Journal Of Nursing Practice
https://thejnp.org/
ISSN: 2614-3488 (print); 2614-3496 (online) Vol.9 No.4. July 2026. Page.860-874

Evaluation Flood Disaster Management System in Primary Health Centers in East Java

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ABSTRACT

Background: Floods are the most frequent disasters in Indonesia, namely 3885 since 1815-2019. The cause of the high morbidity and mortality rates due to floods is the disruption of the continuity of Primary Health Centers services during a disaster. Primary Health Centers play a role in disaster management which includes pre-disaster, during disaster, and post-disaster.

Purpose: This study examines the flood disaster management system at Primary Health Centers.

Methods: This quantitative descriptive study involved 60 flood-prone Primary Health Centers in East Java. The instrument used to measure the role of Primary Health Centers is a questionnaire. The questionnaire contained 18 indicators. Seven indicators were used in the pre-disaster phase, five in the during-disaster phase, and six in the post-disaster phase. Data analysis was performed using frequency distribution and mean ± standard deviation.

Results: The distribution of disaster management systems shows the highest average value in the pre-disaster stage (4.28), followed by the post-disaster stage (3.80), and the disaster stage (3.65). The three stages have the same median value, namely 4.00, with the largest data variation seen in the post-disaster stage (standard deviation 2.916).

Conclusion: Practical implications for disaster preparedness policies at Primary Health Centers include developing emergency plans, routine training for health workers, and providing adequate emergency infrastructure. This policy ensures that primary health care facilities remain ready and responsive in the event of a crisis.

Keywords: Disaster Management, East Java, Flood, Primary Health Centers

Received May 10, 2026; Revised June 12, 2026; Accepted July 3, 2026
DOI: https://doi.org/10.30994/jnp.v9i4.1144

ISSN: 2614-3488 (print); 2614-3496 (online) Vol.9 No.4. July 2026. Page.860-874

BACKGROUND

Flood disaster is one type of hydrometeorological disaster whose frequency of occurrence increases every year. This is influenced by climate change (Klipper IG, Zipf A, 2021). Floods are the most frequent disaster in Indonesia, namely 3885 since 1815-2019 (Fitriyani, et al. 2021). The same thing was also stated by Azizah who stated that flood disasters are the riskiest disasters in Indonesia (Azizah, et al. 2021). According to the National Disaster Management Agency (BNPB), during 2022 there were 1,493 flood disasters. According to the 2022 Indonesian Disaster Risk value (IRBI), East Java Province has a moderate disaster risk value of 121.70. East Java faces a medium-high risk of flooding (BNPB, 2018).

Previous studies have shown that floods have an impact on increasing morbidity rates due to increased risk of cholera, scabies, taeniasis, rhodesian sleeping sickness, malaria, alphavirus, and favivirus infections (Suhr F, 2022). The cause of the high morbidity and mortality rates due to flooding is the disruption of the continuity of Primary Health Centers services during a disaster. Primary Health Centers play a part in disaster management before, during, and after a crisis (Pedoman Penanggulangan Bencana Bidang Kesehatan (Health Sector Disaster Management Guidelines), 2007).

Professionals from Primary Health Centers are crucial to their communities at every stage of the disaster management process (Willson, K.A., FitzGerald, G.J. and Lim, 2021). Prior research has demonstrated that Primary Health Centers' involvement in pre-disaster management have evacuation routes, resource inventories according to potential hazards that may occur, have been able to receive and follow up on early warning information, health teams in the Task Force and have carried out cross-sector coordination. However, Primary Health Centers currently only have an impact map rather than a geomedical map of disaster-prone locations (Laba, et al. 2023). This is consistent with other research demonstrating the poor performance of disaster mitigation in Primary Health Centers. Additionally, geomedical maps, evacuation routes, and early warning systems that require improvement are elements of Primary Health Centers that can lessen risk (Ramadhani, S.A. and Haksama, 2023).

The novelty in this study is evaluating the disaster management system, especially flood disasters in the pre-disater, during-disaster, and post-disaster phases. Simultaneous evaluation of the pre-, during-, and post-disaster phases provides a holistic understanding of the interrelationships between phases often overlooked by partial studies, while East Java is crucial due to its geographic complexity and high hazard variability. Flood disaster management system evaluation is a continuous cycle that assesses the interrelationships between the effectiveness of pre-disaster mitigation, emergency response during the event, and the speed of post-disaster recovery. Furthermore, it allows for policy linkages by identifying coordination gaps between phases that are not visible if evaluations are conducted separately or partially. Simultaneous evaluation of the pre-, during-, and post-disaster phases allows for resource efficiency through comprehensive mapping of budget and personnel allocations to ensure targeted interventions with new knowledge at all levels.

OBJECTIVE

This study examines the flood disaster management system at Primary Health Centers.

METHODS

This study used an observational study with a descriptive design to assess health facilities' function in the flood disaster management system using eighteen indicators (Pusat

Krisis Kesehatan, 2011). This study was conducted for three months in 2022. All Primary Health Centers situated in East Java's flood-prone regions the Bengawan Solo River, Brantas River, Welang-Rejoso River, Kemuning Sampang River, Bajul Mati Banyuwangi River, Pekalen Situbondo River, and Bondoyudo Lumajang River were the study's target population as many as 60 Primary Health Centers. The sampling technique used the total population. When using the complete population sampling technique, the sample size is equal to the population. Since there are less than 100 people in the population, the entire population is employed as a research sample.

The device for measuring the role of Primary Health Centers is a questionnaire compiled by researchers based on a literature review. Respondents in this study filled out a questionnaire that had been evaluated for reliability and validity. Based on the study, a validity test employing the Reproducibility Coefficient formula obtained a value of Kr = 0.903 where Kr> 0.90, consequently, the repeatability coefficient value is approved, and the scalability coefficient on questions with weighting using the Guttman scale is declared valid obtained a value of Ks = 0.903 where Ks> 0.60, so the value of the scalability coefficient is accepted. From the analysis a dependability value of 0.843 was found by applying the Guttman Split-Half Coefficient. According to Priyatno (2013), a dependability rating of 0.7 is acceptable, 0.8 is good, and less than 0.6 is not good. Since the reliability value = 0.843 > 0.7, it can be deemed acceptable.

A questionnaire with eighteen indicators was utilized to collect data. Indicators in the pre-disaster phase consisted of 7 indicators, including making a geomedical map of disaster-prone areas, making evacuation routes, conducting training, inventorying resources according to potential hazards that may occur, receiving and following up on early warning information for health preparedness, forming a field health team that is part of a task force, and coordinating with cross-sectors. Indicators in the disaster phase consisted of 5 indicators, including victim rescue operations based on triage, rapid initial assessment, surveillance of infectious diseases and nutrition, joining the health task force at the field post, and community empowerment. Indicators in the post-disaster phase consisted of 6 indicators, including basic health services in shelters by establishing field health posts, checking clean water and monitoring environmental sanitation, surveillance of infectious diseases and malnutrition that may arise, outbreaks of infectious diseases and malnutrition, efforts to restore mental health problems and nutritional problems in vulnerable groups, and community empowerment. The collected data were then analyzed using frequency distribution. One researcher collected data from January to March 2022, and each participant gave written informed consent expressing their desire to take part in the study.

Data analysis was performed using SPSS ver. 22 after data collection, cleaning, and organization. Respondent characteristics (accreditation, work area, flood vulnerability level, and disaster management system indicators) were described using frequency distributions for categorical data and disaster management system (pre, during, and post) were described using mean ± standard deviation for numerical data. The following are the assessment categories of the disaster management system at each stage.

Pre-disaster (Mean: 4.28; SD: 2.124; Min-Max: 0-7)
Good ≥ 5.34, Moderate 3.22 – 5.33. Poor < 3.22.
During-disaster (Mean: 3.65; SD: 1.424; Min-Max: 1-5)
Good ≥ 4.37, Moderate 2.23 – 4.36. Poor < 2.23.
Post-disaster (Mean: 3.80; SD: 2.916; Min-Max: 0-6)
Good ≥ 5.26, Moderate 0.88 – 5.25. Poor < 0.88

The Faculty of Nursing at Universitas Airlangga granted ethical approval for this study, with reference number 2317-KEPK.

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RESULTS

Table 1. Baseline Primary Health Centers Characteristic in East Java Province, Indonesia

Characteristic	Category	n	%
Accreditation	plenary	2	33.0
	main	7	11.7
	middle	41	68.3
	basic	10	16.7
Work area	rural	36	60.0
	urban	24	40.0
Level of flood vulnerability	high	58	96.7
	moderate	2	3.3
Total		60	100.0

The standards for Primary Health Centers are above average, and Table 1 revealed that 68.3% of Primary Health Centers have intermediate accreditation, which is a reasonably good outcome. 60% of primary health centers are found in rural work areas, which are defined as those whose work areas satisfy at least three of the following four requirements: more than half of the population is employed in the maritime or agricultural industries, the distance between schools is more than 2.5 km, markets and cities is more than 2 km, and hospitals are more than 5 km, households that use electricity are less than 90%, and there is road and transportation access to facilities (Penanggulangan Krisis Kesehatan (Health Crisis Response), 2019). 96.7% of primary health centers are situated in places that are directly connected to rivers, making their work spaces highly vulnerable to flooding.

Table 2. Numerical Distribution of Primary Health Centers Disaster Management Systems in East Java, Indonesia

No.	Disaster Management System	Mean	Median	SD	Min-Max
1	Pre-disaster	4,28	4,00	2,124	0-7
2	During-disaster	3,65	4,00	1,424	1-5
3	Post-disaster	3,80	4,00	2,916	0-6

Table 2 shows that in the pre-disaster stage, the average value was 4.28; range 0–7 (the greatest of all phases); median 4.00; standard deviation 2.124. The disaster stage had an average of 3.65, a median of 4.00, a standard deviation of 1.424, and a range of 1–5 (the least amount of data variance). The post-disaster stage had an average of 3.80, a median of 4.00, a standard deviation of 2.916, and a range of 0–6 (the largest data variation). Primary Health Centers in East Java had the highest average value in the pre-disaster stage of the disaster management system distribution (4.28), the post-disaster stage (3.80) and the disaster stage (3.65) come next. All three stages had the same median value, namely 4.00, with the largest data variation seen in the post-disaster stage (standard deviation 2.916).

Table 3. Frequency Distribution of Disaster Management Systems at Primary Health Centers in East Java, Indonesia

No.	Disaster Management System Indicators	Availability	
		yes n (%)	no n (%)
	Pre-disaster		
1	Making geomedical maps of disaster-prone areas	41 (68.3%)	19 (31.7%)

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No.	Disaster Management System Indicators	Availability	
		yes n (%)	no n (%)
2	Making evacuation routes	28 (46.7%)	32 (53.3%)
3	Conducting training	20 (33.3%)	40 (66.7%)
4	Inventorying resources according to potential hazards that may occur	48 (80.0%)	12 (20.0%)
5	Receiving and following up on early warning information for health preparedness	38 (63.3%)	22 (36.7%)
6	Forming a field health team that is part of a task force	36 (60.0%)	24 (40.0%)
7	Conducting coordination with cross-sectors	46 (76.7%)	14 (23.2%)
	During-disaster		
8	Rescue operations for victims based on triage	38 (63.3%)	22 (36.7%)
9	Rapid initial assessment	37 (61.7%)	23 (38.3%)
10	Surveillance of infectious diseases and nutrition	58 (96.7%)	2 (3.3%)
11	Joining the health task force at the field post	48 (80.0%)	12 (20.0%)
12	Community empowerment	38 (63.3%)	22 (36.7%)
	Post-disaster		
13	Basic health services in shelters by establishing field health posts	38 (63.3%)	22 (36.7%)
14	Clean water checks and environmental sanitation monitoring	38 (63.3%)	22 (36.7%)
15	Surveillance of infectious diseases and malnutrition that may arise	38 (63.3%)	22 (36.7%)
16	Outbreaks of infectious diseases and malnutrition	38 (63.3%)	22 (36.7%)
17	Efforts to restore mental health problems and nutritional problems in vulnerable groups	46 (76.7%)	14 (23.2%)
18	Community empowerment	38 (63.3%)	22 (36.7%)
	Total	100 (100.0%)	100 (100.0%)

Table 3 showed that the most of the pre-disaster management systems are in the resource inventory indicator according to the potential hazards that may occur (80%), most of the during-disaster management systems are in the indicators of infectious disease and nutrition surveillance (96.7%), and most of the post-disaster management systems are in the indicators of efforts to restore mental health problems and nutritional problems in vulnerable groups (76.7%).

Table 4. Cross Tabulation of Pre, During, and Post Disaster Indicators on the Disaster Management System at Primary Health Centers in East Java, Indonesia

Disaster Stage	Category	Disaster Management System			Total n (%)
		Good n (%)	Moderate n (%)	Poor n (%)	
Pre-disaster	Good	22 (36.7)	1 (1.7)	0 (0.0)	23 (38.3)
	Moderate	3 (5.0)	0 (0.0)	3 (5.0)	6 (10.0)
	Poor	4 (6.7)	9 (15.0)	18 (30.0)	31 (51.7)
During-disaster	Good	28 (46.7)	9 (15.0)	3 (5.0)	40 (66.7)
	Moderate	1 (1.7)	0 (0.0)	4 (6.7)	5 (8.3)

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Disaster Stage	Category	Disaster Management System			Total n (%)
		Good n (%)	Moderate n (%)	Poor n (%)	
Post-disaster	Poor	0 (0.0)	1 (1.7)	14 (23.3)	15 (25.0)
	Good	29 (48.3)	9 (15.0)	0 (0.0)	38 (63.3)
	Poor	0 (0.0)	1 (1.7)	21 (35.0)	22 (36.7)
Total		29 (48.3)	10 (16.7)	21 (35.5)	60 (100.0)

Table 4 showed that the most of the Primary Health Centers have a pre-disaster management system in the poor category (51.7%), during a disaster in the good category (66.7%), and post-disaster in the good category (63.3%).

DISCUSSION

Pre-disaster Management System in Primary Health Centers

The analysis shows that most of the Primary Health Centers have a pre-disaster management system in the poor category. Referring to the data that has been collected, most of the pre-disaster management systems are in the resource inventory indicator according to the potential hazards that may occur. The resource inventory indicator according to the potential hazards that may occur is said to be appropriate if there are health workers and health service facilities/infrastructure and their locations (Pedoman Penanggulangan Bencana Bidang Kesehatan (Health Sector Disaster Management Guidelines), 2007). Resource inventory activities in potential hazards are the collection of data related to resources, both human resources and machine resources owned by a region or agency responsible for disaster management (BNPB, 2011). This is demonstrated by the Primary Health Centers working with the local city/district health office to evaluate the facility and equipment capacity program. The facilities and equipment of the Primary Health Centers, including treatment rooms, service rooms, and medical equipment, are enough in quantity and in good condition, according to basic data from the centers and researcher observations. The Primary Health Centers' accreditation status, which places the majority of them in the medium category, supports this. The Primary Health Centers must be accredited at least once every three years in order to enhance the quality of services (Akreditasi Pusat Kesehatan Masyarakat, Klinik, Laboratorium Kesehatan, Unit Transfusi Darah, Tempat Praktik Mandiri Dokter, Dan Tempat Praktik Mandiri Dokter Gigi. (Accreditation of Community Health Centers, Clinics, Health Laboratories, Blood Transfusion, 2022). Functionally, hospitals and other health services must consider factors to ensure the provision of appropriate medical services during a disaster, one of which is vital facilities (Samei, et al. 2024). Facility managers must comprehend the requirements of facilities and equipment in order to comprehend the risks and effects of disasters (Sulaiman, et al. 2020). This is consistent with studies that indicate a collaborative approach is important to maintain optimal inventory and reduce the risk of stockouts during a pandemic (Friday, et al. 2021). The urgent need for resilient infrastructure, strengthened community health systems, better health education, and better water and sanitation services is important to reduce health risks from flooding (Shah, et al. 2024). This is supported by research that states that disaster preparedness requires immediate intervention for building structural safety, water supply systems, fuel storage, emergency management committee organizations, office and storage equipment, furniture and equipment, and boosting worker capability through an organized and methodical training framework (Lestari, et al. 2022). Other studies have revealed that the majority of Emergency Medical Service (EMS) facilities in Iran have a moderate level of disaster preparedness (Beyrami Jam M,

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Aminizadeh M, Akbari-Shahrestanaki Y, 2024). Based on previous results and research, facilities and equipment are important to be equipped according to the needs of health centers in flood-prone areas. These facilities and equipment include, for example, the availability of water health centers or mobile health centers so that they can continue to provide basic health service activities if affected by floods.

Referring to the data that has been collected, a small part of the pre-disaster management system is in the indicator of holding training. Referring to the data that has been collected, more than half of the health centers do not hold training. The indicator of holding training is said to be appropriate if it forms a flood control community group, selects and determines several locations to be used as shelters during floods (BNPB, 2017). The Primary Health Centers offer broad training rather than training specifically in flood catastrophes. Only a tiny percentage of health centers have a flood catastrophe training curriculum that is updated on a regular basis, despite the fact that the majority of health centers understand the significance of preparedness exercises (rehearsals) and feel secure doing so. According to the findings of researcher observations and interviews, the local district or city health office typically conducts preparedness exercises (rehearsals) that include victim transfer, triage, basic skills for trauma treatment (BTLS), cardiopulmonary resuscitation (BCLS), and flood disaster management simulations. This is in line with the Primary Health Centers' disaster management initiatives, which include disaster management training (Pedoman Penanggulangan Bencana Bidang Kesehatan (Health Sector Disaster Management Guidelines), 2007) To increase readiness, disaster management training is crucial. This is consistent with a study by Thobaity et al. that found catastrophe exercises were the primary source of information and skills for Saudi Arabian nurses (Thobaity, et al. 2015). Training for mass casualties needs to involve various sectors from non-medical and public institutions that can improve preparedness for global events (Biswas, et al. 2022). Previous research results stated that disaster preparedness skills and training impact a person's knowledge, attitudes, and conduct, as well as the caliber of health workers (Widayatun W, 2016). The majority of emergency health care workers do not have adequate disaster preparedness (Azizpour I, Mehri S, 2022; Lestari, et al. 2023). To enhance emergency nurses' preparedness for disasters, particularly disaster management, hospitals and nurse managers must work together in an interdisciplinary and multidisciplinary manner. Emergency nurses can be better prepared for disasters by planning disaster simulation exercises, offering psychological support and safety considerations, and developing disaster nursing training programs (Wang, et al. 2023). Qualitative findings also showed that hospital managers attributed major changes in hospital resilience capacity to the pandemic and suggested that strengthening hospital resilience requires resilient staff, sustainable finances, and adaptive leadership and management (Ravaghi, et al. 2023). Previous disaster experience and training enhance disaster preparedness (Almukhlifi Y, Crowfoot G, Wilson A, 2021). Nurses' disaster experience, experience in drills, and review of disaster management plans have a positive impact on disaster perceptions. Disaster preparedness in the institution has a positive impact on disaster preparedness perceptions (Koçak HS, 2023). Disaster management drills positively influence participants' knowledge and attitudes (Kim CH, Do Shin S, Park JO, 2021). Disaster preparedness for healthcare professionals is important because they are the frontline workers protecting personal and public health amidst a global crisis (Su Z, McDonnell D, Ahmad J, 2023). Previous studies stated that 91.7% need regular training and lectures for nurses and midwives, while 88.7% stated that emergency and disaster response simulation exercises should be conducted to adequately prepare nurses and midwives to deal with emergency events (Dzakpasu, et al. 2023). The attitude and familiarity of health workers about where and how to access essential resources must be reinforced in case of an

emergency or tragedy (AlHarastani, et al. 2021). Participation in health care personnel exercises helps build a disaster medical care system, coordination mechanisms among stakeholders, increase motivation among health care personnel, and develop systems in hospitals (Minato Disaster Medical Care System Study Group., 2023).

The local community participates in disaster management training in addition to the medical staff at the Primary Health Centers. Previous studies have identified three important areas for improving disaster preparedness, namely that primary care teams must be more interdisciplinary, primary care services must be more fully integrated into the broader health system, and the lack of awareness of disaster risk reduction principles among Primary Health Centers professionals (Lamberti-Castronuovo, et al. 2024). This is consistent with studies that indicate local governments need to develop urban flood management policies and for urban residents to increase emergency preparedness capacity (Liu, et al. 2024). Previous research revealed a positive and statistically significant relationship between exposure and community risk perception, a strong relationship between risk perception and flood experience, a significant relationship between risk perception and trust, and a greater desire to take better protective measures among those who were aware of the possibility of flooding and flood-related fatalities (Ge, et al. 2021). Subjective norms and participation cognition have an impact on public participation in the disaster mitigation model community, whereas perceived behavioral control, risk perception, prior disaster experience, and participation cognition have an impact on community behavior in non-model communities and have a higher potential for disaster mitigation community development (Que, et al. 2022). There are organizations in Indonesia that are prepared to be used to support the flood disaster management program's success. In partnership with the Indonesian Red Cross (PMI), the Sitiarjo Health Center, Malang Regency regularly supports high school student organizations like Saka Bakti Husada (SBH) and Community-Based Disaster Preparedness volunteers (SIBAT). First aid, basic life support, and disaster preparation are all covered in the course. Primary Health Centers' pre-disaster readiness is weak due to limited budget allocations specifically for mitigation. This is because prevention and preparedness training are rarely a top priority. Not all Primary Health Centers have clear maps or data on disaster-prone areas around their locations, which is a weakness in disaster risk mapping.

During-disaster Management System in Primary Health Centers

The majority of Primary Health Centers had an effective disaster management strategy, according to the study's findings. Referring to the data that has been collected, most disaster management systems have indicators of infectious disease and nutrition surveillance. Infectious disease and nutrition surveillance indicators are said to be appropriate if they carry out environmental management, control with insecticides, supervision of food and beverages, or optimal food provision (Pusat Krisis Kesehatan Kementerian Kesehatan, 2011). Previous studies have stated that floods have an impact on increasing morbidity rates caused by increased risks of cholera, scabies, taeniasis, Rhodesian sleeping sickness, malaria, alphavirus, and favivirus infections (Ma Y, Wen T, Xing D, 2021; Rahman, et al., 2021; Suhr F, 2022; Acosta-España JD, Romero-Alvarez D, Luna C, 2024). There is a connection between post-disaster disease outbreaks and their hazards, according to earlier research. Future disaster risk reduction in some areas can be enhanced by an understanding of risk variables and their effects (Charnley GE, Kelman I, Gaythorpe KA, 2021). Floods highlight the need for urgent action due to the significant impacts of climate change, thus requiring effective flood response and preparedness strategies in developing countries that are vulnerable to natural disasters (Alied, et al. 2024). Epidemics and breakouts are more frequent and impact a greater population during floods. Infectious disorders, reproductive health, and even mental health concerns are among the many challenges that people

encounter during floods. It's critical to understand the typical issues that people face during floods in order to design effective health care programs (Ochani, et al. 2022). Additional research indicates a connection between flood disasters and climate change, which could exacerbate food shortages (Atanga RA, 2021). Floods may have increased the spread of vector-borne and waterborne illnesses. To treat the injured, supply medical facilities with necessary supplies, and assist mobile health teams in impacted areas, a quick health emergency response must be started (Raza M, Fatima A, Habiba U, 2023). Regular flood monitoring and early warning systems are also required (Glago FJ., 2021). Referring to the data that has been collected, a small part of the disaster management system is found in the initial rapid assessment indicator. The initial rapid assessment indicator is said to be appropriate if a series of activities are carried out aimed at identifying the location of the incident, the time of the disaster, the type of disaster that occurred, the estimated number of victims, additional potential risks, or the population exposed to the disaster (Pedoman Penanggulangan Bencana Bidang Kesehatan (Health Sector Disaster Management Guidelines), 2007). Previous research has shown that the emergency medical team (EMT) functions most efficiently during a disaster (Hamilton AR, Södergård B, 2022). The study's findings demonstrated that healthcare professionals do not yet have an optimal role in disaster emergency response because resources have not been managed comprehensively and the mobilization of health workers has not been optimal (Rahayuningsih R, Surjoputro A, 2022). In addition to the increasing need for health workers, emergency service (EMS) calls have also increased. This is shown by research which states that during the COVID-19 outbreak, there was a global phenomenon in the form of an exponential increase in EMS calls (Al Amiry A, 2021).

Flood disaster management at Primary Health Centers was considered good due to the preparedness of trained and responsive officers in conducting evacuation and triage of patients, fast cross-sector coordination such as good cooperation with the sub-district, district, and local BPBD, as well as targeted emergency health services, namely the establishment of health posts at evacuation sites so that residents' access to treatment remains easy and the availability of emergency medicines and medical equipment that are quickly distributed.

Post-disaster Management System in Primary Health Centers

According to the study's findings, the majority of Primary Health Centers have a good post-disaster management system. Referring to the data that has been collected, more than half of the post-disaster management system is found in the indicators of efforts to restore mental health problems and nutritional problems in vulnerable groups. Primary Health Centers have recovery activities are centralized in the local Regional Disaster Management Agency (BPBD), therefore a dedicated unit is in charge of recovery and reconstruction work pertaining to public and individual health initiatives. According to the study, Primary Health Centers implement recovery strategies for communities, assess community health status, enhance social health or public health interventions, rehabilitate flood victims, and arrange psychological consultations for impacted victims in conjunction with psychiatrists as part of promotive and preventive efforts. The interview's findings demonstrated that when infrastructure, buildings, and facilities sustained damage that interfered with essential medical services, Primary Health Centers' physical recovery was restored. This is in line with PMK No. 75 of 2019 concerning Health Crisis Management, which stipulates that the goal of post-health crisis management is to improve and safeguard the health system by returning it to pre-health crisis settings (Penanggulangan Krisis Kesehatan (Health Crisis Response), 2019). According to research, there are chances to improve resilience by pursuing more tiered governance that supports grassroots and community-level networks and incorporates a variety of stakeholders. Plans for long-term recovery must be comprehensive in order to close current

gaps and promote a sustainable society (Marome W, 2021). Flood victims require preventive, supportive, therapeutic, and effective treatments because PTSD is relatively common among them (Golitaleb M, Mazaheri E, Bonyadi M, 2022). According to studies, there is a connection between disasters and poorer mental health results. Relocation and the interruption of vital services raise the risk of psychological morbidity and mortality (Keya, et al. 2023). To achieve effective flood management, proactive risk-based strategies are needed and the need to increase district health systems' ability to react to health care service needs during floods (Manzoor Z, et al. 2022). Thus, to be better prepared for future disasters, it is imperative for governments and international agencies to prioritize funding policies (Gan CC, et al. 2021). In response to changing flood scenarios, an evacuation framework is needed (Yazdani M, Mojtahedi M, Loosemore M, 2022). Previous studies have suggested that the general public should be involved in discussions so that they are aware of the risks and the reasons for the actions they should take during a disaster (Simonovic SP, Kundzewicz ZW, 2021). Disasters impact both physical and psychological issues. People are more susceptible to a variety of illnesses when access to clean water, sanitary facilities, and medical care is compromised by natural catastrophes and extreme weather events brought on by climate change. Both communicable and non-communicable diseases can be brought on by floods and droughts (Moyo E, et al. 2023). Studies have suggested that disasters acutely affect the psychological well-being of children and adolescents, often leading to mental health challenges (Powell T, Wegmann KM, 2021). Multi-sectoral cooperation is required to co-design and implement integrated interventions, such as flood risk reduction, urban land use planning, and enhanced waste management to lower disease risk and improve health, in addition to providing clean drinking water and sanitation (Ntajal J, et al. 2022). Post-disaster housing reconstruction in communities needs to be resourced effectively to avoid bottlenecks (Safapour E, Kermanshachi S, 2021). Previous disaster experiences offer useful insights for enhancing disaster risk management, which could influence policy, increase public awareness, and help Saudi Arabia create a more secure and resilient future (Al-Wathinani AM, et al. 2023). The government must address urgent issues as a priority and necessary steps must be taken to try and address the disaster (Iqbal M, Rabbani A, Haq F, 2022). Information and resource needs for flood-affected well users are presented and recommendations are made on how to improve flood preparedness and recovery (Gilliland AE, et al. 2021).

Post-flood disaster management at Primary Health Centers was effective due to effective cross-sectoral coordination with the sub-district, district, BPBD (Regional Disaster Management Agency), and the Health Office to expedite recovery. Emergency health services responded quickly, establishing emergency health posts, mobile clinics, and swiftly restoring the functions of the polyclinic and emergency room (ER). Optimal prevention of infectious diseases was achieved by officers actively preventing post-disaster illnesses such as acute respiratory infections (ARI) and diarrhea, as well as administering vaccines to vulnerable groups. This was inseparable from the active role of the community through the involvement of health cadres and local residents, helping to expedite the cleanup process and aid distribution.

Limitations based on the findings include this study's limited descriptive design, which only describes current conditions, thus unable to explain the causal relationships between variables in depth. The results only capture phenomena at a specific point in time without considering long-term changes or dynamics. The study uses self-report data (surveys/interviews), which are susceptible to respondent subjectivity, thus allowing for a high risk of bias, such as answers that do not match reality or respondents' tendency to provide answers that are considered positive. This study only has limited generalizability

within the East Java region, so the results cannot be directly applied or generalized to populations outside East Java due to differences in social and cultural characteristics.

CONCLUSION

The study's findings indicate that the flood disaster management system at East Javan Primary Health Centers was in the pre-disaster stage, with an average value of 4.28, a median of 4.00, a standard deviation of 2.124, and a range of 0–7 (the highest of all phases). The disaster stage had an average of 3.65, a median of 4.00, a standard deviation of 1.424, and a range of 1–5 (the least amount of data variance). In the post-disaster stage, the average value was 3.80; median 4.00; standard deviation 2.916; and range 0–6 (the widest data variation). The distribution of disaster management systems Primary Health Centers in East Java showed the highest average value in the pre-disaster stage (4.28), the post-disaster stage (3.80) and the disaster stage (3.65) come next. All three stages had the same median value, namely 4.00, with the largest data variation seen in the post-disaster stage (standard deviation 2.916).

The recommendations include 1) Continuous examination should be conducted to ensure better flood disaster management system in Primary Health Centers and 2) Suggestions for further researchers are to identify factors that can affect the pre-disaster management system.

ACKNOWLEDGMENT

The authors are grateful to the Primary Health Centers who provided support and the participants for the valuable responses that contributed to this research.

CONFLICTS OF INTEREST

The author declare no conflict of interest on this study.

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