GOLDEN RATIO OF DATA IN SUMMARY
VOLUME 7, ISSUE. 1 (2027)
Website: https://goldenratio.id/index.php/grdis

GOLDEN RATIO
ISSN [Online]: 2776-6411

DATA IN SUMMARY | HEALTH & MEDICAL SCIENCE

Analysis of Disaster Emergency Management Preparedness Based on the Hospital Safety Index: A Case Study at dr. Darsono Regional General Hospital, Pacitan Regency

Netty Nurnaningtyas[1], Arif Rianto Budi Nugroho[2], Yohana Noradika Maharani[3], Eko Teguh Paripurno[4], Jaka Purwanta[5]

[1, 3,4,5] Department of Disaster Management, Universitas Pembangunan Nasional "Veteran" Yogyakarta, Indonesia.
Email: nettynurna@gmail.com[1], yohananm101@gmail.com[2], paripurno@upnyk.ac.id[3], jaka.purwanta@upnyk.ac.id[4]
[2] Department of Geological Engineering, Universitas Pembangunan Nasional "Veteran" Yogyakarta, Indonesia.
Email: arif.rianto@upnyk.ac.id[2]

ARTICLE HISTORY

Received: October 07, 2026
Revised: November 04, 2026
Accepted: November 05, 2026

ABSTRACT
https://doi.org/10.52970/grdis.v7i1.2713

ABSTRAK

Indonesia is a disaster-prone country. According to the Indonesian Disaster Risk Index (IRBI), districts/cities and provinces in Indonesia have consistently been classified as having moderate or high disaster risk, with Indonesia recording some of the highest disaster-related mortality rates in the world, including in 2021 and 2022. Hospitals play an important role in disaster risk reduction and emergency response. This study employed a mixed-methods approach combining descriptive quantitative and qualitative methods. The quantitative approach was used to assess hospital preparedness based on the Hospital Safety Index (HSI), while the qualitative approach was used to examine the implementation of disaster-management policies at RSUD dr. Darsono Pacitan through observation and in-depth interviews. Based on the three HSI assessment criteria, the structural safety index was 0.46, the non-structural safety index was 0.55, and the emergency and disaster management index was 0.32. The overall HSI score of RSUD dr. Darsono Pacitan was therefore 0.46, corresponding to Category B. The study also identified several emergency-management elements requiring follow-up, including evaluation of additional rooms and facilities in accordance with applicable hospital building safety standards.

Keywords: Preparedness, Hospital Safety Index, Disaster.

I. Introduction

FroFrom a geoscientific perspective, Indonesia possesses unique geological and geographical characteristics that make it particularly susceptible to natural disasters. The country encompasses extensive continental shelf regions, including the Sunda Shelf and the Sahul Shelf, as well as the highest tropical mountain ranges, particularly the Central Mountains of Papua, which feature permanently snow-covered peaks. Indonesia is also characterized by exceptionally deep marine basins, including the Banda Sea, which reaches depths exceeding 5,000 meters, and the Weber Deep, which extends beyond 7,000 meters between two island arcs. Furthermore, the Indonesian archipelago lies at the convergence of two major global volcanic belts and several significant fold-mountain systems, contributing to its complex tectonic environment and high geological hazard potential (Analisis Risiko Bencana Indonesia, 2019). In addition to these geological

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411

conditions, Indonesia's tropical climate and strategic geographical position between two oceans and two continents increase its exposure to hydrometeorological hazards, including floods, landslides, flash floods, extreme weather events, high waves, coastal erosion, and drought. Prolonged drought conditions may also contribute to forest and land fires (Kajian Risiko Bencana Nasional Provinsi Jawa Timur 2023–2026, 2023). Indonesia is widely recognized as a disaster-prone country, as demonstrated by various national and international disaster risk assessments. According to the Indonesian Disaster Risk Index (IRBI), published by the National Disaster Management Agency (BNPB) since 2011 and periodically updated through 2024, provinces and districts/municipalities throughout Indonesia have consistently been classified as having moderate to high disaster risk, with none categorized as low risk. Furthermore, data from the Centre for Research on the Epidemiology of Disasters (CRED) covering the period 2008–2022 indicate that Indonesia consistently ranked among the ten countries most frequently affected by natural disasters. The country also recorded some of the highest disaster-related mortality rates globally in certain years, including 2021 and 2022 (Pedoman Rumah Sakit Aman Bencana [Safe Hospital], 2024).

Natural and human-induced disasters can affect hospitals both directly and indirectly, potentially disrupting their ability to deliver essential healthcare services. Direct impacts, commonly referred to as internal disasters, occur when hospitals are situated within disaster-affected areas and experience structural damage, operational disruptions, or internal emergencies such as fires, gas leaks, and infectious disease outbreaks. In contrast, indirect impacts, or external disasters, occur when hospitals are located near disaster-affected areas or are required to respond to emergencies originating outside their facilities. Such situations may involve mass-casualty incidents resulting from major transportation accidents, social conflicts, or civil unrest, requiring hospitals to function as emergency treatment centers, triage facilities, or coordination points for medical assistance (Pedoman Rumah Sakit Aman Bencana [Safe Hospital], 2024). Consequently, hospitals play a fundamental role in disaster management by ensuring the continuity of healthcare services, providing emergency medical treatment, and minimizing disaster-related morbidity and mortality (Pengenalan Karakteristik Bencana dan Upaya Mitigasinya di Indonesia, 2017; Purba et al., 2024). As essential components of healthcare systems, hospitals are also critical institutions for strengthening disaster preparedness, response capacity, and community resilience (Azarmi et al., 2022).

According to the World Health Organization (WHO), hospitals are integral components of social and healthcare organizations responsible for providing comprehensive curative and preventive services to communities (Pedoman Rumah Sakit Aman Bencana [Safe Hospital], 2024). In Indonesia, Minister of Health Regulation No. 3 of 2020 defines a hospital as a healthcare institution that provides comprehensive individual health services, including inpatient, outpatient, and emergency care. As the scope and complexity of hospital services continue to expand, the demand for qualified healthcare professionals, specialized infrastructure, and effective organizational management also increases. Hospitals operate as complex institutions with multiple responsibilities, encompassing healthcare delivery, education and training, research and development, and social services. Nevertheless, their primary responsibility remains the provision of comprehensive, accessible, and high-quality individual healthcare services. These responsibilities highlight the importance of maintaining hospital functionality and operational readiness, particularly during emergencies and disasters.

Pacitan Regency, situated in the southern part of East Java Province, Indonesia, covers approximately 143,247.5 hectares and administratively comprises 12 subdistricts and 171 villages and urban villages. Geographically, Pacitan Regency is bordered by Ponorogo Regency in East Java and Wonogiri Regency in Central Java to the north, the Indian Ocean to the south, Wonogiri Regency to the west, and Trenggalek Regency in East Java to the east. Its geographical position along the southern coastline of Java provides an important context for examining regional disaster risks and their potential implications for healthcare facilities. The administrative boundaries and geographical location of Pacitan Regency are illustrated in Figure 1.1.

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411



Figure 1. Map of Pacitan Regency
Source: Kajian Risiko Bencana Kabupaten Pacitan (2022)

Pacitan Regency has several potential disaster hazards based on the 2022 Pacitan Regency Disaster Risk Assessment. These include floods, earthquakes, tsunamis, forest fires, land fires, landslides, high ocean waves, drought, and extreme weather (RPB Pacitan, 2023). According to historical disaster records in Indonesia, an earthquake and tsunami occurred on June 3, 1994, affecting Pacitan Regency, particularly its coastal areas, where severe damage was reported in Sudimoro, Ngadirojo, Kebonagung, Donorojo, Pringkuku, and Pacitan subdistricts. This occurred because the area lies within the Grindulu Fault system, a fault zone associated with the tectonic plates that formed Java. The bay-shaped coastline of urban Pacitan may further exacerbate the impacts and losses if the area is struck by a tsunami (Kajian Risiko Bencana Kabupaten Pacitan, 2022). According to the 2021 Indonesian Disaster Vulnerability Index (IRBI), Pacitan Regency has nine potential disaster hazards: (1) floods; (2) flash floods; (3) landslides; (4) earthquakes; (5) extreme waves and abrasion; (6) forest and land fires; (7) extreme weather; (8) drought; and (9) tsunamis, as shown in Figure 1.2. Forest and land fires, drought, and tsunamis are classified as high-risk hazards, whereas floods, landslides, earthquakes, and extreme waves and abrasion are classified as moderate-risk hazards. Extreme weather is classified as a low-risk hazard. Overall, based on the various disaster hazards identified, Pacitan Regency is categorized as having a moderate level of disaster risk.

Table 1. Disaster Risk Classification in Pacitan Regency

No.	Hazard	Score	Risk Class
1	Flood	17.60	Medium
2	Landslide	11.73	Medium
3	Extreme Waves and Coastal Abrasion	11.73	Medium
4	Earthquake	10.56	Medium
5	Extreme Weather	6.65	Low
6	Forest and Land Fires	17.60	High
7	Drought	17.60	High
8	Tsunami	13.57	High
	Multi-Hazard	125.09	Medium

Based on Table 1, Pacitan Regency faces various disaster threats with different levels of risk. Floods, landslides, extreme waves and coastal abrasion, and earthquakes are classified as medium-risk hazards. Extreme weather is categorized as low risk, whereas forest and land fires, drought, and tsunamis are classified as high-risk hazards. Overall, the multi-hazard risk classification for Pacitan Regency is categorized as medium,

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411

with a total score of 125.09. These conditions highlight the importance of strengthening disaster preparedness and ensuring the safety and operational resilience of healthcare facilities, particularly hospitals.

RSUD dr. Darsono Pacitan is the only government-owned general hospital in Pacitan Regency, East Java Province, and serves as a credible referral center and the main referral hospital for victims of disasters and other emergencies occurring in Pacitan Regency. RSUD dr. Darsono is classified as a Type C hospital according to Decree of the Minister of Health of the Republic of Indonesia No. 009.8/Menkes/SK/I/1993. In addition, based on Regent Decree No. 188.45/291/408.21/2010, the hospital has operated as a fully autonomous Regional Public Service Agency (BLUD) since 2010. Given the high disaster potential in the region, periodic preparedness evaluations across all disaster-related areas are essential. Such evaluations are expected to contribute substantially to disaster preparedness policies and follow-up action plans. This can be achieved through the active involvement of all internal hospital components together with the district disaster coordination authorities, as well as the active and comprehensive participation of all components of RSUD dr. Darsono in disaster preparedness efforts.

II. Literature Review

2.1. Disaster Concept

A disaster is an event or series of events that threatens and disrupts the lives and livelihoods of communities due to natural, non-natural, or human-induced factors, resulting in loss of life, environmental damage, property loss, and psychological impacts (Pengenalan Karakteristik Bencana dan Upaya Mitigasinya di Indonesia, 2017). In disaster risk management, risk is determined by the interaction among hazards, vulnerability, and capacity. Disaster risk increases when hazard exposure and vulnerability are high and the capacity of a community or area to manage potential threats is limited (Du et al., 2015; Frazier et al., 2020). A hazard refers to an event, phenomenon, or condition that has the potential to cause casualties, property damage, and disruption to community life. Based on their characteristics and origins, hazards can be classified into five categories: geological, hydrometeorological, biological, technological, and environmental hazards (Pengenalan Karakteristik Bencana dan Upaya Mitigasinya di Indonesia, 2017). Vulnerability refers to the physical, social, economic, and environmental conditions that increase the susceptibility of individuals or communities to the impacts of hazards and limit their ability to cope with disasters (Pedoman Rumah Sakit Aman Bencana, 2024). Meanwhile, capacity encompasses the strengths, resources, knowledge, skills, and capabilities available to individuals, communities, and institutions to anticipate, prepare for, respond to, and recover from disasters (UNISDR, 2009).

2.2. Disaster Management Cycle

Disaster management encompasses a comprehensive set of activities designed to reduce disaster risks and address their impacts, including prevention, mitigation, preparedness, emergency response, rehabilitation, and reconstruction (Penanggulangan Bencana, 2007). According to Government Regulation No. 21 of 2008, disaster management in Indonesia is organized into three main phases: pre-disaster, emergency response, and post-disaster. The pre-disaster phase focuses on reducing disaster risks through planning, prevention, mitigation, preparedness, and early warning activities. Preparedness measures include developing contingency plans, conducting disaster simulations and drills, ensuring the availability of essential resources, and establishing effective information and communication systems. Meanwhile, mitigation aims to minimize potential disaster impacts through physical development, infrastructure improvements, and the enhancement of community capacity (Penanggulangan Bencana, 2007).

The emergency response phase begins immediately after a disaster occurs and focuses on saving lives, evacuating victims, meeting basic needs, protecting vulnerable populations, and restoring essential infrastructure and facilities. In the health sector, emergency response activities include rapid health

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

GOLDEN RATIO
ISSN [Online]: 2776-6411

assessments, first aid, victim evacuation, emergency healthcare delivery, and the protection of high-risk groups (Pedoman Teknis Penanggulangan Krisis Kesehatan Akibat Bencana, 2010). The post-disaster phase involves rehabilitation and reconstruction efforts aimed at restoring essential public services, healthcare facilities, social conditions, and infrastructure affected by disasters. These activities are intended not only to restore normal conditions but also to strengthen community resilience and reduce vulnerability to future disasters (Usiono et al., 2018).

2.3. Health Crisis Management Policy

A health crisis is a condition resulting from a disaster that causes deaths, injuries, illnesses, population displacement, and disruptions to healthcare services, thereby requiring immediate, coordinated, and comprehensive intervention (Pedoman Teknis Penanggulangan Krisis Kesehatan Akibat Bencana, 2010). In Indonesia, health crisis management is guided by Law No. 24 of 2007 on Disaster Management, Law No. 17 of 2023 on Health, and Minister of Health Regulation No. 145 of 2007 concerning Guidelines for Disaster Management in the Health Sector. Health crisis management involves several essential activities, including rapid assessment, victim assistance and evacuation, the provision of healthcare services, and coordination among relevant institutions and stakeholders. As critical healthcare facilities, hospitals must maintain adequate preparedness to protect patients, healthcare personnel, and other staff while ensuring the continuity of essential medical services during disasters. Hospital preparedness can be evaluated using the Hospital Safety Index (HSI), an assessment tool that examines three main components: structural safety, nonstructural safety, and functional capacity (Lestari et al., 2022; Kusumaningrum & Azinar, 2021).

The functional component of the Hospital Safety Index evaluates a hospital's operational preparedness and ability to maintain essential services during emergencies. This component encompasses human resource preparedness, disaster management systems, communication and information systems, resource availability, and the continuity of healthcare services (Hospital Safety Index Evaluation Forms, 2015). Therefore, strengthening hospital preparedness is essential to minimizing the impacts of health crises, protecting patients and healthcare workers, and ensuring the continuous delivery of essential health services to disaster-affected communities.

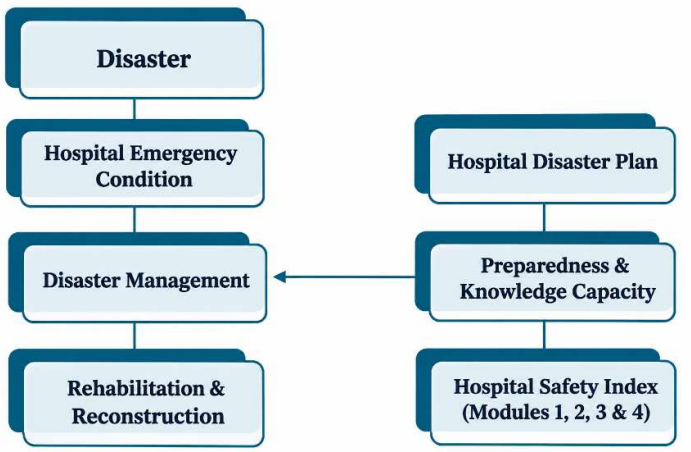


Figure 2. Research Conceptual Framework

III. Research Method

This study employed a mixed-methods approach combining descriptive quantitative and qualitative methods. The quantitative approach was used to assess the disaster preparedness level of RSUD dr. Darsono Pacitan using the Hospital Safety Index (HSI), while the qualitative approach was used to obtain an in-depth

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411

description of disaster management policy implementation through interviews. The study was conducted at RSUD dr. Darsono Pacitan from May to June 2025. The site was selected because RSUD dr. Darsono serves as a referral hospital and a health service center during disaster situations in Pacitan Regency. The study subjects were employees of RSUD dr. Darsono who were involved in the disaster management command system and other employees relevant to the HSI assessment. Participants were selected using purposive sampling. Inclusion criteria were employees who had worked for at least one year, held functional or managerial positions related to disaster preparedness, and were willing to participate. Exclusion criteria were employees who were on leave or retired during the study and employees who were unwilling to participate. A total of 55 respondents met the criteria, representing management, clinical services, K3RS, and supporting units. In addition, in-depth interviews were conducted with five key informants: two members of the K3RS team, one management representative, one service representative, and one supporting-unit representative.

The research instruments consisted of the Hospital Safety Index (HSI) and an interview guide. The HSI instrument comprised 151 assessment points divided into four modules: Module 1 addressed hazards threatening the hospital and the hospital's role in disaster management; Module 2 addressed structural safety; Module 3 addressed non-structural safety; and Module 4 addressed emergency and disaster management. Each HSI indicator was assessed using three levels: 0 for low, 0.5 for average, and 1 for high. The values for all indicators were then converted into percentages and used to determine the hospital preparedness classification. Quantitative data were analyzed by determining the most dominant response for each HSI indicator among the 55 respondents. The resulting values were entered into the HSI calculator according to the prescribed assessment procedure to obtain the Safety Index and the hospital preparedness classification. The Safety Index was categorized into three levels: Category C with a score of 0–35%, Category B with a score of 36–65%, and Category A with a score of 66–100%. Category A indicates that a hospital can function optimally during a disaster; Category B indicates that some constraints remain in the hospital's ability to perform its functions optimally; and Category C indicates that the hospital is not yet able to function optimally or provide adequate protection during a disaster. Qualitative data were analyzed using the Miles and Huberman interactive model, consisting of data reduction, data display, and conclusion drawing and verification. Interview, observation, and documentation data were reduced by selecting information relevant to the research objectives and were then presented in narrative and tabular form as required for the analysis. Conclusions were subsequently drawn based on the patterns and information obtained until the data were considered sufficiently adequate.

IV. Results and Discussion

4.1. Natural and Non-Natural Hazard Sources

Based on the 2021 IRBI, Pacitan Regency has nine potential disaster hazards: floods, flash floods, landslides, earthquakes, extreme waves and abrasion, forest and land fires, extreme weather, drought, and tsunamis (Kajian Risiko Bencana Kabupaten Pacitan, 2022). RSUD dr. Darsono Pacitan is a referral hospital for mass-disaster victims in Pacitan Regency and several border areas of Trenggalek and Wonogiri Regencies. The identification results indicate that RSUD dr. Darsono faces high-level disaster threats, including flooding, internal fires, power failures, and HVAC (Heating, Ventilation and Air Conditioning) failures. Moderate-level threats include earthquakes, landslides, exposure to hazardous and toxic materials (B3), wastewater system failures, mass infectious incidents, and chemical spills. These conditions indicate that the hospital not only functions as a service facility during disasters but also faces internal and external risks that may affect hospital safety and service continuity.

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411

Table 1. Disaster Hazards Affecting RSUD dr. Darsono Pacitan

Moderate Hazard Level	High Hazard Level
Earthquake	Flooding
Landslide	Internal Fire
B3 Exposure	Power Failure
Failure / Wastewater System Damage	HVAC Failure
Mass Infectious Incident	
Chemical Spill	

Flood risk in Pacitan District is associated with high rainfall, which generally occurs from October to April, as well as rainwater management infrastructure that is not yet fully adequate (Nuhun et al., 2024). Interviews with the K3RS team indicated that RSUD dr. Darsono has implemented mitigation measures by constructing biopores and infiltration areas around drainage channels and raising the foundations of new buildings above ground level. These measures are intended to reduce waterlogging and the impact of flooding on hospital areas. In addition to flooding, identified internal threats include fires, power failures, and HVAC failures. Fire risk is a major concern because the hospital has multi-story buildings, patients with diverse conditions and needs, and limitations in evacuation processes, all of which may affect patient safety and the continuity of hospital operations (Ruwanto et al., 2025).

RSUD dr. Darsono has a diverse electrical load to support hospital operations. Interviews indicated that the hospital has increased its electrical capacity through cooperation with the state electricity utility (PLN) and divided the electrical network into two lines to reduce the impact if one area experiences a failure. In the HVAC system, air circulation is an important aspect of infection-risk control in hospitals because inadequate ventilation may increase the risk of disease transmission (Thaib, 2020). Temperature regulation and air conditions are also associated with patient comfort and health during treatment (Majid et al., 2023). The findings are consistent with the 2021 IRBI, which identifies flooding as one of the high-potential hazards in Pacitan Regency. RSUD dr. Darsono has also experienced localized flooding, with the largest incident occurring in November 2017, as well as an earthquake in July 2023 that caused structural damage. Nevertheless, in constructing, repairing, and modifying buildings, the hospital has sought to comply with established safety standards.

4.2. Overall HSI Score

Table 2. Overall HSI Index

Module	Safety Index	Classification	Weight (%)
Structural Safety	0.46	B	50%
Non-Structural Safety	0.55	B	30%
Emergency and Disaster Management	0.32	C	20%
Total	0.46		
Classification	B		

The structural safety module achieved a Safety Index of 0.46 and a Vulnerability Index of 0.54, corresponding to Category B. This result indicates that the hospital's structural preparedness is relatively adequate, but there remains a potential for failure in hospital functioning during disaster response, requiring short-term improvement. The structural safety component accounts for 50% of the HSI assessment and consists of events affecting hospital safety, with a score of 0.66, and building integrity, with a score of 0.53. These conditions require attention because RSUD dr. Darsono is located in an area with disaster potential, particularly flooding, and faces internal threats including fires, power disruptions, and HVAC failures. Observations showed that several older buildings still have minor cracks, leaks, water seepage, mold growth, and damaged paint, although some repairs have been undertaken. The hospital is also developing new buildings and land, so safety, efficiency, and disaster resilience should be incorporated into development planning. Building conditions and service continuity require attention because failure of building components

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411

can disrupt medical services (Harita et al., 2024). Health-facility development in disaster-prone areas also requires comprehensive planning and risk management to improve structural resilience to disasters (Harita et al., 2024).

The non-structural safety assessment produced a Safety Index of 0.55 and a Vulnerability Index of 0.45, corresponding to Category B. This indicates that non-structural preparedness is relatively adequate but still requires short-term improvement. Architectural safety scored 0.66, infrastructure, access, and physical security scored 0.66, critical systems scored 0.67, and equipment and supplies scored 0.66. Observations showed several aspects requiring improvement, particularly evacuation facilities in several multi-story buildings, fire detection and early-warning systems, availability of water reserves, hazardous and toxic waste management, communication systems during power failures, backup electrical capacity, and the condition of some medical equipment that has been in use for more than five years. Preparedness in non-structural aspects is important because hospital equipment and supporting systems may be disrupted by disasters such as floods, earthquakes, and landslides (Du et al., 2015). Risk management practices can also improve hospital preparedness for disasters (Frazier et al., 2020). In addition, the development of disaster preparedness and mitigation programs in health facilities needs to be supported by systematic planning (Arab et al., 2019).

The emergency and disaster management module achieved a Safety Index of 0.32 and a Vulnerability Index of 0.68, placing it in Category C. This was the lowest score among the components and indicates that emergency and disaster management preparedness remains inadequate to ensure optimal continuity of hospital functions during disasters. The submodule scores were 0.43 for coordination, 0.50 for disaster management planning, 0.50 for information and communication, 0.40 for human resources, 0.50 for logistics and finance, 0.40 for patient and support services, and 0.60 for evacuation, decontamination, and security. Interviews and observations identified several major constraints: not all K3RS members are active and trained; a dedicated Emergency Operations Center (EOC) is not yet available; disaster plans and SOPs are not evaluated regularly; an adequate Hospital Recovery Plan is not yet available; no specific arrangements with suppliers for disaster situations have been established; no dedicated budget allocation is available for preparedness programs; and evacuation documentation and simulations are not conducted routinely.

4.3. Results Analisys

The overall preparedness index score of RSUD dr. Darsono Pacitan for disasters and emergencies was 0.46, corresponding to Category B. This means that the hospital should immediately undertake short-term corrective measures. Although the hospital's preparedness status is relatively adequate, it remains vulnerable to functional failure in providing health services in response to disasters. Based on the evaluation of the three modules—Structural Safety, Non-Structural Safety, and Emergency and Disaster Management—the constraints can be analyzed using the SWOT approach as follows:

a. Strengths. The assessment identified several strengths of RSUD dr. Darsono Pacitan in disaster management, including:

    1) As a government hospital, it receives full support from the local government in terms of policies and regulations. The 2025–2030 Pacitan Regency Disaster Management Plan (RPKB) states that resources from all elements of the Pacitan Pentahelix—government institutions, private institutions, civil society organizations, mass media, and academia—are involved and mobilized in disaster emergency management;
    2) Its financial management system and organizational structure as a Regional Public Service Agency (BLUD) provide greater autonomy and flexibility in supporting disaster management programs. The 2025–2030 Pacitan Regency Disaster Management Plan states that regional disaster-emergency budgets are allocated and managed transparently and accountably;

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411

3) It has extensive land that can accommodate a large number of disaster victims when necessary, including space for establishing a temporary emergency hospital in the central courtyard;
4) It has a sufficiently large and diverse workforce, particularly the basic specialist physicians appropriate to the hospital's classification;
5) Most buildings and facilities are relatively new and remain in good working condition.

b. Weaknesses. Based on the observational analysis, several weaknesses were identified in the hospital's disaster management system:

c.

1) Development and construction planning is not yet optimal in producing safe construction designs that comply with regulations because the hospital does not have a specialized consultant in hospital building construction;
2) Management leadership needs to strengthen funding and financial support for hospital operations, particularly for disaster mitigation and preparedness;
3) Logistics and medical supplies are limited for large-scale disaster situations;
4) Training to improve disaster-management capacity, simulations, and disaster-related socialization for all employees remains insufficient.

d. Opportunities. The opportunities available to the hospital based on the researchers' analysis include

1) As a government institution with full accreditation, the hospital has opportunities to cooperate with other parties, such as NGOs, state-owned enterprises, and other institutions, in disaster mitigation and preparedness efforts;
2) Cooperation with BPBD, PMI, and the Fire and Rescue Service can be developed for emergency disaster management and related training;
3) Cooperation with relevant agencies such as PUPR, Bina Marga, and the Environmental Agency can support hospital-area expansion planning from the planning, implementation, supervision, and evaluation stages through reconstruction when disasters occur;
4) Cooperation with the Communication and Information Office (Diskominfo) can support technological development related to disaster information systems, early warning systems, and emergency communication.

e. Threats. The analysis identified several potential threats to the hospital, including:

1) Pacitan Regency is geographically located in an area prone to floods, landslides, earthquakes, and tsunamis; therefore, a major threat would arise if any of these natural disasters occurred on a large scale;
2) The area surrounding the hospital is relatively densely populated and located in low-lying terrain; therefore, a disaster in the surrounding area could hinder patient evacuation from outside the hospital or transfers to other hospitals;
3) A large-scale disaster in the vicinity of the hospital could damage infrastructure and isolate the area, thereby disrupting supplies of energy, electricity, logistics, clean water, and other medical materials;
4) The intensive-care capacity is limited to 12 beds, which may create difficulties if a disaster causes an overcapacity of critically ill patients;
5) Most inpatient wards are located in multi-story buildings; therefore, an earthquake that causes building collapse could complicate evacuation and the provision of temporary shelter.

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

GOLDEN RATIO
ISSN [Online]: 2776-6411

V. Conclusion

Based on the Hospital Safety Index (HSI) assessment, RSUD dr. Darsono Pacitan obtained an overall safety and preparedness score of 0.46, corresponding to Category B. This finding indicates that the hospital has a relatively adequate level of preparedness for emergencies and disasters; however, immediate corrective measures are necessary to minimize potential disruptions to healthcare services. The assessment identified several high-risk hazards, including flooding, internal fires, power failures, and HVAC system failures. Moderate-risk hazards included earthquakes, landslides, exposure to hazardous and toxic materials, wastewater system failures, mass infectious incidents, and chemical spills. Furthermore, several aspects of hospital safety and disaster management require improvement, particularly building safety and integrity, architectural safety, infrastructure and access protection, critical systems, equipment and supplies, coordination, information and communication, logistics and financial support, evacuation procedures, decontamination, and security systems.

These findings highlight the importance of strengthening hospital disaster preparedness through an integrated and sustainable approach. From a practical perspective, hospital management should prioritize regular disaster preparedness training, emergency simulations, and the dissemination of standard operating procedures (SOPs) to ensure that all personnel understand their roles and responsibilities during emergencies. Improvements are also necessary in critical infrastructure and support systems, particularly early warning mechanisms, backup electricity and water supplies, emergency communication systems, medical logistics, and hazardous waste management. Furthermore, strengthening institutional coordination and formal partnerships with the Regional Disaster Management Agency (BPBD), the Health Office, local government, other healthcare facilities, academic institutions, and relevant stakeholders is essential to improving emergency response capacity. In the long term, phased infrastructure development and building revitalization should be implemented in accordance with applicable safety standards and the disaster risk characteristics of Pacitan Regency. These measures are expected to strengthen hospital resilience, protect patients and healthcare personnel, and maintain the continuity of essential healthcare services during disasters.

This study has several limitations. First, the assessment focused on a single hospital, namely RSUD dr. Darsono Pacitan, which may limit the generalizability of the findings to hospitals with different geographical characteristics, infrastructure conditions, organizational structures, and disaster risk profiles. Second, the assessment reflects the hospital's safety and preparedness conditions during the study period and may not fully capture changes in institutional capacity, infrastructure, and disaster management performance over time. Therefore, the findings should be interpreted within the context of the hospital and assessment period examined. Future research should involve comparative assessments of multiple hospitals located in regions with different disaster risk characteristics to identify variations in hospital safety and preparedness. Longitudinal studies are also recommended to evaluate improvements in Hospital Safety Index scores following the implementation of corrective measures and disaster preparedness programs. Furthermore, future studies could examine the relationship between hospital safety indicators, staff preparedness, emergency response capacity, and the continuity of healthcare services. Such research would provide a more comprehensive understanding of the factors influencing hospital resilience and support the development of more effective disaster risk reduction strategies in healthcare facilities.

.

References

Arab, M. A., Khankeh, H. R., Mosadeghrad, A. M., & Farrokhi, M. (2019). Developing a hospital disaster risk management evaluation model. Risk Management and Healthcare Policy, 12, 287–296. https://doi.org/10.2147/RMHP.S215444

Arum Narwastu, A., Sangadji, S., Devi, R. H., & Safarizki, H. A. (2024). Analisis kerapuhan struktur gedung Dinas Pertanian Kabupaten Pacitan dengan static adaptive pushover. PADURAKSA: Jurnal Teknik Sipil

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

GOLDEN RATIO
ISSN [Online]: 2776-6411

Universitas Warmadewa, 13(1), 89–96. https://doi.org/10.22225/pd.13.1.7655.89-96

Azarmi, S., Pishgooie, A. H., Sharififar, S., Khankeh, H. R., & Hejrypour, S. Z. (2022). Challenges of hospital disaster risk management: A systematic review study. Disaster Medicine and Public Health Preparedness, 16(5), 2141–2148. https://doi.org/10.1017/dmp.2021.203

Badan Pusat Statistik Kabupaten Pacitan. (2025). Kabupaten Pacitan dalam angka 2025. https://pacitankab.bps.go.id/id

Delima, M., & Putra, A. Y. M. (2021). Hospital disaster plan dalam perencanaan kesiapsiagaan bencana. Jurnal Kesehatan Perintis (Perintis's Health Journal), 8(1), 54–66. https://doi.org/10.33653/jkp.v8i1.600

Darmawan, A. D. (2024). Data 2024: Jumlah penduduk Kabupaten Bangka 335,29 ribu jiwa. Databoks. https://databoks.katadata.co.id/demografi/statistik/be84c683e1f8caf/data-2024-jumlah-penduduk-kabupaten-bangka-335-29-ribu-jiwa

Diskominfo Kabupaten Pacitan. (2023). Buku profil Kabupaten Pacitan tahun 2023.

Du, Y., Ding, Y., Li, Z., & Cao, G. (2015). The role of hazard vulnerability assessments in disaster preparedness and prevention in China. Military Medical Research, 2(1), 1–7. https://doi.org/10.1186/s40779-015-0059-9

Firdausi, N., Lestari, F., & Ismiyati, A. (2021). Disaster preparedness analysis of public health centers in DKI Jakarta Province in 2020. International Journal of Safety and Security Engineering, 11(1), 91–99. https://doi.org/10.18280/ijsse.110110

Firissa, Y. B., Sultan, M., Abdelwahab, M., & Belachew, F. K. (2023). Disaster response readiness assessment of public hospitals in Addis Ababa City, Addis Ababa, Ethiopia. African Journal of Emergency Medicine, 13(3), 210–216. https://doi.org/10.1016/j.afjem.2023.06.004

Frazier, T. G., Wood, E. X., & Peterson, A. G. (2020). Residual risk in public health and disaster management. Applied Geography, 125, Article 102365. https://doi.org/10.1016/j.apgeog.2020.102365

Goniewicz, M., Khorram-Manesh, A., Timler, D., Al-Wathinani, A. M., & Goniewicz, K. (2023). Hospital disaster preparedness: A comprehensive evaluation using the Hospital Safety Index. Sustainability, 15(17), Article 13197. https://doi.org/10.3390/su151713197

Hardiyanti, M., & Fudholi, D. H. (2021). Permodelan pengetahuan kesiapan penanganan bencana di rumah sakit. Indonesian Journal of Business Intelligence (IJUBI), 4(2), 92. https://doi.org/10.21927/ijubi.v4i2.1934

Harita, H., Daeli, S. D., Zalukhu, M. H., & Zebua, D. (2024). Strategi pengelolaan risiko dalam konstruksi gedung tahan gempa di daerah rawan bencana. Jurnal Ilmu Ekonomi, Pendidikan dan Teknik, 1(2), 1–10. https://doi.org/10.70134/identik.v1i2.35

Kementerian Kesehatan Republik Indonesia. (2024). Pedoman rumah sakit aman bencana (safe hospital). Pusat Krisis Kesehatan, Sekretariat Jenderal, Kementerian Kesehatan Republik Indonesia.

Kartikasari, E. (2016). Mikrozonasi seismik di Kota Pacitan dengan menggunakan data mikrotremor berdasarkan HVSR (Horizontal to Vertical Spectral Ratio) dan SAW (Simple Additive Weight) [Jenis karya ilmiah perlu dikonfirmasi].

Kusumaningrum, A., & Azinar, M. (2021). Terapan hospital disaster plan pada rumah sakit umum daerah. Higeia Journal of Public Health Research and Development, 5(3), 227–238.

Lasiyah, N., Mulyadi, R., & Iriani, O. N. Y. (2024). Analisa manajemen risiko keamanan dan kualitas penggunaan peralatan medis. Jurnal Ilmu Kesehatan Masyarakat, 13(1), 159–167.

Lestari, F., Paramitasari, D., Fatmah, Hamid, A. Y., Suparni, El-Matury, H. J., Wijaya, O., Rahmadani, M., Ismiyati, A., Firdausi, R. A., & Kadir, A. (2022). Analysis of hospital's emergency and disaster preparedness using Hospital Safety Index in Indonesia. Sustainability, 14(10), Article 5879. https://doi.org/10.3390/su14105879

Majid, M. A., Kusumawati, L., & Wijayanto, P. (2023). Optimalisasi penghawaan pada ruang dalam rumah sakit. Jurnal Rekayasa Lingkungan Terbangun Berkelanjutan, 1(2), 348–355. https://doi.org/10.25105/jrltb.v1i2.17782

Mojtahedi, M., Sunindijo, R. Y., Lestari, F., Suparni, S., & Wijaya, O. (2021). Developing hospital emergency and

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.

ISSN [Online]: 2776-6411

disaster management index using TOPSIS method. Sustainability, 13(9), Article 5213. https://doi.org/10.3390/su13095213

Nuhun, R. S., Welenodo, L., Thamrin, M. Z., Fajri, A., Faharuddin, F., & Sakti, S. (2024). Analisis penyebab banjir dan penanganan infrastruktur beserta estimasi biaya. Jurnal Ilmiah Ecosystem, 24(3), 563–583. https://doi.org/10.35965/eco.v24i3.5408

Ortiz-Barrios, M., Gul, M., Yucesan, M., Alfaro-Sarmiento, I., Navarro-Jiménez, E., & Jiménez-Delgado, G. (2022). A fuzzy hybrid decision-making framework for increasing hospital disaster preparedness: The Colombian case. International Journal of Disaster Risk Reduction, 72, Article 102831. https://doi.org/10.1016/j.ijdrr.2022.102831

Pemerintah Kabupaten Pacitan. (2022). Kajian risiko bencana Kabupaten Pacitan.

Pemerintah Kabupaten Pacitan. (2023). Rencana penanggulangan bencana Kabupaten Pacitan.

Pemerintah Kabupaten Pacitan. (2025). Rencana penanggulangan kedaruratan bencana Kabupaten Pacitan (RPKB).

Purba, I. E., Syah, T. D., Ketaren, O., & Tarigan, F. L. (2024). General hospital preparedness in facing flood disasters. IOP Conference Series: Earth and Environmental Science, 1314(1), Article 012096. https://doi.org/10.1088/1755-1315/1314/1/012096

Rendrarini, D. (2019). Pengaruh suhu, hujan dan kelembaban terhadap kerusakan jalan di Kabupaten Pacitan. Jurnal Pilar Teknologi: Jurnal Ilmiah Ilmu-Ilmu Teknik, 4(2), 50–54. https://doi.org/10.33319/piltek.v4i2.38

RSUD dr. Darsono Pacitan. (2021). Sejarah RSUD dr. Darsono Pacitan.

RSUD dr. Darsono Pacitan. (2025). Profil RSUD dr. Darsono Pacitan.

Ruwanto, Hariyono, W., & Hidayat, M. S. (2025). Pencegahan dan penanggulangan kebakaran rumah sakit gedung tinggi: Literatur review. Jurnal Promotif Preventif, 8(1), 94–102. http://journal.unpacti.ac.id/index.php/JPP

Thaib, R. (2020). Analisis ventilasi udara alami pada rumah sakit. Jurnal Ilmiah Jurutera, 7(2), 12–17.

Yanuarto, T., Sridewanto, P., Utomo, A. C., & Satrio, I. T. (2019). Buku saku: Tanggap tangkas tangguh menghadapi bencana (Cetakan ke-4). Badan Nasional Penanggulangan Bencana. https://bnpb.go.id/uploads/24/buku-data-bencana/6-buku-saku-cetakan-4-2019.pdf

2026. The Author(s). This open-access article is distributed under a Creative Commons Attribution (CC-BY-SA) 4.0 license.