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EDITED BY
Dorota Dominika Kamrowska-Zaluska,
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REVIEWED BY
Alysha Helmrich,
University of Georgia, United States
Ihab H. Sawalha,
American University of Madaba, Jordan

*CORRESPONDENCE
Haliza Mohd Zahari
✉ haliza.mz.upnm.edu.my

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Inter-agency information sharing coordination on humanitarian logistics support for urban disaster management in Kuala Lumpur

Ruzaidin Mohammed Zain, Haliza Mohd Zahari* and Noor Azmi Mohd Zainol

Faculty of Defence Studies and Management, National Defence University of Malaysia, Kuala Lumpur, Malaysia

Information sharing is critical in establishing coordinated and effective decision-making processes for a humanitarian logistical response. Better coordination and decision-making will lead to a better response for beneficiaries as a result of timely and high-quality information reaching more humanitarian agencies. However, sharing this information between agencies is a challenge, especially in coordinating logistics response during an urban disaster, due to the sheer scale of potential impacts and risks on human lives and the economy. This research explored the current humanitarian logistics settings and identified issues and challenges of inter-agency information sharing coordination on humanitarian logistics support for urban disasters in Kuala Lumpur. Focus Group Discussion was conducted with participants from six government agencies that are responsible for providing humanitarian logistics support for urban disasters in Kuala Lumpur. This study also examined existing disaster management directives and the agency's Standard Operating Procedures (SOPs). The findings revealed issues with information redundancy, lack of tools to manage and distribute information, and coordination issues among agencies in providing information sharing and managing real-time information during a disaster. A review of existing policies and formulation of clear guidelines are needed to address the issues and improve the overall humanitarian logistics support coordination.

KEYWORDS

information sharing, humanitarian logistics, inter-agency, coordination, urban disaster, Kuala Lumpur

1. Introduction

Information sharing plays a crucial role in determining the effectiveness of the humanitarian logistical response, coordination, and decision-making. The dissemination of timely and accurate information to more humanitarian agencies will improve coordination and decision-making, enhancing the response to beneficiaries' and donors' accountability (Ray-Bennett et al., 2020). According to Tatham et al. (2017), the effective coordination and sharing of information during an inter-agency response increase the effectiveness of the response. As a result, when accurate information is collected and shared among responding organizations, relief capacities increase directly from effective coordination and response (Ray-Bennett et al., 2020). Investigating the softer issues, such as inter-agency

information sharing coordination, will contribute to the effectiveness of humanitarian disaster management as well as humanitarian logistics management (Salam and Khan, 2020).

During a disaster, multiple agencies are involved in providing relief and rescue efforts, but due to a lack of coordination, there may be duplication of efforts, delays in response time, and inefficient allocation of resources (Gupta and George, 2016). This can lead to a suboptimal response and exacerbate the impact of the disaster on affected populations. Specifically, the issue is that different agencies responsible for providing logistics support such as transportation, storage, and distribution of relief supplies are not effectively sharing information with each other, resulting in redundancy and inefficiency in the delivery of aid. This can lead to delays in providing assistance to affected communities and negatively impact their ability to recover from the disaster (Birkland, 2006). The problem is particularly critical in urban areas like Kuala Lumpur, which are densely populated and have complex logistics networks. The lack of coordination and information sharing among agencies can lead to bottlenecks and other logistical challenges that can slow down the response to disasters.

The subsequent parts are arranged in the following sequence. Initially, the first segment elaborates the definitions and concepts of inter-agency information sharing coordination, humanitarian logistics and urban disaster. Then, the second section presents an outline of the research methods and the study area. Subsequently, the third section records the findings, followed by a discussion in the fourth section. Lastly, the fifth section offers the conclusion.

1.1. Inter-agency information sharing coordination

Coordination is crucial in humanitarian aid to enhance efficient and effective provision of resources and information sharing among the humanitarian agencies. According to Akhtar et al. (2012), coordination is a systematic procedure that affects the efficient and effective provision and utilization of humanitarian resources through enhanced cooperation among humanitarian NGOs during the humanitarian crisis. Coordination incorporates several interpretations in the context of relief and humanitarian efforts because it instills many facets. These can be efficiently communicated through the channels that expedite the delivery of humanitarian services (Cozzolino et al., 2012; Lu et al., 2013) and involve a high level of information sharing as a key component of the coordination process (Lu et al., 2013). Numerous agencies continue to have an impact on the environment for humanitarian help, which affects how it is carried out (Akhtar et al., 2012; Dash et al., 2013). While the various agencies involved in the logistical network of humanitarian aid from the government, non-governmental organizations (NGO) or private sectors may have varying perspectives on disaster relief operations during the immediate response phase, cooperation and coordination of the activities are extremely crucial for the success of these operations (Tatham and Spens, 2016).

McLachlin and Larson (2011) argued that the coordination process is still crucial for humanitarian agencies since it affects the logistical process by incorporating efficient information sharing methods. Coordination affects the capacity of humanitarian NGOs to share information, which affects the integration of well-informed decisions pertaining to the overall process, which affects the decision-making process encountered in the logistical assistance chain (Akhtar et al., 2012). Additionally, coordination affects the supply chain efficiency levels by giving essential data on all supply processes and related procedures (Akhtar et al., 2012; Dash et al., 2013). It is crucial for the overall relief efforts to establish and maintain efficient coordination procedures (Ergun et al., 2014).

Information sharing is crucial in reducing failures and casualties and averting crisis escalation because disaster occurrences are typically complex, dynamic, and continually changing. The success of collaborative activities during a disaster response is also influenced by information sharing, which shows how well-equipped other agencies' access to information is. Because of the complexity of disasters, agencies' response strongly depends on collaboration and shared accountability between several administrative levels. By effectively allocating responsibilities and establishing frameworks for information sharing, policy agreements, collaboration, and collaborative planning, good coordination helps avoid service gaps and duplication (Hatakka, 2019). When all agencies actively participate in inter-agency coordination, it is more effective when unbiased, transparent, participatory, and works toward a common objective without favoring any agency. Effective information sharing can play a crucial role in enhancing resilience to disasters. By promoting coordination, collaboration, learning, and continuous improvement, resilience can be built over time, reducing the impact of disasters and promoting a swift recovery. Effective information sharing and collaboration between stakeholders, including community members, emergency responders, and government agencies, can improve response coordination and enhance community resilience (McKnight and Linnenluecke, 2016). Sakurai and Murayama (2019) emphasized the importance of information sharing and collaboration for disaster risk reduction, highlighting the need for effective communication channels and platforms to support these efforts.

1.2. Humanitarian logistics support

On the other hand, humanitarian logistics aims to alleviate difficulties in the most exposed or disaster-affected populations by providing assistance supplies during disasters that are often unforeseen and require enormous supplies (Ye et al., 2020; Abazari et al., 2021). Large-scale operations, unpredictable demand, and the development of unforeseen restrictions during disasters are characteristics of humanitarian logistics (Roh et al., 2022). The primary goal of humanitarian logistics is to ease the difficulties of the most exposed or disaster-affected populations (Abazari et al., 2021). The humanitarian logistics structure involves a complex network of people and agencies, and despite the lack of formal or informal linkages, all participating agencies have the same objective: to enable impacted persons to survive after a tragedy. In addition, these humanitarian logistics operations often take place in regions where the infrastructure is precarious due to the aftermath

of a disaster, which may include factors such as power outages and limited transit infrastructure (Dash et al., 2013; Roh et al., 2015).

1.3. Urban disaster

The phenomenon of urbanization has brought about significant changes in our world. Cities have grown rapidly, and their concentration of population has made them more vulnerable to both man-made and natural disasters. The rise in urbanization has made urban disaster management increasingly important due to various factors such as constant migration to cities, unplanned development, climate change, and rising operating and maintenance costs (Price and Vojinovic, 2008). According to DESA (2019) estimates, the number of people living in urban areas has been on the rise. In 1990, 43% of the world's population resided in urban regions, and by 2018, this number had increased to above 55%, and by 2050, it is predicted to reach 68%, which underscores the need for effective disaster management strategies in urban areas. It is projected that an additional 2.5 billion people will live in urban areas by 2050, with around 90% of them residing in Asia and Africa (Sukmaningsih et al., 2020). In Malaysia, the percentage of those living in urban areas from the total population grew from 49.79% in 1990 to over 76% in 2018 (Bank, 2019). Cities, particularly large cities, are becoming more and more vulnerable to both man-made and natural disasters. The exceedingly dense agglomeration of populations in these areas directly increases their rate of exposure to hazards, exacerbates their vulnerabilities, and subsequently amplifies the risks of potential humanitarian crises, emergencies, and disasters (Park, 2011).

Rapid urbanization, deteriorating environmental quality, an inefficient transport network, a drop in the quality of life, a lack of focus on urban design and heritage preservation, and bad urban governance are all things that can make cities more likely to be affected by disasters (Karim, 2021). These factors often exacerbate vulnerable conditions typical to urban areas such as poor health, inadequate nutrition, poverty, and deficient sanitation system (Klugman, 2010). Most cities worldwide are regarded as being exposed to at least one extreme natural event including flood, cyclone, drought, earthquakes, and volcanic eruption (United Nations, 2018), in addition to various environmental hazards ranging from biological, chemical, physical and socio-political. Combined with the factors mentioned earlier, a higher vulnerability in urban areas means that the risks and impacts are much more severe than in rural areas.

2. Research methods

2.1. Focus group discussion

Focus group discussion (FGD) was employed in this qualitative research to gather information on the current humanitarian logistics settings and issues and challenges of inter-agency information sharing coordination on humanitarian logistics support for urban disasters in Kuala Lumpur. This research used purposive sampling to recruit participants for the focus group. The potential participants were identified and selected based on their position in the agencies, as well as their expertise or experience related to the research question. A total of six government officers from agencies responsible for providing humanitarian logistics support for urban disasters in Kuala Lumpur were recruited for the focus group as listed in Table 1. The participants are representatives from six government agencies: (1) Jabatan Kebajikan Masyarakat or Department of Social Welfare (JKM), (2) Malaysian Armed Forces (ATM), (3) Angkatan Pertahanan Awam Malaysia or Malaysian Civil Defense Force (APM), (4) Jabatan Sukarelawan Malaysia or Malaysia Volunteers Corps (RELA), (5) Jabatan Kerja Raya or Malaysian Public Works Department (JKR) and (6) Dewan Bandaraya Kuala Lumpur or Kuala Lumpur City Hall (DBKL). The focus group session lasted ~90 mins and was conducted *via* online meeting platform in July 2021. The session was audio recorded and transcribed for analysis. The focus group questions were open-ended and designed to explore participants' experiences and perspectives related to the research question. The list of questions asked to the participants are as follow:

TABLE 1 Background of the participants.

Research participant	Position level	Based location
Participant 1	Senior management	Putrajaya HQ
Participant 2	Senior officer	Jalan Ipoh, KL
Participant 3	Senior operations officer	Jalan Padang Tembak, KL
Participant 4	Senior management	Jalan Sri Hartamas, KL
Participant 5	Senior technical	Jalan Sultan Salahuddin, KL
Participant 6	Senior management	Jalan Raja Laut, KL

1. What are the current challenges you face in coordinating with other agencies for humanitarian logistics support during urban disaster management?
2. What kind of information is most important to share between agencies during disaster response operations?
3. What are the most effective ways for agencies to share information and coordinate logistics support during urban disaster response operations?
4. How can agencies ensure that information is shared promptly and accurately during disaster response operations?
5. What are the barriers to effective information sharing and coordination between agencies during urban disaster response operations?
6. How can agencies overcome these barriers and improve inter-agency information sharing and coordination for logistics support during disaster response operations?
7. What role do communication technologies and platforms play in facilitating inter-agency information sharing and coordination during disaster response operations?
8. What best practices or success stories have you observed or experienced in inter-agency information sharing and coordination during urban disaster response operations?

The focus group was moderated by a trained researcher with experience facilitating focus group discussions. The moderator

TABLE 2 List of documents.

Document	Summary
National Security Council (NSC) Directives No. 20 (Malaysia's National Disaster Management Policy and Mechanism)	Malaysia's national disaster management policy. Outlines mechanisms and comprehensive actions to be taken by every agency involved in disaster management before, during and after a disaster.
Department of Social Welfare (JKM) Disaster Management Standard Operating Procedure	JKM's SOP for disaster management. Specific disaster management mechanisms in planning and implementation according to the levels of disaster management.
Department of Public Works (JKR) Disaster Operation Standing Order	JKR's SOP for disaster operation. Action plan and process flow for reporting of disaster conditions and details of assistance provided at locations such as road closures alternatives and infrastructure repairs.
Malaysian Civil Defense Force (APM) Management Guide for the Secretariat of the National Disaster Management Committee	Action plan before, during and after disasters as well as reporting procedures and management of assistance.
Kuala Lumpur City Hall (DBKL) Kuala Lumpur City Plan 2020	Frameworks for Strategic Direction and Initiatives in guiding the development and progress of Kuala Lumpur.
List of depots and stores	All agency's logistics storage premises.

used the focus group questions as a guide for the discussion and encouraged all participants to share their perspectives. A scribe was also present to take notes and record the discussion. The scribe's notes were used to supplement the audio recording and ensure accuracy in the analysis. Voice recordings and verbatim transcriptions of the FGD were also made. Based on the themes and topics identified in the transcript, coding framework was developed that includes key categories and subcategories. Using the coding framework, the transcript was coded by identifying relevant text segments and assigning them to the appropriate category and subcategory. Review of the codes was also conducted to make sure they accurately reflect the content of the discussion. Once the coding is completed, the coded data was analyzed by looking for patterns and trends across categories and subcategories to identify key insights and recommendations for improving inter-agency information sharing coordination on humanitarian logistics support for urban disaster management. Finally, the coding was validated by checking inter-coder reliability and by seeking feedback from other experts in the field.

2.2. Document analysis

This study also deployed the qualitative method of content analysis in analyzing the data from the content of the documental review. The goal of using content analysis is to generate a deep understanding of the content being analyzed, and to identify key themes, patterns, and insights that can inform broader understandings of the research question being investigated. The authors used search terms related to the research question for document selection. The authors included inclusion and exclusion criteria, such as publication date from the year 2010 to 2022 and its relevance to the research question. After the initial search, 13 documents were gathered and the authors screened the documents by title and then reviewed the full-text to determine eligibility for inclusion in the study. As a result, a total of six documents were included in the final analysis. These documents were selected based on their importance and relevancy as the main references and guidelines for involved agencies in conducting humanitarian logistics support operations. The reviewed documents are NSC Directives No. 20, agencies' Standard Operating Procedures (SOP), policies, directives and incident reports, as shown in Table 2.

Content analysis involves systematically categorizing and coding the content of text data, such as transcripts of interviews or written documents, in order to identify themes, patterns, and relationships within the data. Besides, collecting data from several documents helps clarify inputs gained from interview sessions and saves time (Meyer, 2001). The coding was completed by two experienced researchers who had expertise in the field. The coders independently reviewed the selected documents and applied the coding to identify themes and sub-themes. The coders then met to discuss and compare their coding results. They reviewed any discrepancies and resolved them through discussion to reach a consensus. The researchers used several methods to validate the coding process. Inter-coder reliability test was conducted to assess the level of agreement between the two coders. Peer-review process was also carried out, in which two external experts reviewed the coding results and provided feedback. The researchers revised the coding framework and coding process based on the feedback received. Once the data has been coded and validated, data analysis was carried out by examining the patterns and trends that emerge from the data, and drawing conclusions based on these patterns. Finally, the results of the analysis were interpreted to identify key insights and recommendations for improving information sharing and logistics coordination among agencies during urban disaster management.

2.3. Study area

The city of Kuala Lumpur, which serves as both Malaysia's capital and primary economic and commercial hub, was chosen for this study. In accordance with National Security Council (NSC) Directive No. 20, this study comprised six organizations recognized as the primary humanitarian logistics support providers. The six agencies/departments studied are (1) Jabatan Kebajikan Masyarakat or Department of Social Welfare (JKM), (2) Malaysian Armed Forces (ATM), (3) Angkatan Pertahanan Awam Malaysia

TABLE 3 Level of disaster management in Kuala Lumpur.

Level	Authority	Responsibilities
1. District Disaster Management Committee (JPBD)	Chaired by the Kuala Lumpur Mayor	District-level officials are in charge of disaster management. 1. Coordinated actions, adequate assets and human resources, and media management. 2. A localized incident under district control and unlikely to spread. The district's local resources are sufficient for managing disaster response.
2. State Disaster Management Committee (JPBN)	Chaired by the Secretary-General, Ministry of Federal Territory	Provide assets, funds, and human resources to the district level as needed. 1. Organize state-level assistance for the impacted Districts. 2. An incident requiring external support and assistance that affects more than one district but has no chance of spreading.
3. Central Disaster Management Committee (JPBP)	Chaired by the Minister in the Prime Minister's Department	Manage disaster policy and strategy, as well as assets, monetary aid, and human resources. 1. A disaster that is more significant, complex, and affects regions across several states. 2. Coordinating more financial, human, and asset resources is necessary when the situation is complex and involves wide areas.

or Malaysian Civil Defense Force (APM), (4) Jabatan Sukarelawan Malaysia or Malaysia Volunteers Corps (RELA), (5) Jabatan Kerja Raya or Malaysian Public Works Department (JKR) and (6) Dewan Bandaraya Kuala Lumpur or Kuala Lumpur City Hall (DBKL).

Kuala Lumpur is Malaysia's ceremonial, legislative, and judicial capital and a federal territory. As of the 2020 census, its anticipated population was 1,982,112, making it the largest metropolitan in Malaysia and one of the Asian cities with the greatest population growth (Arif Shah, 2020). Greater Kuala Lumpur, popularly known as the Klang Valley, is a 7.564 million people metropolitan agglomeration as of 2018 (DESA, 2019). In terms of population and economic growth, it is one of the metropolitan regions in Southeast Asia with the most rapid expansion (Kozlowski et al., 2022).

There have been many different types of accidents and disasters in Kuala Lumpur, some of which have claimed many lives and inflicted significant property damage due to natural disasters or human error. One of the tragic events that had a significant effect was the explosion and fire at Bright Sparkles Sdn. Bhd. fireworks factory in Sungai Buloh, Selangor on May 7, 1991, which resulted in 22 fatalities and 103 injuries, as well as the collapse of the Highland Towers Condominium in Hulu Kelang, Selangor where 48 people lost their lives in 1993, and most recently, the catastrophic flood impacted ∼30,000 people in the Klang Valley in 2021/2022. The Highland Towers Condominium incident was the most notable disaster in Malaysia's urban setting, after which the National Security Council (NSC) Directive No. 20 (Malaysia's National Disaster Management Policy and Mechanism) was formulated.

3. Findings

3.1. Humanitarian logistics settings in Kuala Lumpur

The National Disaster Management Agency (NADMA) is Malaysia's top national disaster management organization. The NADMA is in charge of organizing the response to national disasters, developing and assuring that all regulations and disaster management procedures are followed, and putting them into action at each level of Disaster management. For Kuala Lumpur, the management of disasters shall be carried out based on three (3) management levels, as in Table 3 below.

3.2. Humanitarian logistics agencies in Kuala Lumpur

Typically, the agencies in charge of disaster management fall into two categories: the Rescue Agency and Relief and Rehabilitation Agency (National Security Council, 2013). Rescue Agency are the government agencies that responsible to carry out search and rescue operations and to provide emergency medical services when disasters occur; meanwhile Relief and Rehabilitation Agency are the government agencies which responsible for providing logistics support, welfare assistance and counseling service in national disaster management operations. Various agencies are directly and indirectly involved in logistics support management for urban disasters in Kuala Lumpur, which fall under the Relief and Rehabilitation Agency category. The list of these agencies and their logistics roles and responsibilities are depicted in Table 4.

3.3. Information sharing coordination

Based on Figure 1, the placement of logistics agencies is in the Green Zone for Relief and Rehabilitation Agencies. Upon the occurrence of a disaster, all Relief and Rehabilitation Agencies involved will report to the Disaster Operations Commander (DOC) in Control Post on Scene (PKTK). All representatives

TABLE 4 Roles and responsibilities of logistics (relief and rehabilitation) agencies in Kuala Lumpur.

Agencies	Logistics roles and responsibilities	Location
JKM	Provide and distribute food aid, clothing and other necessities to disaster victims	1. Jalan Pahang, Kuala Lumpur 2. Putrajaya
	Provide and maintain evacuation centers for disaster victims	
RELA	Assist in preparing and distributing food to disaster victims and disaster management staff	Jalan Sri Hartamas, Kuala Lumpur
	Assist in distributing clothing and other necessities to disaster victims	
	Assist in evacuating disaster victims	
APM	Deliver food and supplies to the disaster area, as well as land and sea transport vehicles for disaster victims' evacuations.	Jalan Padang Tembak, Kuala Lumpur
	Assist in maintaining the shelters for evacuees and the provision of food to those affected by disasters	
JKR	Providing supplies, machinery, and workers to clean up the disaster site	1. Jalan Sultan Salahuddin 2. Jalan Putra, Chow Kit
	Providing temporary shelter (tents or canopies)	
	Providing water and boosting water pressure in places where these services are needed	
ATM	Provide land, air, or sea transportation at all levels of disaster	Kem Batu Kentonmen, Jalan Ipoh
	Prepare machinery equipment facilities	
DBKL	Assist in providing and maintaining evacuation centers for disaster victims	Jalan Raja Laut, Kuala Lumpur
	Assist in providing vehicle	

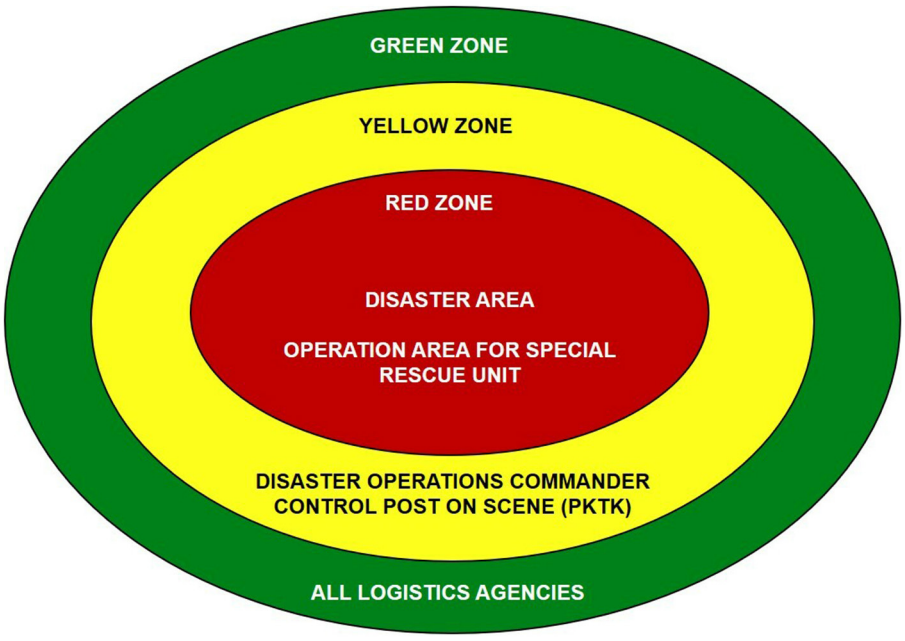

FIGURE 1
Disaster management on scene based on Zone.

from logistics agencies will continue to be in the Green Zone and be ready to act and carry out tasks according to the assigned duties and their respective expertise as directed by the DOC.

The Rescue Agencies and the Relief and Rehabilitation Agencies will all work together under the coordination of the DOC to provide logistical assistance to disaster victims.

3.3.1. Communication and information sharing at the scene

When managing disasters on the ground, the DOC must activate the communication network between all agencies, including utilizing the Network Government Integrated Radio Communications (GIRN). During disasters and crises, information bubbles can form rapidly, leading to the spread of rumors and

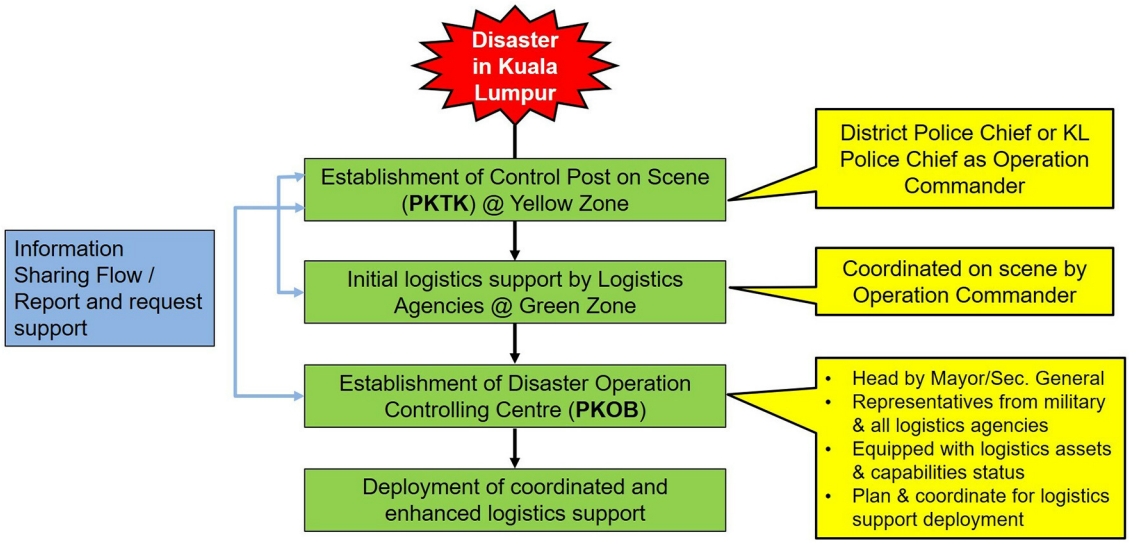

FIGURE 2
Information sharing settings for disaster logistics coordination.

misinformation that can cause confusion, panic, and even harm. To address this issue, it is essential to establish trusted channels of communication by official sources, such as government agencies or emergency responders that include emergency alert systems, official social media accounts, and public information hotlines. Information sharing tools that are currently used by agencies in Kuala Lumpur to coordinate logistics support include social media platforms such as WhatsApp to disseminate real-time information and coordinate relief efforts; and mobile apps such as InfoBencanaJKM and JKR Disaster Management Official Site (eBENCANA) which provides information on disaster victims and relief centers, as well as real-time alert on road closures due to disasters, respectively.

The information sharing settings and flow of information for logistics support coordination are depicted in Figure 2. Once a disaster occurs, the District Police Chief or KL Police Chief will act as the DOC, depending on the level of the disaster. He will establish the PKTK in the Yellow Zone, which will be the center to coordinate rescue tasks and disaster support assistance. In general, the DOC is responsible for overseeing all communication during a disaster operation. The DOC typically coordinates tasks through a PKTK and Disaster Operation Controlling Center (PKOB). The PKOB is responsible for managing the overall response to the disaster and ensuring that all tasks are properly assigned, coordinated, and executed. The PKOB may include various agencies, such as operations, logistics, planning, and finance/administration, who work together to manage the response. Each agencies have a specific role and is responsible for coordinating tasks related to their area of expertise. The PKOB also ensure that communication between all involved agencies is effective and efficient. In summary, the DOC oversees all communication during a disaster operation on scene, and the tasks are typically coordinated through a PKTK and PKOB.

At the initial stage, logistic assistance will be provided by agencies that have arrived at the scene and are stationed in the Green Zone. The DOC will act as a coordinator by receiving information about logistics needs from Rescue agencies in the Red or Yellow Zone and conveying it to the logistics agencies in the Green Zone. Among the needs and information shared are the number of victims involved, the need for vehicles or transportation to evacuate victims from the scene, and so on. Here it can be observed that two-way information sharing moves across Zones that have been set with the DOC acting as coordinator.

In addition, the DOC will provide regular updates to the District/State Disaster Management Committee (JPBD/JPBN), which meets at PKOB. If the logistic agencies cannot provide any additional logistic needs at the scene, the application will be sent to PKOB to obtain appropriate assistance. Once again, there will be a movement and two-way information sharing between PKTK and PKOB to coordinate the logistic needs.

At the PKOB level, all requirements and information received will be coordinated by JPBD/JPBN, composed of representatives of all logistic agencies. Each agency will share information about the status and capabilities of their respective assets that can be mobilized for disaster relief missions. Finally, all these information sharing settings will enable the deployment of coordinated and proper disaster logistics support in Kuala Lumpur.

4. Discussion

The process of providing humanitarian logistics support during a disaster has been considered to be greatly improved by increasing the amount of communication and coordination among the agencies responsible for disaster management (Tomasini and Van Wassenhove, 2009; Roh et al., 2015). This research found some issues and challenges in Kuala Lumpur's logistics agencies' information sharing coordination during disaster response in the city area.

4.1. Level of disaster management

Although National Security Council (2013) has divided disaster management in Kuala Lumpur into three levels (Table 1), its implementation in Kuala Lumpur presents challenges compared to other areas. Kuala Lumpur's position as the nation's capital and the main center of economic and commercial activity has caused every disaster incident to be the focus of the highest levels of national disaster management. This situation has caused confusion and conflict in the line of command and reporting of information when a disaster occurs in the city.

For example, when the 2021 floods hit Kuala Lumpur, the high level of national attention placed on the disaster meant that there was confusion and conflict in the line of command and reporting of information. The federal government's National Disaster Management Agency (NADMA) took the lead in managing the disaster, but the Kuala Lumpur City Hall (DBKL) led by the Kuala Lumpur Mayor as the Chairman of District Disaster Management Committee (JPBD) also had a role to play in coordinating relief efforts as stipulated in NSC Directives No. 20. This resulted in overlapping responsibilities and conflicting directives, leading to delays and inefficiencies in disaster management. Additionally, the high level of attention on the disaster meant that there were often conflicting messages and directions coming from different government agencies, causing confusion and further hindering relief efforts.

A review of the level of disaster management in Kuala Lumpur is recommended to identify its compatibility with the administrative structure and position of the city of Kuala Lumpur. This improvement ensures that the response to disasters can be implemented effectively and avoids redundancy of resources and disaster relief supplies (Martin et al., 2016).

4.2. Inter-agency coordination

Due to a lack of coordination and effective knowledge sharing between the agencies concerned, disaster management strategies are frequently unable to be implemented successfully (Rodzi et al., 2016). This study identified that one issue that affects inter-agency coordination among the humanitarian logistics agencies is the lack of mechanisms to enforce information sharing, such as a clear SOPs that define information sharing requirements, procedures, and timelines; shared information management systems that allow agencies to input, access, and share information in real-time; training and capacity building opportunities; and audits and reviews of agencies' information sharing practices to identify gaps and areas for improvement.

Although written instructions require each agency to update and share the status of their respective logistics assets, there is no enforcement or authority to ensure these requirements are met. This finding is supported by the words of the officer who acted as the secretariat for the Disaster Management Committee (JPB) in Kuala Lumpur.

"… there's no kind of enforcement on sharing of information. Although we are the secretariat of the Disaster Management Committee, we do not have the authority to direct agencies to share their logistics information. We are having difficulty gathering such information." (Participant 3).

Although the duties and responsibilities of each agency have been specified in NSC Directives No. 20, each agency is still subject to its respective policies, guidelines and SOPs (Nazli et al., 2014). Due to a lack of policy guidelines, it is up to each agency to decide what should be disclosed. Some officials keep information secret because there are no clear regulations on what information should be provided and what shouldn't, as stated in the quote below.

"However, in my opinion, there are no written policies or report formats; instead, it is up to us, agency officials. We must decide what information to disclose and what not. There are currently no established formats or rules I can use to decide what information to disclose and how to release it." (Participant 1).

In order to facilitate coordination and avoid duplication of information that makes it difficult to channel logistical assistance, it is recommended that NADMA can establish a clear instruction or policy on information sharing that can be used by all agencies involved. The suggested model is the one based on the United States National Incident Management System (NIMS) Information Sharing and Access Interoperability (ISA) Policy could consist of the following:

1. Purpose—The purpose of this instruction/policy is to provide a framework for the sharing of information among all agencies involved in disaster management, in order to ensure effective coordination, avoid duplication of efforts, and maximize the impact of logistical assistance.
2. Scope—This instruction/policy applies to all agencies involved in disaster management, including but not limited to NADMA, relevant government agencies, non-governmental organizations, and international organizations.
3. Principles of Information Sharing—The following principles should guide the sharing of information among agencies:

   a) Information should be shared promptly, accurately, and in a format that is accessible to all relevant parties.
   b) Confidentiality should be respected and sensitive information should be protected.
   c) The need for information should be balanced against the potential harm that may result from its disclosure.
   d) All agencies should work together to ensure that the information they share is accurate and up-to-date.

4. Responsibilities:

   a) NADMA shall be responsible for establishing and maintaining a central information sharing platform, which will serve as the primary means of sharing information among agencies.
   b) All agencies involved in disaster management shall designate a focal point for information sharing, who shall be responsible for ensuring that information is shared in accordance with this instruction/policy.
   c) All agencies shall cooperate with each other to facilitate the sharing of information.

5. Procedures for information sharing:

   a) NADMA shall establish standard operating procedures (SOPs) for the sharing of information, which shall include guidelines for the use of the central information sharing platform.
   b) All agencies shall comply with the SOPs and use the central information sharing platform as the primary means of sharing information.
   c) In exceptional circumstances where the central information sharing platform is unavailable, agencies may use alternative means of communication, provided that they ensure the confidentiality and accuracy of the information shared.

6. Monitoring and evaluation:

   a) NADMA shall monitor the implementation of this instruction/policy to ensure that it is effective in facilitating coordination and avoiding duplication of efforts.
   b) All agencies shall cooperate with NADMA in monitoring and evaluating the implementation of this instruction/policy.
   c) NADMA shall review this instruction/policy periodically to ensure that it remains relevant and effective.

By adopting this model, it is hoped NADMA can establish a comprehensive information sharing policy that promotes collaboration, coordination, and effective use of resources among all agencies involved in emergency management and response operations.

4.3. Information sharing coordination at the scene

Some participants said it is challenging to identify the available information types and, consequently, to obtain it, particularly when involving logistical agencies at the disaster scene. In a chaotic environment, it is challenging to convey real-time information. A reliable tool is required to coordinate disaster information despite the chaotic environment during a disaster (Gao et al., 2011). At the initial stage, logistic assistance will be provided by agencies that have arrived at the scene and are stationed in the Green Zone. The agencies rely on Disaster Operations Commander for information flow coordination between disaster management zones.

"Information sharing on the scene is very challenging. Everything has to move fast, and often we don't know what information is available and how to get it." (Participant 5).

"The flow of information at the scene depends entirely on the Disaster Operations Commander. He is the middleman between us logistics agencies and rescue agencies in the red zone." (Participant 4).

In addition, breakdowns of communication links, such as traditional phone lines, mobile phone systems, or radio networks, can drastically hinder the response of logistics assistance (Martin et al., 2016). While power and communication links are separate infrastructures in Malaysia, they may have some degree of interdependence, particularly in terms of reliability and consistency. The failure of this communication channel also makes it difficult to exchange information between PKTK and PKOB. Delays or difficulties in the transmission of information between these two entities will affect the response and logistical assistance of the disaster to the victims involved. Thus, a reliable and robust communication platform is recommended for use between agencies at the scene and for reporting information from PKTK to the disaster management committee at PKOB.

5. Conclusion

The effectiveness of information sharing and speed of humanitarian logistics coordination in disaster response operations are vital in managing urban disasters and emergencies in Kuala Lumpur city center because of the enormous potential effects and risks concerning national resilience and stability. This study attempted to explore how the logistics agencies coordinate the information sharing among them and to identify the challenges encountered in providing humanitarian logistics assistance during urban disasters in Kuala Lumpur. This study has reviewed the current humanitarian logistics support settings in Kuala Lumpur and identified issues and challenges in information sharing coordination. Addressing the issues will help the agencies involved to provide humanitarian logistics support during disaster response in the city more effectively and efficiently.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Research Ethics Committee, National Defence University of Malaysia. The patients/participants provided their written informed consent to participate in this study.

Author contributions

RM was responsible for preparing and planning data collection methods, leading data analysis, preparing most manuscript content (including text, figures, and tables), and editing and revising. HM was responsible for preparing data collection, leading FGD session, review, and supervision. NM was responsible for preparing methodology, leading data curation, review, and supervision. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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