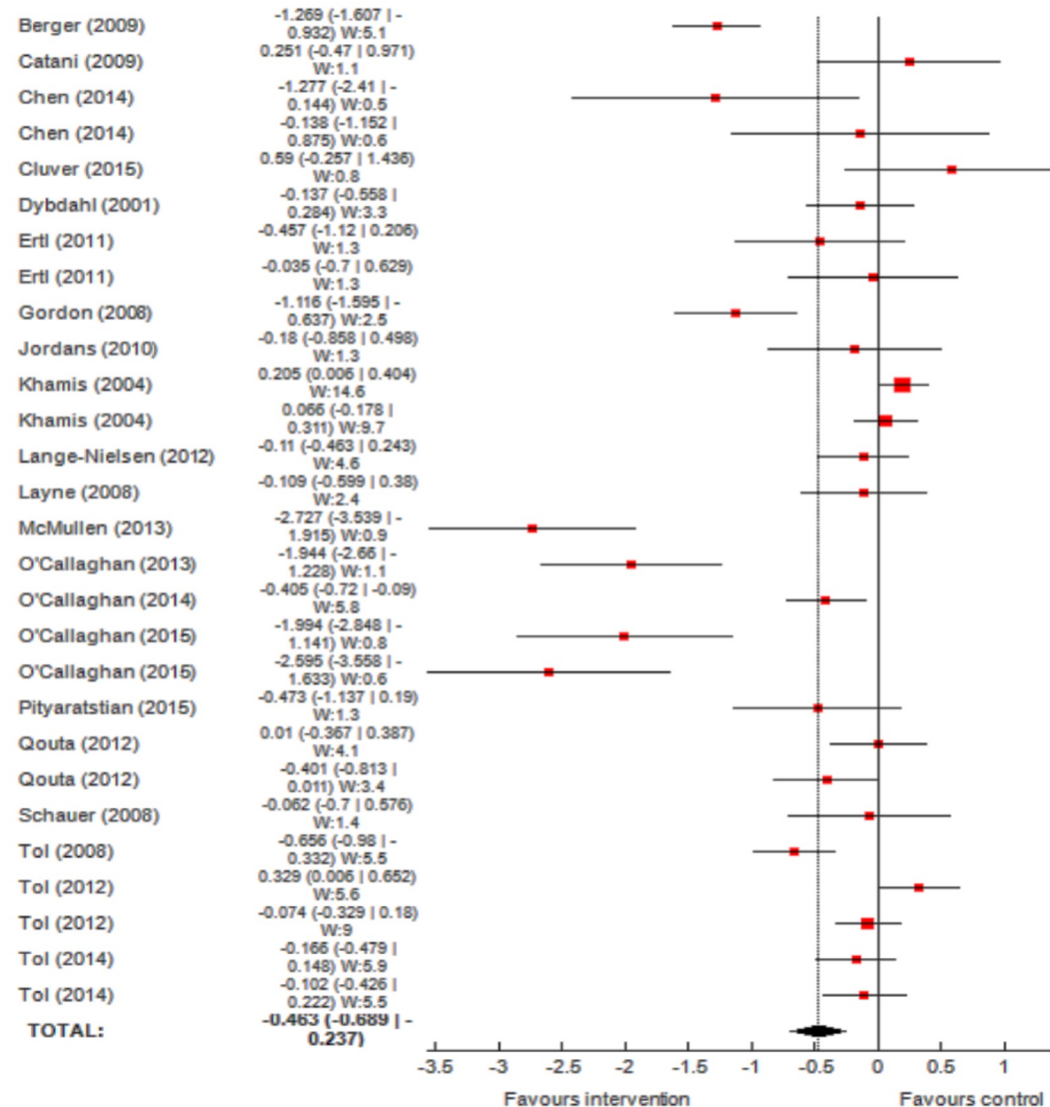
Results are displayed in a **forest plot** showing the precision of each independent study and the cumulative findings, using:

- **Solid vertical line** represents no difference between the effects of the intervention and the comparator.
- **Square and horizontal line** represents the effect size for each study and its 95% confidence interval.
- **Diamond** represents the cumulative estimate of the effect based on the pooled results of the individual studies.

Measure: continuous: d (Hedges g)

Heterogeneity: $Q = 206$; $df = 27$; $p = 0$; $I^2 = 86.9\%$; tau-squared = 0.29

Random effects model: -0.463 (-0.689, -0.237)



Case study: Impact of mental health and psychosocial support interventions on people affected by humanitarian emergencies (1)

In 2017, a systematic review was used to study the impact of mental health and psychosocial support (MHPSS) interventions on people affected by humanitarian emergencies.

It included meta-analysis and qualitative synthesis.

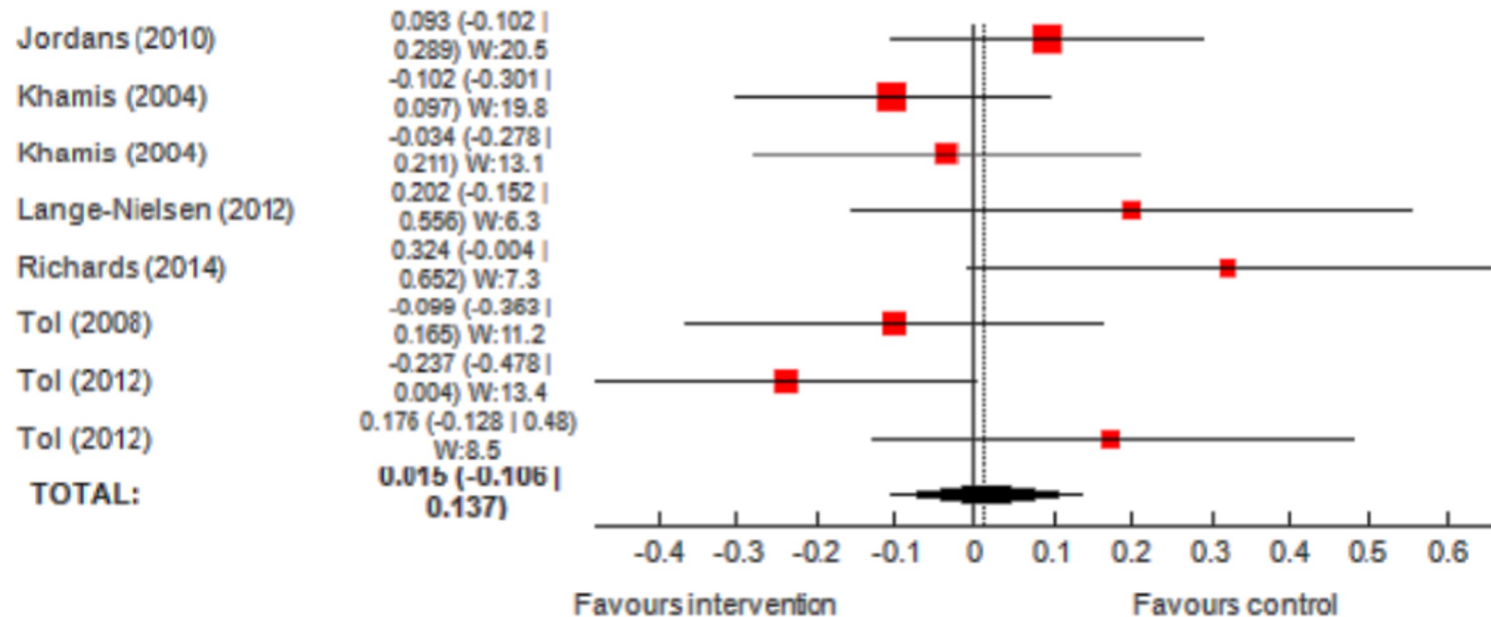
The figure shows the forest plot for the meta-analysis of the impact of MHPSS on PTSD and shows that when the data from the 21 studies were pooled, MHPSS programs had a positive but small effect on PTSD.

Case study: Impact of mental health and psychosocial support interventions on people affected by humanitarian emergencies (2)

Measure: Continuous: d (Hedges g)

Heterogeneity: $Q = 12.5$; $df = 7$; $p = 0.0851$; $I^2 = 44\%$; $\tau^2 = 0.0131$

Random effects model: 0.02 (-0.11, 0.14)



This forest plot shows the meta-analysis of the impact of MHPSS on anxiety. The cumulative estimate suggested that the MHPSS programs have no effect on anxiety.

Case study: *Impact of mental health and psychosocial support interventions on people affected by humanitarian emergencies (3)*

The qualitative evidence synthesis identified five themes that can influence the effectiveness of MHPSS interventions. This information might help implement future interventions and highlight areas of greater emphasis.

These were:

1. Community engagement.
2. Sufficient numbers of trained MHPSS providers.
3. Experience of program activities.
4. Benefits of group-based programs.
5. Building trust and supporting relationships.

Narrative systematic reviews

Narrative systematic reviews provide a narrative/descriptive account of what the evidence tells us, using words and text. They

- 'Tell a story' of the evidence by undertaking descriptive and inferential statistics on each included study individually, not cumulatively.
- Help develop a theory of how the intervention works, why and for whom.
- Provide a preliminary synthesis of the findings of the included studies.
- Provide the 'signal' and 'noise' of evidence.

Qualitative evidence synthesis

Qualitative evidence syntheses use qualitative and ethnographic evidence. They

- Use evidence gathered through interviews, focus groups, observational studies, documentary analysis and case studies.
- Seek common ***themes, concepts and principles*** across different studies, rather than seeking statistical generalizations.
- Pay detailed attention to context/contextual specificity and stakeholder views.
- Help to identify barriers and facilitators to successful outcomes.
- Help users understand why, how and under what conditions an intervention will be successful.

Health elements - the current state of evidence (1)

Narrative and qualitative synthesis are common type of systematic reviews in Health EDRM, because of the heterogeneity of the study methodologies and the small sample sizes.

It is often difficult to compare, contrast and combine studies even within the same topic, because of different definitions, measuring tools, and timeframes.

Humanitarian settings that involve violence can be sensitive in nature, which creates barriers to research and a lack of high-quality data.



Health elements - the current state of evidence (2)

A scoping search of systematic reviews published after 2005 using the keywords 'health', 'disaster', and 'emergencies' found that:

- Most reviews were in English and completed in the Global North.
- Disasters with wide media attention dominated the available research.
- Reviews on natural hazards focused on physical health outcomes, while human-induced or complex humanitarian emergencies focused on mental health and wellbeing.

Barriers to conducting systematic reviews

Lack of high-quality studies, due to:

- Absence of transparent methodology, poor definitions and terminology, and lack of rigorous criteria.

Lack of consistent reporting:

- Meta-analysis is difficult when there are inconsistencies in how outcomes are measured and reported.

Lack of field research:

- Research is often not a priority; to do so would require sending dedicated research personnel to the site well before a disaster.

Future of systematic reviews for Health EDRM



More efficient methods of data collection must be identified and used.

Data collection tools need to be standardized.

A consensus is required on how often a review should be updated.

Research should be tailored to the needs of the affected communities.

Conclusions

- The increase in the number and impact of humanitarian crises means that research and interventions must be evidence-based, standardized, efficient and effective.
- Systematic reviews can help with this by assessing the strength, relevance and utility of available research.
- Systematic reviews are necessary for identifying which research and evidence can be applied to specific disaster scenarios.

Key messages (1)

- Many challenges hamper the generation of evidence and its accurate and consistent application in Health EDRM.
- Practitioners who are aware of evidence limitations may not have the necessary training or skills to design, plan, implement and evaluate their programs. They may also lack the training to discern programmatic and practice-based problems that could be turned into research questions for new studies (Chapter 3.5).
- People in low-income, resource-poor countries and settings may disproportionately suffer from the 'double jeopardy' of lacking the critical mass of trained researchers and practitioners, coupled with limited or non-existent opportunities for interaction between researchers and practitioners in Health EDRM.

Key messages (2)

- Strong leadership will be required from global and regional entities, including donors, with a strong stake in Health EDRM to bring together the main groups required for the generation and use of evidence: the Health EDRM practice community to identify needs and problems requiring research; the academic sector to conduct high-quality research; agencies and donors to bridge the science into practice and application gaps.
- Systematic reviews provide the means to bring together existing evidence to inform these processes and to place the findings of new studies in the context of the totality of the evidence.
- Systematic reviews allow decision-makers in Health EDRM to make use of the best available evidence.

Further readings (1)

Bradt DA. Evidence-based decision-making in humanitarian assistance. Humanitarian Practice Network (HPN), ODI. 2009.

An overview of evidence-based decision-making in technical sectors of humanitarian assistance.

House of Commons Science and Technology Committee. Scientific evidence and advice in Emergencies. 2011. <https://publications.parliament.uk/pa/cm201011/cmselect/cmsctech/498/498.pdf>

This report reviews and critiques the UK's frameworks for risk assessment and emergency response.

Carbone EG, Thomas EV. Science as the Basis of Public Health Emergency Preparedness and Response Practice: The Slow but Crucial Evolution. American Journal of Public Health. 2018; 108(S5): s383-6.

This article outlines the recent development of evidence-based public health emergency preparedness and response in the USA.

Further readings (2)

European Center for Disease Prevention and Control (ECDC). The use of evidence in decision-making during public health emergencies. 2019.

https://www.ecdc.europa.eu/sites/default/files/documents/use-of-evidence-in-decision-making-during-public-health-emergencies_o.pdf

This technical report presents the findings from an ECDC expert workshop to identify and address the links between scientific evidence and decision-making in public health emergencies.

Harden A, et al. Cochrane Qualitative and Implementation Methods Group guidance series—paper 5: methods for integrating qualitative and implementation evidence within intervention effectiveness reviews. *Journal of Clinical Epidemiology*. 2018; 97: 70-8.

This article provides guidance on integrating qualitative and implementation evidence when preparing a systematic review of the effects of Health EDRM interventions.

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<https://www.who.int/hac/techguidance/preparedness/healthemergency-and-disaster-risk-management-framework-eng.pdf>
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- The association between natural disasters and violence: A systematic review of the literature and a call for more epidemiological studies.** Journal of Research in Medical Sciences. 2013: 18(12): 1103–7.

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