

Article Review

Covid-19 Non-natural Disaster Mitigation: A Literature Review

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ABSTRACT

Non-natural disasters are defined as types of disasters that occur due to non-natural causes, including technological failure, modernization failure, epidemics, and disease outbreaks. One type of non-natural disaster that occurs in society is the Covid-19 pandemic. There is a need for disaster mitigation due to Covid-19 to minimize the risk of impacts that will or have occurred. This article was prepared to find out the diversity of disaster mitigation that has been implemented all this time. The research method used is literature study or a type of academic survey research where data is obtained from government website reports, expert studies, scientific literature, and research institute studies. This review describes disaster mitigation methods that have been implemented by individuals, schools, communities, hospitals, and governments to minimize the impact of the Covid-19 pandemic. There is cooperation between individuals, communities, and the government in realizing the fruitful implementation of non-natural disaster mitigation, especially COVID-19. Policies that are not on target and do not focus on handling the Covid-19 pandemic will not be able to minimize deaths from Covid-19, and the socio-economic impact of the spread of the virus will be massive and serious.

Keywords: Covid-19, Community Preparedness, Government Preparedness, School Preparedness, Disaster Mitigation

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INTRODUCTION

Non-natural disasters are defined as types of disasters that occurring due to non-natural incident including technological failure, modernization failure, epidemics, and outbreaks of disease¹. One type of non-natural disaster that occurred in the community last year was the Covid-19 Pandemic². The non-natural disaster of the Covid-19 pandemic that occurred in all countries in the world, including Indonesia, is a non-natural disaster or pandemic od disease that has a very large impact that affects all facets of life. The impact of the Covid-19 pandemic is global, short-term and long-term. Therefore, to minimize the risk of impacts that will or have occurred, quality disaster mitigation is required. All this time,

disaster mitigation has only focused on natural disasters, however, specific non-natural disaster mitigation is still very minimally presented. Disaster mitigation is an efforts taken with the goal of minimized the risks and impacts caused by the disaster to the community in disaster-prone areas³.

Non-natural disaster mitigation of the Covid-19 pandemic can be interpreted as efforts taken by individual, communities and governments to reduce the risk and impact of Covid-19 transmission in the community. There are four essentials that must be implemented in disaster mitigation, including information and maps of disaster-prone areas for each category of epidemic disaster, socialization to increasing public understanding and awareness in dealing with pandemic of disease, know what needs to

be done and avoided as well as how to save yourself if the epidemic of a disease occurs suddenly and regulation, arrangement of disaster-prone areas to reduce the threat of disaster⁴. Covid-19 is a virus that transmits from animals to humans. This virus and disease were first announced in Wuhan city, China in December 2019. On March 21 2020, the amount of Covid-19 cases was more increasing. In 2022, the incident of Covid-19 will begin to decline in Indonesia and the world⁵.

There is an opinion that the Indonesian government tends to assumed the Covid-19 as a mild problem. Several study results state that overconfidence and optimistic bias are related to risk perception, errors in decision making, inaccurate, which ultimately resulted to postponed behavior and tend to ignored existing information. When facing a disaster like Covid-19. some countries like USA, Indonesian and Italy tends to experience overconfidence and optimistic bias, as a result, the initial regulations for handling COVID-19 were less accurate, less alert, and not being able to prepared the logistics of providing personal protective equipment like mask, gloves, shield clothing and ventilator. All of these things was resulting in uncontrolled COVID-19 cases and resulted in many people died. The stigma that was formed at the beginning was that the Indonesian people were immune. Covid-19 unable to live in hot climates, making the Indonesian people trapped in the initial paradigm that was formed, thus potentially forming confirmation bias. This condition was seen during the Covid-19 phenomenon in several countries, including Indonesia which tends to present evidence to support the initial hypothesis, so that it influences the rapidity of handling Covid-19⁶⁻⁸.

This article will present the results of a literature review of Covid-19 non-natural disaster mitigation articles sourced from various references both domestically and abroad. The aim is to provide information to readers to find out the disaster mitigation approach model that has been applied all this time either by the community and government, because the Covid-19 pandemic occurred suddenly and all nations did not have proper preparation to facing the Covid-19 pandemic. Covid-19 pandemic occurred suddenly where all Nations did not have careful preparation in dealing with the Covid-19 pandemic. This information is expected to be a lesson for all of us.

METHOD

This research method is the literature review method. This article uses the current references on Covid-19 disaster mitigation both in Indonesia and abroad that we can adopt for the application of disaster mitigation models that are in accordance with the characteristics and conditions in the country.

The articles used as findings are adjusted to the specified inclusion criteria. Article inclusion criteria include international articles that can be accessed in full (full text) relating to: Journals related to Covid-19 MITIGATION, international journals published from 2016-2022 as well as international journals or journals that have ISSN standards.

RESULTS

Tabel 1. The Covid-19 Disaster Mitigation Model

Preparedness	Non-natural Disaster Mitigation Model: Covid-19
Disaster Mitigation Strategy of Covid-19 in Hospitals	1. The predictive models. The hospital made projections on the amount of cases, inpatient care and deaths caused by Covid-19 over the next few weeks. The goal is to anticipate the need for care such as: Personal protective equipment, ventilator, number of rooms and bed for patients ⁹ .
	2. <i>Susceptible-exposed-infectious-recovered Models</i> This model applied separates individuals who are susceptible to exposure to Covid-19 and those who easily recover quickly. This approach estimates the health interventions an individual will receive, the severity of clinical symptoms and the risk for hospitalization ¹⁰ . Improved human resources with the formation of a first-line implementation team, clear division of tasks and provision of communication ways between medical staff ¹¹ .
	3. <i>Hospital safety index model</i>

Preparedness	Non-natural Mitigation Model: Covid-19	Disaster
	The hospital has increased the role of human resources by forming a disaster committee team, make emergency response plans and ensuring drug availability, instruments, and equipment in disaster situations ¹² .	
	4. <i>Information technology models</i> Hospitals use an information technology approach by developing applications called Hospital Preparedness with the aim of supporting hospitals and stakeholders to carry out a self-assessment regarding hospital preparedness in facing emergencies caused by Covid-19 ¹³ .	
	1. <i>Applied behavior analysis models</i> This method uses a behavioral analysis approach for medical personnel. This approach aims to prevent transmission of Covid-19 to medical personnel who provide health services during the Covid-19 pandemic. Medical personnel are advised to provide services via telehealth and minimize face-to-face contact ¹⁴ .	
Disaster Mitigation Strategy of Covid-19 for Medical Personnel	2. Systematic modeling. Systematic modeling of COVID-19 transmission and mitigation strategies in the ICU that implemented by limiting physical distance between patients and medical personnel to reduce the risk of transmission.	
	1. Nutritional approach. Nutrition is very important to prevent transmission of the Covid-19 virus. The certain nutrients able improve physical and mental health during the COVID-19 pandemic ¹⁵ .	
Disaster Mitigation Strategy of Covid-19 in the community	2. <i>Mitigation self-behaviors approach</i>	

Preparedness	Non-natural Mitigation Model: Covid-19	Disaster
	This approach utilizes changes in individual behavior to avoid transmitted Covid-19 by implementing government-recommended behavior such as washing hands, wearing a mask, keep the distance, avoid crowds and restaurants, places of worship and social activities ^{16,17} .	
	3. Modulation limit contact with new people model Based the research results, repeated contact with interconnected groups (such as at work or within a group of friends) has a lower risk of infected Covid-19 compared to contact with new people ¹⁸ .	
	4. The vaccination and antibody therapy for Covid-19 Predict and mitigate the threat of Covid-19 infection by get vaccinated and antibody therapy for Covid-19 ¹⁹⁻²¹ .	
	5. Lockdown model The community-based mitigation strategy model is implemented by complying with many regulations such as travel restrictions, including reductions in flights and public transportation and crowd-raising activities and get information from authorized government both nationally and internationally to ensure information received about Covid-19 was valid to avoid fake news, rumors and panic ²² .	
	6. <i>Non-Pharmaceutical Interventions (NPIs)</i> Implementation of model lockdowns (NPIs) which means minimizing drug interventions ²³ .	
Disaster Mitigation Strategy of Covid-19 for	1. Division of the student population model The approach is utilize the approach of dividing the	

Preparedness	Non-natural Mitigation Model: Covid-19	Disaster
students at school	number of students into two parts and going to school alternately for face-to-face learning. In addition, regular Covid-19 tests are also needed on teachers and students. Other disaster mitigation measures are also implemented, such as wearing masks, keep distance, improve air ventilation ²⁴ .	
	2. <i>Comprehensive Health School Model (CHSM)</i> Assessment of school readiness to prevent and minimize Covid-19 risks with instruments that include four components of the social and physical environment, teaching and learning, healthy school policies and partnerships and services. Implementation of CHSM in schools is done by arranging the the distance between student seats, open the windows or ventilation and provide disinfectant in the classroom ²⁵ .	
	3. Curriculum adjustments models The school implemented a flexible approach during the Covid-19 pandemic which meant that flexibility to choose a curriculum that retrieved the learning needs of students during the pandemic, distance learning (online) combined with face-to-face learning (hybrid). Face-to-face learning is carried out with implementing health protocols, students and teachers have been vaccinated of Covid-19, and reduced the capacity of students in the same classroom ²⁶ .	
	4. Disaster mitigation education models Implementation of disaster mitigation through	

Preparedness	Non-natural Mitigation Model: Covid-19	Disaster
	education and socialization on preparedness for Covid-19 ^{27,28} . Education can also be conducted by utilizing videos related to Covid-19 disaster mitigation through android smartphones ^{29,30} .	

DISCUSSION

Covid-19 virus is a national disaster as a result all levels of society must take an active role to minimized and improved the behavior of preventing the transmission of Covid-19. The transmission of Covid-19 is very active, was effec in a large number of cases and increasing the death rate. Therefore required the forwardness and preparedness in community to againts the transmitted of this virus. There is community forwardness in preventing disease, standard procedure when exposure and after exposure, able conduct of transmitted and minimize the risk of disadvantage that will be experienced^{31,32}.

There are many methods use to increase community preparedness. One of which is also done by utilizing technology. The health promotion with targeting the general community can be implemented through social media which is useful as an effective learning media. The amount of information obtained, will increase knowledge that is practical for implementing healthy behavior in againts Covid-19³³. Government strategy in the health sector in non-natural disasters Covid-19 mitigation for the community is the action to wear masks, especially when outside the home or public space, contact tracing, education and preparation of independent isolation and hospital isolation³⁴. The health behavior recommended for implementation are keeping health protocols with the habit of washing hands, exercise, wear the mask, keep distance, use hand sanitizer, practice sneezing etiquette, capable to managing stress and eating of nutritious food³⁴.

Risk reduction through mitigating non-natural disasters due to Covid-19 is also done with the same efforts as when againt natural disasters that is community-based disaster risk reduction that has been implemented in Indonesia all this time. The Implementation of a community-based disaster risk reduction

models have been done through a many of activities including the formation of Disaster Resilient Families, Disaster Resilient Village, Disaster Preparedness Village, Disaster Preparedness Cadets in order to increase preparedness and prevention and avoid (prevented and blocked) the potential case and transmission of the Covid-19 pandemic³⁵.

The community mitigation strategies, also include at the individual level. It requires awareness and responsibility individuals to always apply transmission prevention measures to protect people at high risk of Covid-19. After individual level mitigation, Covid-19 disaster mitigation also needs to applied in schools offices and community organizations. Each region needs to do a disaster risk survey of Covid-19 in high risk areas. Disaster risk be the foundation for reasoning to accentuate disaster management efforts in regional development³⁶.

There are many steps taken by the Government to mitigate the Covid-19 disaster. Among others are issued a number of policies related to Covid-19, such as increasing the role of related sectors such as the ministry of health, formation of the Covid-19 cluster, guidelines regarding Covid-19 preparedness and management to prepare a circular compiling government regulatory circulars regarding Covid-19 to be implemented by regional governments. Providing logistics for health protocol equipment for hospitals and other health service institute, procurement of evacuation facilities, prepare of referral hospitals, build the posts, improved of public information technology-based, building a positive paradigm between stakeholders, increasing the role of the epidemiological surveillance system in regularly and periodically, regional quarantine, limitation of foreigner to come in Indonesia and many else³⁷. The regional government is implementing one of the Covid-19 mitigation strategies by utilizing the call center hotline to give clear information, immediate, and bidirectional. The role of the hotline call center is expected to increase community preparedness by providing accurate information, real-time, and persuasive to adjust applicable health protocols and can also be used as a tool of good risk communication for the community³⁸.

Hospitals are also one of the health service institute that had to improve when the Covid-19 pandemic was declared. The hospital preparedness in againts the Covid-19 pandemic

intend to confirm that hospitals are ready at all times to respond to emergency conditions due to Covid-19. Disaster mitigation strategies due to Covid-19 implemented by hospitals include: division of duties and responsibilities for each hospital staff. Furthermore have to prepare of human resources by forming a Rapid Reaction Team (RPT), Communication system support facilities in hospitals can be improved by using Handy Talky (HT), Routing Information Protocol, mobile phones and telephones and improve the process of managing emergency situations¹¹. In addition, hospitals can also form disaster emergency teams and arraged emergency response plans and confirmed drug availability, instruments, equipment for disaster situations to prove that the hospital can be used as a referral for patients exposed to Covid-19¹². Another strategy can also be taken by hospitals with conducting self-efficacy to measure abilities a hospital receiving a surge patients caused Covid-19. Self efficacy can be done by utilizing the Hospital Preparedness application¹³.

One of the school strategies in implementation of disaster mitigation caused Covid-19 is the hybrid method where schools practice the online learning combined with face-to-face learning. However, for face-to-face learning there are several requirement that must be applied are teachers and students must vaccinated, wear masks, keep distance and Class capacity is 50% occupied²⁶.

The Covid-19 disaster mitigation strategy is also done through education. because according to research results, there is compliance with the implementation of health protocols as recommended by the government is influenced by individual knowledge about Covid-19³⁹. The need for disaster mitigation education from an early age in the community is not only carried out through formal education in schools, but also through non-formal education by collaborating with related organizations related to the prevention of Covid-19. Disaster mitigation activities for school children can be carried out through disaster mitigation training, simulations, outreach about disaster preparedness in schools²⁷. Education for students can also be carried out by utilizing the SIGAP covid-19 application technology which is short for preparedness for the coronavirus disease (covid-19) pandemic which is developed in a game so that it can attract students' interest in

knowing about covid-19. The SIGAP application consists of educational material such as washing hands, increasing endurance, questions, preventing Covid-19 and other material²⁹.

CONCLUSION

The Covid-19 mitigation strategy in hospitals is carried out by using information technology and patient triage. Medical personnel utilize telehealth and social distance and use personal protective equipment. Covid-19 mitigation in the wider community is applied with maintaining of nutritional intake, social distance and local lockdown. Meanwhile, mitigation in schools applied with modified online learning methods through the use of smartphones and face-to-face learning is still implemented but by reducing the capacity of students in the classroom.

There needs to be teamworks between the government, community, hospitals and other institutions in realizing the successful implementation of non-natural disaster mitigation, especially Covid-19. It is recommended that the community to participate actively with the local government in implementing regulations and complying with health protocols to minimize the risk of the impact of Covid-19 on the wider community.

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