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Hospital Preparedness for Natural Disaster: A Qualitative Study at Undata Regional General Hospital, Central Sulawesi

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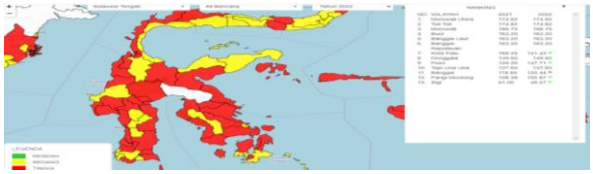
ABSTRACT

Natural disasters pose significant threats to human life, and no region in Indonesia is immune. In 2018, Central Sulawesi faced its most devastating disaster, severely impacting various sectors, particularly hospitals. As the primary referral center in the province, Undata Hospital plays a crucial role in disaster response. This study utilized a descriptive qualitative research approach, collecting data through in-depth interviews, field observations, and document reviews. Undata Hospital has a natural disaster policy (Hospital Disaster Plan), with SOPs (general procedures), has a disaster response team (HDP team and the K3RS team), Financial resources come from the hospital's situational funds, the infrastructure needs remain unfulfilled, and the last training session was conducted in 2017. Undata Hospital disaster readiness is at a basic level. Despite having a disaster policy, it lacks socialization and specific SOPs for natural disasters. The disaster response teams are not fully functional, infrastructure needs are inadequately addressed, continuous training and simulations are insufficient, and funding for disaster preparedness is lacking

INTRODUCTION

Disasters, whether sudden or gradual, cause significant short-term upheaval in a region, disrupting human life, damaging property, and impacting the economy, environment, and social structures. These events challenge the capacity and readiness of hospitals, making disaster preparedness a critical topic at both national and international levels(Fauzi and Mussadun 2021; Mufidatullaily, Sagiran, and Dewi 2020; Presiden Republik Indonesia 2007; Umar 2013).



The "Indonesian Disaster Risk Index (IRBI)" reveals that no region in Indonesia is at low risk of disasters, with Central Sulawesi being particularly vulnerable(BNPB n.d.). In 2018, Central Sulawesi experienced its most devastating natural disaster: a 7.9 magnitude earthquake, followed by a tsunami with waves up to 3 meters, and liquefaction at four locations. This disaster resulted in 3,673 deaths, 667 missing persons, 4,456 injuries, and displaced 175,742 people. Economic losses totaled Rp. 18.48 trillion, and 44 facilities were damaged, including 1 regional health laboratory, 14 hospitals, 12 health centers, and 17 auxiliary health centers(Badan Nasional Penanggulangan Bencana 2023; Wahidin et al. 2022; Wiseno 2018). The region's susceptibility to earthquakes is due to its geographical position along several active faults, including the Palu-Koro Fault(Supartoyo, Sulaiman, and Junaedi 2017).

Hospitals must be fully prepared to respond to natural disaster victims, ensuring adequate facilities, safe building structures, and competent healthcare professionals (Alruwaili, Islam, and Usher 2022; Nekoie-Moghadam et al. 2016; Pusat Penanggulangan Krisis Kesehatan 2007; Wijaya, Trisnantoro, and Mardiatno 2017). Their involvement is mandated by Law No. 44 of 2009, which requires hospitals to actively participate in disaster victim care and maintain accident prevention and disaster management systems (Presiden Republik Indonesia 2009). Hospital disaster readiness should be documented and understood by all employees, as outlined in Ministerial Regulation No. 66 of 2016 on Occupational Safety and Health in Hospitals (K3RS). This regulation emphasizes minimizing the impact of disasters on physical, material, and human resources, as well as operational disruptions, environmental damage, and threats to the hospital's financial stability and reputation(Nada, Kamaluddin, and Hidayat 2020; Peraturan Menteri Kesehatan 2016).

Undata Hospital is the primary referral center in Central Sulawesi. A preliminary study identified several issues during the 2018 natural disaster, such as inadequate health facilities for disaster management, damaged and nonfunctional equipment, patient care conducted in the open hospital yard, surgeries performed with makeshift tools, only 30% of the workforce actively involved, and the last training and simulation held in 2017. To address these concerns, researchers conducted a study at Undata Hospital to analyze its management readiness, focusing on policy aspects, standard procedures and operations, human resources, financial resources, facilities and infrastructure, and training and simulation.

METHODS

The research employed a descriptive qualitative approach, utilizing primary data gathered through semi-structured in-depth interviews and field observations. Secondary data from document reviews supplemented the primary data collection methods(Komariah and Satori 2011).

The research involved three main informants: the Head of Occupational Safety and Health (K3RS), Deputy Director of Services, and the Coordinator of the Emergency Room (IGD) medical team. Additionally, five triangulation informants were included: K3RS members, the head of the finance department, the head of the education department, the head of IPSRS, and the head nurse of the emergency room. Data processing occurred in four

stages: data collection, data reduction, data display, and conclusion drawing/data verification.

The study was conducted at Undata Regional General Hospital in Central Sulawesi Province. This hospital, located on RE Martadinata street, Tondo, Central Sulawesi, is classified as a type B hospital. It boasts a building area of 14,890.33 m² and a land area of 53,125 m², accommodating a total of 332 beds. Undata Hospital serves as the primary referral center in Central Sulawesi.

RESULTS AND DISCUSSION

Table 1. Characteristics of Informants

Initials	Age (Year)	Gender	Years of service	Potition	Education
IU 1	46	Male	23	Head of Hospital Occupational Safety and Health	S2
IU 2	58	Female	2	Head of Medical Services Division	S2
IU 3	45	Male	18	Emergency Medical Coordinator	Doctor
IT 1	65	Male	35	Head of IPSRS Division	S1
IT 2	55	Female	30	Head of General Emergency Room	Nursing profession
IT 3	43	Male	16	Head of Sub-Division of Treasury and Fund Mobilization	S1
IT 4	48	Female	3	Head of Education and Research Division	S2
IT 5	35	Male	10	Member of Hospital Occupational Safety and Health/IGD Executive Nurse	S1

Table 1 illustrates the demographic characteristics of the triangulated informants. Their ages ranged from 24 to 65 years, with the majority holding Bachelor's degrees (4 individuals), followed by 2 individuals with Master's degrees, and 1 individual serving as a nurse. Work experience varied from 2 to 35 years, with 5 male informants and 3 female informants.

The study identified interview results within six primary themes: 1) policies, 2) standard operating procedures, 3) human resources, 4) financial resources, 5) facilities and infrastructure, and 6) training and simulation.

Policies

Findings regarding the disaster preparedness policy obtained from in-depth interviews with key informants.

> "The HDP policy was created based on a self-assessment using HSI. The policy was last updated in 2022. The lack of support from management has resulted in incomplete dissemination to all human resources. Only a portion of the human resources are aware of the policy's content (IU1)

Another opinion suggests that there are difficulties accessing the policy because it has not been disseminated to the majority of healthcare workers.

> The HDP is available, but the informants do not know the content of the policy because the dissemination did not involve ER doctors. (IU 3)
>
> Registered as a member of K3RS but unaware of their membership because they have not seen and read the policy content. (IT5).

Undata Hospital implements a policy in the form of a Hospital Disaster Plan (HDP). The policy is only socialized before the accreditation process, and only some healthcare personnel participate. This contradicts the Minister of Health of the Republic of Indonesia Regulation No. 432/MENKES/SK/IV/2007, which states that hospital management's commitment must be reflected in clear and understandable written policies for all hospital staff (Menteri Kesehatan Republik Indonesia 2007).

This research is aligned with the statements in a study conducted at the Indramayu Regional General Hospital, which highlights the necessity of

management commitment in disaster preparedness, starting from the establishment of policies that have been ratified and signed by hospital leaders(Fajriah, Jat, and Setyaningsih 2022). Previous findings also indicate that although X Hospital in Semarang City has a fire prevention policy, the socialization regarding this matter is still lacking among the workforce, patients, and hospital visitors(Nastiti, Denny, and Kurniawan 2017).

Standard Procedures and Operations

Undata Hospital has standard operating procedures (SOPs) for disaster preparedness, observations reveal that the existing SOPs are still general and not specifically tailored for natural disasters. The procedures for handling mass casualty incidents include performing emergency triage.

> The SPO was created based on disaster potential assessment. RSUD Undata has two major hazard potentials: earthquakes and fire protection. (IU 1)

The disaster command organizational structure is detailed in the Hospital Disaster Plan (HDP) document, with descriptions of the main duties and functions of each responsible area.

> The SPO is available, but its management becomes unclear in emergency situations. Therefore, the procedures applied in the ER refer to patient handling according to the occurring conditions. (IU 3)
>
> It is available in written form, but no education has been provided by the head of the department. (IT 5)

The primary informant stated that there are Standard Operating Procedures (SOPs) for fire and earthquake emergencies, but field observations did not reveal any evidence of their existence. Triangulation informants indicated that the hospital does not have specific SOPs for handling patients in disaster situations. Service provision is based on the patient's condition. Minister of Health Regulation No. 66 of 2016 emphasizes that all policies, procedures, internal regulations, guidelines, standard operating procedures, and implementation guidelines signed by the hospital director should be easily understood by all human resources in the hospital(Peraturan Menteri Kesehatan 2016). This condition aligns with research conducted at the Indramayu Regional General Hospital, which showed that disaster SOPs are not displayed on walls but only communicated during socialization and training sessions, exposing only some employees to and understanding the procedures(Fajriah et al. 2022).

Human Resources

The in-depth interview results reveal differences in perception among informants, attributed to the lack of socialization regarding the content of the hospital disaster plan.

> The HDP team has been established, comprising 10% of the Emergency Department (IGD) healthcare staff, is activated only during emergencies and disasters. Additionally, the K3RS team, consisting of 8-10 healthcare workers, has been formed (IU1)
>
> A disaster response team has been established, but the membership is unknown because the Director's Decree has not been disseminated(IU2, IU3, IT2, IT5)

Below is the command system of the HDP team at Undata Regional General Hospital:

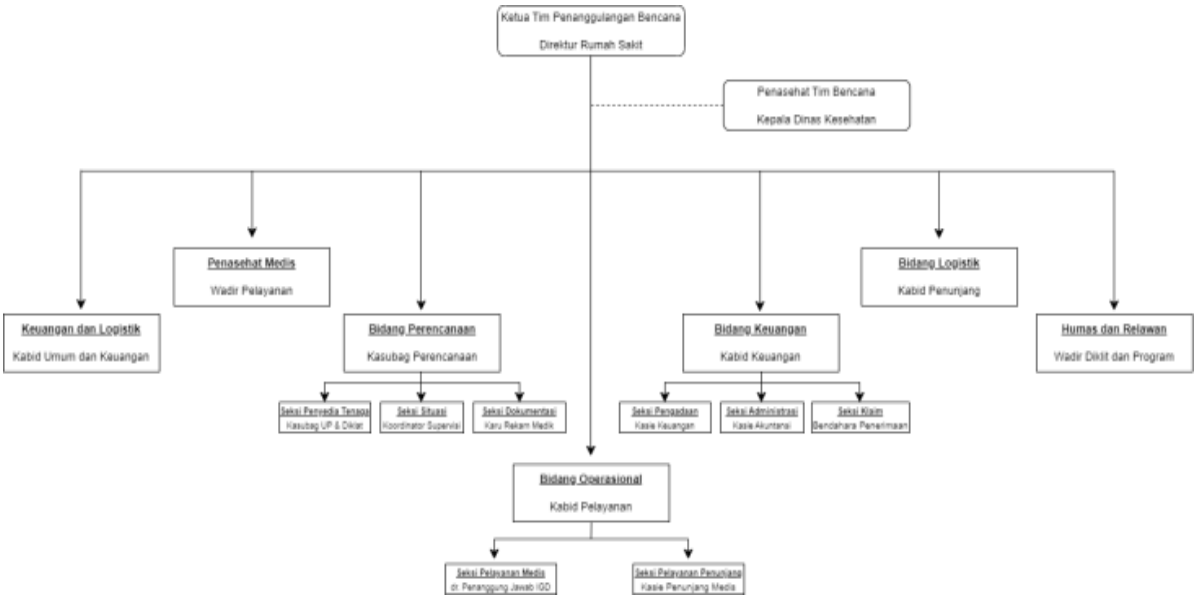


Figure 1. Human Resources

The commitment of hospital management to the preparedness of human resources is manifested through a disaster response team, consisting of the K3RS team and the HDP team, has been established. However, most personnel are unaware of their team membership status due to the lack of dissemination regarding the disaster response team decree. Furthermore, in-depth interviews regarding the human resource needs during disasters revealed that during the 2018 disaster emergency response, only 30% of the total hospital healthcare staff were able to work. Hospital management still needs to mobilize the human resources available within the hospital because it would be inconducive if volunteer mobilization encountered obstacles.

This condition aligns with Minister of Health Regulation No. 75 of 2019 concerning Disaster Crisis Management, which emphasizes the need to increase health crisis human resources, starting with mapping and planning the needs of health human resources related to crisis management, considering the required competencies and quantities(Menteri Kesehatan Republik Indonesia 2019). This research is consistent with findings at Ibnusina Yarsi Hospital in Bukittinggi, which explains that the hospital has a disaster response team with a complete organizational structure and clear tasks and functions. However, updates are needed due to changes in team members within the organizational structure, and some team members are unaware of their membership in the disaster response team(Delima and Putra 2021).

Financial Resources

The results of in-depth interviews regarding the availability of special funds allocated by the hospital for disaster preparedness.

> The hospital does not allocate specific funds for natural disaster management. Instead, it utilizes operational funds as needed, guided by leadership directives. The majority of disaster management funding comes from grants provided by the local government. Furthermore, the hospital does not have an emergency fund procedure; rather, emergency funds are sourced from the health department (IU1, IU2, IU3, IT3)

The implementation of disaster preparedness necessitates significant financial allocation, yet financial constraints often pose common barriers for many institutions. In the case of Undata Hospital, insufficient efforts have been made to establish the necessary infrastructure for disaster preparedness due to a lack of focus on this aspect. Funding for activities such as socialization, training, and simulations is sourced from situational funds that are not earmarked specifically for disaster preparedness.

In accordance with the Republic of Indonesia Law Number 44 of 2009 concerning hospitals, the responsibility of the Government and Regional Governments includes ensuring financing for emergency situations in hospitals due to disasters and Extraordinary Events (KLB)(Presiden Republik Indonesia 2009). Additionally, hospitals also need to plan financial budgets in the pre-disaster phase by preparing hospital facilities, formulating written procedures or policies, coordinating/socializing with relevant agencies, and conducting socialization and simulations for healthcare workers. During disaster emergency response, budget is needed for team mobilization, transportation, logistics, communication, consumption, medicines and consumables, as well as the cost of caring for disaster victims. In the post-disaster phase, budget is needed for reporting, documentation, and the cost of replacing lost or damaged equipment(Departemen Kesehatan Republik Indonesia 2009). This research is in line with the study conducted at DKT Dr. Soetarto Hospital, which found that financial resources and emergency fund access mechanisms during emergencies and disasters are still categorized as low. This is due to the lack of a specific budget for emergencies and disasters, instead using funds that are situationally diverted according to superiors' commands.(Gulo et al. 2022).

Facilities and Infrastructure

The in-depth interviews and field observations revealed that Undata Hospital lacks several necessary facilities in terms of infrastructure and logistics readiness.

> Undata Hospital has a logistics warehouse available, stocked with medicines and medical equipment with a capacity double that required for a day's usage. Critical elements such as oxygen gas, water supply, and power sources are adequately provided, and external mobilization facilities are available. However, the hospital currently lacks a command post, communal kitchen, emergency tents, and non-cellular communication equipment (IU1, IU2, IT1, IT4)

Hospital readiness in facing disasters will be considered successful if all facilities can operate well, are easily accessible, and function at maximum capacity, especially in pre-disaster conditions, during the disaster emergency response phase, and after the disaster.

The disaster preparedness infrastructure and facilities already available at Undata Hospital include a logistics warehouse, nutrition installation, mobilization facilities, CSSD and its equipment, medical gas stock, electricity supply with fuel, and sufficient quantities of medical equipment and medications. However, the hospital lacks several critical facilities such as a command post, emergency tents, communication equipment (HT and PABX), and an adequately equipped mortuary.

A safe hospital is one where the facilities can always function and are easily accessible at maximum capacity before, during, and after an emergency or disaster(Komisi Akreditasi Rumah Sakit 2017). According to the Disaster Safe Hospital Guidelines, a hospital should have at least: 1) General facilities: Command post, Communication tools, Information center, Nutrition installation, Logistics warehouse, Disaster personnel area (staging area), Family gathering area and Surge capacity wards. 2) Disaster victim handling facilities: Triage room, Triage system, Triage equipment, Treatment rooms (red, yellow, green, and black zones) and Operating rooms. 3) Supporting hospital service facilities: Electrical systems, Generators, Clean water supply system, Medical gas, Central Sterile Supply Department (CSSD), Fuel storage, Waste management, Air handling systems in critical areas and Communication systems(Kemenkes RI 2024)

This research aligns with findings from a study at Addis Ababa Hospital in Ethiopia, indicating significant gaps in disaster preparedness infrastructure. These gaps are due to the lack of communication network access and inadequate equipment, highlighting the need for cross-sector collaboration and cooperation to meet these needs(Firissa et al. 2023).

Training and Simulation

The training and simulations conducted faced challenges due to a lack of support from Undata Hospital management, as they require significant funding.

> Undata Hospital has conducted several training sessions and simulations. In early 2022, the hospital organized fire protection training in collaboration with the fire department. In 2023, the hospital conducted code blue training, focusing on the emergency management of patients experiencing cardiac and respiratory arrest. The last specific disaster simulation training was held in 2017. Further disaster-specific training has not been conducted due to the high costs involved(IU1, IU2, IU3, IT4)

Knowledge and skills play a crucial role in enhancing the performance of healthcare workers. The hospital conducted fire-specific training and simulations in early 2022. Code Blue K3RS training (emergency patient response during cardiac and respiratory arrest) was held in 2023. However, the last disaster preparedness training was conducted in 2017. Since then, disaster preparedness training has not been held again due to a lack of managerial support from hospital management.

The importance of such training and simulation is discussed in the K3-MFK integration guideline book for hospitals and health facilities, which is based on risk vulnerability analysis in natural disaster situations. Training and simulation aim to ensure the readiness of human resources responsible for emergency or disaster response, and should be conducted at least once a year in each building(Lestantyo 2023).

This research is consistent with findings in Rajawali Citra Hospital regarding disasters, emphasizing that team members must have the experience, knowledge, and skills required to work in disaster situations. Therefore, disaster teams must be selectively chosen according to the needs and expertise required.(Putra 2021).

CONCLUSION

Write a conclusion based on your interpretation of the findings and discussion. The conclusion presents critical points that explain the answers to research questions. In this section, the author can provide input and recommendations. Suggestions present advanced ideas to be developed in subsequent research or practical improvement.

The significant gap in disaster preparedness management at Undata Hospital is due to the lack of comprehensive disaster guidelines and SOPs, dysfunctional disaster teams, inadequate disaster facility infrastructure, and a lack of continuous implementation of training and simulations. The solution to these issues can begin with budget allocation for hospital disaster preparedness management. If given attention and maximized, this would ensure annual execution of training and simulations, fulfillment of disaster preparedness infrastructure, and realization of commitment to guideline and procedure development. The initiative regarding the deployment of Health Reserve Personnel (TCK) during emergency response would be highly effective if executed according to plan, as disaster issues are not solely the responsibility of hospitals, thus requiring collaboration among all levels of stakeholders from other agencies such as local government, Regional Disaster Management Agency (BPBD), Health Department, Social Department, and others.

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