



EFFECTS OF VARIOUS DISASTER MANAGEMENT APPROACHES: AN EVIDENCE SUMMARY

CONTEXTUALISATION OF REVIEW FINDINGS FOR SOUTH ASIA AND
BANGLADESH [JANUARY 2017]

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LIST OF ABBREVIATIONS

CBT	: Cognitive Behavioral Therapy
CDMP	: Comprehensive Disaster Management Programme
CPP	: Cyclone Preparedness Programme
DFID	: Department For International Development
DM	: Disaster Management
DMA	: Disaster Management Act
EM-DAT	: Emergency Events Database
EPR	: Emergency Response Preparedness
GOB	: Government Of Bangladesh
HIC	: High Income Countries
IPCC	: Intergovernmental Panel On Climate Change
LMIC	: Low And Middle-Income Countries
MCI	: Mass Casualty Incident
NDM	: National Disaster Management
NDMA	: National Disaster Management Authority
NDMP	: National Disaster Management Plan
PTSD	: Post-Traumatic Stress Disorder
SAARC	: South Asia Association For Regional Cooperation
SARH	: South Asia Research Hub
SDGS	: Sustainable Development Goals
SR	: Systematic Review
UCTS	: Unconditional Cash Transfers
UNESCAP	: United Nations Economic And Social Commission For Asian And The Pacific
UNISDR	: United Nations International Strategy For Disaster Reduction
WHO	: World Health Organization

EXECUTIVE SUMMARY

South Asia, owing to its diverse geo-climatic characteristics, is prone to a variety of natural hazards. Between 1990 and 2015, the region faced a total of 1,792 natural disasters, which resulted in the loss of around one million lives, affected more than 2.6 billion people and incurred damages of approximately USD 165 billion (EM-DAT, 2016). The disaster policy planning in the developing countries, especially in the South and South East-Asian countries, seems to be developing under the influence of past significant disaster events.

The literature on disaster management is varied and extensive. However, fewer studies evaluate the effectiveness of the various disaster management approaches for long-term outcomes. With this background, this Evidence Summary was prepared on 'Effects of Various Disaster Management Approaches' to review and summarise review-level evidence on the effectiveness of disaster management approaches in LMICs.

ABOUT THIS SUMMARY

The concept of contextualisation is crucial to draw and utilise the effective evidence from other countries or a given context to make informed decision making and implement programs and policies. The purpose of this document is to contextualise findings coming from the Evidence Summary on Effects of Various Disaster Management Approaches for South Asia and Bangladesh. It will provide policy-makers with a reliable basis for informed decision-making regarding the applicability and transferability of different disaster management interventions to South Asian settings, with particular emphasis on Bangladesh. It highlights that even though evidence reviewed offers some insights, there has been a paucity of rigorous research on effectiveness of disaster management approaches for South Asia which limits the strength of the contextualisation.

APPROACH

The contextualization followed an approach of focusing on similarities and dissimilarities amongst population, region, policies and practices in the South Asian countries. The team focussed on extracting existing disaster management strategies and programmes that were implemented in the countries at the time of a disaster and how various governments coped up with the aftermath. The 4Rs (risk mitigation, response readiness, response execution, and recovery) were taken into account while setting the context for further recommendations. In this evidence summary, we have considered only those systematic reviews (SRs) that reported conclusive evidence on effectiveness of disaster management interventions for various outcomes.

SUMMARY OF CONTEXTUALISATION

Many countries in South Asia have spent millions of dollars improving their response and readiness towards disasters. Consequently, an assessment of the efficacy and effectiveness of the response to disasters is required to ensure that resources are used in the most efficient and effective way. While trying to identify the approaches that can be replicable in other countries, it was noted that not many SRs had a clear focus on low and middle income countries (LMICs), and none on the South Asian region. Most of the reviews had mixed geographical focus or no geographical focus, thus it was

difficult to contextualise the findings for South Asia and Bangladesh in particular. Therefore, few of the interventions revealed in the SRs which have been a success in the region or in a country similar to South Asia in terms of population, geographical location, culture, livelihood pattern, food habits and demographic conditions (such as Sri Lanka, Thailand, China etc.) have been identified and considered for contextualisation. While the evidence reviewed offers some insights, the paucity of rigorous research on effectiveness of disaster management approaches for South Asia limits the strength of the conclusions. The findings from the SRs considered in evidence summary which can be replicated in South Asian countries are discussed below:

- **Medical Interventions and Rehabilitation:**

- Psychological rehabilitation interventions will be especially helpful and effective in resource-poor regions which have few trained mental health professionals.
- Given the availability of limited health infrastructure in South Asian countries, a community-based approach can be incorporated as part of a comprehensive disaster health management plan.
- In order to increase acceptance from the community, there is a need to gear the intervention strategies with incorporating cultural norms and traditional beliefs.

- **Mechanisms and Models of Coordination:**

- Presently, coordination among the organizations and agencies providing medical and health assistance is very low in the South Asian countries leading to inefficiencies, inequity and duplication in the services to the targeted population.
- There is need to improve coordination among organizations as it was found out that coordination efforts increased the availability of drugs and manpower and other health response in Bangladesh post 1991 cyclone (Akl et al., 2015).

- **Cash Based Interventions**

- Studies found that unconditional cash transfers led to greater improvements in dietary diversity and quality than food transfers.
- It has been identified that local finance institutions can play an important role in implementing and creating awareness about importance of cash based interventions.
- These institutions can be utilized wisely and meticulously by South Asian countries for implementing this approach as it does not require creation of additional infrastructure.

- **Capacity, Education and Training:**

- Children form one of the most vulnerable categories of population at risk with respect to their capacity to prepare for, or respond to, the effects of a disaster.
- To lessen the vulnerability of children, emergency management agencies, schools and non-governmental organizations have increasingly invested in the disaster education program for children. It produces benefits to children as well as the wider community by enhancing their knowledge base regarding disaster and improved risk perceptions among children.
- Disaster education, in either addition to a stand-alone curriculum or as an extra-curricular program, can be replicated in the South Asian countries as there is an increasing focus on primary education in these countries.

As most of the reviews included for contextualization lacked geographical focus, country level disaggregation of the findings was not possible in the evidence summary. However, as the objective

was to contextualize the findings for South Asia in general and Bangladesh in particular, an attempt has been made to draw from interventions which have been carried out in settings similar to South Asia in terms of population, geographical location, infrastructure, available resources, among others. Given the major challenges faced by Bangladesh for disaster management, the main interventions which can be useful for the country in disaster management will be use of community based approaches both for medical and communication intervention, promoting and strengthening school based disaster education, coordination among agencies and cash based interventions through local financial institutions.

LIMITATIONS

The scope of the majority of SRs was not specific to any one of the natural hazards rather included a broad category of natural hazards. Further, more than half of the reviews did not have any geographical focus and included both LMICs and high income countries (HICs). No review specifically laid focus on the South Asian region or any South Asian country in particular. A few SRs did, however, include South Asian countries in their synthesis. Medical interventions (mainly on psychological aid) were the most studied disaster management intervention, followed by capacity interventions. There is a paucity of studies which systematically analyze various non-medical interventions in a natural disaster setting. With respect to different stages of disaster management, most reviews focused on interventions for response execution stage. Most of these SRs did not carry out a quantitative analysis or meta-analysis of studies included in them. A large number of SRs did not conclude on effectiveness of an intervention due to insufficient or inconclusive evidence.

CONCLUSION

In the studies reviewed, limited evidence is reported, which is skewed towards administering medical interventions pre and post disaster. Meta-analytic results of the existing literature also indicate that disaster interventions for children and adolescents are efficacious. Also, the role of technologies has been discussed by few SRs, however their effectiveness has not been studied explicitly which could have an implication for successful implementation of an intervention. Future research would benefit from including evaluations of cost-effectiveness and ease of dissemination. Research studies are needed in this field to better inform decision-making of different stakeholders working in providing and financing services in humanitarian crisis. The evaluation research would benefit from better collaboration between academic researchers and organizations working in the field.

1. BACKGROUND

Natural hazards and their associated risks have continued to occur and are perceived to increase further in complexity, magnitude, and frequency. With increasing world population, occurrence of natural disaster has increased annually by 5% along with 4% increase in the number of people affected by these disasters. The destruction caused by natural hazards, can lead to large-scale losses, especially in areas with high population and economic investment concentration (Diley et al., 2005). South Asia, owing to its diverse geo-climatic characteristics, is prone to a variety of natural hazards. Between 1990 and 2015, the region faced a total of 1,792 natural disasters which resulted in loss of around 1 million lives, affected more than 2.6 billion people and incurred a damage of approximately USD 165 billion (EM-DAT, 2016). These figures are, by far, the highest among the recorded disasters in various geographic regions of the world. In 2015 alone, South Asia was the most disaster prone region in the world recording 52 disasters and 14,647 deaths that accounted for a staggering 64 per cent of total global fatalities (UNESCAP, 2015).

In research domain, Disaster Management (DM) is a relatively new field and has received much attention post 1990s, essentially following a series of natural disasters that are still continuing. The disaster policy planning in the developing countries, especially in the South and South East-Asian countries, seems to be developing under the influence of past significant disaster events. The literature on disaster management is varied and extensive. However, fewer studies evaluate the effectiveness of the various disaster management approaches for long-term outcomes. In light of the importance and advantages of evidence based decisions, evidence summaries can be beneficial in broadening the spectrum of evidence use, incorporating various contexts and in avoiding duplication of effort by drawing results from existing studies and reviews which cater to disaster management approaches.

1.1 CONCEPT OF CONTEXTUALIZATION

The concept of contextualisation is crucial to draw and utilise the effective evidence from other countries or a given context to make informed decision making and implement programs and policies. The crucial assumption underlying the process of contextualisation is that an intervention that has been successful in one setting may turn out to be effective somewhere else taking into considerations the contextual factors.

Before drawing lessons from other countries, or contextualising evidence from one setting into another, it is important to differentiate between certain often repeated terms – applicability, feasibility, transferability and generalizability. Wang et al. (2005) make a clear distinction between these concepts as described in the table below.

Table 1.1 Applicability and transferability

Applicability or feasibility	Transferability or generalizability
Whether the intervention process could be implemented in the local setting	If the intervention were to be implemented, would the effectiveness of the intervention be similar to the level detected in study setting?
Focus of appraisal on the process of intervention	Focus of appraisal on outcome of the intervention

Source: Adapted from Wang et al. (2005)

Three kinds of information are necessary for assessing transferability of an intervention – (i) information on the intervention itself (ii) evaluation context, and (c) interactions between the intervention and its context (Rychetnik et al., 2002). Whether an intervention is successful in one country or a specific disaster setting is capable of being replicated or transferred in another country or disaster setting can be determined by (i) understanding the local contextual factors, and (ii) attributes of applicability or transferability in the primary setting. Attributes of applicability are specific to the intervention and context of the primary review or evaluation (Wang et al., 2005). These attributes may include political environment, characteristics of target population, capacity of key actors, organizational structures, social and cultural adaptability, and scale of the problem.

However, availability of detailed contextual information is very rare, especially in case of SR, which was the focus of this evidence summary. A SR, by definition, is a summary of ‘results of available carefully designed studies’. (Cochrane, 2011) Being a review, and not a primary evaluation or a study, SRs may not describe the attributes of primary intervention or study. This important piece of information is currently missing for evidence based assessment of applicability and transferability of interventions in the context of South Asia. Most of the reviews included in the evidence summary do not describe contextual factors (such as literacy, income, cultural values and access to media etc.) or compare the interventions and outcomes on these parameters. Any such assessment must be guided by clear consideration of the attributes mentioned above. While the evidence reviewed offers some insights, the paucity of rigorous research on effectiveness of disaster management approaches for South Asia limits the strength of the contextualisation.

1.2 SOUTH ASIA: BACKGROUND

The South Asia region, which is home to more than 1.7 billion people, has around 400 million people living below the poverty line. This region is highly vulnerable to natural disasters and has experienced almost all kinds of natural disasters like earthquakes, floods, cyclones, landslides, droughts etc. repeatedly leading to high number of fatalities and economic losses. It is primarily due to a range of geophysical, socio-economic and developmental conditions which include long coastlines; a highly variable monsoon system; high tectonic activity; poverty; income inequality; high population densities associated with rapid urbanisation; unplanned and haphazard urban development. There is also a lack of appropriate disaster risk reduction mechanisms and

institutional/regulatory frameworks in the countries of the region (UNISDR, 2005; WB, 2009; Prabhakar et al., 2015).

Not only do there exist socioeconomic, cultural and political disparities across countries but within countries as well in the South Asian region. However, for the purpose of this contextualization, we focus on the contextual similarities existing across the South Asian region. Also, those interventions in the SRs which have been a success in the region or in a country similar to South Asia in terms of population, geographical location, culture, livelihood pattern, food habits and demographic conditions (such as Sri Lanka, Thailand, China etc.) have been considered. On mapping the occurrence of events in the last century, it can be seen that almost all the six South Asian countries¹ identified in this project have had six or more of the following natural hazards: drought, earthquake, cold wave, heat wave, flood, landslide, tropical cyclone, convective storm, and forest fires. A country and event wise break up is given in table 1.2.

Table 1.2: Country wise list of occurrence of events in South Asia²

S.No	Disaster	Sub-type	No of Events (1900-2016)					
			Afghanistan	Bangladesh	India	Myanmar	Nepal	Pakistan
1	Drought		6	7	14	--	6	1
2	Earthquake		33	6	31	8	8	30
3	Cold Wave		7	18	29	--	6	3
4	Heat Wave		--	2	25	--	1	14
5	Flood	Flash	19	11	24	3	5	16
6	Flood	Riverine	45	44	145	15	25	42
7	Flood	Coastal	--	2	4	--	--	--
8	Flood	--	22	--	136	7	22	--
9	Landslide	Avalanche	14	--	8	--	5	12
10	Landslide	Landslide	6	4	38	7	21	10
11	Tropical Cyclone		--	87	104	17	--	7
12	Convective Storm		3	35	37	1	3	10
13	Forest Fire		--	--	2	2	2	--

Source: EM-DAT, 2016

The Intergovernmental Panel on Climate Change (IPCC) had predicted that due to climate change heavy precipitation events will increase substantially in the South Asia region (IPCC, 2012). These heavy precipitation events and projected rising sea levels will greatly impact the coastal areas, especially the heavily populated mega delta regions around Bangladesh, as they will be at greatest

¹For the purposes of this study and the document, South Asian region covers Afghanistan, Bangladesh, India, Nepal, Pakistan and Myanmar.

² EM-DAT: The international disasters database. Retrieved from <http://emdat.be/guidelines>. In the majority of cases, a disaster will only be entered into EM-DAT if at least two sources report the disaster's occurrence in terms of deaths and/or affected persons. Further, at least one of the following criteria must be fulfilled in order for an event to be entered into the database: (i) Deaths: 10 or more people deaths, (ii) Affected: 100 or more people affected / injured / homeless.

risk due to increased flooding from the sea or from the rivers (IPCC, 2007). Dhaka is in the top thirteen of the most populated cities in the world that are coastal trading hubs and is vital in global supply chains. It is also exposed to flooding and storms, and it is estimated that exposure of its economic assets is expected to increase from US\$ 8 billion to US\$ 544 billion between 2005 and 2070 (IPCC, 2012).

The adoption of proactive risk reduction approach can be seen in various South Asia countries. Bangladesh had realized the importance of disaster management strategies for protecting the existing development the country, including infrastructure. To achieve this objective, the Government of Bangladesh enacted the Disaster Management Act (DMA) in 2012. India, in 2005, had adopted The Disaster Management Act which provides the legal and institutional framework for disaster management in the country at the national, state and district levels. Recently in 2016, India released its National Disaster Management Plan (NDMP). Similarly, the earthquakes in 2005 in Northern Pakistan unfolded Pakistan's vulnerability to disaster risks and pushed the government to shift the focus from a response-based approach to a proactive approach. This shift in the formulation of National Disaster Management Ordinance (2006) was then replaced by the National Disaster Management (NDM) Act in 2010. Lastly, Nepal had adopted the National Policy Framework for Tenth Plan (2003–2008) and identified disaster management as the core need of sustainable and broad-based economic growth.

The above mentioned plans and programmes represent only a few of the developments that national governments of these countries are progressing. These developments highlight the shift in focus from post-disaster relief and rehabilitation to holistic management of disasters covering all phases of disasters. While countries have their own disaster management frameworks and South Asian Association for Regional Cooperation has also contributed to the disaster management practices, there remains a lot to achieve in terms of reducing the risks for the large population that resides in this region. Numerous studies have been undertaken to understand the various approaches for managing disasters and their effectiveness. It is difficult to identify a single approach to disaster risk reduction in such. A regional response to natural disasters, whether in the shape of the SAARC Framework on Disaster Management or other bilateral and trilateral institutional arrangements that nations may think of, is extremely important for disaster risk reduction. Furthermore, collaboration and cooperation among different stakeholders, including UN agencies, regional and international organisations, civil sectors, private sectors, media and academics is crucial for effective disaster risk reduction to improve the resilience of communities.

1.3 BANGLADESH

In South Asia, Bangladesh holds the record of having the highest population density and it also one of the ten most densely populated countries in the world. As the topography of the country is mostly low and flat, its geographical location makes it more of a disaster-prone country. Two-thirds of Bangladesh is less than five meters above sea level and is susceptible to a lot of river and rainwater flooding and, in low lying coastal areas, to tidal flooding during storms. The country is vulnerable to a large variety of natural disasters such as cyclones and tidal surges, floods, tornadoes, landslides, river erosion and drought. These disasters have the tendency to cause immense damage to life and property. Some of the human induced, biological and technical hazards the country faces include

river traffic accidents, epidemics, fires, building collapse, gas field explosion, political conflict and terrorist attacks, among others (Rahman, H. (n.d.); WHO (2012)).

In parts of Bay of Bengal, the continental shelf is shallow and extends for about 20-25 km. Also, the coastline in the eastern part is conical and funnel-like in shape. As a result, the storm surges in this region are comparatively strong. Bangladesh has been hit by seven of the deadliest ten cyclones of the twentieth century. Over the last 55 years, country has witnessed six serious floods with the inundation of 35-70% land area causing huge loss to human lives, livestock, crops and other properties. In the context of cyclone, *Sidr* like disaster, the destruction usually becomes catastrophic. The early warning to the livestock farmers in accordance with other people is the most important aspect of saving life and properties. The Centre for Research on Epidemiology of Disasters estimates that from 1979 to 2008 over 191,415 people were killed and about 229 million directly affected by natural disasters in Bangladesh. (Government of Bangladesh, 2013)

Post-1990s the Government of Bangladesh (GoB) realized the need to shift from traditional reactive approach to a more proactive approach that included “hazard identification and mitigation, community preparedness and integrated response efforts” addressing natural disasters. The result of this change in approach has been reflected through adoption of Comprehensive Disaster Management Programme (CDMP) in 2003. It has two goals: to facilitate a paradigm shift in disaster management in Bangladesh away from relief and rehabilitation towards risk reduction, and to foster a holistic, multi-hazard approach to reducing the nation’s risks and vulnerabilities to human-induced and natural hazards. The Cyclone Preparedness Programme (CPP) is engaged in massive public awareness and capacity development activities for pre-disaster preparedness at family and community levels. Even though efforts have been made to put in place a detailed system on Disaster Management (by CDMP) with Disaster Management Committees at different levels but they suffer due to insufficient fund to carry out their responsibility efficiently. (Government of Bangladesh, 2013)

In case of disaster management, availability of health infrastructure plays a crucial role. Bangladesh has an extensive health infrastructure in the public and private sectors, though it faces the challenge of lack of human and other resources in health care, such as drugs, instruments and supplies (WHO, 2011). There is need for more investment of public funds, stronger local accountability to improve the quality of public services, increasing for profit private health sector and lack of its regulation are some of the major health system challenges (WHO, 2011).

The need to address these challenges becomes important as it is forecasted that climate change will increase the frequency and severity of many of Bangladesh’s natural hazards. Climate change is predicted to cause an inundation of 10% of the land mass due to rising sea levels. This will further lead to problems such as loss of agricultural land, homes and eventually result in migration. Factors such as inadequate building practices, very high urban growth and overcrowding lead to an increased vulnerability of the population to these disasters.

1.4 PURPOSE OF THE DOCUMENT

The South Asia Research Hub (SARH), Department for International Development (DfID), has launched a Systematic Review (SR) Programme for South Asia. The programme aims at providing DFID country offices, policy-makers and development practitioners in South Asia with a robust

assessment of the evidence base for their policies and programmes. To this effect, inter alia, it commissioned preparation of Evidence Summary on Effects of Various Disaster Management Approaches. The aim of the Evidence Summary was to review and summarise review-level evidence on the effectiveness of disaster management approaches in LMICs.

- The purpose of this document is to contextualise findings coming from the Evidence Summary on Effects of Various Disaster Management Approaches for South Asia and Bangladesh.
- It will provide policy-makers with a reliable basis for informed decision-making regarding the applicability and transferability of different disaster management interventions to South Asian settings, with particular emphasis on Bangladesh.
- It aims to highlight that even though evidence reviewed offers some insights, there has been a paucity of rigorous research on effectiveness of disaster management approaches for South Asia which limits the strength of the contextualisation.

For the purposes of this study and the document, South Asian region covers Afghanistan, Bangladesh, India, Nepal, Pakistan and Myanmar.

2. METHODS

2.1 PROCESS OF CONTEXTUALISATION

For the process of contextualization for the South Asian region, only those SRs that reported conclusive evidence on effectiveness of disaster management interventions on various outcomes were considered. Most of the interventions have their genesis in the developed countries, with its proven efficacy to a certain population. There has been a paucity of SRs on disaster management with a clear focus on LMICs or even South Asian region. Most of the reviews had mixed geographical focus, including countries from HIC, LMIC including South Asia. However, due to mixed or no geographical focus of a large number of systematic reviews, it is difficult to generalize the evidence. Thus, few of the interventions revealed in the SRs which have been a success in the region or in a country similar to South Asia in terms of population, geographical location, culture, livelihood pattern, food habits and demographic conditions (such as Sri Lanka, Thailand, China etc.) were identified and considered for contextualization. An attempt was made to identify and evaluate the contextual factors for South Asia region, which are described in the SRs included.

However, efficacy of these interventions in developing countries depends on whether interventions are adapted according to local, cultural and religious diversity of the population. It has been considered during contextualization whether the intervention model incorporate, as far as possible, indigenous concepts, practices and wisdom that have been adopted for decades by the local tribes and communities in their approach while responding to any disaster. It is important that these populations do not view the intervention as an imported approach, but as a proven technique that requires cultural adaptations such that better results can be obtained.

This document has the added value of integrating suggestions, comments and feedback provided by field experts during consultative meetings as well as incorporating data from external relevant literature on the status of disaster management in South Asia and Bangladesh.

2.2 APPROACH OF CONTEXTUALISATION

The contextualization followed an approach of focusing on similarities and dissimilarities amongst population, region, policies and practices in the South Asian countries. The team focused on extracting existing disaster management strategies and programmes that were implemented in the countries at the time of a disaster and how various governments coped up with the aftermath. The 4Rs were taken into account while setting the context for further recommendations. Lastly, the whole process pursued the following questions. These were also highlighted in the research protocol and the evidence summary document –

- 1) Which approaches will be relevant for the South Asian region (covering countries – Afghanistan, Bangladesh, India, Nepal, Pakistan and Myanmar)?
- 2) What are the factors that contributed to the success (or lack of success) of an approach in managing a particular disaster/s?

- 3) What are the different actors (public, private, volunteer, international) involved in different approaches which are effective in managing the disasters?
- 4) What characteristics are embedded in approaches that are found to be replicable in other countries/regions?
- 5) Which phase of disaster management has been relatively more investigated and efficient in the South Asian Region?

3. CONTEXTUALISATION RESULTS

3.1 POSSIBLE CONTEXTUAL FACTORS THAT MIGHT IMPACT EFFECTIVENESS

There are several contextual factors that could have an impact on effectiveness of a disaster management intervention in a specific country or regional setting. There are certain social, political, and economic factors, which are indispensable for the effectiveness of disaster management approaches. These include (i) nature and scale of disaster, including the stage of disaster, (ii) frequency of disasters in the region or country, (iii) impact of a disaster across areas and population, (iv) characteristics of affected and vulnerable population including their levels of literacy, income, prior experience of disaster, resilience, cultural practices, adaptability etc. (v) capacity of institutions and communities to use an intervention (including skills, infrastructure, resources (human and financial), social and political factors etc.).

Apart from contextual factors, it is crucial to study the factors that act as barriers or facilitators in the success or failure of disaster management intervention. One of the research questions that the evidence summary sought to answer was to identify the factors that contributed to the success (or lack thereof) of an approach (intervention) in managing a particular disaster/s as reported in the SRs. The SRs included in the evidence summary had various objectives. However, only eight reviews included factors influencing the performance of an intervention within their objectives. Reviews with other objectives also discussed some of the barriers, facilitators and challenges in the course of their discussion. The main factors that appear to contribute to success or lack of effectiveness of a disaster management intervention are discussed below. These are categorised into (i) Facilitators and (ii) Barriers and challenges.

Factors that had a positive impact on effectiveness of an intervention or facilitating factors included community engagement, coordination and collaboration, communication and information, sound planning and decision making, availability of resources and technical capacity, use of new technologies, greater ownership from the host countries/ communities, and population characteristics.

Factors that posed a challenge to effectiveness of an intervention included ineffective communication, lack of coordination, insufficient organisational capacity, delays and time pressures, lack of plans and legislation, and a lack of understanding of local context.

These factors, as discussed in the SRs, have been elaborated upon in the evidence summary.

3.2 PRESENCE OF CONTEXTUAL INFORMATION IN THE SYSTEMATIC REVIEWS

GEOGRAPHICAL CONTEXT

To contextualize for South Asia, one of the criteria for selection of the SRs is to identify the geographical focus. Of all the 47 reviews included in the evidence summary, 30 did not have any geographical focus and included LMICs as well as HICs. Only 10 reviews had a clear focus on LMICs and seven reviews had a focus on HICs.

Of the reviews, which reported conclusive evidence (positive or negative) of effectiveness of a disaster management intervention, 3 had a focus on LMICs, 10 had no geographical focus (included HIC as well as LMIC), and none of the reviews had focus on South Asian countries specifically. Number of LMIC studies in SR on natural disasters was not clearly reported in five SRs. The remaining SRs included natural hazard management studies from LMICs from different regions of the world. The majority of SR cover the following LMICs countries: China, India, Sri Lanka, Thailand, Turkey, Pakistan, Bangladesh, Haiti and Iran. Table 1.3 gives SR wise information in this regard.

HAZARD CONTEXT – NATURE AND TYPE OF HAZARD

Several SRs studied disaster management interventions for both types of hazards – natural and man-made. Some SRs provided disaggregated information about the number of studies evaluating interventions for natural phenomena under LMIC settings. Of the 47 included reviews, most SRs lay focus on earthquakes, floods, hurricanes, tsunamis and heat waves.

Of the SRs that reported conclusive evidence of effectiveness, information about the disaster context for LMICs was clearly reported in eight SRs. These included tsunami, earthquakes, cyclone, flood, and storm. Table 1.3 gives SR wise description of contextual information.

Table 3.1 Contextual information in SRs with conclusive evidence of effectiveness

SR Citation	Intervention	Outcome	Country context	LMIC studies on natural hazards	Other relevant contextual information
Fu et al. (2015)	School based post disaster mental health and psychological interventions on youth	Improved mental and psychological health	No geographical focus	4 [Armenia (earthquake) (1); China (earthquake) (1); Turkey (earthquake) (1); Sri Lanka (tsunami) (1)]	SR reviewed universal psychological interventions for school children in disaster settings
Griffiths & Ford (2013)	Antiretroviral care to displaced populations in humanitarian settings	Health outcomes (mortality, follow up, patient retention)	No geographical focus	3 Thailand (Flooding) (2); Haiti (Earthquake) (1)	Importance of collaborative activities between patients, healthcare providers and government was discussed

SR Citation	Intervention	Outcome	Country context	LMIC studies on natural hazards	Other relevant contextual information
Khan et al. (2015)	Psychological care program, Mental health program; social activity program; rehabilitation programmes	Functional restoration, improved symptoms/ impairments, participation), health care processes, safety.	LMIC	10 [China (Earthquake) (8); India (Tsunami)(1); Sri Lanka (Tsunami) (1)]	Medical rehabilitation interventions for natural disaster survivors in LMICs
Lipinski et al. (2016)	Psychosocial interventions (For example, psychosocial care; mixed psycho educational, Cognitive Behavioral Therapy (CBT) etc.)	Reduction in PTSD symptoms; Improvement in psychological wellbeing	LMIC	10 [India (4), Sri Lanka(3), Thailand (3)]	Interventions for tsunami affected population in LMICs. SR discussed the importance of local cultural context in effectiveness of interventions
Lopes et al. (2014)	Psychological aid	Psychological wellbeing	No geographical focus	Not clear	SR studied psychological aid interventions in victims of earthquakes and hurricane across age groups. No geographical context was reported or discussed

SR Citation	Intervention	Outcome	Country context	LMIC studies on natural hazards	Other relevant contextual information
Newman et al. (2014)	Psychological aid - CBT, Psychological First Aid, and Spiritual-Hypnosis Assisted Treatment, etc.	Health outcomes - Psychological well being	No geographical focus	Not clear	Interventions for children and adolescent survivors of disasters (both natural and man made)
Codreanu et al. (2014)	Disaster education intervention. e.g., Disaster risk reduction educational programme, hazard education programmes	Knowledge outcomes - Enhancement and retention of disaster related knowledge	No geographical focus	6 [Turkey (Earthquake) (1); Tajikistan (Earthquake) (1); Nepal (Earthquake) (1); Iran (Flood) (1); India (All) (1); South Africa (All) (1)]	The SR included education programmes for children as well as adults. Contexts of education were (1) school education (from teachers and proactive with teachers and students); (2) self education; (3) community education; and (4) family education
Hsu et al. (2004)	Disaster drills, technology-based interventions and tabletop exercises in training hospital staff to respond to an MCI	Improved capacity to manage disaster risk & post disaster impact	No geographical focus	Not clear	Training of staff in hospital settings

SR Citation	Intervention	Outcome	Country context	LMIC studies on natural hazards	Other relevant contextual information
Johnson et al. (2014)	Disaster education programmes for children.	Knowledge outcomes - knowledge of hazard risks, protective actions, mitigation actions, recovery actions and preparedness	No geographical focus	Not clear	Training programmes targeted towards helping children and teenagers respond to disasters
Doocy & Tappis (2016)	Unconditional Cash Transfers; Conditional Cash Transfers; Vouchers	Sector specific outcomes - food security	LMIC	43 [Bangladesh (1); Belize (1); Haiti (4); Indonesia (10); Mozambique (1); Philippines (1); Somalia (3); Niger (1); Ethiopia (3); Pakistan (4); Zimbabwe (1); Swaziland(1); Zambia (1); Kenya (3), Sri Lanka (2); Sudan (1); Uganda (1); Vietnam (3); Zambia (1)]	SR identified contextual factors that impacted the effectiveness of an intervention. These included, resource availability, technical capacity, use of new technologies, resilience of target population etc.

SR Citation	Intervention	Outcome	Country context	LMIC studies on natural hazards	Other relevant contextual information
Akl et al. (2015)	Mechanisms and models of coordination between organizations, agencies and bodies providing or financing health services.	Health outcomes of the affected population, Access of the affected population to health services;	No geographical focus	3 [Turkey (Earthquake) (1) Mozambique (Flood) (1); Bangladesh (Cyclone) (1)]	Intervention studied specifically in the context of providing and financing health services
Bradley et al. (2014)	Risk Communication – face to face, television, radio, Internet or telephone communication, or any other method of risk communication	Behaviour change outcomes Knowledge outcomes	No geographical focus	5 [Iran (Flood)(1); India (Cyclone (1); Mauritius (Tsunami) (1); Haiti (storm) (1); St. Vincent and the Grenadines (All) (1)]	Factors influencing the success of an intervention were discussed in a few settings
Hopwood & Schutte (2016)	Media exposure to disasters	Health outcomes - Psychological health	No geographical focus	Not clear	None significant

*Findings from SRs which reported conclusive evidence on effectiveness of interventions

3.3 APPLICABILITY AND TRANSFERABILITY

In this evidence summary, we have considered only those SRs that reported conclusive evidence on effectiveness of disaster management interventions for various outcomes. In this section, we discuss the applicability and transferability of these interventions in South Asian region.

MEDICAL INTERVENTIONS AND REHABILITATION

South Asian countries face various challenges in managing natural disasters due to availability of limited healthcare resources such as infrastructure, health professionals, medical importunes etc. Thus, it becomes crucial to focus on those medical interventions which require fewer resources, and have the potential to improve the diagnosis, management and care of patients injured after natural disasters in a cost efficient manner. It has been highlighted that, for comprehensive management,

there is a need to understand geographical location and availability of the local health services, trained rehabilitation professionals and medical workforce. Special needs and management plans for persons with pre-existing disabilities and/or comorbidities are often disregarded which needs to be emphasized while formulating rehabilitation plans (Khan et al., 2015).

With an increasing frequency of natural disasters, there is a greater focus on the role of rehabilitation in disaster management. However, there are only a few studies which have focused on LMICs, particularly on South Asian countries (Khan et al., 2015; Lipinski et al., 2016). There has been some evidence for the effectiveness of inpatient rehabilitation in reducing disability and improving participation and quality of life and for community-based rehabilitation for participation. Post-traumatic stress disorder (PTSD) is one the most common psychiatric disorders observed among natural disaster survivors. School based or community based psychological rehabilitation interventions in countries like India and Sri Lanka have shown evidence reducing emotional distress among children and women exposed to tsunami and earthquake (Khan et al., 2015; Lipinski et al., 2016). In this intervention, community workers were taught basic mental health interventions by team of psychiatrists, nurses, and social workers. Both cultural and gender aspects have been incorporated in formulating these interventions (Khan et al., 2015; Lipinski et al., 2016). In Sri Lanka, counsellors used practices like yoga and meditation with the Buddhist communities to reduce the PTSD symptoms in the survivors. Also, female facilitators have been utilized for young female participants (Lipinski et al., 2016).

Some SRs have no geographical context but they did consider mixed countries (both HICs and LMICs) in the scope of the study (Fu et al., 2015; Griffith and Ford, 2013). One such study³ evaluated rehabilitation program in Sri Lanka post 2004 Tsunami. Classroom-based programs were conducted by teachers for elementary school students providing them with psycho-education material, and exercises for cognitive-behavioral skills, meditative practices, and bioenergetics. These programs showed significant reduction in trauma related symptoms in the students post the interventions (Fu et al., 2015).

Studies have also emphasized the efficacy of cognitive-behavior therapy, particularly exposure techniques, for the treatment of post-traumatic stress disorder after earthquakes (Lopes et al., 2014). Results of one review mentioned enhanced outcome following parental involvement in the treatment of children suffering from PTSD post disaster (Newman et al., 2014). However, these reviews do not have any geographical focus and do not make any distinction between HIC and LMIC. Thus, it is not possible to disaggregate the findings to country level, therefore limiting the generalizability for South Asian countries. But this factor can be looked upon in further research in South Asian context.

These psychological rehabilitation interventions will be especially helpful and effective in resource-poor regions which have few trained mental health professionals. Given the availability of limited health infrastructure in South Asian countries, community-based approach can be incorporated as part of a comprehensive disaster health management plan. In order to increase acceptances from the community, there is a need to gear the intervention strategies with incorporating cultural norms and traditional beliefs. In terms of long-term psychological disorders and impaired functioning,

³ Fu et al., 2005

women, children and disabled survivors are identified as the most at-risk population post-disaster. Understanding special needs of these vulnerable groups is essential for an intervention to succeed. Therefore, it is important to provide services to children affected by psychological distress post-disaster. And for implementation of interventions for children, schools have proven to be the most appropriate option outside one's home. Also, teachers, if trained as non-professional mental health workers, can also play an important role in the process of alleviating distress from the children. Given the success of this type of intervention in Sri Lanka and also in some parts of India, these communities based psychological rehabilitation interventions can be applied in other South Asian countries as well. This also helps in resolving the issue of health infrastructure to some extent as there are already enough schools and teachers in South Asian countries.

Despite the importance of an effective health system response to various disasters, relevant research is still in its infancy, especially in LMICs. Most of the existing research related to health system's disaster management or the capability to supply medical services during disasters has occurred in HICs. Hence, there is a lack of evidence of effectiveness in LMICs, especially in the context of South Asian countries.

MECHANISMS AND MODELS OF COORDINATION

Coordination forms a crucial aspect for the response strategies for disaster management as it can increase the flow of resources, enhances accountability and increases the effectiveness of a relief effort. While evaluating the SRs, only one SR evaluated the effectiveness of coordination between organizations in improving health systems outcomes (Akl et al., 2015). The study finds very low quality evidence suggesting that information coordination between organizations, agencies and bodies may be effective in improving health systems inputs. However, one of the studies which was included in this systematic review found out positive impact of coordination efforts on the availability of drugs and manpower and other health response in Bangladesh post 1991 cyclone (Akl et al., 2015). Yet, it will be difficult to contextualize that the coordination between organizations can improve health system outcomes in other South Asian countries.

Presently, coordination among the organizations and agencies providing medical and health assistance is very low in the South Asian countries leading to inefficiencies, inequity and duplication in the services to the targeted population. In Bangladesh, the health sector emergency response preparedness (EPR) coordination mechanism is jointly led by WHO and the Government of Bangladesh (GoB). It is in place at the national level but is very poor at the peripheral level. WHO (2013) suggests that health EPR committees need to be developed and activated at the subnational level to improve the coordination mechanism.

CASH BASED INTERVENTIONS

Effectiveness of cash based interventions in the event of humanitarian emergencies has been studied by only one SR with geographical focus on LMICs (Doocy & Tappis, 2016). There are different types of cash-based interventions (such as conditional cash transfers, unconditional cash transfers, vouchers etc.) to humanitarian assistance which are collectively referred as cash transfer programmes. A conditional cash transfer requires recipients to meet certain requirements before

the transfer is fulfilled. In contrast, grants paid to beneficiaries without the beneficiary having to do anything specific to receive the benefit are referred to as unconditional cash transfers (or “cash payment without associated activities”). They provide the recipients with additional, rapidly available income to enable them to manage better the negative consequences of disasters, including on health. Vouchers are coupons, tokens or smartcards, which can only be used in particular shops and/or on particular items.

Cash transfer programmes and vouchers improve household food security among conflict-affected populations and maintain household food security within the context of food insecurity crises and drought. Studies found that unconditional cash transfers led to greater improvements in dietary diversity and quality than food transfers. However, food transfers were found to be more successful in increasing per capita caloric intake compared to unconditional cash transfers and vouchers (Doocy & Tappis, 2016).

Usage of local finance institutions, including banks, micro-lenders, and *hawala* were considered preferable to physical cash distribution. They offer dual advantages; first, they allow beneficiaries to withdraw funds multiple times in smaller amounts at one point of time, and second, reduce the requirement for agency staff to travel into the field with large amounts of cash. Use of new technologies such as electronic transfers or smartcards reduces the time required for cash transfer and increases the efficiency of programme monitoring. There are other factors which form a crucial component for the success of cash transfer programs, such as sufficient organizational capacity, availability of qualified staff and sufficient financial resources. One such factor which facilitates implementation on multiple levels and is not restricted to cash based programs is effective coordination. In many instances, international organizations, often without government participation or plans, provided cash-based assistance for disaster-affected populations for maintenance of achievements beyond the life of a project (Doocy & Tappis, 2016).

Lastly, local finance institutions play an important part for implementing and creating awareness of importance of cash based interventions. These institutions can be utilized wisely and meticulously by South Asian countries for implementing this approach as it does not require additional infrastructure. There is a need to put the emphasis on coordination even though it is not unique to cash based interventions, but challenges may be greater due to the fact that humanitarian coordination mechanisms are structured around sectors of intervention (including health, shelter, and education) and cash can be used for varied purposes.

CAPACITY, EDUCATION AND TRAINING

An effective disaster response can only be achieved through sufficient advance preparation before the occurrence of any disaster (Zhong et al., 2014). **Disaster education** is one of the approaches towards preparedness to reduce the negative consequences of a disaster. This may include education on disaster risk, mitigation and preparedness strategies. According to the Hyogo Framework for Action (2005-2015), the objective of education on disaster is ‘to build a culture of safety and resilience at all levels,’ in order to reduce the adverse social and economic impacts of hazards (Johnson et al., 2014).

Children form one of the most vulnerable categories of population at risk with respect to their capacity to prepare for, or respond to, the effects of a disaster. To lessen the vulnerability of children, over the last decade, emergency management agencies, schools and non-governmental organizations have increasingly invested in the disaster education program for children. UNISDR also recognized the role of school education and knowledge in the formation of sustainable communities and came up with a slogan “Disaster risk reduction begins at school” in 2006-2007. The campaign was designed to motivate children towards an enhanced disaster knowledge and disaster resilience behavioural change. Recognizing this position of children in disasters, many countries have acted on it. They have organized awareness programs about children’s needs during such situations and some have also introduced disaster education in schools which includes risk analysis, awareness and reduction, and disaster management (Codreanu et al., 2014).

It has been witnessed that specific interventions or disaster education for children in general, produces benefits to children as well as the wider community. Interventions resulted in an increase in knowledge base regarding disaster and improved risk perceptions among children. However, best results were obtained by combining theoretical and practical activities in school, family, community, and self-education programs. Therefore, risk awareness needs to be part of early education programs which will lead, in turn, to an individual’s growing civic and professional responsibility (Codreanu et al., 2014).

There are other SRs which have contemplated the impact of training and capacity building in the event of a disaster. Johnson et al. (2014) found that children participation in disaster education programs had positive impact on a household’s preparedness for disaster. One of the SRs that reviewed the effectiveness of training of hospital staff in mass-casualty incident concluded that current evidence of effectiveness of MCI (mass casualty incident) for hospital staff is limited. A number of studies suggest that disaster drills can be effective in training hospital staff. However, it will be difficult to draw lessons from these SRs for South Asian countries as they do not hold any geographical focus. Thus, it is difficult to identify contextual factors on the basis of which of these interventions can be applied in South Asian countries.

Disaster education, either in addition to a stand-alone curriculum or as an extra-curricular program, can be replicated in the South Asian countries as they have an increasing focus on primary education. With the SDGs in focus, developing economies are paying attention and creating holistic awareness in the communities regarding the importance of education for a society as a whole. This also helps in transfer of knowledge from children to parents (Johnson et al., 2014).

COMMUNICATION AND INFORMATION

‘Risk communication aims to provide the public with information about the effects of an event, and how actions may affect the outcome of the event’ (Bradley et al., 2014). These interventions are used across various phases of a disaster’s life cycle. Potential channels of communication include face to face conversations, telephone calls, group meetings, mass media such as television etc. Bradley et al. (2014) found positive effect of risk communication interventions in terms of behaviour change, reduced risk and vulnerability, and knowledge outcomes. One successful example of communication intervention was observed in Iran in which community participation approach was

used for preparedness and mitigation of floods. Village disaster teams were developed to conduct training of local people which includes identifying areas at risk of flooding, developing personalized plans, developing early warning systems and conducting evacuation exercises over a period of three months (Bradley et al., 2014). These type of community based interventions already exists in some South Asian countries (such as India) but there is a need to encourage them further, with enhancement in early warning alerts through several communication channels such as information dissemination from national to local level through several layers of government, translation into local languages at district level, and locally through oral dissemination. Generally, warnings in local languages with use local dialect are not widely disseminated, which can alert communities to take measures which ensure their safety when disaster strikes. Authenticity of these early warnings is also a challenge. Rather than different bodies for different disasters/hazards, the focus should be on one body disseminating all the warnings. Dissemination of information to the local level at the earliest possible period with minimum time delay would strengthen the impact of disaster preparedness programmes.

3.4 LESSONS LEARNT FOR BANGLADESH

In the evidence summary we conducted, most of the reviews from which contextualization has been drawn neither had any geographical focus nor make any distinction between HIC and LMIC. Thus, it was not possible to disaggregate all the findings to country level, limiting the generalizability for South Asian countries. As a result, transferability and applicability of an intervention in the context of South Asia, especially in Bangladesh, is a cause of concern. However, an attempt has been made to draw from interventions which have been carried out in settings similar to South Asia in terms of population, geographical location, infrastructure, resources etc.

Bangladesh, like other South Asian countries, faces the issue of resource constraints which include shortage of funds, trained mental health professionals, among other issues. Given the positive effects of community based approaches, this intervention can be incorporated as part of a comprehensive disaster health management plan. There is a need to gear the intervention strategies by incorporating cultural norms and traditional beliefs which will enhance community participation during disaster management interventions. Bradley et al. (2014) also found a positive effect of risk communication interventions through community participation approach for preparedness and mitigation of floods in Iran. These community based interventions exist but there is a need to further strengthen them, while simultaneously enhancing early warning alerts through several communication channels such as information dissemination from national to local level through several layers of government, translation into local languages at district level and locally through oral dissemination. This information dissemination to the local level at the earliest possible period with minimum time delay would strengthen the impact of disaster preparedness programmes.

Cash based interventions have had positive effects and can be implemented with the help of local finance institutions including banks, micro-lenders, and hawala as they require no additional infrastructure (Doocy & Tappis, 2016). There is a need to put the emphasis on coordination even though it is not unique to cash based interventions, but challenges may be greater due to the fact that humanitarian coordination mechanisms are structured around sectors of intervention (including health, shelter, and education) and cash can be used for varied purposes. The evidence on the

effectiveness of coordination between organizations in improving health systems outcomes is limited (Akl et al., 2015). However, one of the studies which was included in this systematic review found positive impact of coordination efforts on the availability of drugs and manpower and other health response in Bangladesh post 1991 cyclone (Akl et al., 2015). In Bangladesh, the health sector emergency response preparedness (EPR) coordination mechanism is jointly led by WHO and the Government of Bangladesh (GoB). It is in place at the national level but is quite poor at the peripheral level. WHO (2013) suggests that health EPR committees need to be developed and activated at the subnational level to improve the coordination mechanism.

Evidence found that disaster education intervention for children resulted in increase in knowledge base regarding disaster and improved risk perceptions among children as well as for the wider community. In the case of Bangladesh, under CDMP programmes, issues on hazards, vulnerability, DRR measures have already been made part of education system from elementary-secondary to tertiary level of education. In addition, different certificate courses, post-graduate diploma courses, Bachelor of Science (Hons.) and Masters in disaster management have been introduced in different public and private universities (Islam, n.d.). However, the best results were obtained by combining theoretical and practical activities in school, family, community, and self-education programs (Codreanu et al., 2014). Given the context, the evidence reviewed offers some insights but the paucity of rigorous research on effectiveness of disaster management approaches for South Asia (especially for Bangladesh) limits the strength of the conclusions.

4. CONCLUSION

DISCUSSION

The process of contextualization was carried out on the basis of the findings from the project on 'Evidence Summary on Effects of Various Disaster Management Approaches'. The aim of this Evidence Summary was to review and summarize review-level evidence on the effectiveness of disaster management approaches in low and middle income countries (LMICs). It studied and synthesized evidence from 47 SRs. These reviews were selected after an extensive search, a two staged screening, and a quality assurance process. A narrative synthesis was done for the SRs dealing with different interventions and corresponding outcomes across the four phases of disaster management.

The SRs included in this evidence summary covered a wide range of interventions but they varied in their approach, size (number of studies included), scope and method of synthesis. Therefore, it is not possible to ascertain which intervention is most effective in managing disasters. Based on the results of included SRs, contextualization has been done for South Asia and some policy implication has been drawn.

The role of coordination and collaboration in making an intervention effective has been highlighted especially in cases of medical interventions and capacity enhancement programmes. Such collaboration is needed between different actors, such as non-governmental organizations, service-providers, governments, academicians etc. A more optimal use of new and emerging technologies can assist in better implementation of disaster management programmes especially in case of disaster communication and preparedness.

Participation and ownership from communities is integral to success of DM interventions in a natural hazards setting. School based disaster education intervention enhances theoretical disaster knowledge; however best results are obtained by combining theoretical and practical activities in school, family, community, and self-education programs. There is need for a concerted educational drive to achieve disaster preparedness behavioral change. Communities need to be involved from the beginning, where they play a role in decision making and implementation of interventions, and gear towards mitigating risks of a disaster, planning or execution of a response and recovery. It emerges from the evidence summary that interventions which were sensitive to the sociocultural context and practices of the target region had a more positive impact and wider acceptance. Thus, there is a need to devise necessary and appropriate strategies to counteract exclusion processes in disaster management for inclusive outcomes.

LIMITATIONS

The scope of the majority of SRs was not specific to any one of the natural hazards rather included a broad category of natural hazards. Further, more than half of the reviews did not have any geographical focus and included both LMICs and HICs. None of the reviews compared the effectiveness of interventions in HICs and LMICs or within same group of countries with different contextual factors. Only 10 reviews had a clear focus on LMICs. No review specifically laid focus on South Asian region or any South Asian country in particular. A few SRs did, however, include South

Asian countries in their synthesis. Out of the SRs that report on positive effect of an intervention, 6 SRs clearly stated that they included South Asian Countries (India, Nepal, Pakistan, and Bangladesh).

Medical interventions (mainly on psychological aid) were the most studied disaster management intervention followed by capacity interventions. There is a paucity of studies which systematically analyze various non-medical interventions in a natural disaster setting. With respect to different stages of disaster management, most reviews focused on interventions for response execution stage. Most of these systematic reviews did not carry out a quantitative analysis or meta-analysis of studies included in them. The outcome which was analyzed by most of the reviews (even by non-medical interventions) was health outcomes. Some reviews concluded clearly on evidence for different outcomes, while others provided a narrative conclusion. A large number of SRs did not conclude on effectiveness of an intervention due to insufficient or inconclusive evidence.

CONCLUSION

The evidence reviewed offers some insights but the paucity of rigorous research on effectiveness of disaster management approaches for South Asia limits the strength of the conclusions. It is not robust enough to draw generalizable conclusions about the success of the interventions in specific locations, especially for Bangladesh. In the studies reviewed, the limited evidence received is skewed towards administering medical interventions pre and post disaster. Meta-analytic results of the existing literature also indicate that disaster interventions for children and adolescents are efficacious. However, more outcomes research on emerging and existing interventions is needed to enhance public health interventions and address issues that cannot yet be determined based on the existing literature. Also, although the role of technologies has been discussed by a few SRs, their effectiveness has not been studied explicitly, which could have an implication for successful implementation of an intervention. Future research would benefit from including evaluations of cost-effectiveness and ease of dissemination.

Research studies are needed in this field to better inform decision-making of different stakeholders working in providing and financing services in humanitarian crisis. The evaluation research would benefit from better collaboration between academic researchers and organizations working in the field. Researchers are also encouraged to develop guidelines for conducting and reporting studies on coordination mechanisms in disaster settings given the complexity of evaluating effectiveness in such fields.

While significant achievements have been made in post-disaster response and reconstruction, there are still formidable challenges to reducing the risk of future disasters. Climate change has far-reaching implications for managing disaster risk in India, as the frequency and intensity of flash floods, landslides, droughts, cyclones, and storm surges are expected to increase in upcoming decades. Climate sensitive disaster management planning can play a tremendous role in terms of reducing increasing disaster risks.

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6. APPENDICES

APPENDIX 1: PROCESS OF CONTEXTUALISATION

