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The Impact of Pollutants and Deforestation on the Spread of Monkeypox: An Unintended Consequence of Progress

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Abstract

Monkeypox (MPX) is a rare zoonotic illness, like smallpox, caused by the monkeypox virus, which is a member of the Orthopoxvirus genus of the Chordopoxvirinae subfamily that falls under the classification of the Poxviridae family. MPX is clinically characterized by a wide variety of symptoms and signs, including fever, sore throat, headache, myalgia, lymphadenopathy, and rashes. As the world is undergoing progressive industrialization over time, there is a corresponding increase in environmental pollutants and deforestation. Previous studies have found a correlation between exposure to environmental contaminants and the incidence of MPX. Additionally, it has been hypothesized that deforestation may also have played a role in the disease's resurgence or in its ability to spread. Habitat loss and ecological instability brought on by environmental contaminants and deforestation may increase human-infected animal interaction and hasten the spread. The likely connection should be known by health authorities and doctors, as well as government officials, to help fund further investigations and craft strategies to combat the risk of an increasing prevalence of MPX in the world, especially in densely populated underdeveloped regions of Asia and Africa, where containment of MPX poses greater challenges. In this article, we have provided an important real-world perspective and suggested future recommendations to halt the further spread of MPX to new places.

Letter to the Editor

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Monkeypox (MPX) is a rare zoonotic disease, caused by the monkeypox virus (MPV), which is a member of the Orthopoxvirus genus of the Chordopoxvirinae subfamily that falls under the classification of the Poxviridae family.[1] MPX is clinically characterized by fever, sore throat, headache, myalgia, lymphadenopathy, and rashes, in addition to associated complications such as inflammation of the pharyngeal and genital mucosae, and conjunctivitis. As evident from the mentioned clinical characteristics, the disease presents with a wide variety of nonspecific symptoms and signs with possible differential diagnoses, including chickenpox, varicella, measles, rickettsiosis, molluscum contagiosum, anthrax, and allergic dermatitis.[2]

The virus is transmitted from one person to another, either directly or indirectly, through contact with contaminated fluids. While the reservoir host for MPV remains elusive, African rodents are believed to play an important role in the animal-to-human transmission of the illness, either directly to humans or via intermediate hosts, such as nonhuman primates, typically through the scratches or bites inflicted by infected animals, the handling of bush meat, or by coming into association with contaminated body fluids or lesion material.[3]

As the world is undergoing progressive industrialization over time, there is a corresponding increase in environmental pollutants and deforestation, which may create a conducive environment for the spread of MPV, as it might result in the loss of natural habitat and disruption of the ecosystem, increasing human-infected animal interaction and enabling the spread of the virus to new places. A study conducted by Sultan Ayoub Meo et al. in New York, United States, revealed a substantial connection between the number of MPX cases and environmental contaminants, notably carbon monoxide (CO) and nitrogen dioxide (NO2), with an approximate augmentation of 0.3 units for each unitary increment in ambient CO levels. Surprisingly, no discernible association was detected between MPX and other pollutants, including ozone and PM2.5.[4] Another comparable investigation was carried out by Sultan Ayoub Meo et al. over a broader European population, including the United Kingdom, France, Germany, Italy, the Netherlands, Switzerland, and Portugal, which reported a positive correlation between the number of daily MPX cases, which increased by 29.6%, 9.7%, 13%, and 80.6% for every 10-unit rise in PM2.5, PM10, NO2, and O3 levels, respectively.[5] The findings of this investigation yielded comparable results, albeit with the notable distinction that O3 and PM2.5 were also determined to exert a substantial influence on the incidence of MPX. The complexities underlying the manifestation and transmission of MPX urge further exploration to unravel the underlying mechanisms that govern its relationship with these specific pollutants. A deeper understanding of these dynamics holds the potential to shed light on the multifaceted

nature of monkeypox and its intricate interactions with various environmental factors. Additionally, a previous study suggested that deforestation may also have played an important role in the spread or resurgence of monkeypox.[6] Therefore, environmental contamination and deforestation clearly seem to have a substantial impact on the development of monkeypox, highlighting the significance of tackling these issues.

In light of these studies, one cannot help but contemplate: Is the prevalence of monkeypox an unintended consequence of the progress the world has made? The aforementioned studies are of chief significance and raise concerns because the condition of environmental contamination and deforestation continues to deteriorate with the passage of time. Government and health authorities should be aware of the potential association and conduct multiple resource-intensive research in the imminent future, especially in densely populated underdeveloped regions of Asia and Africa, where containment of MPX poses greater challenges to further establish the correlation. Furthermore, it is crucial to devise comprehensive plans to reduce deforestation and implement targeted measures to control and reduce the levels of environmental contaminants.

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Ethical standards. The present study includes printed and published information; therefore, the formal ethical clearance was not applicable to this research.

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