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MORALITY BEFORE KNOWLEDGE

Prevention of disaster triggered by crowd surge: comparative insights in selected countries and Indonesia

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ABSTRACT

Introduction: Hazards, whether caused by natural or human activities, can potentially lead to disaster. In 2015, the United Nations (UN) at its conference in Sendai, Japan established a framework related to disaster risk reduction to be guided until 2030. However, disaster management related to human-induced hazards has received less attention. The Covid-19 pandemic that has been overcome has made restrictions on human movement begin to loosen. With the increase in travel between regions, countries, and continents, people began to form crowds at events related to religion, entertainment, sports, and other activities. A poorly managed crowd develops into an uncontrolled crowd or riot, and disaster ensues. This paper aims to develop alternative prevention efforts so that similar disasters do not occur in the future. **Methods:** The method of this paper is a literature review and systematic content analysis of previous scientific articles and research. First, the paper describes disasters at planned events such as music concerts in Texas, United States, and less planned ones such as the Halloween festival in Seoul, South Korea. Then the countermeasures of the two events were compared with the incident in Malang, Indonesia. **Finding**: The result is that strong cooperation between related parties is needed in organizing events to maintain community safety. The use of technology and tightening regulations can be factors supporting the prevention of this disaster. Increasing the capacity of communities to deal with similar disaster risks is still not widely discussed, so further research is needed. **Conclusion:** Islamic science is a comprehensive paradigm, similar to Western science, that can serve as a framework for scientists from various fields of knowledge. The Islamic paradigm attempts to critique the concept of universality, which has been one of the values embraced by the Western scientific paradigm. This concept has been one of the reasons why scientific revolutions have occurred slowly.

KEYWORDS: : crowd; disaster; mass gatherings; riots; stampede.

1. Introduction

Disasters are complex events that result from the convergence of trigger, hazard, and vulnerability factors (Coppola, 2015). Hazards can be natural (such as earthquakes, volcanoes, and tsunamis) or human-induced (such as bombings, stampedes, and riots) (Bhandari, 2014). In 2015, the United Nations (UN) established a framework for disaster risk reduction at a conference in Sendai, Japan. This framework, which outlines clear guidelines and four priorities to be implemented between 2015 and 2030, focuses primarily on natural hazards. However, it's worth noting that human-induced disasters have received less attention in this framework, with words like "crowd" and "riot" notably absent.

On May 5, 2023, the United Nations declared that COVID-19 would no longer be a world public health emergency (World Health Organization, 2023). Months earlier, many countries had considered COVID-19 a common disease and had implemented new normal habits in people's daily activities to prevent its spread again. Travel activities between

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regions, countries, and continents began to increase, one of which was to participate in various mass gathering events in terms of religion, entertainment, sports, and other events (Sharma et al., 2023).

At every mass gathering event, a crowd consisting of a group and different groups of people is formed. Crowds that are not well managed, develop into unruly crowds as well as riots (Still, 2014). People who rarely crowd during the pandemic may have decreased safety awareness which becomes one of the vulnerabilities that affect the occurrence of disasters. This paper aims to provide an understanding of how crowd-related disasters occur and what prevention efforts can be taken. First, this paper describes the vulnerability and disaster triggers of crowds at planned events such as those in Texas, United States, and less planned events such as in Seoul, South Korea. Then continued with a study of events in Malang, Indonesia. Narratives from people's testimonies before a disaster occurs can help understand the process of disaster occurrence so that alternative prevention efforts can be prepared so that similar disasters do not occur again in the future (Sugiyama & Yamori, 2023).

2. Methods

The method in preparing this paper is a literature review and systematic content analysis of previous scientific articles and research related to this paper. Content is obtained from Scopus and Google Scholar databases as well as several online news. This paper describes each selected example of disaster, in terms of location conditions, number of victims, and chronology from the start of the event to the occurrence of the disaster. Then the analysis is carried out to determine alternative prevention efforts that can be done.

3. Result and Discussion

Loss of life as a result of crowd-related disasters is common due to a rapid and excessive increase in crowds so victims are trapped and have difficulty breathing and trampling (CNN, 2022). The panic in the crowd made the situation even more uncontrollable and added to the impact of the disaster. Several crowd-related disasters have continued to occur in the last 2 years and caused fatalities as can be seen in Figure 1, disasters spread across several countries in the world in various interest events (Reuters, 2022). The author chose one example of a planned event such as the music festival of a famous singer named Travis Scott held in 2021 at a sports complex called NRG Park in Houston, Texas, United States (Haghani et al., 2023). In addition, the authors also chose a study on an unplanned event, namely the 2022 Halloween festival in Itaewon district, Seoul, South Korea (Sharma et al., 2023). In addition to these two study examples, the author also studied the disaster that occurred in Indonesia, namely at the Kanjuruhan Stadium, Malang at the end of 2022 (Wang, 2023).

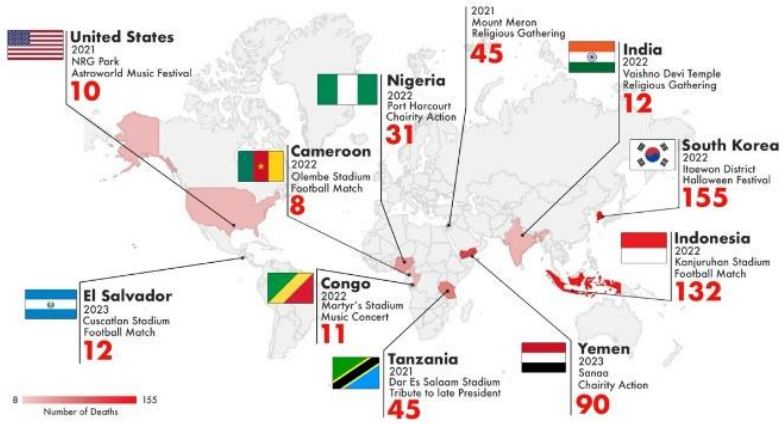

Figure 1. Distribution of death toll due to crowd-related disasters in the last 2 years (2021-2023). Collated by authors from various sources

3.1 Astroworld festival, Texas, United States, 2021

Travis Scott, a male singer from the United States, has many fans around the world. Music concerts in his hometown of Houston, Texas are always crowded with spectators, including a music festival called Astroworld which was held on November 5, 2021, at NRG Park. On that day at around 10:30 a.m., the main gate was breached by many people holding tickets and those who did not. At 2:00 p.m., many people also broke through the VIP gate, a few hours before Scott's performance, which was scheduled to start at 8:30 p.m. The local police chief met with Scott and his lawyer to discuss the vulnerability but the event went ahead as planned. At around 9 p.m., the audience began colliding and tumbling, resulting in a panic situation, so a fleet of police and ambulances was launched to the front of the stage. Because of the loud music and the dense crowd, control and rescue efforts were difficult. At 10:14 p.m. Scott finished singing the last song, and the audience began to disperse, while 300 people were treated and 10 people were pronounced dead from asphyxia (Haghani et al., 2023).

3.2 The Itaewon halloween festival, Seoul, South Korea, 2022

On the night of October 29, 2022, precisely in the Itaewon district, Halloween celebrations were held again after 3 years of social restrictions in South Korea due to the spread of COVID-19. Itaewon is a district that has many entertainment and other commercial venues, this area has fairly narrow streets, if visitors get off at the train station, there is a shortcut that is quite narrow only 4 meters wide. At 10:24 p.m. the local fire department received the first emergency report of an out-of-control crowd, and subsequent reports continued to arrive at the local police station. At 10:43 p.m., the local government ordered a halt to all Halloween festival activities in Itaewon and began an emergency response. Due to the high level of crowd density, ambulances, police, and other officers had difficulty getting to the scene and carrying out rescues. Control and rescue efforts were carried out until 9:45 a.m., after which the South Korean president stated that the death toll was 151 and 82 people were injured. By 8 p.m. on November 1, the toll had risen to 155 deaths and 152 injuries (Sharma et al., 2023).

3.3 Post-match arema vs persebaya, Malang, Indonesia, 2022

On October 1, 2022, there was a post-match event in Liga 1 Indonesia professional football between Team Arema FC and Team Persebaya in week 11 of Liga 1 Season Period 2022-2023 at Kanjuruhan Stadium, Malang Regency, East Java Province. This incident resulted in the casualties of 712 people, consisting of 132 people died. 96 were seriously injured, and 484 were minor/moderately injured (TGIPF, 2022). At around 10:08 p.m. local time, police fired tear gas in quick succession inside the stadium, causing panic and a rush to get out of the stadium. The narrow exit conditions resulted in a surge in crowds and people began to be trampled (KOMNAS HAM RI, 2023).

The focus of this paper is to describe the vulnerability and trigger of crowd disasters at several mass gatherings and then develop alternative prevention efforts so that similar disasters do not occur again in the future. From three recent case studies, the authors identified several similarities that might help formulate alternative disaster prevention efforts.

3.4 Similarity of descriptions of vulnerabilities and triggers of disasters

In each case, there were instances of spectators breaking through security barricades. Whether it's at the entrance or inside the stadium itself. There is a possibility of inadequate barricades and a lack of supervision of the barricades. It is more likely such as aggressive and destructive crowd behavior, thus ignoring existing rules and restrictions. Consciously or unconsciously, the audience has brought themselves closer to danger.

Organizers in the case under study have been warned of the danger of crowds posing a potentially catastrophic risk. As in Malang, where the police chief officially requested an early schedule change, in Texas the government asked for the event to be disbanded early. All were advised to the organizers to reduce disaster risk but were not taken seriously with various considerations.

Judging from each chronology, all of them had experienced panic in the crowd. Panic situations cause each individual to rush into decisions and tend to neglect personal safety. The crowd surge is formed because panicked people run around and form a crowd surge, once one person falls then next pull others around him to fall then there is a stampede and trampling (Sieben & Seyfried, 2023).

The situation that has led to the disaster is not addressed with a quick and appropriate emergency response from local officials. In Itaewon and Houston, it took more than an hour for an emergency response. In Malang, police used tear gas, which was an improper procedure under the rules of the World Football Association, causing panic.

3.5 Alternative disaster prevention efforts

In compiling alternative disaster prevention efforts, the author guides the disaster cycle which is divided into two agendas, namely pre-disaster and post-disaster. In the Pre-disaster agenda, 4P(Bhandari, 2014) *(Preservation, Prediction, Prevention, Preparedness*) and 4E (*Emergency needs assessment, empowerment, early warning, and environmental improvement) are needed*. Some alternative efforts by the pre-disaster agenda can be seen in Table 1.

The government as the authority to set rules, can immediately tighten various matters related to the holding of mass gatherings. The rules made can cover several areas such as stadium building feasibility rules that pay attention to crowd risk management, mandatory rules to prepare clear information boards, emergency communication tools, ready health facilities, and adequate distribution of open space for evacuation gathering points (Still, 2022). In addition, it is also necessary to formulate rules for the renovation of the old stadium and the conditions for the construction of the new stadium related to open space and sufficient ventilation for good air circulation in the stadium, as well as the preparation of easy paths or access as evacuation routes for ambulances and other vehicles.

Police and other emergency responders such as soldiers, firefighters, and private security should be given crowd management training. This will be even better if supported by clear standard operating procedures, as well as the help of density monitoring devices equipped with cameras so that the dynamics at the location can be monitored from the control room, and if there is a potential crowd surge, officers can act immediately (Tarlow, 2002). Organizers and relevant parties can predict changes in crowd levels by taking advantage of advances in information technology, such as those used by the Saudi Arabian government, by building operations control rooms manned by crowd managers, police, and military. The software provides data on the level of crowd density in *real-time* (AlQahtany & Abubakar, 2020). Data sent to operations control rooms can uncover patterns of crowd behavior that signal potential hazards, such as high density, stress, stop-and-go crowds, and other anomalies. This software system has been available in Mecca since 2007 and plays a role in organizing the Hajj every year.

Organizers must prepare health facilities supported by emergency response management systems followed by the readiness of personnel and supporting equipment (Spaepen et al., 2023). At the location must be prepared a communication system that can be heard clearly, for example by installing many loudspeakers or monitor screens with the latest information on site and evacuation guidance. In addition to communication with spectators, communication with emergency responders is also very necessary for speed of handling, for example with siren systems or special line communication installed at locations directly connected to emergency services.

Results from other studies show that community involvement in disaster prevention applies not only to natural hazards but also to man-made hazards (Schreurs et al., 2019).

The capacity to deal with disasters and safety culture are issues that have not been discussed much so further research needs to be done. Increasing one's capacity to deal with risks and protect oneself is what greatly influences the occurrence of disasters (Wisner et al., 2012). More blame is placed on the organizers and security, while visitors are rarely criticized. In every recorded crowd-related disaster incident, no one was seriously injured or died. Who survives certainly does not escape his perception of risk and his capacity to distance himself from danger (Marshall, 2020). One of the real efforts that can be made is to empower football team support groups to increase their capacity to deal with disasters and promote a culture of safety (Ali et al., 2011)

Table 1. Efforts in the pre-disaster agenda that can be done

Pre-disaster Agenda	Alternative efforts that can be done
Preservation	Make strict regulations regarding the feasibility of stadiums and other gathering places as well as strict requirements in organizing mass gathering events.
Predictions	Installation of density monitoring devices to determine crowd behavior and potential surges.
Prevention	Create lots of large, clear and easy-to-understand information boards.
Readiness	Training and furthermore, only allowing trained security personnel who can carry out security both from the Police and other parties.
Emergency Needs Assessment	Prepare the nearest health facility with an emergency response management system followed by the readiness of its personnel and equipment.
Empowerment	Invite football team support groups in capacity building to face disasters and promotion of safety culture.
Early Warning	Install a communication system in an emergency that can be heard clearly by everyone on site.
Environmental Improvement	Construction of open spaces and ventilation for good air circulation and prepare easy access for evacuation routes.

4. Conclusion

There is still a disaster in the crowded place. From several countries chosen as the place of study, shortcomings were found, among others, high vulnerability and low capacity of visitors, and slow emergency response from local officials, as well as the absence of monitoring by the government either normally or utilizing information technology. In addition, pre-disaster efforts from organizers and local governments still leave considerable room for improvement. The use of technology and tightening regulations can be factors supporting the prevention of this disaster. Increasing community capacity in dealing with crowd-related disaster risks can utilize information groups such as football team fan groups or local community leaders. Research on community capacity building is still not widely discussed so further research is needed.

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Author Contribution

Conceptualization, writing original draft, M.F.; methodology, data analysis, M.F.; validation, M.F., and R.H.K.; formal analysis, M.F.; investigation, M.F.; resources, M.F. and R.H.K.; writing—original draft preparation, M.F.; writing—review and editing, M.F. and

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