A Systematic Literature Review of Community Disaster Resilience: Main and Related Research Areas and Agendas

Abstract

Community disaster resilience has been advocated as a new safety management paradigm, compatible with the nature of complex socio-technical systems. This study aimed to characterize the main research areas of published works, identify the disciplines associated with the works and propose research agendas for future inquiries, based on a systematic literature review that encompassed 89 research papers from 2010 to 2020. Four research areas are identified: resilience management, disaster resilience assessment, collaboration, and capacity building. The area "resilience management" and "disaster resilience assessment" accounted for 43% of the studies and this indicates that research has emphasized the description of how community disaster resilience has been managed and assessed. Three disciplines relating to disaster resilience (disaster risk science, public health and environment) accounted for 61% of the studies, and this indicates that research has fostered core areas of community disaster resilience. The review revealed three key research agenda: a growing trend to describe successful efforts to avert a potentially catastrophic disaster through initiative, qualitative, and solution-based case studies; a paradigmatic shift; and implementation of how communities could help the disaster victims recuperate from disasters.

Keywords: Community disaster resilience, resilience management, disaster resilience assessment

1. Introduction

Community disaster resilience has become a popular concept which has been introduced to various areas as the concept is a common concern for the survival of all races. Numerous prior research studies (e.g. Deshmukh & Hastak, 2012; Canyon et al., 2015; Alshehri et al., 2013; Alaedini et al., 2011; Murphy, 2020; Doberstein et al., 2019; Berke et al., 2011) have been conducted in its major area as well as in relation to related areas. This wide range of scientific information therefore calls into a review of this subject in order to broadly understand how the concept of disaster resilience is applied at the community level, how it is related to other areas, and how the future research agendas for community disaster resilience should be structured.

Prior to this review, Righi et al. (2015) conducted a systematic literature review with a broader nature, exploring how the concept of disaster resilience has been applied in engineering research area. This review implied in the limitations that relevant areas were neglected. It is therefore necessary to include this crucial issue. Built upon the prior study, this present review therefore investigated how the concept of disaster resilience has been applied at the community level and in related areas. As resilience is a multidisciplinary concept that has been investigated by several different disciplines (namely sustainability, psychology, economy and sociology), this study looked into how disciplines related to community disaster resilience to provide agenda for future inquiries. This study therefore characterized the main research areas of published works, identified the disciplines of the works, and proposed research agendas for future inquiries.

To investigate the existing knowledge to gain insights of the community disaster resilience, systematic reviews are strongly recommended for supporting the theoretical progress of scientific disciplines in general, as they identify over as well as under explored areas, in addition to constructs that should be refined (Craft, 2020). Unlike a conventional review, a systematic literature uses a research protocol that reduces the effects of chance and increases the legitimacy and authority of the evidence found from the review (Cui et al., 2018) so that readers can assess its rigor, completeness and repeatability. Based on a systematic literature review, three research questions were addressed by this paper: (a) What are the characteristics of the main research areas of community disaster resilience? (b) What are the related disciplines of community disaster resilience? (c) How should research agendas for community disaster resilience be structured?

2. Research design
2.1. Steps of the systematic literature review

This review commenced with the definition of the three research questions, and subsequently three steps were followed: (a) defining criteria for research paper selection; (b) specifying the data bases and selecting the papers based on the criteria; and (c) involving with data analysis, conclusion, and discussion of selected papers.

Regarding step (a), inclusion and exclusion criteria were defined as follows:

(i)   Inclusion: the search was limited to the selection of research papers in English, focusing on "community disaster resilience", the subject of this review which was referred to as keywords and used for the online search for papers. All these three words must be present in the title of the selected papers. This could ensure that the selected papers substantially focused on the subject of this study. The search encompassed research papers that had been published from 2010 to 2020.

(ii)   Exclusion: the papers that the keywords are present in abstracts and contents of the papers were not included, as it might only refer to the existence of the subject. The papers that focus on the subject of this study but appear in symposiums were not included as they are too succinct. Also, the papers that focus on the subject of this study but are present in conferences were not included because they have not produced full research papers. Books, annual workshops, and the annual meetings were not included because they are not research study. Dissertations and theses were not regarded as "data" and included in the calculation of the distribution of papers by this review.

The papers were not counted as data in this study as this study aimed to characterize the research areas and propose the research agenda of community disaster resilience. In order to establish rigorous and inclusive results of the study, full research papers that clearly identified the research designs were counted as data in this study. However, this did not mean their sources were neglected. Their contributions were included to enrich data analysis. Two papers published (namely Canyon et al., 2015; Nicholls et al., 2015) were also cited although their research designs were not clearly specified but the data can lead to a deeper understanding of their relationships with other studies and therefore establish rigorous data analysis.

Regarding step (b), the databases were defined and selected according to the criteria, comprising those available from the authors' institution and the location of studies was conducted by considering search strings in numerous publishers' electronic databases to find publications relevant to the keywords of the review. All papers must be present in more than one source. The papers available from the authors' institution were also included. Based on the inclusion criteria, 138 papers that the three keywords are present in the title from more than 200 databases were

identified. After checking for studies present in more than one database and applying the exclusion criteria, 89 papers from 133 sources. A wide range of sources was preferred in order to increase credibility of results.

Regarding step (c), a spreadsheet was developed to facilitate data analysis, including the fields presented below: (i) identification of data (namely database(s), journal's name, title, year of publication, institution of the first author, sector in which the study was developed); (ii) contents of the study (e.g. objectives, research methodology, and main results); (iii) methodological approaches (qualitative, quantitative, and mixed-method); (iv.) categories of resilience; (v) areas of disciplines relating to resilience; and (vi) trends and patterns of the studies to identify the research agenda.

2.2 Characteristics of the selected studies

Among the 138 papers searched by Mendeley Desktop Software, 89 full papers from journals were selected. The remaining were excluded because they are by nature more succinct than journal papers. All papers are present in googlescholar.com and in one or some among the following 132 sources which can be classified into three groups. The first group includes 3-50 papers, including: researchgate.net (Murphy, 2020), search.proquest.com (Doberstein et al., 2019), ebscohost.com (Deshmukh & Hastak, 2012), europepmc.org (da Silva et al., 2015), pubmed.ncbi.nlm. nih.gov and safetylit.org (Cui et al., 2018); academia.edu (Comes et al., 2019), econpapers.repec.org (Chandra et al., 2013), semanticscholar. org (Cha et al., 2016), core.ac.uk and Elsevier (Carlile & Christensen, 2004), Taylor & Francis (Canyon et al., 2015); mdpi.com, ncbi.nlm.nih.gov and Springer (Berke et al., 2011), cabdirect.org (Barameda & Barameda , 2011) , ingentaconnect.com (Bacud, 2018), cambridge.org (Alshehri et al., 2013), and Wiley Online Library (Alaedini et al., 2011). The second one comprises 21 sources, namely: search.informit.org, knowledge.aidr.org.au, Citeseer, American Public Health Association, ascelibrary. org, cphd.ph.ucla.edu, cyberleninka.org, ERIC, espace.library.uq.edu.au, etc. The last group includes: ajem.infoservices.com.au, Adult Learning Australia Inc., apo.org.au, bip.org.bd, carpedien.ien.gov.br, ci.nii.ac.jp, clsu-ijst.org, cnki.com.cn, coastalresourcecenter.org, cogitatiopress.com, covid19.alnap.org, cpij.or.jp, dialnet.unirioja.es, digital.library.adelaide. edu.au, discovery.ucl.ac.uk and so on.

2.3 Framework for addressing the research questions

In order to address the research questions, it is necessary to develop operational definitions of what characterizes the main research areas, what disciplines relate to community disaster resilience, and as well as how research agendas should be structured. The main characteristics of the selected studies refer to methodological approaches and research areas of community disaster resilience. A discipline refers to an area of study or practice. A research agenda termed as guidelines for the development of knowledge and practice within and across research areas of resilience is defined mostly by identifying trends and patterns in the research areas. A content analytical process was used for data analysis.

3. Results of the Study

The three research questions that guided this paper are discussed in Sections 3.1, 3.2 and 3.3 respectively: (a) what are the characteristics of the main research areas of community disaster resilience? (b) What are the related disciplines of community disaster resilience? (c) How should research agenda for community disaster resilience be structured?

3.1 Characteristics of the main research areas of community disaster resilience

    3.1.1 Methodological approaches

Among the 89 papers, 87 state their research strategies and this indicates the strengths of the study. Only 2 do not explicitly state their research strategy and this indicates the flaw of the study. The 87 papers can be classified into 3 groups: qualitative, (48.27%, n. = 42), quantitative (36.78%, n. = 32), and mixed methods (14.94%, n. = 13). The distribution of the research methodology of the total studies can be shown below.

Table 1 Distribution of research methodology

Types of research methodology	Percent
Qualitative	48.27%
Quantitative	36.78%
Mixed methods	14.95%
Total	100.00%,

Almost half of the total studies was qualitative. This type of approach was in line with case studies and field studies such as observation, documentation, and categorization of the phenomena. This type of data was elicited from interview (Perera et al., 2017; Pollock et al., 2019; Rahman & Kausel, 2012; Drolet et al., 2015; O'Neill et al., 2016), semi-structured interviews (Houston et al., 2019), group interview (Alaedini et al., 2011; Arneson et al. 2017; Comes et al., 2019), in-depth interviews (Gultom & Joyce, 2014; Cretney, 2016), focus group (Golding et al., 2020; Mosley et al, 2012), field work (Murphy et al., 2014), forum design (Wells et al., 2013; Berke et al., 2011; Dufty, 2017), content analysis (Firdhous & Karuratane, 2018; Herath et al., 2020; Hong et al., 2018), participatory action research (Miles, 2018), document analysis (Sulaiman & Fernando, 2019), ethnographic research (McIlvaine-Newsad et al., 2020), constructivist research (Bacud, 2018), meeting through ergonomics framework (da Silva et al.2015), and critical review of the literature (Satria, et al., 2012).

One third of the studies was quantitative. This research area is linked to safety and disaster measurement, focusing on how resilience can be an effective measure of the reliability. The devised mechanisms include toolkit (Cui et al., 2018; Chandra et al., 2015), a tabletop exercise (Kumar et al., 2019), loss assessment tools (Deshmukh & Hastak, 2012), the Community Disaster Resilience Framework (CDRF) (Feofilovs & Romagnoli, 2017), index (Kafle, 2012), composite community disaster resilience index (CCDRI) (Righi et al., 2015), scorecard (Ramsey et al., 2016; Singh-Peterson et al., 2015; Singh-Peterson et al., 2016; Toseroni et al., 2016; Townshend et al., 2015; Villagra & Quintana, 2017; Wang et al., 2019), and grid (Orencio & Fujii, 2013; Patel et al., 2020; Pratikto, 2015).

The minority of the studies were mixed methods designed for integrating qualitative and quantitative data analysis. Primary data utilized alongside secondary sources were drawn from a wide range of methods: interdisciplinarity of new methodologies (Sutley, 2018; Igwe & Wordu, 2016), questionnaires, interviews, and focus group discussions (Barameda & Barameda, 2011), survey method and focus group discussions (Lin et al., 2018), qualitative and interpretive analysis (Imperiale & Vanclay, 2020; Kapucu et al., 2013), surveys and focus groups (Rivera et al., 2015), systematic literature review, and extended literature review (Doberstein et al., 2019).

3.1.2 Research areas of community disaster resilience

Community disaster resilience has been advocated as a new safety management paradigm, compatible with the nature of complex socio-technical systems. Regarding to the results of data analysis, four main research areas account for 71% of the total, including: resilience management (22.47%, n. = 20); disaster resilience assessment (20.22 %, n. = 18); collaboration (16.85 %, n. = 15); and capacity building (11.23 %, n. = 10). Nevertheless, other domains widely regarded as complex are still under explored, such as responses to disaster (8.98%, n. = 8); resilience factors to disaster (7.86 %, n. = 7); research/academic (5.61%, n. = 5), disaster risk reduction (4.49 %, n. = **4**), and training (2.24 %, n. = 2).
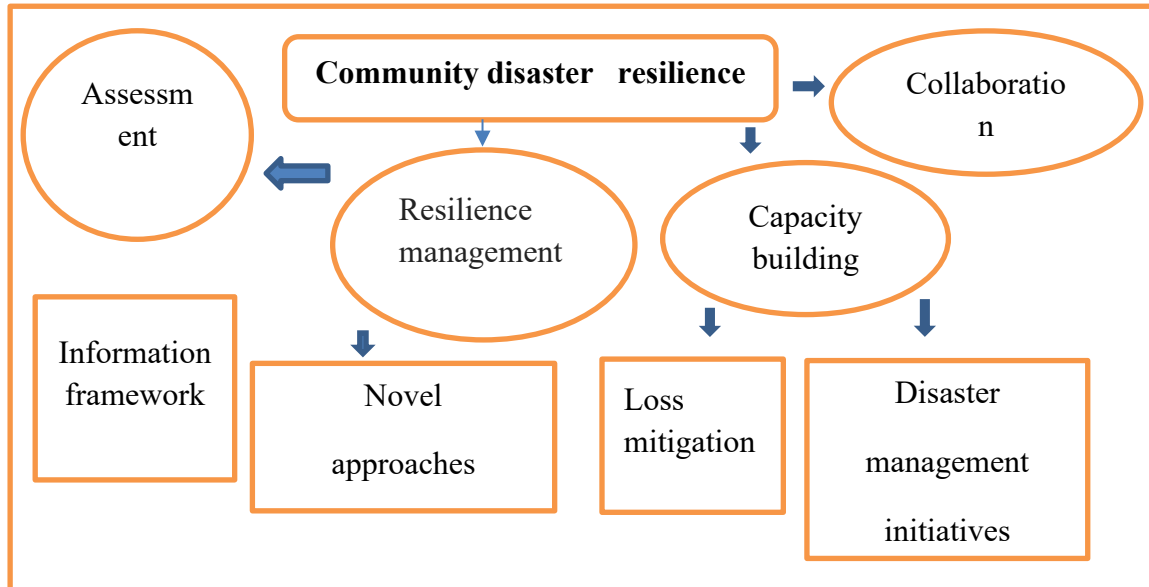

Figure 1 Research areas of community disaster resilience

3.1.2.1 Resilience management

The results of data analysis indicates that the mainstream studies in this area involve getting actionable about community resilience (Chandra et al., 2013; Igwe & Wordu, 2016), the role of recreation in disaster resilience (McIlvaine-Newsad et al., 2020), disaster resilience and social solidarity on social media (Hong et al., 2018), and self-organizing collective action among farmworkers (Reams et al., 2017). Other studies focus on these issues: preparation in disaster-prone areas (Pollock et al., 2019; Murphy et al., 2014), aiming at disaster prevention and management regarding natural hazards and the resilience to a potential disaster event (Odiase et al., 2019), and disaster victims (da Silva et al., 2015) at all ages which engage child-oriented preventive program (Hamiel et al., 2013, August), health workers (Nicholls et al., 2015), elders with a focus on spiritual life (Satria et al., 2012), and learning through adversity and disaster (Golding et al., 2020), training community coalitions (Cha et al., 2016), community participation (Dufty, 2017), and community's perception on disaster resilience (Ranjan & Abenayake, 2014).

The studies in this area focus on frameworks such as information framework for smart and connected communities (Kumar et al., 2019), participatory disaster recovery simulation modeling for resilience planning (Miles, 2018), and integrated approach to enhance resilience (Herath et al., 2020). This also includes risk management (Firdhous & Karuratane, 2018), communication (Liu, 2020; Spialek & Houston, 2019), crisis communication (Gultom, & Joyce, 2014), information deficits (Arneson et al., 2017), information system (Muto & Kohtake, 2017), and information

asymmetries (Comes et al., 2019). Novel approaches were designed for fostering citizen and disaster mitigation, preparedness, response, recovery, and resilience such as environmental disasters (Rifat & Liu, 2020), industry-related needs and skills for enhancing disaster resilience in stakeholder perspectives (Perera et al., 2017), disaster journalism (Houston et al. 2019), post-disaster projects (Tōhoku Dionisio & Pawson, 2016), barriers to disaster risk reduction and resilience (Imperiale & Vanclay, 2020), and protect, accommodate, retreat or avoid (PARA) for flood disaster risk reduction and resilience (Doberstein et al., 2019).

3.1.2.2 Disaster resilience assessment

Disaster resilience assessment is the core aspect of safety management. Innovative safety assessment tools in this review include these methods: disaster resilience index (Orencio & Fujii, 2013; Aksha & Emrich, 2020), scorecard for assessment (Ramsey et al., 2016; Ludin & Arbon, 2017), indicators (Singh-Peterson et al., 2015), new methodologies for disaster resilience (Sutley, 2018), scorecard toolkit (Singh-Peterson, 2016), measuring the impact (Wang et al., 2019), a software for measuring social networks (Wilkin et al., 2019), a tabletop exercise (Chandra et al., 2015), a composite indicator approach (Feofilovs & Romagnoli, 2017), and measurement of social networks for innovation (Righi et al., 2015).

3.1.2.3 Collaboration

This research area focuses on the role of community welfare to enhance social cohesion and disaster resilience (Patel & Gleason, 2018), social capital, factors to disaster (Alshehri et al., 2013), particularly natural disaster awareness, preparedness, and recovery (Min et al., 2020), incorporation of business sectors to empower community for resilience, entrepreneurship and partnership (Pratikto, 2015), collaboration (Wilkin et al., 2019), disaster policy and governance (Villagra & Quintana, 2017), and depression collaborative care and planning to disaster recovery (Keegan et al., 2018).

3.1.2.4 Capacity building

The ability to reduce risks or probability of risks on possible potential disasters is engaged with disaster response (Igwe & Wordu, 2016; Rivera & Vargas, 2018) through an integrated approach (Herath et al., 2020), capacity-building in disaster mental health resilience (Mosley et al., 2012), spatial links between household and business post-disaster return (Xiao & Van Zandt, 2012), ecosystem restoration (Lin, 2019; Patel et al., 2020), disaster planning and developing (Wells et al. 2013), rebuilding communities and lives (Barameda & Barameda, 2011), women rebuilding lives as innovative practices (Drolet et al., 2015), and rebuilding relocated tribal communities via culture (Lin & Lin, 2020).

3.2 Disciplines relating to community disaster resilience

Resilience has called for attention from various disciplines, as the concept is a multidisciplinary. Eight disciplines account for 71% of the total core disciplines: disaster risk science (29.70 %, n =26), public health (15.70%, n =14), environment (15.70%, n =14), management (14.60%, n =13), social development (10%, n =9), communication (6.60%, n =6), academic (5.50%, n. = 5), and training (2.20 %, n. = 2). Categories of disciplines relating to community disaster resilience are shown below.

Table 2 Categories adopted for classifying and describing disciplines relating to community disaster resilience

Disciplines relating to community disaster resilience	Percent
Disaster risk science	29.70 %
Public health	15.70%
Environment	15.70%
Management	14.60%
Social development	10%
Communication	6.60%
Academic	5.50%
Training	2.20 %
Total	100.00%,

Specimen of top five areas were chosen. This disaster risk science accounts for the majority of the research study in this area as it aims at safety. This research area focuses on mass emergencies & disasters (Reams, 2017), disaster risk reduction (Orencio & Fujii, 2013) and risk management (Pollock, 2019). The research in public health area involves public health preparation (Chandra et al., 2013; Chandra et al., 2015), the impacts of disaster emergency (Acosta et al., 2018; O'Neill, 2016) on mental health (Mosley, 2012) and trauma (Tōhoku Dionisio & Pawson, 2016), especially on children (Sanderson et al., 2016). and the elders (Satria et al. 2012).

Environment stresses the importance of environmental planning and management regarding recreation administration, earth and planetary science (McIlvaine-Newsad, et al., 2020) take in engineering & system safety (Rivera et al., 2015), science & technology (Rivera & Vargas, 2018), the interdisciplinarity of new methodologies (Sutley, 2018), and infrastructure resilience and reconstruction (I3R2) (Deshmukh & Hastak, 2012), geophysics (Pratikto, 2015) and geo-information (Herath et al. 2020; Righi et al. 2015). Management highlights the importance of disaster prevention and management (Cretney, 2016; Singh-Peterson et al., 2015), emergency management (Murphy, 2020; Kafle, 2012), information system (Odiase et al., 2019), and politics and governance (Imperiale & Vanclay, 2020).

Several studies of this area report stories of social development (Barameda & Barameda, 2011; Arneson et al., 2017), deals with social change (da Silva et al., 2015), the meetings of disaster victims as a space for developing community resilience (Drolet et al., 2015), innovative community practices (Golding et al., 2020), community learning through adversity and disaster (Igwe & Wordu, 2016), humanity and social sciences (Nicholls et al., 2015), applied social science (Patel & Gleason, 2018), social cohesion and resilience across communities (Townshend et al., 2015) and organization (Burnard, K.J. & Bhamra, R., 2019).

3.3 Research agenda proposal
The review above provides a basis for the proposition of a research agenda. Five major trends could be identified as follows:

i.   There is a growing trend to describe successful efforts to avert a potentially catastrophic disaster through initiative, qualitative, and solution-based case studies. A variety of indexes, metrics, and standards for community- and ecosystem-based methods at the local level is proposed. Simple-to-use and standardized disaster resilience tools to improve communities' quality, self-efficacy, and capability to facilitate improved disaster resilience are a major concern.

ii.   There is a paradigmatic shift. Interdisciplinary methodologies, composite-based and multi-criteria analysis and integrated models integrating social, economic, human, physical, and environmental factors have replaced traditional single-factor models.   Although the approach to mitigate disasters to manage the inherent capabilities of local communities to reduce the effects is common, a multidisciplinary, scientific and knowledge-based approach, which incorporates local wisdom in order to gain a deeper and wider understanding of the management of the issue, increasingly calls for attention and interest.

iii.   Implementation of how communities could help the disaster victims recuperate from disasters calls more attention, especially the decisions that needed to be taken into consideration in response to the disaster, and of how they contributed to increasing community resilience, the development of essential skills and improved interaction among individuals in the community becomes prevalent.

iv.   There is a considerable interest in information and communication technologies in disaster resilience research in minimizing the human as well as economic losses through proper disaster management initiatives as ICT has leveraged to enhance the disaster resilience of the rural communities.

v.   Case studies on participating communities to strengthen their disaster resilience through cross-community cooperation in order to maximize opportunities by comparing their plans, actions and reactions with those reported in research publications, and aligning their community disaster management with reported best practice internationally are growing dramatically. Also, the need to adapt such practice to local context is more acknowledged.

4. Conclusion and Discussion

Five conclusions could be drawn from the review. Above all, the disaster resilience studies aim at disaster resilience and recovery of the community from multidisciplinary and integrative perspectives, with a focus on building community resilience among disaster-affected communities. Next, reports on comparative findings of cohesion and resilience indexes in communities that experienced disasters and evacuation in potentially different phases of coping and resilience are growing. The studies point to a potentially important link between context-based social cohesion and resilience. They also suggest likelihood of staged manifestations of resilience and a staged model of disaster impacts. In addition, information from several studies can help in disaster recovery planning by ensuring supports is available at key points in time for communities that experience disasters. Lastly, there is a great need to compare communities that have experienced different types of disasters and over time periods to document any changes to resilience or cohesion thereby assisting with disaster policy development and program planning.

Drawing upon the conclusion of the study, a few critical and preventable inequalities in disaster impacts and post disaster recovery should be discussed. As traditional cartographic tools, (namely hazard, vulnerability, or risk maps) cannot appropriately represent the overall resilience of a territory (inclusive of its social and environmental dimensions), the development of a new quantitative adaptive strategy, which aims at strengthening an adaptive relationship between human communities and their surrounds is critical. This paradigmatic shift needs new analytical and measuring tools in order to describe, evaluate and develop the strategies needs to be discussed. To provide solutions for minimizing these unequal impacts, there is a great need for interdisciplinary methodologies that use social factors to set project scopes and drive analyses and designs. However, limited guidance exists on how to develop and execute interdisciplinary methodologies, especially related to the study of community disaster resilience. Sutley (2018)

offers an approach for developing and assessing interdisciplinary research methodologies. The framework incorporates insights from social science into structural engineering for integrated research focused on community disaster resilience. Similarly, Toseroni et al. (2016) proposes a methodological approach to map such community resilience by assessing energy and resource consumption to maintain the stability of the social-ecological system. In addition, despite studies on a number of health and social-community service programs are randomized to community engagement and planning for multisector coalition support or technical assistance for individual program support, little is known about a multilevel randomized comparative effectiveness trial that aims to build community resilience among disaster-affected communities. Lastly, culturally-oriented solution to providing intervention post disaster is limited. Sanderson et al. (2016) illustrates how one foreign NGO provided resources, training, and guidance to community members who were seeking help in implementing trauma intervention. Through equal partnership with local leaders, the intervention was translated to meet the specific cultural and contextual needs of children and childcare workers in the tent cities and schools of Port au Prince following the earthquake.

5. Limitations of the Study

This review is limited to the numbers of chosen papers, as only full papers were chosen. However, in order to establish more rigorous and inclusive results of the study, the numbers of citations of published papers to be chosen for future inquiry should be taken into account.

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