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Public health perspectives from the biggest human mass gathering on earth: Kumbh Mela, India

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SUMMARY

Mass gathering events pose critical health challenges, especially for the control of diseases. The rising population, better connectivity, and scope of travel have increased the frequency and magnitude of mass gatherings and underscore the need to shift the discourse from reacting to the public health issues they throw up to taking active steps in preventing them based on evidence through research. The Kumbh Mela is a religious event in India that constitutes the largest number of people gathered at a specific place and at a specific time. It is older than the Hajj by centuries, yet the public health aspects related to this event, which is held every 3 years, have not been fully studied. Understanding the Kumbh Mela can highlight the health challenges faced and provide crucial lessons for the management of mass gatherings. This investigation used the Kumbh Mela in the city of Allahabad as a case study to describe the health problems and the efforts taken to manage them. In-depth studies of the Kumbh Mela in the future are required to generate evidence for context-specific measures to address the complex health challenges of mass gatherings.

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1. Introduction

According to the World Health Organization (WHO), a mass gathering (MG) is "any occasion, either organized or spontaneous, that attracts sufficient numbers of people to strain the planning and response resources of the community, city or nation hosting the event".[1] These include spontaneous and organized events like sports, social and cultural functions, and political and religious gatherings. The magnitude is widely contextual, from a couple of thousand to a few million.[2] The Kumbh Mela is a 3-month long religious conglomeration held every 3 years in one of four different cities in the north of India, by rotation, the most famous being held in Allahabad. This is considered to be the biggest human gathering on earth. The last one held in Allahabad in 2013 had 120 million visitors. Thus, there were almost as many human beings as the entire population of Mexico gathered together in one place.[3,4]

With a history stretching centuries before Hajj, Kumbh Mela receives little attention in academic discourse. In relation to the incidents of MG tragedies occurring across the globe, and even in India for events on a much smaller scale, the Kumbh Mela stands out for its better track record on safety and management.[5] This relative absence of large-scale human tragedy during the Kumbh Mela, coupled with the limited international media coverage of this predominantly regional, albeit massive, event, could be the reason for the lack of research studies on the subject. Nevertheless, the sheer magnitude of the event poses a significant logistical and public health problem, and exploring its management and execution could provide crucial lessons and highlight the challenges faced in the management of MGs from a public health perspective.

2. Public health challenges at mass gathering events

MG events pose a unique set of public health challenges, including stampedes, crush injures, burns due to fires, exposure to extreme weather, infectious diseases, water-, sanitation-, and hygiene-related illness, and epidemic outbreaks.[6] The complex set of health needs required to manage such events are well documented in the *Lancet* series on MGs published in 2014; this highlighted the need for comprehensive planning, rapid detection,

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and effective management during events such as the London 2012 Olympic and Paralympic Games, the 2012 European Football Championship Finals (Euro 2012) in Poland and Ukraine, and the Hajj 2012 and 2013.[6–8] During MGs, special attention is also needed in relation to disease surveillance, infection control, and water and sanitation. This requires setting up and implementing systems from scratch, or usually the up-scaling of existing systems in place.[9] Growing numbers and ever-larger crowds gathering at MG events lead to ever-increasing health risks, making it imperative to have robust mechanisms for prevention and pre-empting public health risks.[10]

MGs may also have considerable implications in relation to other acute public health incidents such as pandemics and disasters, which also require planning, preparedness, and management, and an increase in the capacities of the health systems.[11] However, resource materials and studies on how to prepare for and manage health risks during MGs have not been developed fully.[11,12] Most of the existing guidelines on MG events focus mainly on crowd control and the prevention of stampedes, with little attention to public health.[13–16] This makes it imperative to take a critical look at the public health risks, such as infectious diseases, that could severely disrupt the management of MGs.[17]

3. History of the Kumbh Mela

The name Kumbh Mela comes from the Sanskrit word 'Kumbha' meaning an 'urn' and 'Mela' meaning 'fair' or 'gathering'. It refers to the legendary battle between the gods and demons in Hindu mythology for the elixir of life by churning the primordial ocean of life made of milk. The tussle for the elixir is said to have caused the urn to tilt and four drops to fall on the four cities of Allahabad, Nashik, Ujjain, and Haridwar, where the Kumbh Mela is held in rotation every 3 years. Thus each city hosts the event every 12 years. The dates are pre-determined based on special combinations of the zodiac. Held on the banks of the rivers in each of the four cities, the main tradition associated with the Kumbh Mela is ritual bathing in the river on certain auspicious days during the 3-month period of the festival. Since Allahabad is the city with the confluence of two sacred rivers, the Ganges and the Yammuna, the Kumbh Mela held there is said to be the most auspicious and draws larger numbers of devotees than the other three cities.[18]

The pilgrims include religious and holy men and women from different sects or 'akahras' and their vast numbers of followers, who have a pre-determined order for entering the river each time for the ritual baths. They are trailed by other devotees who take the sacred dip in the river. This makes the entire process complex, set to a pattern that can result in long lines of devotees waiting their turn to enter the river. The event is also the site of religious discussions between different religious sects, devotional singing, mass feeding of holy men and women and the poor, and religious assemblies where doctrines are debated and standardized.[19]

The Kumbh Mela is the largest and the most important periodic MG in India, bringing Hindu devotees from all across the world. The purification rites involved in the ritual bathing, especially at Allahabad Ganges, are believed to interrupt the cycle of reincarnation according to Hindu theology. The highest holy days occur once every 144 years. Over the years, the number of devotees attending the Kumbh Mela has increased logarithmically, from around 400 000 in 1903 to 120 million in 2013.[3,20] This is the largest human gathering on earth, so large that the movements of the amassed individuals can be seen from space.[21]

4. Health challenges at the Kumbh Mela

Like other religious MGs, the Kumbh Mela is a largely organized, low-adrenaline event with fixed rituals and practices. The large number of people attending the Kumbh Mela makes its planning and management a substantial task for the local government, which is responsible for the event. The government has to manage prior planning and address the safety and needs of the millions arriving from all across the country and even from abroad, as well as ensure the prevention of the spread of diseases, addressing the management of health systems and other basic services like food, transportation, and safety. However, unlike other religious MGs like the Hajj, the Kumbh Mela does not involve a fixed human settlement, but the creation of a temporary 'pop-up city' of canvas, corrugated metal sheets, bamboo, nails, and rope in the flood plains of the rivers, which houses and feeds millions of people for 3 months every year 3 years.[22] Moreover, unlike the Hajj where people's entry into the country and region can be monitored given that air travel is the most common mode of transport as it involves a large number of international visitors, people come to the Kumbh Mela by air, road, rail, and foot from within India, making it almost impossible to maintain detailed records of the peoples' movements. The logistics of the water, sanitation, security, health, and transportation needs of millions calls for meticulous planning and quick responses. Given that the region in which the Allahabad Kumbh Mela is held is among the most under-developed of India, with an inadequate health infrastructure,[23,24] providing adequate healthcare services to the influx of millions of pilgrims is a daunting task.

The sheer density of people descending on the river banks at the Allahabad Kumbh Mela results in overcrowding, which has the potential to lead to stampedes and consequently deaths and crush injuries. At the 1954 Kumbh Mela, a stampede killed nearly 500 people and injured around 2000;[2] this was attributed to the heavy influx of people and dignitaries, including the Prime Minister and the President of India, as this was the first Kumbh Mela since the country's independence in 1947.[25] The enquiry commission set up following this event recommended restrictions on the visits of dignitaries during Kumbh Mela, which was strictly followed for all subsequent events.[25] Since then, the Allahabad Kumbh Mela has rarely seen any major instances of stampedes, except in 2013, when 36 people died in a stampede at the Allahabad railway station due to a massive rush of passengers.[26] This highlights the fact that while at the site there may be robust mechanisms in place to prevent stampedes, associated sectors like transport also need to be factored in to ensure that the event runs smoothly.

As the event involves bathing in the river as well as the close proximity of millions of people, there is a dramatically increased risk of water-borne infection and disease. Furthermore, the event is open to all visitors and pilgrims, and there are specific rival religious sects and orders and their followers, the management of which is a recurring challenge. Government officials overseeing the event have to negotiate the bathing schedules of these different groups, as clashes have resulted in indirect deaths. For example in 2010, a vehicle carrying members of a prominent sect struck several people, setting off a stampede.[27]

The earliest documented record of infectious disease at the Kumbh Mela festival was an outbreak of cholera in 1817. This spread through the returning pilgrims across India and through its ports to Europe and East Asia, leading to the 1817–1824 Asiatic cholera pandemic.[28] There were sporadic epidemics during the Kumbh Mela in 1892, 1948, and in the 1960s.[3,2] This led the government to push for compulsory inoculation of all visitors attending the Kumbh Mela, which has since been relaxed.

5. Public health services at Kumbh Mela 2013

The importance of public health in the management of the Kumbh Mela is underscored by the fact that in 1966, around 20% of

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