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DRUG MANAGEMENT STRATEGIES IN DISASTER SITUATIONS

Strategi Pengelolaan Obat pada Situasi Bencana

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ABSTRAK

Bencana merupakan rangkaian peristiwa yang mengancam dan mengganggu kehidupan dan penghidupan masyarakat. Bencana dapat memberi dampak pada sector kesehatan, infrastruktur dan ekonomi. Penelitian ini bertujuan untuk mengeksplorasi pengelolaan obat pada situasi kebencanaan di Indonesia, mengidentifikasi hambatan serta memberikan rekomendasi strategis. Penelitian ini menggunakan studi deskriptif kualitatif. Populasi dari penelitian ini yaitu tenaga farmasi yang terlibat langsung melakukan pekerjaan kefarmasian selama bencana. Data dikumpulkan dari 10 informan yang terdiri atas tenaga farmasi Dinas Kesehatan Kota/Kabupaten dan anggota Apoteker Tanggap Bencana (ATB) di daerah terdampak bencana. Data dikumpulkan melalui wawancara mendalam. Data yang diperoleh dianalisis menggunakan teknik analisis tematik dengan menggunakan model Miles dan Huberman. Hasil penelitian ini menunjukkan bahwa pengelolaan obat dalam situasi bencana di Indonesia belum berjalan optimal. Untuk mengatasi hal tersebut dibutuhkan koordinasi lintas sektor dan sistem pencatatan terintegrasi untuk memastikan ketersediaan obat yang efektif dan tepat sasaran. Rekomendasi yang dihasilkan meliputi penerapan SOP khusus, sistem pengadaan obat satu pintu dan program edukasi untuk pengungsi mengenai cara cerdas menggunakan obat terutama saat situasi bencana. Hasil penelitian ini dapat menjadi panduan untuk perbaikan manajemen pengelolaan obat di situasi darurat dan mendukung pengembangan kebijakan pengelolaan perbekalan farmasi dalam penanganan bencana.

Kata kunci: *bencana, pelayanan farmasi, pengelolaan obat, krisis kesehatan, tenaga farmasi*

ABSTRACT

Disasters are events that threaten and disrupt people's lives and livelihoods. Disasters can impact the health, infrastructure, and economic sectors. This research aims to explore medicine management in disaster situations in Indonesia, identify barriers, and provide strategic recommendations. This research used a qualitative descriptive study. The population was pharmacy workers who were directly involved in performing pharmaceutical work during disasters. Data were collected from 10 informants, including pharmacists from the City/Regency Health Office and Apoteker Tanggap Bencana (ATB) members in disaster-affected areas. Data were collected through in-depth interviews. The data obtained were analyzed using thematic analysis techniques using the Miles and Huberman model. The results of this study indicate that drug management in disaster situations in Indonesia has not run optimally. To overcome this, cross-sector coordination and an integrated recording system are needed to ensure the availability of effective and targeted drugs. The resulting recommendations include the implementation of special SOPs, a one-stop drug procurement system, and educational programs for refugees on how to use drugs intelligently, especially during disaster situations. The results of this study can serve as a guide for improving drug management in emergencies and support the development of pharmaceutical supply management policies in disaster management.

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Keywords: disaster, drug management, healthcare crisis, pharmaceutical care, Pharmacist

INTRODUCTION

A disaster is an event or series of events that threatens and disrupts people's lives and livelihoods. Disasters can occur due to natural or human-induced factors and can impact the health, infrastructure, and economic sectors[1], [2], [3].The pharmaceutical industry could also be at risk of experiencing an impact of around 10%, which could lead to disruptions in drug production.[4]As an effort to prepare for disasters, an effective logistics management system with a good management concept is needed[5].

Disaster management consists of three stages: pre-disaster, emergency response, and post-disaster. The pre-disaster stage aims to increase resilience, particularly by increasing disaster preparedness and efforts to reduce losses when a disaster occurs. The post-disaster recovery stage aims to increase resilience, particularly by increasing the system's ability to adapt to post-disaster conditions and efforts to restore the system to its original state.[6]. Emergency situations in disaster conditions are very difficult to anticipate and are one of the challenges in managing health logistics[7].

The role of pharmacists in improving healthcare services is equally important under both normal conditions and disaster situations. Pharmacists' role in disaster preparedness includes contributing to the development of pharmaceutical service planning policies that focus on optimizing medication provision in disaster situations.[8]. In addition, it also plays a role in providing education on how to use medicines intelligently in the community, so that the community is better prepared to face disasters that may occur[9], [10]. In disaster situations, pharmacists play a vital role in managing drug logistics, providing pharmaceutical services, and ensuring the rational use of drugs for disaster-affected patients[9],[11]. Pharmacy staff also participate in disaster preparedness training to improve their skills and abilities in providing pharmaceutical services in disaster situations[10], [12]**.** In the post-disaster period, pharmacists play a role in ensuring that the pharmaceutical supplies needed for health services are met and supporting affected communities so they can return to their normal pre-disaster situation[10].

Drug management standards cover critical aspects such as procurement, storage, distribution, and monitoring of drugs, based on medical needs at the disaster site. An ideal drug management system in a disaster should have a rapid and flexible procurement mechanism that allows for the delivery of drugs according to priority needs in the field[13]. The procurement process begins with planning drug requirements[14]. Minimum stocks of high-priority drugs must be maintained to ensure a surge in demand during a disaster[15]. The drug storage system in disaster conditions must still be considered to ensure the quality of the drugs remains guaranteed[13], [16]. Likewise, an effective drug distribution system is also very important to ensure that the required drugs reach their destination quickly[17]. According to Lionel & Herxheimer[18].To ensure the availability of drugs according to needs, the process of continuous monitoring of drug demand and logistics management must be carried out effectively.

This research is important because medication management in disaster situations can be optimal if the standard operating procedures (SOPs) for medication management during disasters are well-developed and more adaptive. SOPs must ensure efficient drug distribution, enhance the resilience of the drug supply chain, and improve disaster preparedness[10], [19]. Effective and efficient medication management is essential for maintaining the quality of healthcare services and preventing further health problems. This study aims to explore medication management during disasters in Indonesia, identify barriers, and provide strategic recommendations.

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METHODS

This study employed a qualitative descriptive approach. The population comprised pharmacists directly involved in pharmaceutical care during disasters. The sampling technique employed purposive sampling. The subjects consisted of 10 informants, including pharmacists from the City/Regency Health Office and members of the Disaster Response Pharmacists (ATB) in disaster-affected areas. The study was conducted in 2024 for 10 months, with data collection taking place over two months (April-May). Data were collected through in-depth interviews using a structured yet flexible interview guide. The data were analyzed using thematic analysis, incorporating the steps of the Miles and Huberman model, which include data reduction, data presentation, and conclusion drawing/verification.

This research is declared ethically fit as evidenced by the ethically fit certificate No. DP.04.03/F.XXVI.20/205/2024 KEPK Tasikmalaya Health Polytechnic Directorate General of Health Workers, Ministry of Health, Republic of Indonesia.

RESULT

This study identified several key findings related to medication management during disasters. These findings include issues in medication management during disasters, the role of pharmacists, and recommendations for improvement from participating informants. Interviews with 10 informants were analyzed using thematic analysis techniques, resulting in 10 codes, 2 categories, and 1 theme. The data are presented in Table 1:

Table 1. Results of Exploratory Research on Drug Management in Disaster Situations

Theme	Category	Code
Optimizing pharmaceutical services in disaster conditions	Drug management during disasters	1. Pharmaceutical supplies management regulations 2. Drug distribution 3. Drug recording and control 4. Receipt of medication 5. Drug procurement 6. Drug storage
	Pharmaceutical services	1. Pharmaceutical service problems 2. The role of pharmaceutical personnel 3. Education to the community 4. Strategic recommendations

Medication management during disasters involves five key components: distribution, recording and control, receipt, procurement, and storage. In Indonesia, this process is regulated by the 2023 Health Crisis Center guidelines and the Regulation of the Minister of Health No. 059/2011 on drug and medical supply management during disasters. However, implementation remains challenging, as these regulations have yet to address all operational needs in health crises. This highlights the need for more adaptive and context-specific guidelines. Additionally, integrating clinical pharmacy services into disaster response systems is essential to ensure the rational and effective use of medicines in emergency conditions.

Table 2. Research Results on Barriers to Drug Management in Disaster Situations

No	Code	Results	Number of Informants
1	Drug distribution	Donate medicine when completing duties, complete with minutes	5
		Distribution of drugs at each post is not even	9
		Drug withdrawal when duplication of treatment occurs	3

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No	Code	Results	Number of Informants
2	Drug recording and control	There is no integrated recording and control system yet	9
		Donated drugs are managed by the local logistics post.	6
		Utilization of Excel for drug recording documentation	1
3	Receipt of medication	There is a donation of expired drugs	10
		Drugs not registered with BPOM from abroad may be rejected	3
		The medicine that arrived did not match the needs	6
4	Drug procurement	Procurement of drugs at various levels starting from district-provincial-ministry level	10
		Proposal for one-stop drug procurement to meet needs	9
5	Drug storage	The results of sorting drugs with near expiry dates are submitted to the health office.	6
		Temperature control by installing portable AC in tents and vaccines with cool boxes	6
		Storage and management of drugs is not yet appropriate	10
		After the Aceh tsunami, there began to be a buffer stock of medicines for disasters.	1

Research results show that drug distribution in disaster situations is often uneven across evacuation posts. Lack of coordination between health posts, health services, and donation agencies results in some posts having excess drug stocks while others have shortages. This results in not all evacuees receiving the necessary medication, particularly in the early stages of a disaster when access to the disaster site is still limited. The drug stock recording system in the field is still manual, potentially leading to errors and misinformation. Several informants stated that without an integrated digital recording system, it is difficult to accurately monitor drug stock levels, leading to frequent duplication of deliveries or stock shortages at certain posts. Informants also noted that in disaster situations, there are challenges in receiving drugs. Drug donations often face obstacles, such as expired or near-expiration dates, which are rejected. Furthermore, drugs donated from abroad that are not registered with the Food and Drug Monitoring Agency (BPOM) may also be rejected to protect the safety of recipients. In some cases, there is a mismatch between the type and quantity of drugs received and the needs on the ground.

Drug procurement during disasters is carried out in stages, from the district, provincial, and ministerial levels. Informants reported that necessary drugs are not fully available optimally in disaster situations. Therefore, drug procurement through a one-stop shop system can be implemented to ensure the availability of drugs as needed. Informants also revealed that drug storage facilities in evacuation posts often do not meet required standards, especially for drugs that require special temperature control, such as vaccines and antibiotics. In many evacuation sites, adequate refrigerators or cool boxes are not available, which impacts the quality and effectiveness of drugs.

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Pharmacists play a crucial role, but their involvement in disaster situations is still limited, resulting in suboptimal oversight of drug distribution. Public education on drug use in disaster situations is essential to avoid medication errors and duplication in distribution. Informants reported that a common treatment problem is drug duplication. This occurs because there is no integrated system for recording patient drug use across health posts, and the public is poorly educated about how to use medications wisely during a disaster.The involvement of pharmaceutical personnel in disaster management is still limited, this may be due to a lack of competence regarding disasters and inadequate training.[20]The results of this study concluded that there are six recommendations that can be implemented to optimize pharmaceutical services in disaster situations. The recommendations are shown in Table 3.

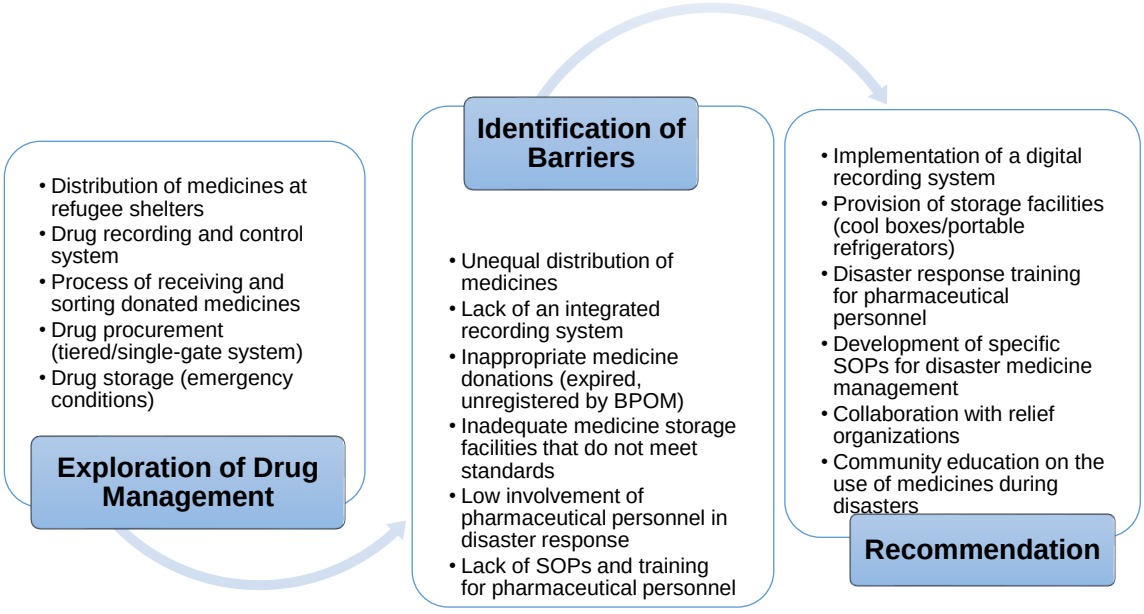

Figure 1. Mindmap of Drug Management Optimization Strategy In Disaster

Table 3. Recommendations that Can Be Implemented To Optimize Pharmaceutical Services in Disaster Conditions

No	Recommendation	Description
1	Implementation of an Integrated Digital Inventory System	Use a digital-based drug stock recording system to monitor stock in real-time between posts, reducing the risk of recording errors and duplicate drug deliveries[13], [16].
2	Provision of Adequate Storage Facilities	Prepare storage facilities such as cool boxes or portable refrigerators at each health post to maintain the quality of drugs, especially those that are sensitive to temperature[13], [16].
3	Disaster Management Training for Pharmaceutical Workers	Provide training in disaster logistics, drug distribution management, accurate record keeping, and health education to pharmacists so they are ready to adapt in emergency situations[10], [19].
4	Development of SOPs for Disaster Drug Management	Develop Standard Operating Procedures (SOPs) covering procurement, distribution, storage, and recording of drugs in disaster situations to provide clear guidance[3], [10].
5	Collaboration with Humanitarian Aid Organizations	Increase cooperation with aid agencies and humanitarian organizations to ensure the procurement and distribution of drugs according to medical needs in the field[13], [15], [17].

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DISCUSSION

Pharmaceutical services in disaster situations face a number of challenges that impact the effectiveness of medication distribution and management. One key issue is the lack of clear standard operating procedures (SOPs). Most hospitals and pharmacies are known to lack clear SOPs for disaster management, which can hinder their ability to respond effectively. This is evident in only 56% of pharmacists working in European hospitals who can demonstrate SOPs for medication management during disaster emergencies[21]**.**Drug shortages are a significant problem that can be caused by poor inventory management[22]This special SOP is expected to address coordination issues, improve logistics arrangements, and ensure adequate drug availability according to field needs[3], [10]. This study demonstrates the importance of specific medication management guidelines or SOPs tailored to disaster conditions. The absence of SOPs often leads to irregularities in medication management, which impacts the effectiveness of pharmaceutical services.

Medication management during a disaster involves five main aspects: distribution, recording and control, receipt, procurement, and storage. Each of these aspects plays a crucial role in ensuring that needed medications are available, distributed on time, and stored safely, even in an emergency. Effective management of these five aspects will improve the response and preparedness of pharmaceutical services to address emergency needs[23].Medication management in disaster situations is less than optimal, leading to irregular drug distribution and the risk of stockpiles or even shortages at certain posts. Disasters can disrupt the drug supply chain, hindering distribution to affected areas[15]**.**When post-disaster demand for medicines spikes, this requires a strategy to ensure their availability in the field. Developing a drug logistics management control model that considers drug type, waiting time, cost, and storage factors can help improve the resilience of the pharmaceutical supply chain during disasters. Disaster drug management requires a multifaceted approach with sound planning strategies, effective coordination, and drug logistics control to address potential drug shortages and surpluses in the field[13], [15], [17].

The role of pharmacists in disaster situations remains limited. As a profession competent in drug management, their involvement is crucial to ensuring standard drug distribution and use. Increasing the participation of pharmacists in disaster management can help maintain the quality of drug distribution supervision and improve the safety and efficiency of pharmaceutical services in disaster situations. One role of pharmacists is to educate the public, which can prevent medication errors and duplication. Adequate knowledge of proper drug use can help the public avoid the risk of overdose, drug interactions, duplication, and drug abuse, especially in disaster situations where access to health information can be limited[10], [17], [19].

Less than 18% of pharmaceutical workers are ready to participate directly in disaster management[24].The limited number of pharmacists involved in disaster situations also results in limited public education on the proper use of medications. According to Kuwawenaruwa et al., health services during the Sri Lankan flood disaster reported a shortage of health workers volunteering to help[25]. Pharmacists often focused solely on medication management, and a lack of public education on disaster preparedness limited their role in educating the public about proper medication use[17],[26]. Improving clinical pharmacy services and integrating pharmacists into disaster health teams is one way to address this gap[27]. Disaster response pharmacy training is one effort to increase the knowledge and readiness of pharmacy personnel to be able to play a direct role in carrying out pharmaceutical work in disaster situations[10], [19]. According to Watson et al, the existence of policies to expand the role of pharmaceutical personnel in disaster situations such as wound care, prescribing and immunization, requires integrated training to support these capabilities [19].

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This study provides a comprehensive overview of medication management practices and the role of pharmacists in disaster situations, but it has several limitations. Its focus was limited to a few disaster locations in Indonesia, so the results cannot be generalized nationally. Furthermore, the qualitative approach used did not quantitatively measure the effectiveness of the intervention, requiring further research to more objectively assess its impact.

Nevertheless, this study has important strengths. It explores specific, often overlooked issues in medication management during crisis situations, particularly in distribution, recording, control, and the involvement of pharmacists. Furthermore, the use of Miles and Huberman's analytical method, supported by NVivo software, provided clarity in data processing and the extraction of key themes. The involvement of informants from diverse backgrounds strengthened content validity and enriched understanding of field dynamics.

CONCLUSION

Medication management in disaster situations in Indonesia is not yet optimal. Addressing this requires cross-sector coordination and an integrated recording system to ensure the availability of effective and targeted medications. Recommendations include the implementation of specific standard operating procedures (SOPs), a one-stop drug procurement system, and an educational program for evacuees on how to use medications wisely, especially during disasters. The results of this study can serve as a guide for improving medication management in emergency situations and support the development of pharmaceutical supply management policies for disaster management.

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