REVIEW ARTICLE

Sustainable Community-based Disaster Management for Flood in Indonesia

Ratna Puji Priyanti[1,2], Asri[1,3], Linlin Lindayani[4], Anja Hesnia Kholis[2], Nurul Hidayah[2], Fahruddin Kurdi[5]

[1] School of Nursing, Kaohsiung Medical University, Taiwan
[2] Department Medical-Surgical and Emergency Nursing, STIKES Pemkab Jombang, Indonesia
[3] Department of Community Health Nursing, Faculty of Health Science, Universitas Muhammadiyah Surabaya
[4] School of Nursing PPNI West Java
[5] Department of Community, Family and Gerontic Nursing, Faculty of Nursing, Universitas Jember, Indonesia

ABSTRACT

Indonesia the archipelago country which laying in the pacific ring of fire is vulnerable to the natural disaster. Flood is the most usual natural disaster that happen in Indonesia. As developing country, Indonesia is very suitable to implement the community-based disaster management (CBDM) as new method to manage the flood disaster. However, the common CBDM in Indonesia was not reach good achievement because of less continuity. Hence, the needs to sustainable the CBDM especially in flood disaster is needed. This paper is discussing about the strategies to achieve the sustainable CBDM in Indonesia. Several strategies found in this study, including: understanding the community; understanding disaster risk; strengthening disaster management governance; effective communication and network; Intensive mutual assistance; and Integrating CBDM in Health Care Education Curricula. These strategies aim to make CBDM sustainable. Future research is needed to prove the implementation of this strategy in sustainable CBDM.

Keywords: Community-based Disaster Management, Flood, Strategies, Sustainable

Corresponding Author:
Ratna Puji Priyanti, M.S., RN
Email: ns.ratnapuji@gmail.com
Tel: +62-0321-870214

INTRODUCTION

The occurrence of disaster has increase in the past decades due to force of man and natural changes (1,2). Indonesia is not exceptional f or disaster. Laying in the pacific of fire plate, made Indonesia known as 'supermarket of disaster' (3,4). Hydro-meteorological disaster is the most common disaster happen in Indonesia. Based on The National Disaster Mitigation Agency (BNPB) in September 2020, there were 1944 disaster which flood disaster is the most common disaster (5). BNPB noted that more than 100 people died due to the flood and 17 others were missing. BNPB recorded 726 flood events that resulted in displacement of more than 2.8 million as of August 30, 2020. The housing damage was reported as: heavily damaged 4,581 units, moderately damaged 2,784, slightly damaged 9,833 and submerged 540,739. Meanwhile, public facilities infrastructure damaged 496 educational facilities, 581 religious services, 112 health, 109 offices and 299 bridges (5).

Traditional flood control approaches, such as building dykes, flood barriers, and levees, or altering river passageways (e.g. cutting through channel meanders to minimize the flow distance, lining with concrete, or straightening), have failed to reduce flooding and material losses during floods. (6,7). This forces people who are involved and interested in flood disaster management to think about other efforts that can be done to control floods. The "community-based approach" is one of the efforts to build the community resilience towards disaster.

A discursive content appealing to most of foreign donors, non-government organization (NGO) and high-level government officials has become the community-based approach (CBA) (8). The "Community-based disaster management" (CBDM), known as the cornerstone of community disaster reduction, is designed to effectively determine the level of disaster

vulnerability at the community, strengthen the ability of community to manage and strengthen the community capacity of disaster resilience to prepare, mitigate, action, and recover post the event of disaster (9). CBDM ultimately empowers people to cope with disaster triggered by the emergence of natural hazard with self-development and culturally appropriate ways of coping (10).

The word "community-based" means that, from the program planning level to the program creation, execution, reporting, and assessment processes, disaster risk management work is carried out by and along with the community as a key role. It is understood that the community is the key actor in this definition who takes and executes crucial decisions on disaster risk management (8). Communities include many units such as government, NGOs, organizations, and residents (11). Various name has been given to community-based methods to disaster risk reduction.

The name including: "Community-based disaster risk management (CBDRM), community-based disaster management (CBDM), community-driven disaster risk reduction (CBDRR), community-based disaster preparedness (CBDP), community-driven disaster risk management (CDDRR), community-managed disaster risk reduction (CMDRR) and community-managed disaster risk management (CMDRM)" (12).

The Community-based solution is sufficient for disaster-prone developed countries. A community-based solution is more cost-effective than costly systemic reduction steps, a privilege that cannot be afforded or maintained by most developed and disaster-prone countries without external assistance (13). Potential casualties are the local community of a disaster-prone environment who bear much of the roles of dealing with the impacts of disasters due to visibility and proximity. The local community has local understanding of vulnerabilities and is a source of all conventional coping strategies that are suitable for their own environment. In periods of disaster, the local community reacts first and the last surviving members as impacted populations try to recover following a disaster (13). As a systemic approach, "Community-Based Flood Risk Management" (CBFRM) has developed to increase community responsibility and participation in the process of growth. Self-help, mutual-help, and public-help scenarios are vital components of local residents' response to flood disasters are most helpful in providing prompt emergency response, particularly when the affected sites are localized inaccessible (due to loss of transport and communications), the public-help portion (provided primarily by government) is important in sustaining aid facilities (14).

Despite the end of the initiative, previous emergency recovery projects failed to be sustainable at the local level. Efforts to mitigate crises cannot be maintained without resilience. Participation of these programs by groups is a vital aspect of sustainable emergency recovery. The involvement of the community related to the participation of the community in establishing the contingency plan (15). The key aspect of community involvement is its sustainability, partnership, participation, empowerment and control by the local people are the most common aspects of group involvement (16). It is impossible to decrease the losses and scale of the catastrophe unless the emergency recovery measures are sustainable at the individual and community level. Individuals can own and take action on the concerns, implications and obstacles to every prevention and/or preparedness (17). The need to take the participation of citizens deeper into policy and strategy (13). People in the community involved in creating the contingency plan (15). CBDM further tackles environmental concerns, as CBDM adoption also guarantees that efficiency, credibility and fairness are met (15). The core aspect of sustainable CBDM is the continuous/ contingency participation of the group to incorporate the catastrophe risk management in their community. Sustainability is difficult to attain because of the dependence to other parties; incapable of mobilizing local power to minimize personal vulnerability (8)

The "Sendai framework for disaster risk reduction" has underlined the engagement of the community participation for "Disaster Risk Reduction" (DRR). The concept of risk reduction swift from top-bottom become bottom-up with increase community engagement in DRR policy & strategies (18). Sendai framework has 4 priorities, 7 targets, 1 goal, and 1 outcome (19). By 2030 all the 7 targets of disaster risk reduction that inter-related with the Sustainable Development Goals achievable (20).

Till date, many information regarding CBDM, But the new term of sustainable CBDM is still few information available. Flood disaster in Indonesia is common disaster and can happen annually in river bank or flood prone area (4,21). Hence the sustainable action of "community-based flood disaster management" (CBFDM) is needed. This paper wants to explore the strategies of the sustainable community-based flood disaster management as a new implementation for disaster risk reduction.

An Overview Of Community-Based Disaster Management (CBDM) In Indonesia

CBDM was initially used in Yogyakarta in 1994, in the context of the Merapi volcano.(8). It began with a study of the behavior of residents in the Merapi

area who had survived the 1994 volcanic eruption. The concept begun to be used in 1996-1998 as participation of international DRR activist (12).

Indonesia has been implemented the Community-based approach in DRR management. Based on figure 1, CBDM is one of the pillars of "disaster risk management" in Indonesia. This means that the Indonesian government believes that CBDM is very effective in implementing disaster management in Indonesia. In the figure, it is stated that the important thing in DRR management in Indonesia is communication and coordination from various parties and the five pillars.

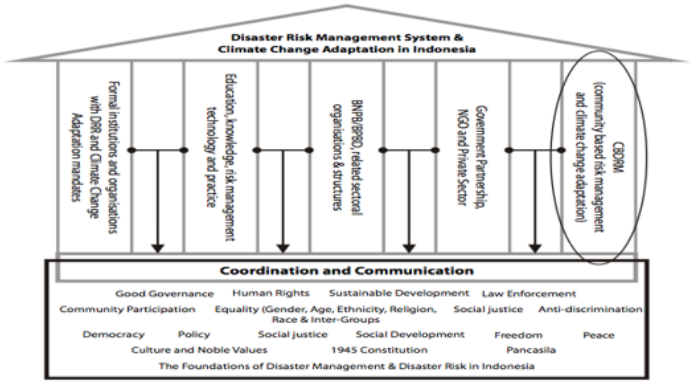

Figure 1: The pillar of Disaster Risk Reduction in Indonesia adapted from (8)

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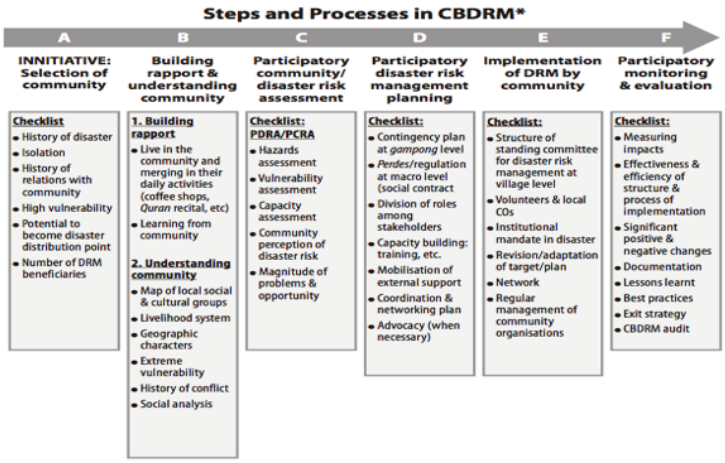

Figure 2: Steps and Process in CBDRM adapted from (12)

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The process of implementing CBDM requires a lot of time and effort. Identifying the socio-culture of the community, increasing public awareness to increasing direct community involvement in disaster management requires a very large amount of trust and effort.

METHODS

This review obtains articles from academic papers, government reports, grey literature, and various reports published in 2011-2021 in Bahasa Indonesia and English. Keywords used in the search process are a combination of community-based, disaster, disaster management, flood, sustainable, continuity, and Indonesia. A total of 18 literatures were obtained, which were used to answer the purpose of this article review. The review results are presented in 6 themes: Understanding the community, understanding disaster risk, strengthening disaster management governance, effective communication and framework, intensive mutual assistance, and integrating community-based disaster management in health care education curricula.

Understanding The Community

In deciding effective methods, steps, and behavior under CBDM, understanding local culture and its attitudes and values towards space, place, and nature is critical (22). CBDM strategies should help bridge or transcend cultural gaps successfully whenever they pose challenges to the reduction of vulnerability and shape building blocks for the reduction of vulnerability based on optimistic perceptions and compliance with cultural norms. Interventions should value current values and societies that may otherwise contribute to societal unrest or violence and should be willing to help raise knowledge of traditional patterns that may intensify risks for those subgroups inside populations (23).

In CBDM, psychological aspects such as faith, connection, and trust play a critical role (24). Community social capital, which includes things like loyalty, attachment, and a feeling of effectiveness, is a sort of indefinable capital that serves the community's common interests., including mitigating the likelihood of community hazards, fostering the regeneration of community populations and encouraging post-disaster restoration. Community social capital has been found to promote emergency preparedness, cooperative behavior, and community security behavior (11).

Understanding Disaster Risk

It is necessary to deliberate the city's flood risk in order to increase understanding and knowledge of the community. All urban planning has employed risk assessment to appropriately evaluate risk-based research, technology, and local knowledge, including the provision of full multi-hazards risk assessments for all areas. (25). Local awareness of disaster risk and

mutual trust is important in CBDM (26). CBDM stressed the community's willingness to recognize the possibility of solving local concerns, concerns and issues from an everyday perspective through preparation and execution to minimize the likelihood of disasters.

Education

Community disaster-reduction capacity development has been recognized as a key technique for reducing CBDM levels. In CBDM, knowledge distribution and education may help to enhance disaster-reduction capacity development. (9). The first step in improving community understanding and understanding of the risk of disasters is to educate the population (24). In order to improve the awareness of existing vulnerability and capability in the village, risk prevention initiatives and, accordingly, the development of a village action plan for all households and a village drill / simulation to assess the village's response to a disaster (27).

Experience sharing / lesson learnt

These flood victims' structural modifications are based on their past flood experience, which they may have shared with their neighbors or other flood victims. (28). Sharing the experience amongst villagers to finalize the valid disaster management strategies that are specifically for the city and to find agreement on the right strategies to be applied in the community for each disaster period (29). Sharing previous flood experiences, for example, is linked to two critical preparedness measures (guard valuables, create a secure meeting place) that villagers can do to strengthen their flood resilience (30).

Strengthening Disaster Management Governance

For effective and productive disaster risk management, national, regional and global disaster risk governance is important. It needs clear vision, strategies, expertise, direction and collaboration across sectors and the engagement of relevant stakeholders (25). In order to facilitate collaboration frameworks and collaborations through organizations and to use instruments related to DRR and sustainable development, improving disaster risk governance for prevention, mitigation, preparedness, response, recovery and reconstruction is important (19). Improving the emergency response governance framework by the implementation of engagement, fairness and equality values, professionalism, freedom, cost utilization and targeted/ effective principles. Strengthening the country's disaster risk management by establishing a slew of regulations, laws, plans, and programs (25,31).

Effective Communication And Framework

Effective communication

In order to help their neighborhood to survive the flooding, community gathered together and developed their own self-help behaviors (16). It was possible for local community to manage themselves and also support other neighboring communities. To ensure their survival, flood-prone populations are capable to manage and handle the crisis (7). Include events where the local population organizes to work together by constructing dam enclosures, packing sand bags, transmitting up-to-date information to each other, distributing food and medication, etc., to protect their homes and local roads from flooding. Instead of waiting and relying solely on government funding, they have come up with their own ideas and technologies to reduce the possibility of floods (32).

Social connection

CBDM relies on the importance of social relations between members of the community and "community-based organizations" (CBOs) that support their needs (33). Social trust, attachment, connection is a community resource or kind of intangible capital that assists a community in achieving its shared objectives, such as DRR, population recovery, and post-disaster rebuilding. (11). Residents' ability to react and recover from a catastrophe demands that they have access to suitable information on the danger and adequate processes for responding (34).

Intensive Mutual Assistance

It was observed that intense mutual aid was taken seriously at the neighborhood level, and their ability to respond efficiently and adequately to flooding or other crises could be strengthened by involving the media and allowing the public a more involved role (35).

Preparedness

Participation, trust, unity and reciprocity, grounded in joint empathy and a sense of collective responsibility, are mutually strengthening ideals at the core of government and good citizenship in the execution of such an initiative (26). It is also important to provide community planning systems consisting of public consultation and public participation. To brace the population facing the rainfall season and flood disaster, extensive mutual assistance can be begun before the rainfall season (35). The intensive mutual assistance began before the rainy season. The community is provided with assistance starting from cleaning the bushes and rubbish from rivers and gutters around the house. At the household level, starting with assistance in preparing emergency equipment that can be used when a flood strike. Community involvement has been started since assistance has made an evacuation plan, communication risk, and determination of shelters for affected communities (15).

Contingency plan

Contingency plan in the implementation of CBDM is required. Community active in the development of the response plan, including the prevention of hazards, the

disaster-stricken regions, the refugees' situation, the number and characteristics of those affected, and the community's access to help, the length of assistance required. In cooperation with similar agencies, the educational agency will help the contingency plan process (15). continuing education in the application of DRR ranging from community level to individual is still carried out in assisting the successful execution of sustainable CBDM.

Integrating Community-Based Disaster Management In Health Care Education Curricula

Till date very few information to integrate the community-based disaster management in disaster nursing curricula. Several articles show the integration the CBDM in disaster medicine curricula (36). However, University Gadjah Mada Indonesia has special project to integrate the CBDM in disaster curricula for health student (medical education, nutrition and nursing study programs). In this project, the health students were involved in disaster family plan, preparing vulnerable groups, as well as train the family member to evaluate everyone in the family's risk of vulnerability, and train those who are less susceptible to assist vulnerable individuals in groups and families. (37). Thus, students play an active role in monitoring and evaluating community involvement in the implementation of CBDM. Student assistance to the community can play a role in 2 directions, namely student learning to understand the the community's social life of in the implementation of CBDM, and the implementation of CBDM in an ongoing manner with the presence of students in integrated field practices.

CONCLUSION

Sustainable CBDM is a new model of the implementation disaster risk reduction. The key factor in sustainable CBDM is the community and contingency participation of the community. The community contain many persons such as government, NGOs, enterprises, and residents. The concepts of sustainable is the contingency participation of the community toward DRR. A strategy to make the CBDM sustainable including understanding the community, understanding disaster risk, strengthening disaster management governance, Effective communication and network, Intensive mutual assistance, Integrating CBDM in disaster nursing curricula. These strategies aim to make CBDM sustainable. Future research is needed to prove the implementation of this strategy in sustainable CBDM.

ACKNOWLEDGEMENT

Prof. Chiu-Chu Lin from School of Nursing, Kaohsiung Medical University, Taiwan.

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