

# Investigating a Potential Outbreak during a Social and Religious Gathering in India: A Cross Sectional Study

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## Abstract

COVID-19, an infectious respiratory illness caused by the severe acute respiratory syndrome–corona virus 2 (SARS-CoV2), has now spread to multiple countries including India. The Kumbh Mela in Haridwar which witnessed approximately 90 lakhs human footprints this year was a gigantic congregation of Hindu devotees and sages at the banks of rivers of Haridwar.

**Methodology:** It is a cross-sectional study based on the evidential information and documentation of data and interviews of various pilgrims travelling and returning back from Kumbh mela to thirteen districts of Uttarakhand. Concentration was mostly on two important dates 12<sup>th</sup> and 14<sup>th</sup> of June to observe the transmission, the upsurge in case positivity rate and comparing the data before, during and after the event.

**Results:** Kumbh Mela was found to be one of the contributing factors in upsurge of COVID 19 cases in Uttarakhand.

**Conclusion:** This study can channelize to comprehend the prevailing situation of an economic, social and health care crisis due to covid-19 pandemic. An empathetic consideration from such situation will help us to take necessary precautions for the upcoming third wave of Covid-19. Large social and religious gatherings should be monitored properly to protect from prevailing infectious spread from happening.

**Keywords:** Social gathering • Disease spread model • Infection

## Introduction

COVID-19, an infectious respiratory illness caused by the severe acute respiratory syndrome–corona virus 2 (SARS-CoV2), has now spread to multiple countries including India. Since the middle of March 2021, the second wave has started, and on June 09, the highest number of cases (144,829) has been identified in India [1]. The stride at which the disease has spread in the last one year, since it was first recognized from China, is unprecedented. The disease is progressively spreading in India as well, threatening the health and economy of the country. Moreover, the presence of asymptomatic cases, limited access to testing in different settings and several other factors such as various national movements such as the farmers' movement, election in different states in India that led to the rapid spread of this infection. The Kumbh Mela which witnessed approximately 90 lakhs human footprints this year was a gigantic congregation of Hindu devotees and sages at the banks of rivers on certain auspicious days in the Hindu calendar. The Maha Kumbh is held every 12 years between January and June. It was for the 1st time in the history of the grand religious congregation held on the banks of the Ganga in Haridwar in the state of Uttarakhand. The concept of Kumbh Mela came into existence when the elixir of life consumed by the Gods in the puranas were dropped at four places which became the Kumbh Mela venues. The fight between the Gods and the Demons occurred for 12 divine days which are connected with 12 worldly years. Therefore, four Kumbh Mela are organized at four different places in a cycle of 12 years. This year 2021, Government restricted the event

to one month in understanding the COVID-19 pandemic. Standard operating procedure for Kumbh 2021 was issued from the government.

## Aim and objective

- To investigate an outbreak in different districts of Uttarakhand due to mass gathering during Kumbh Mela.
- The proliferation of SARS-CoV-2 has shown it to be heterogeneous at a global scale, but the potential COVID spread in India by virtue of religious and social gatherings is documented in this paper.
- Gather insights to develop a policy brief for management of outbreaks during large gatherings.

## Methodology

It is a cross section study where evidential information was collected from March 2021 through various newspapers both in vernacular language and in English that was preserved grey literature. Data, subsequently table and graph were plotted based on data from Uttarakhand COVID 19 Health Bulletin Report, World o meter, and documented to enunciate the spread of COVID-19 in different geographical areas of Uttarakhand by travelling of pilgrims and devotees who visited Kumbh Mela.

Documentation started with collected interviews along with a reported interview of a pilgrim from Kumbh which was taken from newspaper. Another interview from a mail received by one of foreign participant who visited Kumbh, and some other statements from people who visited there or worked there accumulated from newspapers and articles. As after this interviews result founded was directed towards flow of transmission of COVID 19 infection from outside to inside and inside to outside disease spread model was created. In order to find the change in active cases in Haridwar and its relation with PAN India during Kumbh between of 10th June to 25th June relevant data was extracted from world o meter and plotted accordingly. Along with the active cases, the data related to Covid 19 case positivity rate was extracted from Uttarakhand COVID 19 Health Bulletin Report was documented and plotted to find out change of transmission rate from before the event and during the Kumbh. The case positivity rate was calculated on weekly average from 1<sup>st</sup>

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of March to 28<sup>th</sup> June, after this 14 days follow-up was carried out from 29<sup>th</sup> June to 12<sup>th</sup> June to discern what extent returnees from Kumbh can spread the virus in the community. All the documented data was matched with the four quadrants through which footprints of travelers fall in Kumbh from twelve different region, one quadrant include three region, included regions were Naziabad, Kotwal, Nainital, Dehradun, Rishikesh, Garhwal, Delhi, Meerut, Mannagar, Punjab, Haryana, Saharanpur. All the qualitative findings were discussed with selected participants of the study to establish member check and in order to find relevance with their expressions. The study was scrutinized concerning consolidated criteria for reporting qualitative studies and initiated compliant with the guidelines except for disclosure of partaking subject's identity.

## Results

Through one of the qualitative findings, it came out that was reported in the newspaper a Hindu priest after tested positive for Covid-19 during the Kumbh instead of isolating himself travelled to his hometown [2]. One key analysis that came up from this was Safety measures was not followed and standard operating procedures were not implemented properly. The findings were supported further by a concreated evidence that was documented in an interview of BBC, Haridwar's chief medical officer, told that crowd management became "very difficult" because people didn't come with negative reports and that they "couldn't turn back the devout who had come all the way driven by faith. With crowds of that size, SOPs became almost impossible to follow. They look very good on paper, but it's impossible to implement them [2]." Moreover, one of the officials were found to be unable to impose the standard operating procedures Har Ki Pauri ghat of Haridwar on the two Shahi Snans because of time constraints. Moreover, some of the states began belated effort to trace and quarantine the returned people [3]. Another Kumbh Attendee who was contacted through email shared a similar picture of Covid security no checks at the airport or in Haridwar.

As devotees and pilgrims came from different parts and many moved back to their home or stayed in Kumbh and those who went back after this event may became carrier of the virus and cause outbreak to the areas they are going and by this way outbreak can be transmitted from inside to outside and vice versa. This all event can happen during the ongoing days of Kumbh. Figure 1 illustrates transmission of the diseases with the attendees where the arrow signifies the travelling pattern.

Data extracted from world o meter [1] and Uttarakhand COVID 19 Health Bulletin report [4] shows active cases which gradually increased during the Kumbh in Haridwar and India including two major bathing dates in the 12<sup>th</sup> and 14<sup>th</sup> of June (Figure 2). Along with the active cases, Kumbh also witnessed change in COVID 19 case positivity rate (Figure 3). Key finding that came out is before the Kumbh the COVID 19 case positivity rate during 4<sup>th</sup> March to 10<sup>th</sup> March was below 2 % in Uttarakhand which drastically increased after the two shahi snans on the day of 12<sup>th</sup> and 14<sup>th</sup> of June. Despite the under reporting of cases and decrease in number of testing in 13 districts of Uttarakhand after 14 days follow up Analysis key findings came out for Almora and Udham Singh Nagar, sudden spike of cases with 22.2 % and 16 % increase in case positivity rate during 29<sup>th</sup> June to 12<sup>th</sup> May, (Table 1). However, case positivity rate was decreased in Bageshwar, Rudraprayag and Tehri Garhwal between 6<sup>th</sup> to 12<sup>th</sup> May compare to first week. This might happen due to under reporting of cases. These districts fall under the two of the quadrants Figure 4 through which infection might spread.

## Limitations

This study is based on whatever quantitative data and qualitative findings is available in Uttarakhand COVID-19 health bulletin report, various newspapers and interview respectively. Many newspapers chronicled that COVID 19 cases were underreported in Uttarakhand during Kumbh and especially in Haridwar

## Disease spread model in and outside kumbh with movement of travellers

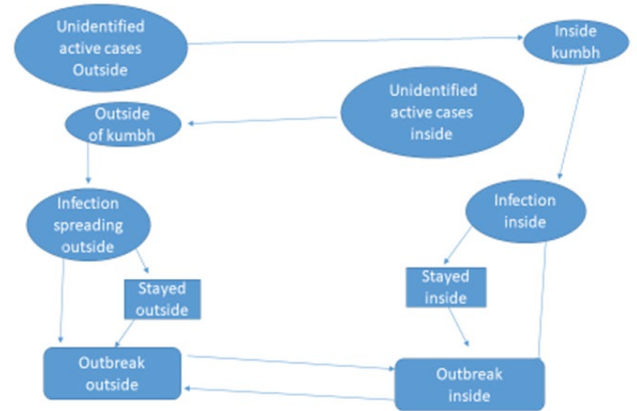


Figure 1. Disease spread model in and outside kumbh with movement of travellers.

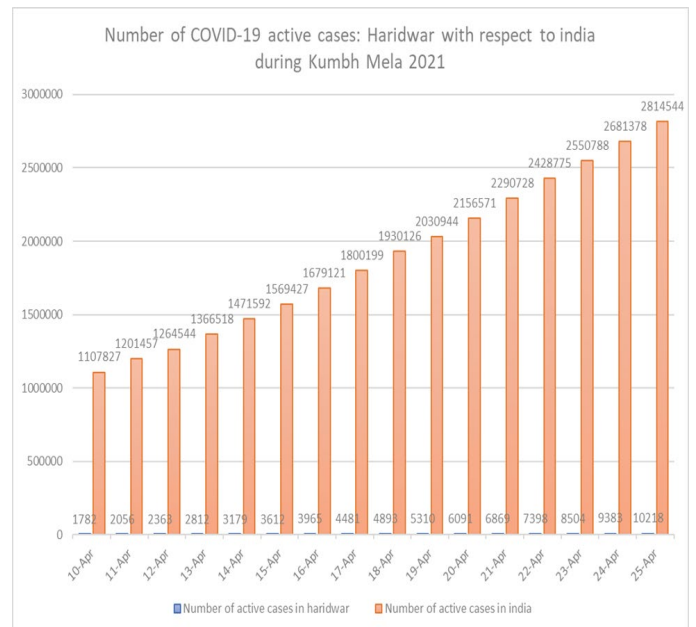


Figure 2. Number of COVID-19 active cases: Haridwar with respect to India during Kumbh Mela 2021.

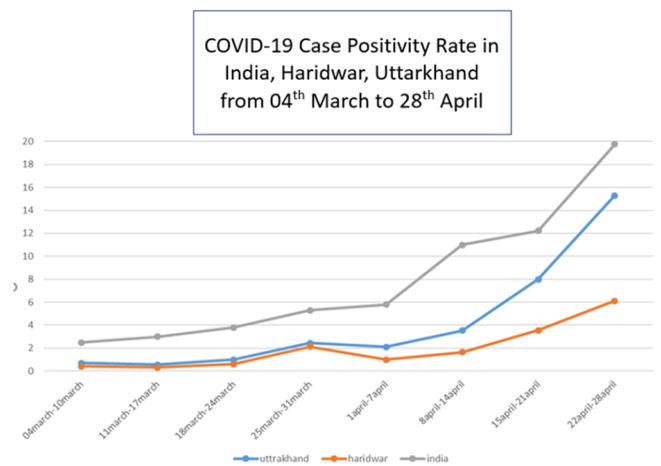
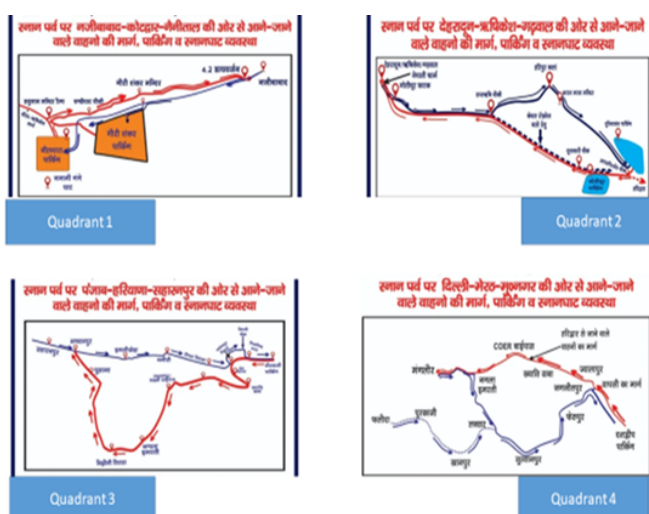


Figure 3. COVID-19 case positivity rate in India, Haridwar, Uttarkhand from 4<sup>th</sup> March to 28<sup>th</sup> April.

**Table 1.** District wise COVID-19 case positivity rate of Uttarakhand.

Districts	29 <sup>th</sup> April - 5 <sup>th</sup> May	6 <sup>th</sup> - 12 <sup>th</sup> May
Almora	18.47	40.65
Bageshwar	14.89	14.38
Chamoli	24.02	24.87
Champawat	16.21	19.15
Dehradun	23.48	32.5
Haridwar	6.8	15.21
Nainital	34.37	42.49
Pauri Garhwal	20.43	24.07
Pithoragarh	13.72	20.27
Rudraprayag	22.92	21.12
Tehri Garhwal	30.08	24.05
US Nagar	21.4	37.39
Uttarkashi	13.76	40.47



**Figure 4.** Kumbh Mela Registration guide [5].

and exact figures are expected much more than the reported. In addition, there is no data about exact number of visitors from particular districts of Uttarakhand and their travel history. There is no valid data about daily test conducted and number of positive cases during the Kumbh. Moreover, it cannot be stated properly about the contribution of case load of Kumbh to PAN India as there are other confounders contributing the cases rise in India during Kumbh.

## Discussion

In the previous year Tablighi Jamaat in Delhi was considered as one of super spreader event of COVID 19 where more than 20000 Jamaat members

and their contacts were quarantined across 15 states in India [5-7]. However, failure of Contact tracing and implementation of Standard operating procedure in Kumbh 2021 led many unchecked COVID 19 cases travel freely. Moreover, constant underreporting and fake tests in Haridwar was in every newspaper makes challenge to understand and respond to the situation [8]. This study gives a clear view that how valid data its public accessibility plays a crucial role in understanding the spectrum of transmission for preparation and will give overview of how the disease transmission would take place for the upcoming third wave.

## Conclusion

2021 is a very fascinating and enchanting year, because this year the Ganges had roared up to purify the sins of the devotees after 12 years. When millions of devout Hindus gathered in the month of June in the Himalayan town of Haridwar to participate in the Kumbh Mela festival even as India battled a distressing second wave of coronavirus, many feared that it would turn out to be a "super-spreader event." And now we think the fears had come true, as many Kumbh returnees were tested positive, are the possible spreaders of this infection throughout various parts of the country. In the prevailing situation of an economic, social and health care crisis due to covid-19 pandemic it is essential to have a realization of public health implications.

## Conflict of Interest

None.

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