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Case Report

Social Media and Natural Disasters: Lessons from Kermanshah Earthquake(s) in 2017: Case Report

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Abstract

Introduction: Social media has emerged as a transformative tool in disaster management, addressing challenges such as communication gaps, coordination inefficiencies, and delays in information dissemination. The Kermanshah earthquake in Iran serves as a case study, highlighting the critical role of platforms like Telegram and Instagram in disaster response and recovery.

Methods: This case report examines the role of social media during the Kermanshah earthquake by analyzing data from social media activity, official reports, and news coverage. The analysis focuses on how social media facilitated information exchange, resource mobilization, and community engagement post-disaster period.

Results: Social media enabled victims to communicate their safety and location to relatives in real time, mainly through Telegram. It was key in organizing volunteers and healthcare personnel and supporting resource distribution. However, the large volume of unfiltered information posed challenges for relief organizations, requiring prioritization and verification. Additionally, the lack of coordinated communication between crisis managers and mass media led to the spread of inaccurate information. Limited internet connectivity in some areas further hindered the effective use of these platforms.

Conclusion: The Kermanshah earthquake demonstrated the dual role of social media in disaster management, acting both as a facilitator and a source of challenges. While it significantly enhanced communication and mobilization efforts, better strategies are needed for filtering information, ensuring authenticity, and integrating social media with official disaster response systems.

Keywords: Earthquakes, Disaster planning, Social media

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Introduction

Social media are internet-based applications, including web-based and mobile-based technologies. As of 2023, the worldwide number of social media users has reached a record high of 4.9 billion people, and it is projected to increase to around 5.85 billion users by 2027 (1-5). They also act as a popular means of communication for supplying new sources of information and rapid communication in emergencies (6). Natural disasters are rising globally, resulting in catastrophic impacts on human populations, ecosystems, and economic structures. Numerous natural disasters, such as earthquakes, lack predictability, posing significant risks to the safety and lives of countless individuals. During a disaster, individuals often communicate extensively to seek information regarding their relatives and friends' well-being and obtain details about food, shelter, and transportation options (5). Social media significantly contributes to disseminating disaster-related news and organizing local and

volunteer efforts (7). Moreover, the individuals on the scene can contribute to governmental officials and authorities to better respond to the incident via on-time transfer of information through social networks. Awareness of the incident status leads to making proper decisions and conducting timely interventions (6). In the recovery phase, social media plays a crucial role in rebuilding infrastructure and managing stress (5). Access to social networks enables individuals to receive their required resources in the fastest possible time. Forums on frequently visited websites promulgate information about specific issues during disasters to inform and enhance preparation (5). Although extensive studies have been conducted on the impact of social media in managing natural disasters (8-12), each event presents distinct circumstances and novel experiences that influence the utilization of social media in disaster management. The current research seeks to explore the insights gained from the role of social media during the Kermanshah earthquakes that occurred in 2017.

Case Report

On November 12, 2017, at 9:48 PM local time, a seismic event measuring 7.3 on the Richter scale struck Kermanshah, Iran. The earthquake's epicenter was located at a depth of 11 kilometers, which could impact the provinces of Kermanshah, Ilam, and Kurdistan, along with extensive regions in Iran's western, northern, southwestern, and western areas. Additionally, certain regions in northeastern Iraq may also be affected, attributable to the earthquake's shallow depth and prolonged duration. The earthquake's epicenter was located in Azgaleh, a village within Tholath Babajani county, with Sar Pol-e-Zahab experiencing the most significant damage due to its proximity. By November 22, Kermanshah province had recorded approximately 700 aftershocks. According to the most recent statistics from forensic medicine, the total number of casualties from the earthquake has reached 620. Additionally, there were 9,388 reported injuries, and around 70,000 individuals were displaced from their homes (13).

Discussion

In the Kermanshah Earthquake, the most extensively utilized social media platforms were Telegram and Instagram, with Twitter following closely behind. Based on the evaluations performed, the analyses by Payeshgar Virtual Space (Payeshgar is an Iranian website with a robot developed by the USA. Text mining, data mining, and machine learning methods are used on the vast amount of data that are received daily, converting them to what the clients want); the monitoring of a thousand Telegram channels and Twitter users from 09:00 PM on November 12 until 10:00 PM on November 13; i.e., within less than 24 hours since the occurrence of the incident, was suggestive of the idea that virtual space users had released over 75 thousand materials. On Twitter, over 40,000 tweets were posted, garnering 22,000 likes and being shared by 12,000 users. In Telegram channels, over 35,000 posts were disseminated from 32,000 distinct sources, garnering 380 million visits. The peak frequency of publication occurs at 10 PM, during which over 23,000 posts have been published across these two networks (7). During the incident, all conventional communication channels were halted, activating social media platforms (5). The individuals who experienced seismic tremors across different areas initiated efforts to confirm the event's details through various communication channels. Telegram emerged as a particularly popular platform during the Kermanshah incident. Confusion and incredibility were the two initial reactions of the users to the images of the destroyed buildings in the earthquake-damaged regions and the news on the incident's casualties.

On the other hand, the users and the incident's survivors began dispersing the images and films related to the damaged regions in the social networks. They demanded aid and cooperation from the people and the officials. Furthermore, several social network users used this instrument to inform their friends and relatives about their health status and position. Social media played a significant role in facilitating mobilization at local, national, and global levels for the victims of this disaster, enabling the victims and their friends and families to disseminate crucial information promptly (13).

Social media platforms have also played a crucial role in disseminating information regarding both hazardous and secure locations to individuals who may not be familiar with the area (13). The role of celebrities in provoking people-driven contributions and guiding the

aids through Instagram as one of the other active social networks was very notable. Of course, alongside all the advantages and handy functions of social networks, it has to be noted that there are always adverse outcomes and limitations like the spread of rumors and false news (7). During the Kermanshah Earthquake, a series of posts on social media highlighted a list of villages that had not received any rescue or relief efforts, even though most of these locations had already been identified and assistance had been mobilized shortly after the disaster. Furthermore, such incidents create an environment conducive to virtual fraud, representing another negative consequence of social media usage. For example, numerous misleading and confusing messages circulated on platforms like Instagram and Twitter aimed at perpetrating fraudulent activities.

The inherent property of social networks transforms them into a proper ground for producing and publishing rumors, which can become problematic during crises. For example, fake news and images were published in virtual space related to similar incidents in other countries around the globe rather than specifically in Kermanshah. Furthermore, during the incident, there was a notable spread of unfounded scientific assertions, such as linking the event to HAARP experiments and similar theories. However, these claims were dismissed by seismology experts on platforms like Telegram and Instagram (13).

The current study seeks to explore the influence of social media during the Kermanshah Earthquake and provide insights for enhancing communication and data exchange among stakeholders involved in similar events. Communication is one of the primary indicators of planning, response, and improvement in natural disasters. Disasters frequently harm communication and information infrastructures, diminishing access to and the flow of information. Enhancing communication processes and systems that impact natural disasters must be a primary concern for governments, organizations, communities, and individuals. In this context, the evolution of social media significantly contributes to the advancement of communication during disaster situations (14). The inherent characteristics of social networks enable them to disseminate information and announcements regarding crises and disasters swiftly and repeatedly (15).

To date, the volume of reports and the dissemination of information regarding earthquakes in Iran has not matched the level observed during the Kermanshah Earthquake. Unlike previous seismic events, this recent earthquake highlighted the significant impact of social networks in enhancing public awareness and facilitating assistance efforts among the populace. Ahmadi (2018) also pointed in his article to the highlighted role of such social networks as Telegram in mobilizing support for the victims of this catastrophe at local, national, and global levels (13). The recognition of issues and the repeated dissemination of proposed solutions across social media platforms significantly aid in addressing these challenges and fulfilling the needs of individuals affected by earthquakes. This process often leads to an influx of supportive resources in various regions, driven by comprehensive information sharing. For instance, in numerous areas of Sar Pol-e-Zahab, clothing donations from individuals in other cities were found abandoned on the ground, highlighting the complexities involved in aid distribution.

The dispersion of the earthquake news through social media like Telegram and Instagram since the first incident hours caused an increase in the government's sensitivity. In the Kermanshah Earthquake, Telegram was the most frequently used social network, followed by Instagram. In contrast, Twitter, followed by Facebook, was the most frequently used media during natural disasters in other countries. That is probably because Twitter is more acceptable than other social networks (2, 16). The significance of the topics discussed in tweets lies in their capacity to raise awareness about critical situations that are currently unfolding. Communities affected by disasters and professional responders could benefit from implementing an automated system designed to extract pertinent information from Twitter (17). The substantial amount of information disseminated through social networks following natural disasters can lead to audience overload, resulting in difficulties for individuals in differentiating between accurate and inaccurate news (18, 19). As it was observed, one of the very positive functions of the virtual space after the Kermanshah Earthquake was the

dispersion of the news about the people's needs and criticisms of the government and responsible organizations' performance, which resulted in better accountability and acceleration of the relief and rescue operations. Although social networks became an opportunity for the proctor and relief organizations' gathering of on-time information regarding the dimensions of the calamity, victims and their needs, large volume of information, and the existence of contradictory and baseless news caused the creation of disruption in the rescue and relief operations and led to people's confusion and society's distrust in the organizations in charge of relief operations.

Additionally, the massive challenge faced by relief-proctoring organizations was the gathering and processing a large volume of information. Indeed, the correct information had to be filtered as soon as possible, and decisions had to be made regarding the priorities. The large volume of information and the need for verification had also occurred in similar incidents like the earthquake in the east of Japan in 2011 (14, 20). It is important to pay attention to the fact that the accuracy of the information offered during crises is challenging. When these media are utilized incorrectly, it will not only cause the officials to make improper decisions, but it also increases the users' terror and even psychological problems, misleads them, and creates severe damage. The Kermanshah Earthquake imparted a significant lesson regarding the pervasive distrust among the populace toward governmental authorities. This sentiment was notably amplified by the role of social media in exposing this public skepticism. Although the governmental sector and the proctoring organizations used social networks to absorb people-driven contributions, many people chose to get their cash contributions to reach the earthquake-stricken individuals through other ways. For example, although Iran's Red Crescent is the coordinating organization in natural disasters, many people prefer not to make any contributions through this organization and have their contributions delivered personally or through celebrities to the earthquake-stricken people. Distrust and severe weakness in the people's reliance on the governmental and even semi-governmental institutions proctoring the rescue and relief operations during the Kermanshah Earthquake reflected the gap between the people and the government. It is essential to highlight that this significant matter requires thorough investigation within social pathology, and substantial efforts must be undertaken to address and rectify it.

Conclusion

This article seeks to elucidate the significance of social media in disaster management while also highlighting the insights gained from utilizing social networks during the Kermanshah Earthquake. The experiences derived from this disaster may prove beneficial for oversight and relief agencies that leverage social media as a tool for disaster management in times of crisis. Constructing a native social network specific to the incidents and disasters can be very contributive and provide people with correct news. Indeed, social media are recommended to target people's emotions less and emphasize the perception of the situation, social accountability, and collective wisdom.

The significance of the insights gained from the growing reliance on social media as a vital tool for crisis communication has become increasingly apparent. Various stakeholders, including the general public, volunteer organizations, and crisis management entities, have recognized the critical role of information sharing and establishing effective communication channels during crises. Recent events, particularly the Kermanshah Earthquake, have demonstrated that social media can facilitate numerous complex and conventional interventions throughout all phases of a crisis, including pre-incident preparation, response, and post-incident recovery.

Before crises and disasters, increasing readiness and reducing the effects can be contributory. Offering proper responses during the crisis and offering supportive counseling and interventions, especially psychological ones, after the crisis can play a considerable role, as well. Of course, these measures can be twice as efficient as other interventions and do not mean the negation of the required crisis management measures. Overall, a native framework similar to that of some countries needs to be created for using social media to manage communications during disasters.

Learned lessons

1) The rapid dissemination of news related to the earthquake through social media platforms was

notably swift. Additionally, the areas affected by the earthquake often lacked traditional media outlets; however, citizen journalists effectively filled this gap by delivering timely news updates and visual documentation. This grassroots reporting enabled the public and officials to understand better the extent of the destruction and damage caused by the disaster. Proper provision of information plays a distinct role in controlling and organizing social, organizational, and psychological confusion.

2) The emergence of social media platforms, such as Telegram and Instagram, has significantly overshadowed traditional media outlets, particularly government-operated television news channels. These governmental channels often disseminated inconsistent information and recycled old news, leading to a growing distrust and confusion among the public. Consequently, social media has surpassed these television channels regarding influence and credibility. As a result, government-run television and radio have come to be perceived as increasingly irrelevant and inactive. At the same time, individuals have demonstrated greater trust in social media compared to traditional TV news.

3) Kermanshah's earthquakes showed that social media were not threats, but they provided appropriate chances for providing information and building culture in the society due to their extensiveness, speed of information transfer, having no limitations, and being frequently visited. Of course, these networks have to be supervised.

4) The objective and experimental evidence well justifies social media's effective and prominent role in communication management during crises. These media simultaneously engaged in such interventions as gathering information, providing information, and encouraging the creation of public mobilization in line with helping the victims and rescue and relief operations. The significant aspect to consider is the potential for mutual communication and relationships among the victims from the onset of the incident.

5) Proctoring and relief organizations face a significant challenge in collecting and analyzing information disseminated across diverse social media platforms. The sheer volume of data requires a systematic approach to filter the reports effectively and prioritize actions, facilitating informed decision-making.

6) This incident highlighted the intricate relationship between sociopolitical factors and disaster management. Consequently, conducting a thorough scientific, critical, and root-cause analysis of this issue is essential.

7) Many individuals affected by earthquakes, both in urban and rural areas, utilized social media platforms, particularly Telegram, to communicate their well-being and locations to friends and family during the disaster.

8) The individuals who had volunteered to help the people and a small fraction of healthcare and treatment personnel were organized and managed via social media.

9) Inciting the general public's feelings by reflecting on the news and reporting the shortfalls and the demands of the earthquake-stricken individuals in the social networks that could not be generalized to the whole region caused the flowing of a flood of people-driven contributions and the delivery of goods that were outside the preset framework and not so much needed by the earthquake-stricken society.

10) In Kermanshah Earthquake, the absence of a coherent and integrated relationship between the mass media, including TV and virtual space, and crisis management officials led to the dispersion of inauthentic and non-scientific news. The relationship between the media and the crisis managers results in faster management and more precise provision of information regarding crises.

11) The use of social media in some areas affected by earthquakes that had limited or no internet connection has had problems requiring support systems to benefit from the Internet.

Conflict of Interest

There are no conflicts of interest.

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