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The Role of Militaries in Natural Disaster Management: A Systematic Review

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Original Article

Abstract

INTRODUCTION: Large-scale natural disasters, particularly in the first hours and days, place severe pressure on civilian response capacities, and in many countries, militaries act as complementary and enabling actors. This study aimed to systematically examine the roles, capacities, outcomes, and challenges of military involvement in the natural disaster crisis management cycle.

METHODS: This study was conducted as a systematic review by searching scientific databases including ProQuest, PubMed, ScienceDirect, Scopus, and Web of Science, as well as SID, Noormags, and Magiran, from October 1950 to May 2025. Articles were selected based on predefined search strategies and inclusion and exclusion criteria. After screening and quality assessment, 22 eligible articles were included in the final analysis. Data were analyzed using thematic content analysis.

FINDINGS: The review identified 12 empirical and 10 conceptual–policy studies. Most of the evidence focused on the response phase, and only a limited number of studies addressed preparedness and recovery. No studies reported military involvement in the mitigation phase. The most frequently reported military roles included medical and health services, logistics, search and rescue, and evacuation and transport. The key military capabilities identified included logistics, emergency medical capacity, rapid deployment, and airlift.

CONCLUSION: The results indicate that in natural disasters, militaries can play a key but temporary and complementary role in health-based and logistical responses and are mainly involved in the response phase. The effectiveness of this involvement depends on clearly defined roles, strengthened civil–military coordination, doctrine development, and investment in specialized training.

Keywords: Military; Crisis management; Natural disasters; Disaster response.

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Introduction

In many countries, militaries are considered as one of the most important governance capacities in natural disaster management, and in major disasters, their presence in search and rescue, evacuation and transportation of people and goods, medical services, logistical support, technical and engineering measures, and security provision has been widely reported (1-3).

Features such as organized manpower, land, sea, and air transportation networks, command and control systems, and the ability to operate in high-risk conditions have allowed armies to play a complementary and sometimes key role in saving the lives of the injured in the first hours and days after a disaster (4).

At the same time, international institutions have developed policy and operational frameworks to ensure the targeted use of the comparative advantages of military forces while preventing the

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undermining of the civilian and humanitarian nature of disaster response. At the macro level, the Sendai Framework emphasizes the participation of all government institutions and stakeholders across disaster risk governance, preparedness, response, and recovery, and defines the utilization of military capacities within national mechanisms under civilian leadership (5). Similarly, the World Health Organization, through the framework of civil–military health cooperation, underscores the strategic use of military health services throughout the entire cycle of preparedness, response, and health system recovery (6).

The “Oslo Guidelines,” developed with the involvement of the United Nations Office for the Coordination of Humanitarian Affairs, regulate the use of military and civil defense assets in natural disaster relief operations. These guidelines stress that military assistance should play a complementary role alongside civilian mechanisms and be employed only in exceptional circumstances and as a last resort—namely, when no equivalent civilian alternative is available and the unique capabilities of military forces are essential to meet a critical humanitarian need. At the same time, relief operations must remain fundamentally civilian and humanitarian in character and be conducted under the overall direction of humanitarian authorities. Although military assets remain within their own command structures, they are expected to operate in coordination with civilian mechanisms. Furthermore, humanitarian organizations are advised to minimize dependence on military forces, and governments are encouraged to strengthen civilian capacities to safeguard the principles of humanity, neutrality, and impartiality (7–9).

At the European Union level, the “European Consensus on Humanitarian Aid” also defines the participation of military forces as part of national disaster management capacities. It emphasizes their supportive and regulated role, civilian leadership of the response, the principle of last resort, the limited and time-bound employment of military assets, alignment with clearly identified needs, the existence of exit strategies, and clear demarcation between military and humanitarian missions. The document notes that, owing to their cohesive command structure, operational readiness, heavy logistics, engineering capabilities, transport and communication assets, and trained personnel, armed forces can play a particularly effective role during the initial phases of a disaster (10).

From an operational perspective, "UN-CMCoord Handbook: United Nations Humanitarian Civil-Military Coordination" outlines principles for coordination between civilian actors and military forces, framing the military role as complementary to civilian capacities. It highlights the relative advantages of the military in logistics, emergency engineering, transport, communications, specialized search and rescue, and medical support. Support activities are categorized into direct, indirect, and infrastructure-support interventions, with the understanding that the military’s primary value—particularly in the early stages—often lies in indirect assistance and infrastructure support. The handbook further underscores the principles of last resort, the need for exit strategies, clarity of roles, and the design of coordination and information-sharing mechanisms (11).

Nevertheless, empirical evidence indicates that military involvement in natural disasters, while offering significant opportunities, is accompanied by multiple challenges. These include the risk of securitization of the disaster space, overlaps in roles and authority with civilian institutions, competition over resources, potential undermining of neutrality and public acceptance of humanitarian response, and long-term implications for civil–military relations (12,13). Research in the field of civil–military coordination and multi-agency disaster management has identified obstacles such as weak coordination mechanisms, differences in organizational culture and command chains, and limitations in operational data and information sharing, while simultaneously emphasizing the critical role of the military in bridging response capacity gaps (14).

In recent years, numerous studies have examined military participation in natural disasters across various countries, providing a fragmented picture of military roles, capacities, outcomes, and challenges. These studies have primarily been published as case reports focusing on health, logistics, or civil–military coordination, with only a few systematic reviews addressing specific dimensions such as coordination models or logistical operations (3,13,15). However, to date, no comprehensive review has systematically mapped the roles, capacities, outcomes, and challenges of military involvement across the entire disaster management cycle.

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This study aims to address this gap through a systematic review, collecting and analyzing existing research to identify and categorize the recurring roles, capacities, outcomes, and challenges of military interventions in natural disasters. In doing so, it provides a foundation for improving doctrine, planning, and civil–military coordination in large-scale disaster scenarios. Furthermore, it may inform the reassessment of the role of armed forces, particularly the military, in natural disaster management in Iran.

Methods

This systematic review was conducted and reported in accordance with the PRISMA guidelines, aiming to examine the roles and performance of military forces in crisis management during natural disasters. Prior to designing the review, a preliminary search was conducted in the Cochrane Library and other reputable scientific databases to ensure that no similar systematic review existed.

The search was carried out in major international databases, including ProQuest, PubMed, ScienceDirect, Scopus, and Web of Science, as well as in recognized national databases, such as SID, Noormags, and Magiran. Reference lists of eligible articles were also hand-searched to identify additional studies.

In this systematic review, all original research articles as well as conceptual and policy-oriented studies published in reputable peer-reviewed scientific journals were included. The search covered the period from October 1950 to May, 2025. No language restrictions were applied during the searches; studies published in languages other than English and Persian were included to ensure comprehensiveness and to avoid excluding relevant eligible studies.

To design the search strategy, a combination of the main keywords listed in Table 1 and their Persian equivalents was used with the Boolean operators AND and OR. Additionally, in databases that supported truncation, searches were performed by placing an asterisk (*) at the end of the keyword stem. The search was conducted in the “title, abstract, and keywords” sections of the articles. In the PubMed database, MeSH terms were used to identify relevant articles. Zotero software (version 7.0.24) was used for reference management and duplicate removal.

To formulate the research question and structure the search strategy, the Population, Phenomenon of Interest, Context (PICo) framework recommended by the Joanna Briggs Institute (JBI) for qualitative systematic reviews was applied (16). In this study:

- Population (P): Armed forces and militaries involved in natural disaster management;
- Phenomenon of Interest (I): Reported roles, impacts, capacities, and challenges regarding military performance across the disaster management cycle;
- Context (Co): Various types of natural disasters and phases of disaster management.

Inclusion and Exclusion Criteria

Studies were selected based on pre-defined criteria.

Inclusion criteria were as follows:

- Research articles and peer-reviewed studies published up to May, 2025;
- Articles related to the independent or collaborative involvement of militaries in natural disaster crisis management.

Exclusion criteria i were as follows:

- Studies that addressed the role of militaries in non-natural crises (such as wars or man-made disasters);
- Articles that examined the role of non-military institutions or provided vague descriptions of the roles of militaries;
- Articles for which the full text could not be obtained after contacting the corresponding author;
- Duplicate articles;
- Articles without full text.

Study Selection Process

In the first stage, titles and abstracts were independently reviewed by two researchers. Articles that met the initial criteria were screened for full-text review. Finally, the selected articles were finalized based on the inclusion and exclusion criteria. Any disagreements between researchers were resolved through discussion or the opinion of a third author. The study selection process is presented in Figure 1 according to the PRISMA flow diagram.

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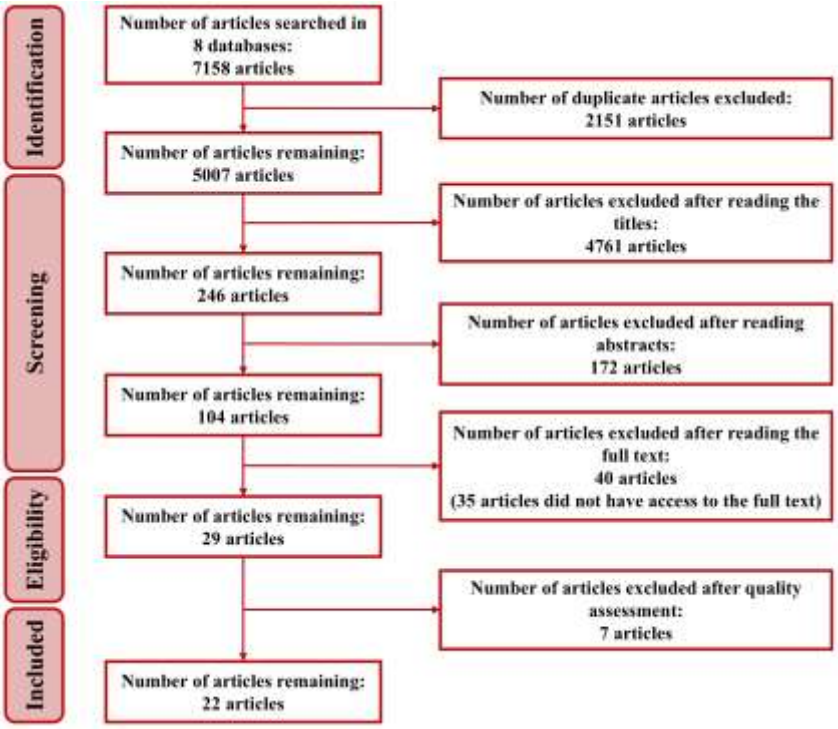

Figure 1. PRISMA flow diagram of the study selection process

Table 1. Word groups used for the database search strategy

Search terms	Word group
Army and Military Forces	Military OR Army OR Armed Forces OR Defense Forces OR National Guard OR Civil–Military Relations
Crisis and Natural Disaster Management	Disaster management OR Crisis OR Disaster OR Natural Disaster OR Crisis Management OR Emergency Response OR Disaster Relief OR Humanitarian Assistance OR Risk Reduction OR Mitigation OR Preparedness OR Response OR Recovery OR Relief Operations OR Earthquake OR Flood OR Tsunami OR Hurricane OR Wildfire OR Cyclone OR Drought OR Landslide
Roles and Function	Role OR Contribution OR Involvement OR Responsibilities OR Collaboration OR Operations OR Participation

Data Extraction

The data extraction process was conducted using a pre-designed form. Key information—including authors' names and year of publication, country, study design, type of disaster, type of intervention, and the role of armed forces, as well as reported capacities and challenges—was extracted and organized into standardized tables (Tables 2 and 3).

Quality Assessment of Studies

To assess the methodological quality and risk of bias of the included studies, the Joanna Briggs Institute (JBI) critical appraisal checklists appropriate for each study design were applied. The studies were classified into three levels: high, moderate, and low quality (17–20). Quality assessment was performed independently by two researchers; in cases of disagreement, consensus was reached through consultation with a third researcher. Quality score thresholds were defined based on a similar study, such that scores below 55% were considered low quality, scores between 55% and 70% moderate quality, and scores above 70% high quality (21). Studies rated as low quality were excluded from the final analysis.

Data Analysis Method

In this study, qualitative data extracted from the selected texts were analyzed using thematic content analysis to identify recurring patterns in the roles, capacities, outcomes, and challenges of military involvement in natural disasters. Thematic content analysis is a qualitative approach in which the researcher examines multiple texts to identify and categorize shared themes and concepts. The primary objective of this method is to describe the data, while interpretation of deeper or more complex meanings is kept to a minimum (22).

In this review, the full texts of eligible articles were first read repeatedly to ensure thorough familiarization with the data. In the initial stage,

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structural information such as country and type of disaster was summarized using descriptive statistics. Subsequently, meaning units relevant to the study objectives were extracted and grouped into related categories. These steps were carried out by two researchers. In the next stage, the frequency of each theme across the final set of studies was calculated and presented in analytical tables. Continuous review of themes and codes, along with cross-study comparisons, was undertaken to enhance internal coherence and conceptual distinction among the themes.

Findings

During the identification and search phase across eight databases, a total of 7,158 records were identified. After removing duplicates and screening titles, abstracts, and full texts, 29 records remained. Following quality appraisal, seven studies were excluded due to low methodological quality, resulting in the inclusion of 22 eligible studies in the final synthesis. After full-text review of these 22 articles, their key characteristics were summarized in Tables 2 and 3, while the extracted themes and their frequencies were presented in Figures 2 to 5.

The study by De Mendonça et al. (2019) addressed two distinct disaster events; therefore, each event was entered separately into the tables.

The included studies were categorized into two groups based on their nature. The first group comprised experience-based studies, which reported and analyzed the actual roles of armed forces in past natural disasters. The second group consisted of conceptual and policy-oriented studies, which, drawing on official documents, laws, and national and international guidelines, examined the potential roles of armed forces and the requirements for their engagement in disaster contexts.

Table 2. Summary of empirical studies on military involvement in natural disaster crisis management

Author	Year	Study Design	Quality Assessment	Country	Disaster Type/Year	Military Branches	Involvement Phase	Response Time/ Duration
Novo & Ponte e Sousa (23)	2020	Analytical Study	High	Portugal	Cyclone Idai, 2019 (Mozambique)	Air Force	Response	Several days / Over two weeks
De Mendonça et al (24)	2019	Qualitative Study	Moderate	Brazil	Haiti Earthquake, 2010	Navy	Response	Less than 24 hours / 60 days
De Mendonça et al (24)	2019	Qualitative Study	Moderate	Brazil	Chile Earthquake, 2010	Navy Air Force	Response	48 hours / 41 days
Chauhan & Chopra) (25)	2017	Descriptive Study	High	India	Nepal Earthquake, 2015	Ground Force Air Force	Preparedness/ Response	4 hours after the earthquake / Approximately one month
Zaw & Lim (3)	2017	Analytical Cross-Sectional Study	High	Myanmar	Myanmar Flood, 2015	Ground Force Air Force Navy	Preparedness/ Response	Immediately / Unknown
Nishiyama (26)	2014	Descriptive Study	High	Japan	Japan Earthquake, 2011	Ground Force Air Force Navy	Response	Immediately / About four months
Mamuji (27)	2012	Analytical Study	High	Canada	Haiti Earthquake, 2010	Ground Force Air Force Navy	Response	3 days / About five weeks
Van Fenema (28)	2012	Qualitative Case Study	Moderate	USA	Hurricane Katrina, 2005	Ground Force Air Force Navy	Response	One day before the cyclone / Unknown
Madiwale & Virk (29)	2011	Qualitative Case Study	Moderate	Pakistan	Pakistan Floods, 2010	Ground Force Air Force	Response	Within 72 hours / Short-term
Thompson(30)	2010	Analytical Field Study	Moderate	USA	Kashmir Earthquake, 2005	Ground Force Air Force	Response	48 hours after the event / Over 30 days
Tarantino (31)	2006	Analytical Study	High	USA	Indian Ocean Tsunami, 2004	Air Force Navy	Response	Immediately / About one month
Abolghasemi et al (32)	2005	Descriptive Study	High	Islamic Republic of Iran Army	Bam Earthquake, 2003	Ground Force Air Force Navy	Response	Immediately / Unknown
Anderson (33)	1994	Analytical Study	High	India	Maharashtra Earthquake, 1993	-	Response/ Recovery	Immediately / Two weeks

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Table 3. Summary of conceptual and policy studies on military intervention in natural disaster crisis management

Author	Year	Study Design	Quality	Country	Phase of Intervention
Talavera (34)	2024	Analytical Policy Study	High	Peru	Preparedness/ Response
Radmehr et al (35)	2022	Theoretical Analytical Study	High	Japan	Response
Lugova et al (36)	2020	Analytical Policy Study	High	Malaysia	Response
Avadi & Seth (37)	2020	Comparative Analytical Study	High	India	Response
Kumar & Dimri (38)	2018	Comparative Analytical Study	High	India	Preparedness/ Response
Hornyacsek (39)	2018	Theoretical Analytical Study	Moderate	European Countries (Hungary, Romania, and Austria)	Response/ Recovery
Baytiyeh & Naja (40)	2016	Theoretical Analytical Study	Moderate	Lebanon	Response
Hosseini & Jeddi (41)	2012	Theoretical Analytical Study	Moderate	Armed Forces (in general)	Response
Gaydos & Luz (42)	1994	Theoretical Analytical Study	High	USA	Preparedness/ Response
Burgess (43)	1957	Theoretical Analytical Study	High	USA	Response Recovery

Experience-Based Studies

Review of the experience-based studies (Table 2) indicates that these investigations primarily focused on disasters of national or transnational scale. The geographical scope is diverse, encompassing countries with varying military and civilian capacities; this diversity facilitates comparison of intervention patterns across different contextual settings. The United States and India exhibit the highest frequency of reported military involvement among the included cases.

All included studies concentrated on the response phase. Only a limited number of studies additionally addressed the preparedness phase (two cases) or the recovery phase (one case) alongside response. The initiation of military involvement was most commonly reported as occurring immediately or within the first 72 hours following the event. The duration of operations ranged from several weeks to several months, with variations largely depending on disaster severity and geographical extent. The disasters examined included earthquakes, floods, cyclones, and tsunamis. The composition of military branches deployed varied according to the nature and geographic characteristics of the disaster. In many cases, a combined ground force, air force, and navy deployment was observed; however, air force involvement was more prominent (10 cases).

Type of Participation

The most frequently reported roles, in descending order, included medical and healthcare services, logistics, support and distribution activities, search and rescue operations, and evacuation and transfer of affected populations—all of which pertain to the response phase. In contrast, roles associated with the preparedness phase—such as preparedness training and inter-agency collaboration, development of intervention policies and guidelines, and pre-disaster stockpiling of essential supplies—were identified less frequently in this review. Regarding the recovery phase, only one study reported military assistance in infrastructure reconstruction (Figure 2).

Capacities, Equipment, and Resources

The most frequently reported capabilities included logistics and supply support, emergency medical capacity (such as field hospitals or hospital ships), rapid deployment capability, airlift capacity, and an effective command and control system (Figure 3).

Challenges and Limitations

According to the extracted data, the most frequently reported challenges and limitations in the experience-based studies included insufficient civil–military coordination and weak information sharing; lack of alignment between interventions and identified needs or established standards; and deficiencies in preparedness and planning across the disaster management cycle (e.g., exclusive focus on response, absence of pre-disaster plans and exercises, and ambiguity regarding the duration of military presence). Subsequently, challenges related to social acceptance and the securitization of the operational environment, as well as human resource constraints and lack of specialized training, were reported in some cases. Operational and tactical challenges—such as delayed deployment, inappropriate resource distribution, and lack of tactical coherence—were also noted. Finally, challenges related to logistics, equipment, and funding were reported (Figure 4).

Outcomes and Impacts of Military Intervention

In most cases, military involvement contributed to life-saving operations and large-scale evacuations. Particularly during the initial hours

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and days following the disaster, military engagement enhanced health response capacity through the deployment of field hospitals or hospital ships, mobilization of mobile surgical teams, and expansion of inpatient and outpatient service capacity. Moreover, large-scale logistical and transportation support played a pivotal role in accessing hard-to-reach areas and ensuring continuity of service delivery (Figure 5).

Conceptual–Policy Studies

Review of the conceptual–policy studies (Table 3) indicates that the roles envisaged for militaries within the disaster management cycle are predominantly concentrated in the response phase. Nevertheless, certain roles have also been articulated for the preparedness and recovery phases.

Type of Participation

In the preparedness phase, emphasis is placed on intersectoral collaboration and preparedness training. In the response phase, roles such as medical and healthcare services, search and rescue, evacuation and population transfer, logistics and supply support, distribution activities, and security provision are systematically delineated. For the recovery phase, assistance in infrastructure reconstruction is mentioned as a complementary and limited role. Notably, no specific role is defined for militaries in the mitigation phase within the reviewed policy texts (Figure 2).

Capacities, Equipment, and Resources

The policy literature included in this review identifies large-scale logistics and supply capability as the most frequently emphasized military capacity. In addition, rapid deployment of personnel and supplies, high-level technical and engineering expertise, airlift capacity, an effective command and control system, and emergency medical capacity are recognized as comparative advantages of military forces (Figure 3).

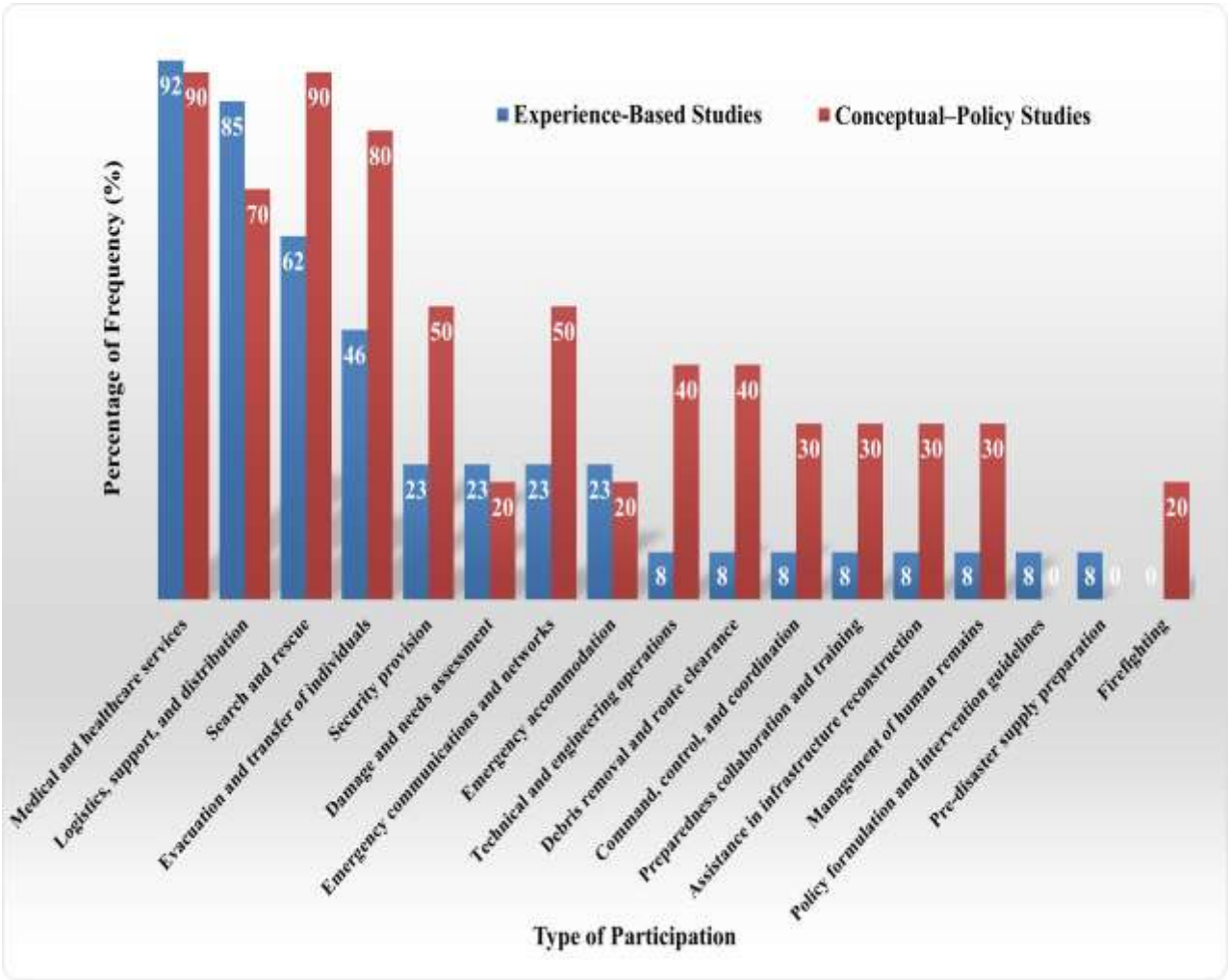

Figure 2. Types of operationalized and expected military participation in natural disasters

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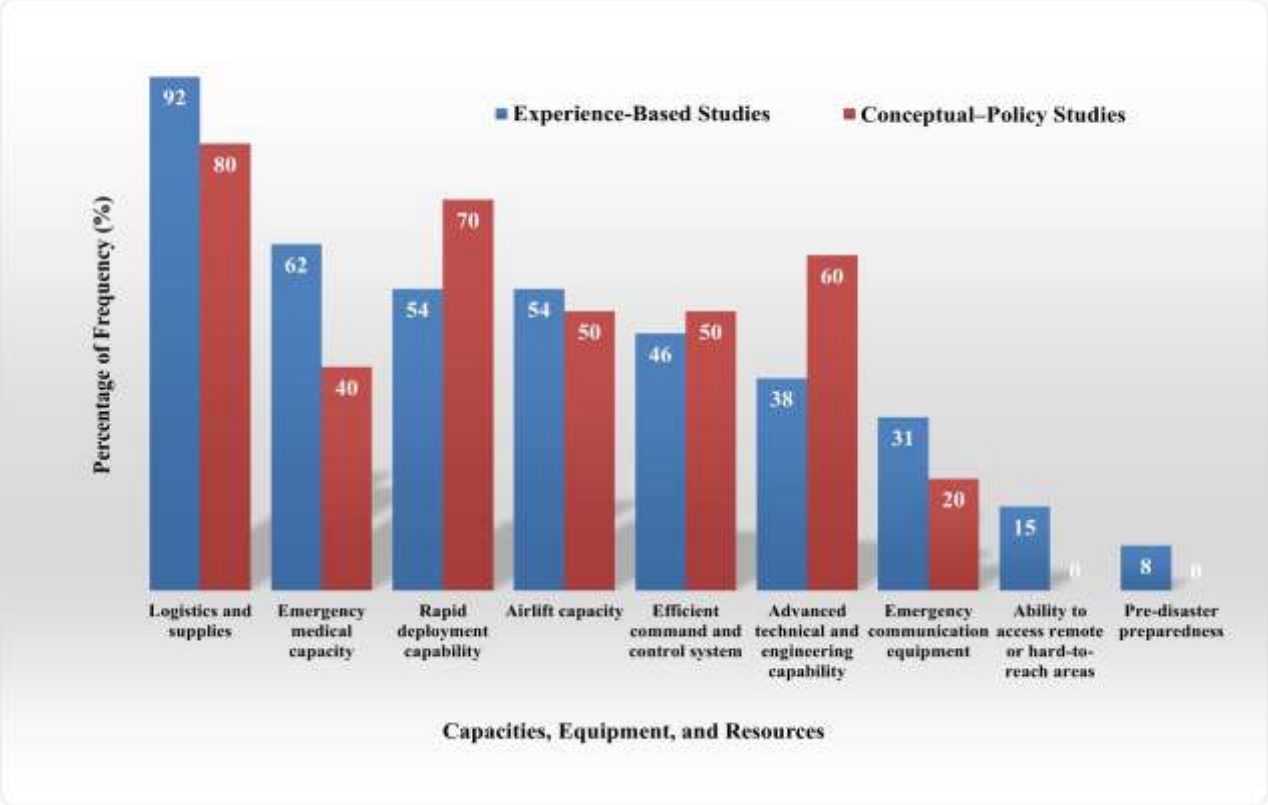

Figure 3. Types of operationalized and expected military capacities, equipment, and resources in natural disasters

Figure 4. Operationalized and anticipated challenges and limitations of military involvement in natural disasters

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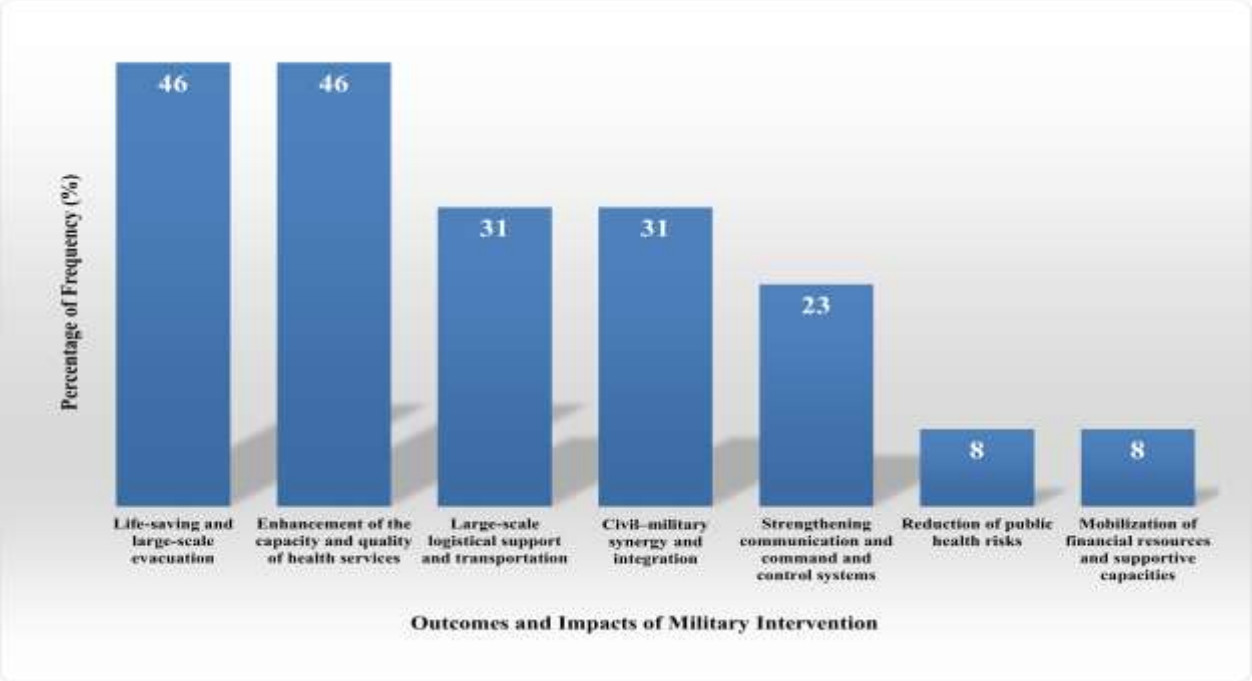

Figure 5. Outcomes and impacts of the military interventions in past disasters

Challenges and Limitations

The identified or anticipated challenges are predominantly structural and inter-organizational in nature. The absence of a clear doctrine and ambiguity in role delineation are highlighted as the primary barriers to effective military involvement in natural disasters. This is followed by insufficient civil–military coordination and weak information sharing, human resource constraints and lack of specialized training, and limitations related to logistics, equipment, and funding (Figure 4).

Discussion and Conclusion

The Role of Military Forces in the Response Phase and Key Intervention Capacities

The findings of this review indicate that, across the included studies, the roles attributed to military forces in natural disasters—both in real-world events and in conceptual–policy literature—have been predominantly concentrated in the response phase. A substantial proportion of the evidence highlights medical and healthcare services, logistics and support, search and rescue operations, and evacuation and transfer of affected populations as the most frequently reported roles. This pattern reflects the operational characteristics of military forces, which—by virtue of organized manpower, transportation networks, command and control systems, and the ability to operate in high-risk environments—can play a complementary role during the initial hours and days following a disaster.

Within this framework, the most recurrent capacities identified in this review include logistics and supply support, emergency medical capability, rapid deployment, airlift capacity, command and control systems, emergency communication networks, and technical and engineering expertise. These capacities are consistent with those recognized in international civil–military coordination frameworks as comparative advantages of military forces in emergency response. The convergence between empirical findings and policy documents suggests that field evidence largely reflects the operationalization of existing conceptual frameworks.

The predominance of response-oriented roles reflects not only a descriptive pattern but also the operational demands of large-scale disasters and the limited capacity of civilian systems in the immediate aftermath. In many cases, gaps in medical care, logistics, and search and rescue during the early hours necessitate rapid military deployment. Accordingly, medical services, logistics and support, and search and rescue remain the primary functions of military forces.

This pattern is supported by prior literature emphasizing the ability of militaries to rapidly mobilize medical personnel, deploy field hospitals, and utilize air assets. Therefore, the focus on the response phase is driven by urgent operational

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needs and the inherent structure of military capabilities rather than neglect of other phases of disaster management.

Impacts and Outcomes of Military Participation

Military involvement was most commonly associated with saving lives and strengthening medical service capacity during the early phase of disasters. Evidence indicates that early response and search and rescue operations play a critical role in reducing mortality and injury severity, and military forces can contribute significantly in this regard.

However, the majority of the existing literature is descriptive and case-based, and robust evaluation studies on effectiveness remain limited. While field reports suggest positive impacts, they are insufficient for generalization, systematic comparison, or cost–benefit analysis. This highlights the need for future studies with stronger methodological designs and measurable indicators

Operational Scope and Role Boundaries in the Disaster Management Cycle

The operational effectiveness of military forces is most evident during the initial hours and days of response, when capabilities such as airlift, rapid deployment, field hospitals, and command and control systems are most impactful. As operations transition into the recovery phase, effectiveness may decline if role boundaries and exit strategies are not clearly defined. This aligns with policy literature that generally limits military involvement to short-term response activities.

Military involvement in the mitigation phase is not systematically reported in the included studies, reflecting the primary mandate of armed forces and the allocation of long-term risk reduction responsibilities to civilian institutions.

Challenges, Lessons Learned, and Policy Implications

The most frequently reported challenges in the included studies primarily relate to civil–military coordination, information sharing, and the alignment of interventions with actual needs and standards—issues that have been consistently emphasized in the literature. Notably, misalignment between actions and needs or standards is more prominently reported in empirical field studies, whereas conceptual and policy-oriented texts tend to focus on macro-level architecture, doctrine, and role delineation. This divergence suggests that what is framed at the policy level as a “lack of doctrine” often manifests operationally as poor coordination, duplication of efforts, and ambiguity in command structures.

Overall, the evidence indicates that scale and speed—while necessary—are not sufficient conditions for effectiveness. These comparative advantages translate into desirable outcomes, such as saving lives and strengthening health system capacity, only when roles are clearly defined, intersectoral coordination is institutionalized, unified command mechanisms are established, rules of engagement and exit strategies are clearly articulated, and the principle of “last resort” is upheld. These lessons are consistent with the Oslo Guidelines and United Nations policy frameworks.

In the preparedness phase, clearly defining military roles across the disaster management cycle, designing explicit exit strategies, conducting scenario-based exercises, and implementing joint training can reduce operational challenges. During the response phase, rapid mobilization of medical services, logistics, and air transport within a civilian-led and coordinated command structure is crucial. In the recovery phase, military presence should be progressively reduced and confined to limited, specialized support to preserve social acceptance and prevent the unintended substitution of civilian institutions. Across all phases, continuous assessment of alignment between delivered services and the actual needs of affected populations remains an operational imperative to minimize recurring mismatches between interventions and standards.

The findings of this systematic review indicate that military forces—by virtue of capacities such as logistical support, organized manpower, heavy equipment, command and control systems, and high operational readiness, particularly their 24-hour preparedness and the critical importance of the early “golden hours” following a crisis—can play a complementary and effective role in responding to natural disasters, especially during the initial hours and days. The comparative advantage of militaries primarily manifests in the emergency response phase, particularly in bridging gaps in civilian capacity. In contrast, their role in the mitigation phase has not been systematically reported in the existing literature and remains largely underexplored.

However, the effective utilization of military capacities is accompanied by structural and institutional challenges. The absence of a clearly defined doctrine, weaknesses in civil–military

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coordination mechanisms, insufficient mission-specific humanitarian training, and limited alignment of actions and equipment with humanitarian needs and standards were among the most frequently reported barriers in the included studies. These challenges appear to be less a function of the inherent nature of military participation and more closely related to the quality of crisis governance, clarity of role delineation, and the degree of institutionalized coordination between civilian and military actors.

Although the primary mission of armed forces is the protection of national security and territorial integrity, documented experiences suggest that their existing capacities can be mobilized—within a rule-based, time-bound framework and under civilian leadership—to strengthen disaster response. Nonetheless, these findings cannot be universally generalized to all militaries and require context-sensitive interpretation and adaptation in accordance with each country's legal framework, institutional capacity, and disaster management system.

In the case of Iran, despite the involvement of military forces in numerous natural disasters, scientific documentation of these experiences remains limited. Accordingly, there is a need for context-specific research—particularly qualitative studies involving military stakeholders and disaster management authorities—as well as the development of evidence-informed policymaking and clearly defined civil–military cooperation frameworks to strengthen the effective and accountable role of the military in natural disaster management.

To enhance the effectiveness of military interventions in disaster management—particularly in countries such as Iran that are exposed to multiple natural hazards—it is recommended that a comprehensive national doctrine be developed, clearly defining the roles and responsibilities of the military in both peacetime and crisis situations within existing legal frameworks. Strengthening "software" capacities, including the development of joint operational protocols and the conduct of integrated exercises with designated civilian emergency and relief agencies, is also essential.

Furthermore, providing specialized training for military personnel in line with humanitarian standards can improve their understanding of the needs of affected populations and help prevent the securitization of disaster environments. Finally, conducting qualitative studies and systematic lesson-learned analyses can support a transition from a predominantly reactive approach toward an evidence-informed model of military engagement in disaster management.

It should be noted that this systematic review was limited to peer-reviewed scientific articles and academic texts. Consequently, an important limitation is the potential exclusion of relevant reports, operational documents, or experiential evidence that have not been formally published in scientific outlets.

Compliance with Ethical Guidelines

Ethical approval was not required for this study

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Author's Contributions

This article is based on the idea of Ahmad Soltani and Arman Omidian, who conceived the study, developed the methodology, designed the research, and were responsible for data collection and analysis. Asghar Asgharzadeh provided guidance on data preparation and military-related aspects of the study. Arman Omidian served as the corresponding author and edited the final manuscript submitted to the journal.

Conflict of Interests

The authors declare no conflict of interest.

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