

Commentary

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Floods, landslides and COVID-19 in the Uttarakhand State, India: Impact of Ongoing Crises on Public Health

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Abstract

The Uttarakhand State, known for its Himalayan Mountains, is a territory in Northern India that is extremely vulnerable to earthquakes, landslides, and floods. Currently, due to the COVID-19 outbreak, India is facing the dual challenge of containing a pandemic and responding to natural disasters. This situation can have a negative impact on the health and the economic development of the region, leading to a long-lasting humanitarian crisis that can disrupt even more, the already overburdened health service. In addition, it can pose serious threats to the wellbeing of the population as it complicates physical distancing and other COVID-19 prevention measures. It is of utmost importance to analyse the impact of floods, landslides, and COVID-19 pandemic on the health system of the Uttarakhand State, and how these crises interact with each other.

The Intergovernmental Panel on Climate Change (IPCC) in the recent fourth assessment report declared of a great certainty, that the Earth has heated since 1750 due to anthropogenic activities. In addition, the Panel states that by the upcoming century, average surface temperatures will increase between 1.6-3C pending the diverse emission occurrences with effects on natural and coastal areas, agriculture, health, species and forests, as well as water resources.¹

A clear sign of global warming is its effects on high mountain systems such as glacial recession. According to scientists, glacial retreats are a natural occurrence but since the late 1990s, glacial recess has increased across different glaciers in the world including the Himalayas. Uttarakhand is a state in Northern India, known for its Himalayan Mountains as well as the valleys of Bhabar and Terai. Its population counts more than 10000000 people and it is covered by 86% mountains and 65% forestland.^{2,3} As a territory rich in natural beauties, the state is unfortunately vulnerable to many natural disasters and in the past 20 years, it has faced earthquakes, landslides, floods as well as forest fires.⁴⁻⁷

The Uttarkashi district of the Uttarakhand State with an altitude of 4km has the Gangtore glacier and is the second biggest glacier in India. The glacier with lengths of about 30km is of recent, retreating at the rate of 20-22m per year and this has caused worry among the public and scientists as melted water from the glacier is useful for watersheds and catchments in the state. The implications of this retreat are that water bodies in Uttarakhand State might in the nearest future be adversely affected thus also affecting hydropower generation, and water supply at big irrigation systems across the world.¹ Also, there might be a behavioural change in the phenology of Uttarakhand forests, higher rates and intensity of forest fires, change in nutrient activity, amongst others.⁸

Natural disasters impact the health and safety of the residents of Uttarakhand, as well as their economy and their societal development. Furthermore, when interacting with a pandemic such as the Coronavirus Pandemic, as an example of what happened in other countries,⁹ these disasters can pose serious threats to the lives and wellbeing of the people of the Uttarakhand State, increase the burden on the population, and make the management of COVID-19 even more challenging.

According to the Indian Covid tracker “Corona-Clusters,” 342606 people contracted the novel virus in Uttarakhand, 7371 of who have died. The World Bank also postulates that Uttarakhand is a fast-growing state that has been effective in poverty reduction in India since

2005,¹⁰ however the state's central and southern districts disproportionately record higher poverty levels, and are therefore more vulnerable to the pandemic and floods.

Natural hazards can impact pandemics either directly by disrupting health services and complicating physical distancing measures, or indirectly by increasing pressure on the already constrained infrastructure and health facilities, as well as stretching government budgets which are overwhelmed by the COVID-19 response. States like Uttarakhand which occupy a challenging geographical area are prone to flash floods and landslides, thereby representing an example of when natural disasters cross the path of COVID-19.

Hence, this paper will address the impact of natural disasters and climate change on public health and healthcare interventions during the COVID-19 pandemic in the Uttarakhand State of India.

Impact of climate change and natural disasters

The long-term impacts of climate disasters such as floods are not well studied and understood.¹¹ However, studies have analysed and reviewed the short and long-term impact of these tragedies on the health of the populations affected and how these can even affect the dynamics of migratory movements.¹²

Previous literature has suggested that due to drowning and acute trauma, as well as higher vulnerability to disaster and poor disaster management, mortality rates could be up to 50% higher during the first year after floods.¹¹ It has also been reported that in low-income countries, the risks from floods and subsequent deaths impact more on the economically-challenged ethnic minorities, women, children and elderly people, as well as the part of the population that lives in unstable accommodation and mountains.¹¹

In 2008, the current WHO Director-General, Dr. Margaret Chan, in a statement about the impact of climate change on human health, identified flooding and landslides as causative factors for the surge of transmissible diseases such as cholera, particularly in poor sanitary conditions.¹³ In the same statement, she highlighted how diseases like diarrhoea, which become more common during floods and landslides, are 1 of the leading infective causes of pediatric deaths; thus, it could be said that floods and landslides, by increasing the transmission of infectious disease, are causing more and more deaths daily.

As a transmissible disease, COVID is not exempt from the list of infectious diseases whose spread could increase during natural disasters. Indeed, there are mainly 2 issues that arise from such natural events, which can affect COVID transmission.

COVID-19 transmission and natural disasters

1). Impact on prevention measures: During emergency situations it could be hard to implement public health measures which are required to limit the spread of COVID-19, such as hand hygiene, social distancing and wearing personal protective equipment.¹⁴ As we have learnt, during the pandemic, respecting these measures is fundamental to mitigating the spread of the disease.¹⁵ However, such things are difficult in areas hit hard by poverty which dictates a household arrangement that goes against social distancing guidelines. This problem will persist even after the initial phase of disasters, as people who have been affected by disasters such as floods might be staying in temporary accommodations such as refugee camps, where social distancing will be more complicated to practice and hygiene conditions will be more scarce.¹⁶ Besides the difficulty of implementation, awareness and education programs on

the spread of the disease are placed in the background, due to the reallocation of resources and health professionals, which will in turn have an impact on disease transmissibility, as well as impacting the mitigation and treatment of any other medical condition.

In addition, it is likely that people who are undergoing preventative quarantine due to possible contact with a COVID-19 positive individual, for example, or who are currently experiencing symptoms of COVID-19 or have received a positive test, will mix with people who have not been infected yet.¹⁷ This will also indeed increase the spread of the virus. Furthermore, testing centres, which have been fundamental in identifying the disease, are also affected. As more and more COVID-positive people are asymptomatic, frequent community testing is required to mitigate the spread of the disease.¹⁸ A lack of such testing centres will impact disease transmission, as people who have been infected or have come in contact with a COVID case will not have the possibility of testing themselves; therefore, it will not be possible to break the cycle of disease transmission.

2) Impact on healthcare delivery: Floods and natural disasters affect infrastructure and disrupt health services directly, as health professionals will be left without a place to practice, so it may be more difficult for local people to seek medical advice as well as guidance on health guidelines, and indirectly, increasing the pressure on the health system and the demand for the number of beds, professionals and others healthcare facilities. In Uttarakhand, for example, despite having a good network of hospitals and healthcare centres, the state is suffering from an acute shortage of personnel in Public Primary Care Centres, particularly in the most rural and isolated areas, therefore leaving the rural communities with little support.¹⁹ This shortage can be exacerbated during natural crises due to road blockades preventing healthcare workers from getting to their place of work, especially in low-resource settings like India where public transport is widely used by healthcare workers. At local community centres, there is a lack of specialists, namely obstetricians and gynecologists, pediatricians and physicians as well as laboratory technicians, nurses and midwives.²⁰ Furthermore, there is also a lack of faculty which therefore leaves gaps in the training of nurses and future physicians.²⁰ Unfortunately, the state is also struggling with faulty or insufficient equipment in the operating theatres and labour rooms, which also poses a threat to the wellbeing of the population.²⁰

Governmental efforts: Vision 2030

Considering this, the local government has drafted a "Vision 2030" plan in order to strengthen the healthcare system, the local infrastructures as well as accommodation, with the hope of improving the staff shortage in the most remote regions.²⁰

Concerning clean water supply, nutrition, sanitation and more, the government released a Public Health Policy Document in 2020, where they acknowledged the funding needed to improve the state of these and take on challenges such as appropriate Comprehensive Disaster management, sustainable Curative and Palliative care in Cancer treatments, and successful school-based health programs.²¹ In the same report, the government also acknowledged the need to reduce maternal mortality rate, infant and child mortality rate, as well as the necessity to decrease the number of citizens living under the poverty line, which currently corresponds to 32.70%.²¹ The latter intervention is immensely significant because poverty is a potent marker of vulnerability to crises particularly natural disasters. While in this report the government committed itself to

improving the public health of the state, by putting in place the above-mentioned interventions as well as training more health and social workers, controlling tobacco use and putting more emphasis on sexual and reproductive health, all of this becomes challenging when the system is under further strain due to natural disasters and lately, due to the effect of COVID-19.²¹

The Uttarakhand floods as a case study

In May 2021, 9 hill districts in Uttarakhand claimed 31% of all COVID cases reported in the country.²² In order to address the situation, the state government stated that COVID-19 testing in the state would now be double in number, compared to the national average. Several states across India, including Uttarakhand have received consignments of oxygen concentrators and tents for temporary health facilities from WHO to tackle the COVID-19 surge response.²³

These efforts were almost blown off-course by the burst of the Himalayan glacier in February that sent flood water surging downstream towards power plants and villages, halting 2 hydroelectric power plant projects. In response, the state disaster response force of Uttarakhand deployed 2 personnel in each of the 20 villages in the 9 hill districts heavily impacted by COVID-19 to account for the disproportionate burden. Under this initiative, contact tracing was conducted to isolate low-risk and high-risk patients, masks, sanitizers, necessary medicines were distributed, and 260 metric tons of oxygen were sent by other states in 3 consignments. Monitoring was also instilled to ensure compliance with anti-COVID measures.²⁴

Following the tragedy, Prime Minister Modi also announced a discretionary payment of 200000 Indian rupees for the families of the deceased, and 50000 rupees for those seriously injured in the accident. 1041.00 Crore has also been allocated to the State of Uttarakhand under the State Disaster Risk Management Fund (SDRMF). Electricity and water supply has been restored in all 13 villages.²⁵

The district administration, police and disaster management departments of the State Government, along with all central agencies have also been working for rescue and relief work, for instance, 2 teams of SDRF (State Disaster Relief Force) have been deployed and 8 medical teams with 10 ambulances of the State Health Department, along with the Chief Medical Officer have been deployed.

Necessary mitigation efforts

As of June 2021, the average positivity percentage of Uttarakhand is 4.3%, however, the rate is double that in hill districts most vulnerable to natural hazards,²⁶ as seen with the Uttarakhand glacier. Amid a menacing COVID-19 crisis exacerbating the dearth of facilities in Uttarakhand, it is more critical than ever for policy makers and scientists to systematically evaluate the ecological degradation in the region and invest in robust technology to successfully predict and prevent future calamities. Vigilant monitoring of weather and glacier changes, installing efficient warning systems, establishing feasible evacuation plans, and adopting mitigation strategies for climate change at the regional and communal level is a need of the moment. Since rampant urbanization and unchecked religious tourism in the region are further sensitizing the ecosystem,²⁷ the state government must prioritize environmental sustainability above developmental projects, and closely monitor and limit the number of pilgrims visiting each year. This

should be done in a sensitive manner, understanding the religious importance of such events as well as the economic benefits that such tourism brings to the state. In a time of extreme poverty enhanced by COVID-19 and tragic weather events, the state must now more than ever support local workers and their families economically and socially, as well as sensibly monitoring these events. Having free testing facilities at the local sites of worship could ensure more COVID-19 cases are found, while continuing to provide the population with the possibility of practicing their religion. Moreover, foreign visitors could be given information leaflets as well as tours of the environmental sites that need protection; this way they could be informed about the necessary behavior to protect and respect the local environment and engage more with the local economy. Lastly, when facilities are built to host the pilgrims that visit the area frequently, this should be done in a sustainable manner and incentives should be given to those who build more sustainable facilities. This will promote local industries and favour the economy, while ensuring that the environment is being protected.

Additionally, it is imperative to expedite the development of formal education programs and training exercises in emergency preparedness for healthcare workers, administrative and management staff in medical facilities, and first responders. Their performance can be assessed and improved using disaster simulation exercises and mock drills. Targeting remote villages to provide disaster training for public volunteers and increasing public awareness of disaster risks and response will further bolster the survival chances of marginalized communities.

Concurrently, containment measures against COVID-19 should be strengthened further to prevent a subsequent spike in cases especially in post-disaster temporary accommodations where these measures cease to be a priority. Thus, mobilization of state funds and resources, and deployment of ancillary medical staff and public health experts is crucial to expand surveillance systems, awareness programs, immunization coverage, and community testing and tracing capacities to address the increased regional demand.

As the biggest social determinant of health, massive gains can also be made by addressing the poverty that underlies the high vulnerability of Uttarakhand residents to crises of all kind.

Conclusion

The recurrent floods and landslides in Uttarakhand, coupled with an unfolding COVID-19 catastrophe, reflect many factors, including the region's vulnerable ecosystem and underfunded public health infrastructure. A poverty-stricken state, Uttarakhand severely lacks the facilities to effectively weather the challenge of COVID-19 alongside the loss of life and amenities caused by the recent flooding. Although rescue teams were immediately deployed in the aftermath of the flood, its spill-over effects including a significant disruption of health services and rise in communicable diseases can have long-term consequences on population health. The government's inability to address the seeds for these events of mass destruction including climate hazards, unregulated socioeconomic activities and limited public health capacity further renders all relief efforts fragile and easily reversed.

There is an utmost need to cultivate a resilient regional public health system through strict environmental monitoring and substantial investment in the health sector to improve disaster management functionaries, rapidly adapt to changing circumstances, and respond proactively to imminent threats.

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