

ARTICLE

Crowd stampede management at sporting events: a systematic literature review

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Abstract-Background: This article investigates crowd stampedes at sporting events as a critical emergency management concern in the 21st century. The objective is to identify strategies for improving crowd safety and reducing mass casualties worldwide. This study provides a comprehensive worldwide perspective on the issue of crowd stampedes at sporting events. **Methods:** A systematic literature review was conducted to gather relevant studies. **Results:** The study's findings support the need for a whole society-based approach involving international organizations, regional governments, sports participants, and spectators. **Conclusions:** The key includes transforming position-based approaches to foster social value, sharing lessons learned, sport clusters, advanced technologies, functional exercise, and full-scale exercise.

Keywords: Sports, own position-based approach, whole society-based approach, emergency management, sport clusters

1 Introduction

The presence of crowds at sporting events has been shown to have numerous positive effects. According to [Kamarudin, Azia, and Ramely \(2022\)](#), crowds are critical to strengthening social relationships with governments and local communities. Additionally, crowds contribute significantly to the sports economy of a region. When crowds attend sports stadiums, they incur various expenses, which in turn create job opportunities, promote tourism development, enhance key resources and infrastructure, and boost regional economies. Essentially, the success of sporting events in today's world relies on the presence and support of the crowd.

However, as [Biglari, Nia, Bagheri, and Coombs \(2023\)](#) point out, it is important to acknowledge that the positive benefits associated with crowds at sporting events can be overshadowed by negative incidents. Crowd stampedes are often accompanied by physical violence, fires, hooliganism, racism, and extreme nationalism. Consequently, those who have experienced or witnessed such stampedes may no longer feel socially supported when attending sporting events. Moreover, these incidents can have a negative economic impact, as individuals may be hesitant to spend their own money on sporting events due

to safety concerns. Therefore, the social and economic benefits that are initially associated with crowds can quickly turn into negative costs.

The impact of sporting events, whether positive or negative, is contingent upon how society manages them. Crowd stampedes can be managed and mitigated as a man-made emergency by implementing appropriate actions worldwide ([Chen, 2023](#); [Petersen et al., 2024](#)). Nonetheless, many stakeholders in the realm of sporting events have been resistant to change and reluctant to fully embrace innovative measures. Additionally, there is a lack of comprehensive research examining the issue of crowd stampedes from a global perspective. Therefore, a pertinent research question is, "How has the global community addressed the issue of crowd stampede at sporting events?" The idea of a global community refers to the political, economic, and social interdependence of all people on a global scale, supported by mechanisms of global governance such as formal and informal interactions between and among states, the market, citizens, and other entities ([Ivanova, 2012](#); [Gems & Pfister, 2014](#)).

The primary objective of this study has been to investigate methods for improving the management of crowd stampedes during sporting events, with the ultimate goal of enhancing emergency management (i.e., reducing fatalities and injuries, minimizing financial losses, and mitigating psychological effects). The emergency management cycle, encompassing what happens before, during, and after a crowd stampede, generally comprises emergency prevention/mitigation, preparedness, response, and

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recovery (Fraser, 2011). Initially, the study examined the concept of its own position-based approach and proposed a shift towards a whole society-based approach involving international organizations, regional governments, sports participants, and spectators.

The central theme of the study revolves around the idea that these four stakeholders should transition from an individualistic approach while emphasizing the importance of social value, information exchange, the formation of sport clusters, the adoption of advanced technologies, and the implementation of emergency training programs. This paper will significantly contribute to addressing the crowd stampede problem by offering a comprehensive viewpoint on it and a thorough justification of the emergency management concept.

2 Literature review

2.1 Basic concepts

This study defines and explores three basic concepts: crowds, sporting events, and crowd stampedes. A crowd is a group of individuals who gather at a sporting venue. Sporting events encompass both professional and amateur games that are organized and managed at a certain level, with a particular emphasis on major games. According to *Oxford Learner's Dictionaries* (2024), a stampede is “a situation in which a group of people or large animals, such as horses, suddenly start running in the same direction, especially because they are frightened or excited.” The distinction between crowd stampedes and crowd crushes is important. During a crowd stampede, people have some space to run, whereas in a crowd crush, there is limited or no room for individuals to walk hurriedly (Aljazeera, 2022). Crowd stampedes, in contrast to crowd crushes, are associated with large-scale sporting events. In summary, while the definition of crowd stampede in this paper refers to a crowd with adequate space (with the support of dictionary meaning), it also incorporates the meaning of a crowd crush with confined space in some situations (such as an automobile accident near a sports stadium or an earthquake).

Crowd stampedes at sporting events have resulted in severe consequences, including fatalities, economic damage, and psychological impacts. The causes of these stampedes are diverse (Barr, Drury, Butler, Choudhury, & Neville, 2023). Table 1 provides some examples of these causes within modern society. While crowd stampedes may seem like a sporadic movement, they are influenced by various factors within sporting venues. These factors include overcrowding, dangerous behavior, crowd control failure, inadequate infrastructure, and other contingencies. Political, social, psychological, and other factors also contribute to crowd stampedes.

The issue of crowd stampedes has gained significant attention in recent years (Mao, 2023). Although crowd stampedes have undeniable impacts, there is a prevailing belief that these man-made emergencies can be prevented. Emergency management is crucial to effectively

addressing crowd stampedes through the utilization of personnel, resources, and strategies. These encompass the periods before, during, and after crowd stampedes.

2.2 Previous studies

Crowd stampedes have been examined to some extent by various disciplines, including crowd management, crowd science, safety science, sports medicine, policing, emergency management, and tourism (Sieben & Seyfried, 2023). However, the existing research on crowd stampedes at sporting events remains inadequate (Ludvigsen, 2020). While some researchers have explored crowd stampedes in soccer games, their focus has been on the World Cup. Unfortunately, despite the numerous reports on the subject, there is a lack of systematic research on crowd stampedes at other sporting events.

In 1897, Emile Durkheim published a book in French systematically discussing various types of suicides from a sociological perspective (Durkheim, 1897). Some individuals committed suicide due to significant behavioral changes, which could be either positive or negative, but resulted in their deaths. The researcher introduced the concept of social integration as one of the factors contributing to suicide. When individuals became marginalized within society, they faced peer pressure and some committed suicide. However, it is important to note that the book did not delve into the subject of emergency management concerning suicide, in particular, even though a growing number of scholars and professionals have identified it as a type of human-caused emergency.

Rubin (2004) focused on preparing for terrorism incidents at sporting events in the US. The study highlighted the role of team physicians in managing the impact of terrorism incidents. The researcher introduced the concept of emergency preparedness in the area of sports games and discussed various strategies for sporting venues, including incident command systems, emergency action plans, triage, and mass casualty emergencies. Nonetheless, this article lacks a comprehensive discussion on the preparedness efforts of professionals other than medical staff.

In 2008, the Department of Homeland Security (DHS) published policy guidelines on evacuations from sports stadiums (DHS, 2008). The guidelines emphasized the importance of effective communication, coordination, and cooperation between stadium operations and governmental entities at various levels. It was maintained that evacuation plans must be integrated with other emergency plans. The DHS stressed the need to integrate evacuation plans with other emergency plans. Additionally, the guidelines recommended the establishment of evacuations in each stadium to include crowd managers. However, these guidelines focused on a national perspective.

Hoggett and Scott (2010) studied how police officers decide whether to use force against crowd violence. The researchers found that when police officers perceived angry crowds as uniformly dangerous and irrational, they were more inclined to rely on the use of force. However, the

Table 1. List of major crowd stampedes at sporting events.

Years (Months)	Places	Contents
1955 (June)	Sarthe, France	During the Grand Prix race, a fatal incident occurred, resulting in the deaths of 81 spectators and the driver of a sports car.
1964 (May)	Lima, Peru	A riot ensued as a consequence of the referee's decision during a soccer match, resulting in a tragic loss of at least 300 lives.
1971 (January)	Glasgow, Scotland	During a soccer match, several fans left the stadium only to quickly return due to a late goal. Sixty-six people lost their lives during the crowd rush.
1982 (October)	Moscow, Russia	In a devastating incident at a soccer stadium, a woman unexpectedly came to a halt and attempted to locate her lost shoe on the stairs. This led to a crowd stampede, resulting in the loss of 340 people.
1985 (May)	Brussels, Belgium	Due to a riot that occurred in the vicinity of a soccer stadium, 39 individuals, including several Italians, lost their lives.
1989 (April)	Sheffield, England	In a tragic event, a crowd surge at a soccer stadium resulted in the loss of 96 lives.
1989 (October)	San Francisco, US	During the 1989 World Series in baseball, a significant earthquake struck and interrupted the game, leading to its postponement.
2001 (May)	Accra, Ghana	In a devastating incident, police resorted to using tear gas to control rioting spectators in a soccer stadium, resulting in the loss of over 126 lives.
2022 (October)	East Java, Indonesia	Police officers fired tear gas at spectators in a soccer stadium. A crowd stampede occurred, resulting in the loss of 125 lives.

Sources: [Reuters \(2022\)](#) and [Isaac \(2023\)](#). Note: US = United States.

two researchers acknowledged that the dynamics of crowd behavior are much more complex. They concluded that police officers should prioritize negotiations, facilitation, and communication with crowds. However, this study did not apply its theoretical process to sporting events.

[Feliciani et al., 2023](#); [Feliciani, Corbetta, Haghani, and Nishinari \(2023\)](#) attempted to identify any trend in crowd accidents by utilizing a database. Many researchers have assumed that as crowd size increases, there is a corresponding increase in human deaths. However, this study did not confirm that finding. The researchers acknowledged that, due to limitations in the database used, they could not determine whether larger crowds are safer or more dangerous than small crowds. However, the study did not specifically focus on crowd stampedes during sporting events but included all types of crowd accidents across the globe.

2.3 Characteristics of this research

The topic of crowd stampedes around sporting events encompasses various aspects of society and involves integral components such as continuous planning, physical event venue, best practices, the relationship between safety and event experience, the social atmosphere, and multiple disciplines, among others ([Menaker, Sheptak, Kurland, & Tekin, 2021](#)). It is important to note that addressing this issue cannot be effectively tackled by relying solely on a singular player, institution, or strategy. Appropriate alternatives can be identified and implemented to address the issue effectively.

This study proposes two approaches: the position-based approach and the whole society-based approach. The position-based approach recognizes that each stakeholder has a specific position within the context of a crowd stampede ([Descatha et al., 2017](#)). This approach fully

embodies the unique interests and concerns of individual stakeholders related to the issue. On the other hand, the whole society acknowledges that the entire group of stakeholders, encompassing various interests, is involved in a crowd stampede ([WHO, 2020](#)). The former can be viewed as a negative concept in many ways, as it is believed to prioritize its stance over those of others. On the other hand, the latter is positive since it considers every facet of society together.

This research focuses on analyzing the topic of crowd stampedes at sporting events through integral components of human society, such as politics, economy, psychology, and local culture. It approaches the topic as an emergency issue and aims to utilize emergency management principles to address it effectively. This study takes an all-inclusive perspective by considering various stakeholders and their activities worldwide. In summary, this study provides a more comprehensive review of crowd stampedes at sporting events than other studies.

3 Methods

3.1 Rationale of the review

To view and summarize new findings on the issue of crowd stampedes at sporting events, this research has opted for a systematic literature review as the key methodology ([Xiao & Watson, 2019](#)). Using an empirical method for the same purpose would be challenging, mainly due to the high cost of data collection across multiple nations or the time-consuming nature of data collection. However, the research process follows a clear flow diagram, as depicted in [Fig. 1](#), which includes a well-defined research question, research goal, analytical variables, and other directions for the study.

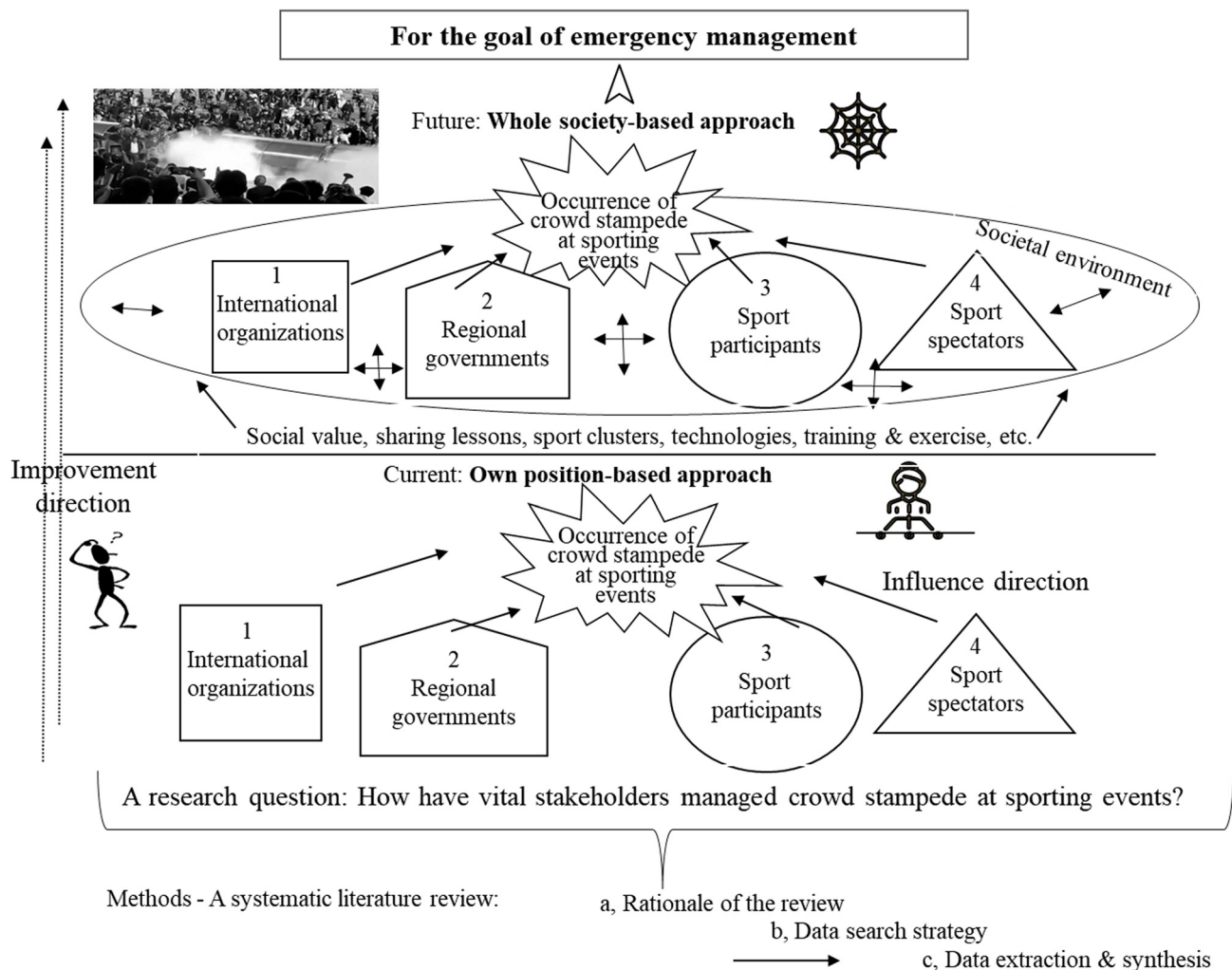


Fig. 1. Analytical framework of the research.

3.2 Data search strategy

In this study, three search strategies have been actively utilized: searching with keywords, searching with subject (sub)headings, and searching with citations (Charles Sturt University, 2023). The research began by typing keywords into search engines and downloading related files. The study then decided and assessed the inclusion or exclusion of specific documents based on their headings and subheadings. When identifying appropriate phrases within the documents, the study continued reading related content and identified in-text citations. These steps have facilitated the broad extension of the data search process to include other documents.

To elaborate further, the typed keywords used in this study included phrases such as “crowd management and sports events,” “sporting events and emergency management,” “impacts of crowd stampede,” “crowd stampede and implications,” and others. Google.com contains numerous government documents on the subject among several internationally recognized search engines, while the others host research articles (refer to Tab. 2). This study

meticulously screened paper titles and related abstracts via various phases, particularly by deleting duplicates, to merge results from multiple search engines. The criterion for including or excluding a specific text was whether it was related to crowd stampedes, sporting events, or emergency management. Selecting texts that use an appropriate study design to meet the research question is crucial. The study dates and a chronology of the topic or subject under examination also had to be established.

3.3 Data extraction and synthesis

For data extraction, four stakeholders were coded: international organizations, regional governments, sports participants, and sports spectators. These four groups play crucial roles in 21st-century sporting events (Mendizabal, San-Jose, & Garcia-Merino, 2020). International organizations are to foster international cooperation for the success of sporting events. Regional governments facilitate sporting events while managing local emergencies. Sports participants include event organizers, mass media, players, safety staff, vendors, and others who

Table 2. An overview of text data identification.

Units	Duration of time	
	13 April 2022–16 September 2023	13 December 2023–8 February 2024
Every database used	Google.com, Scopus, EBSCOhost, ProQuest, JSTOR, ScienceDirect, SAGE Journals, Taylor & Francis Online, Oxford University Press, Yahoo.com, and others	
The number of data points that were first identified	116	153 (= 116 + 37)
The number of data points deleted	79	107 (= 79 + 28)
The number of data points included	37	46 (= 37 + 9)
Kinds (number) of data points included	Research articles (23), books (1), government documents (7), conference proceedings (1), and websites (5)	Research articles (29 = 23 + 6), books (2 = 1 + 1), government documents (8 = 7 + 1), conference proceedings (1 = 1 + 0), and websites (6 = 5 + 1)

engage in sports on a physical or substantial level. In contrast, sports spectators are primarily emergency victims who typically watch sports.

In the process of synthesis, the same four stakeholders can be included in two categorical approaches: the own position-based approach and the whole society-based approach. This study establishes the same two analytical categories while breaking down the text materials into those two approaches, reading the texts, and then allocating them into two distinct portions (Sabtu & Effendi, 2024). Besides, this allows for a systematic comparison. By using the same four stakeholders as analytical units, bias can be reduced during synthesis. The study has attempted to extract and synthesize relative content for its own position-based approach as research results. Subsequently, the research can allocate alternative contents proportionally to the entire table as a whole society-based approach.

4 Results: own position-based approach

4.1 International organizations

Many sporting international non-governmental organizations (SINGOs) in the sporting industry have established their own rules regarding crowd stampedes during their sporting events. These organizations have been compelled to address this issue due to recurring accidents (FIFA, 2023). The SINGOs include the International Olympic Committee (IOC), the International Association of Athletics Federations (IAAF), the Federation Internationale de Footwear Association (FIFA), and the Federation Internationale de l'Automobile (FIA). SINGOs face difficulties in fully implementing crowd rules due to local barriers.

Few United Nations (UN) agencies have directly or indirectly addressed the issue of crowd stampedes at sporting events. The main focus has been terrorism or violent extremism (UN, 2020). Examples of this focus include the UN Global Programme on the Security of Major Sporting Events and the Promotion of Sport and its

Values as a Tool to Prevent Violent Extremism. The UN Office for Disaster Risk Reduction (UNDRR) has recognized crowd stampedes at sporting events as a risk to human society. It has distinguished between crowd stampedes and crowd crushes but has not performed further actions.

4.2 Regional governments

Many regional governments have not adequately addressed contingency planning for crowd stampedes at sporting events because they prioritize dealing with frequently occurring incidents in their administrative zones (FEMA, 2013). In other words, while various national and local governments have implemented emergency planning for crowd stampedes, they have not given equal consideration to contingency planning. Whereas the former deals with ordinary events (i.e., almost routinely occurring events), the latter tends to cope with special events (i.e., almost non-routinely occurring events).

Despite the persistent efforts of regional governments, Europe has encountered comparable challenges in managing crowd stampedes. The Council of Europe's "Convention on an Integrated Safety, Security and Service Approach at Football Matches and Other Sports Events" established relevant standards in the area in 2016. Its precursor was established shortly after the Heysel Stadium tragedy in 1985 (Gacek, Marciniak, & Wozniak, 2018). Furthermore, the European Union (EU) has issued general recommendations on significant events, and the Union of European Football Associations (UEFA) has developed specific security and safety guidelines. Still, because of a lack of contingency planning toward hooliganism, small gates, etc., those institutions have not yet entirely succeeded in managing crowd stampedes.

It is expected that police officers, firefighters, emergency managers, and other government workers should fully or partially participate in crowd stampede management at sporting events. However, there are instances where they do not always fulfill their assigned roles and responsibilities on the spot. For example, some police

officers sometimes use tear gas towards football spectators, disregarding FIFA's regulations on no-crowd control gas. Additionally, some firefighters or emergency managers may arrive late to sporting events, missing crucial time for crowd management as they may not consider crowd stampedes to be within their major responsibilities.

4.3 Sport participants

Event organizers have generally not invested enough funds in crowd stampede prevention during sporting events. Instead, they have tended to allocate financial resources towards crowd stampede recovery. These organizers have made their efforts toward the success of their businesses by choosing locations and dates, ticketing, securing sponsors, preparing for bad weather, and other business concerns. They have placed significance on safety management around sporting events but have not been willing to allocate funds to crowd stampedes. Once mass casualties occur, they pay related expenses.

Sport participants have shown nonlinear reactions to crowd stampedes at sporting events (Kefan, Song, Liu, & Liu, 2019). For example, some players have forgotten that their emotional responses could lead to casualties during games. Safety guards have been willing to watch games without carefully monitoring crowd movements. Vendors have also contributed to the spread of rumors among sports spectators. Additionally, many mass media outlets have not provided information about crowd surges or related management in advance.

4.4 Sport spectators

According to Rek-Wozniak and Wozniak (2020), many sports spectators lack or are not interested in various information regarding the mechanism of crowd stampedes at sporting events. They may claim to have gained knowledge through emergency management training, but these trainings focus on risk communication rather than security management. Similarly, the interaction between crowd stampedes and risk communication has also gone unnoticed by spectators, including tourists from other countries or regions. This is because, as visitors, they are unfamiliar with the local environment, which includes the channels for risk communication surrounding sports stadiums, and are not local residents.

Human beings often exhibit bounded rationality, particularly in situations of imminent crowd stampede. Some spectators may struggle to think rationally due to limited information and an intense atmosphere. They may also be prone to mimicking the behavior of others, such as shouting, pushing, running, shoving, and firing. Although Gustave Le Bon's pathological aspects of crowd motion have been deemed incorrect, some have continued to debate whether these behaviors represent typical manifestations of the unhealthy parts of crowd psychology (Malmberg, 2023). At any rate, when admitting that these factors contributed to crowd stampedes, the complicated aspects of human psychology are still applicable.

5 Discussion

A research team in Malaysia empirically proved the effects of the whole society-based approach on crowd stampedes at sporting events in Kuala Lumpur and Selangor (Rahmat et al., 2011). They interviewed various respondents and analyzed the correlation between the whole society-based approach, measured through four variables (social forces, information exchange, space, and time), and safety performance. Despite a few difficulties, the research team accepted the correlation between the whole society-based approach and safety performance.

The entire society-based approach is more synergistic for creating social value, such as relation value or social harmony in the context of crowd stampede, than the individual position-based approach (Misener & Schlenker, 2016). The whole society-based approach recognizes the need for systematic movement planning, practical strategies, and regional culture. It encourages various stakeholders to proactively collaborate and work towards societal harmony. However, the latter is to fulfill limited interests around crowd stampedes. Eventually, the social value of the whole society-based approach will serve as a catalyst for crowd stampedes.

When considering the occurrence of crowd stampedes at sporting events, it is important to acknowledge the involvement of various actors, causes, impacts, and lasting implications, regardless of structured boundaries (Zourgani & Ait-Bihi, 2023). In light of these factors, shifting from a position-based approach to a whole society-based one is highly valuable. Based on the comprehensive effects of utilizing the whole society approach, the four stakeholders will transition from their position-based approach to a whole society-based approach to mitigate crowd stampedes at sporting events. Table 3 includes the detailed strategies of the four stakeholders.

This transition will make valuable contributions to the existing literature on crowd management, emergency management, and medical science, among other fields. Considering the lack of rigorous studies, this paper specifically addresses crowd stampedes at sporting events from a worldwide or societal perspective. The results of this study will challenge and expand upon existing theories, pushing them towards a more comprehensive understanding of the issue.

During the transition from a position-based approach to a whole society-based approach, the four stakeholders will collaborate (by putting stakeholder analysis into practice, establishing priorities, and communicating) to identify and codify important lessons, which will then be disseminated to a global community (Thompson, McAt-
eer, Davies, & Hoffman, 2020). Numerous tactics, such as developing a comprehensive agenda, engaging in effective planning, facilitating the event, ensuring follow-up, and being adaptable, will ensure the success of these events. In other words, all stakeholders need to share a learned lesson with Earth's community, which aims to unite all living things on Earth and distribute accountability for the shift (Burdon, 2013). Once there is a consensus among the

Table 3. Appropriate strategies for a whole society-based approach.

Units	Appropriate strategies
1 International organizations	As the focus shifts from emergency response to emergency prevention, SINGOs, including the IOC, IAAF, FIFA, and FIA, will prioritize proactive communication with regional partners regarding the local implementation of crowd rules. UN programs and UNDRR will adopt a comprehensive approach to address crowd stampedes. This approach goes beyond counter-terrorism measures and emphasizes all-hazards management, considering the potential for cascading disasters and inter-sector relations.
2 Regional governments	Regional governments will include contingency planning for special events, including the potential for crowd stampedes, to further enhance national emergency management systems. The Council of Europe, the EU, and other European organizations, for example, will also increase the level of their contingency planning for hooliganism, limited gates, and other issues. The roles and responsibilities of police officers, firefighters, emergency managers, and other officials will be clearly defined through contingency planning and emergency planning.
3 Sports participants	Event organizers will allocate research funds to develop forecasting capabilities for unseen activities such as accidents and injuries. They will also collaborate with international organizations and regional governments to enhance their preparedness. They may set up reward systems for unseen activity detection for emergency prevention. Other sports participants, such as sports players, safety guards, vendors, mass media, and others, will be managed through a quick command and control function to ensure linear and systematic responses.
4 Sports spectators	Sports spectators have to undergo appropriate emergency management training, including not only risk communication but also safety and security management. Additionally, tourists will promptly seek further information on regional characteristics from local stakeholders. Sports spectators can enhance their level of disaster awareness by studying and practicing various aspects related to crowd safety. This includes understanding the dangers associated with crowds, knowing when and how to look for exits, being smart and vigilant, local culture, mental capacities, etc.

stakeholders regarding the whole community approach, they will proceed to take action at the local community level. This will involve incorporating the whole community-based approach into an official document and disseminating it through the Internet, mobile phones, and other efficient tools.

This transition will continue to align with the subject of sport clusters. Sport clusters are a concept that strategically focuses human and material resources within a given geographic area to foster a synergistic environment, enhancing the overall development and efficiency of the sports sector (Kim, Kim, & Jang, 2021). As a result, community resilience against disasters will be significantly improved. Similarly, when considering the whole society-based approach of connecting people and resources within and outside sporting events, the effects of sport clusters on crowd stampedes will be at worldwide sporting events.

In the transition, it will be necessary for all four stakeholders to fully rely on cutting-edge technologies, such as information and communication technology (ICT), artificial intelligence (AI), and others (Cieslinski, Witkowski, Piepiora, Piepiora, & Bernat, 2016; Zhu et al., 2023). These technologies will play a crucial role in connecting stakeholders worldwide. Additionally, advanced technologies will provide real-time information for decision-making processes related to crowd stampedes before, during, and after such incidents occur.

The effects of advanced technologies are contingent upon how humans utilize them (Hatfield, Mahoutchian, & Paynter, 2023). ICT will collect information on stakeholders worldwide and establish a vast network. Examples include monitoring spectator movement, predicting logistics, virtual reality, stampede simulations, and employing drones. AI can also be applied to remote working, video calling, crowd evacuation, etc. However, these technologies would be ineffective without users' constant attention and willingness.

While many have advocated for exercise drills to prepare for crowd stampedes at sporting events, it is recommended to conduct functional or full-scale exercise as part of a whole society-based approach (NIDM, 2022; MHSAA, 2023). Drills are designed to test a single function, such as risk communication within a single agency, while functional exercises test organizational capacities. On the other hand, full-scale exercises are used to assess coordination among multiple agencies. Through this transition, emergency trainees will include not only sports stakeholders but also other members of society, such as various volunteers and foreign watchers.

After completing the initial training, trainees will undergo a regular re-certification process (Faraji, Hemmatinezhad, & Taylor, 2018). Trainees will refresh their understanding of the urgent roles and responsibilities before, during, and after a crowd stampede. The field may

start practicing discussion-oriented exercises if it is having trouble putting operation-oriented exercises into practice. This includes risk communication, safety and security management, and emergency management. Authorities and trainers are responsible for reviewing the training and updating the content as needed. Through this re-certification process, the training field ensures the training remains effective for all trainees.

6 Conclusions

The re-occurrence of crowd stampedes at sporting events can be prevented worldwide, considering it is a man-made emergency. This study aims to explore the role of major stakeholders in improving the reality of crowd stampedes. The article discusses previous studies, identifies four stakeholders (i.e., international organizations, regional governments, sports participants, and sports spectators), and examines their implications to achieve this. In particular, the study presents two approaches (i.e., a position-based approach and a whole society-based approach) and successfully achieves its objective.

The main thesis of this study suggests that the four stakeholders involved in crowd stampedes will strive to transition from a position-based approach to a whole society-based approach, driven by the potential effects. Each stakeholder will carry out specific tasks sequentially, such as proactive communication on crowd regulations, contingency planning with special events, research funds for unseen activity detection, disaster awareness, and others. They will continue to contribute to social value, information exchange, sport clusters, pay attention to cutting-edge ICT and AI, and undergo re-certification of emergency training.

This study has the distinctive characteristic of investigating the topic of crowd stampedes at sporting events from a holistic perspective. One of its strengths is its comprehensive approach and research focus. Similarly, this study's most significant contribution to the domains of sporting events and emergency management, in particular, will come from its flexible incorporation of the whole community approach concept. However, a limitation of this study is the potential exclusion of several countries and their activities. This is mainly due to the limitation of space, as the article includes key stakeholders and their activities based on a comprehensive literature review. Thus, the lack of exhaustiveness remains a limitation of this study.

Researchers can further study the topic of crowd stampedes at sporting events by adopting their own research approaches. They may integrate various regional perspectives on crowd stampedes worldwide to create a comprehensive understanding. Alternatively, they can apply the main objective of this study to their own research. Researchers can include all nations and their activities by setting specific time periods to overcome the limitations of this study. Without confining the research scope to a particular approach, they may encounter similar challenges to those faced in this study.

Ultimately, all future research should aim to reduce the number of human casualties worldwide. Specific research questions will include “What physiological and psychological elements play a role in panic and stampede behavior during a sporting event in a crowd?” “In what ways may the lessons from previous crowd stampedes be applied to the ongoing enhancement of emergency management for sporting events?” and “How can an international study on crowd stampedes at sporting events be planned to include a range of countries in order to provide universal emergency management?” among others. These questions will incorporate numerous academic disciplines, including sports management, sports science, psychology, and emergency management, among others.

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Conflicts of Interest

The author has no relevant financial or non-financial interests to disclose.

Data availability statement

DANS Data Station Social Sciences and Humanities: “Replication Data for: PRISMA 2020 Checklist – sports,” <https://doi.org/10.17026/SS/HQXUFR,V2>

References

- Aljazeera. (2022). *Seoul tragedy: The difference between crowd crush and stampede*. Retrieved from <https://www.aljazeera.com/news/2022/10/30/what-is-the-difference-between-a-stampede-and-a-crowd-crush>
- Barr, D., Drury, J., Butler, T., Choudhury, S., & Neville, F. (2023). Beyond ‘stampedes’: Towards a new psychology of crowd crush disasters. *British Journal of Social Psychology*. <https://doi.org/10.1111/bjso.12666>
- Biglari, N., Nia, S.R.H., Bagheri, H., & Coombs, W.T. (2023). Identifying professional football crowd crisis management solutions: The best-worst method. *Journal of New Studies in Sport Management*, 4 (1), 654–675. <https://doi.org/10.22103/jnssm.2023.20356.1133>
- Burdon, P.D. (2013). The Earth community and ecological jurisprudence. *Onati SocioLegal Series*, 3 (5), 815–837. <http://ssrn.com/abstract=2247826>
- Charles Sturt University. (2023). *Literature review: Developing a search strategy*. Retrieved from https://libguides.csu.edu.au/review/Search_Strategies
- Chen, K.-F. (2023). It is time to modernize disaster preparedness with crowd analysis. *Journal of Acute Medicine*, 13 (1), 1–3. [https://doi.org/10.6705/j.jacme.202303_13\(1\).0001](https://doi.org/10.6705/j.jacme.202303_13(1).0001)
- Cielinski, W.B., Witkowski, K., Piepiora, Z., Piepiora, P.A., & Bernat, P. (2016). The safety engineering of mass sports events – The model of emergency management of logistics processes with using of advanced technologies (Augmented Reality, GPS i ICT). *Proceedings of the 2016 International Conference on Intelligent Control and Computer Application* (pp. 484–489). <https://doi.org/10.2991/icca-16.2016.114>

- Sieben, A., & Seyfried, A. (2023). Inside a life-threatening crowd: Analysis of the Love Parade disaster from the perspective of eyewitnesses. *Safety Science*, *166*, 106229. <https://doi.org/10.1016/j.ssci.2023.106229>
- Thompson, D., McAteer, S., Davies, N., & Hoffman, A. (2020). *Stepping up to the plate: Planning for a lasting health legacy from major sporting events*. Doha, Qatar : World Innovation Summit for Health. <https://2020.wish.org.qa/app/uploads/2020/09/IMPJ7849-04-Sporting-Events-WISH2020-201103-WEB.pdf>
- United Nations (UN). (2020). *UN global programme on security of major sporting events, and promotion of sport and its values as a tool to prevent violent extremism*. New York, New York: UN. <https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2021/05/Security-of-Major-Sporting-Events.pdf>
- World Health Organization (WHO). (2020). *Everyone's business: Whole-of-society action to manage health risks and reduce socioeconomic impacts of emergencies and disasters*. Brussels, Belgium: WHO. <https://globalplatform.undrr.org/sites/default/files/2022-01/Everyone%E2%80%99s%20business-%20whole-of-society%20action%20to%20manage%20health%20risks%20and%20reduce%20socio-economic%20impacts%20of%20emergencies%20and%20disasters-%20operational%20guidance.pdf>
- Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, *39* (1), 93–112. <https://doi.org/10.1177/0739456X17723971>
- Zhu, Y., Ni, K., Li, X., Zaman, A., Liu, X., & Bai, Y. (2023). Artificial intelligence aided crowd analytics in rail transit station. *Transportation Research Record*. <https://doi.org/10.1177/036119812311751>
- Zourgani, A., & Ait-Bihi, A. (2023). A systematic literature review: assessing the impact of sports events between 2010 and 2022. *International Journal of Sport Policy and Politics*, *15* (2), 347–365. <https://doi.org/10.1080/19406940.2023.2206397>

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