

Perspective

An Insight into Monkeypox: How Should Pakistan Respond?

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Abstract:

Monkeypox a zoonotic disease has been on the rise since 1970, when it was first reported in the Democratic Republic of Congo. Similar to smallpox, this virus had been an endemic for Africa for years. However, its first outbreak happened in 2003 when more than 70 cases were reported in the United States of America. Following that in 2022 this virus has spread to 68 new countries throughout the world and has been declared as a Global Health Emergency by WHO on 23rd of July 2022. Monkeypox is transmitted by close interactions, exchange of bodily fluids and respiratory droplets. WHO declared that more than 90% of cases have been found among men who were involved in Men-to-Men sexual intercourse. This article covers all aspects of this virus after thoroughly researching several peer-reviewed articles, reports and taking findings from the WHO. Though monkeypox is spreading quite fast its fatality rate is between 3-6% resulting in few deaths. With focus on resuming the Vaccinia Vaccine drive and developing an anti-viral agent Tecovirimat SIGA, the chances of combating this virus seem high, if all countries collaborate with WHO.

Introduction:

Monkeypox, a disease similar to smallpox first originated in the Democratic Republic of Congo, when it was identified in a 9-month-old baby boy. This disease is a viral zoonotic, caused by the monkeypox virus and belongs to the orthopoxvirus genus which is extended from the Poxviridae family. There are two known clades of Monkeypox, namely the West African clade and Congo Basin clade, varying in their fatality rate and distribution within Africa. The Congo Basin clade is believed to be more severe. Both the clades differ in their geographical distribution and the only country where both have been discovered is Cameroon.

The exact animal reservoir(s) is yet unknown however studies have shown that several animals like African rodents, Squirrels, mice, prairie dogs are prone to infection by this disease though the exact range of species that can be infected is not yet known. Since it is a zoonotic virus, it can be transmitted due to close interactions with infected animals. However, once it has infected a human, human to human transmissions is possible. Monkeypox can be transmitted by face-to-face

interactions (exchange of respiratory droplets), exchange of bodily fluids, blood, through skin lesions, sexual intercourse and through contaminated materials like bed sheets. It can also be transmitted through the placenta to the fetus during the pregnancy period. According to WHO Director General in the International Health Regulations meeting, more than 90% of the cases have been reported among men between the age of 35-40 who were involved in Men-to-Men sexual activities.

After getting infected, symptoms of monkeypox appear within 6-13 days but may stretch till 21 days in certain cases. A person effected with the disease will undergo fever, lymphadenopathy, myalgia, asthenia and chills. Soon the skin rashes will appear in the form of pimples or blisters and will be concentrated on the face, on the palm of hands and the sole of feet. Though they might appear on any part of the body as well including the genitalia. Monkeypox is not as fatal as smallpox, with the former having a fatality rate of 3-6% while the latter had a fatality rate of 30% back in the late 20th century. However, it can prove to be dangerous for children and adults with health complications.

Looking into the history of monkeypox, it was first reported in 1970. The first outbreak of this disease was in 2003 when about 70 cases were reported in United States of America for the first time. The authorities concluded that the virus leaked into America through African rodents, that were transported to the country that year. Since WHO recognizes even 1 case of a disease outside of its known territory as an outbreak, it is correct to say that the first outbreak occurred back in 2003. However, virus was milder than the one found in Africa.

The following table gives a summary of all the confirmed and suspected cases reported between the period of 1970 and 2019. The cases have been

Table 1: *Number of Monkeypox Cases per Clade (6)*

| Decade | Central African Clade (N) | West African Clade (N) | Total Cases |
|-----------|---|------------------------|---------------|
| 1970-1979 | 38 | 9 | 47 |
| 1980-1989 | 355 | 1 | 356 |
| 1990-1999 | 520 | 0 | 520 |
| 2000-2009 | 92 Confirmed 10,027 suspected ² | 47 | 139 10,027 |
| 2009-2019 | 85 Confirmed 18,788 suspected ² | 195 | 280 18,788 |

categorized per clade.

Till 1970, the number of cases reported per year were very low when compared to 2022. Since 1st January 2022 till 22nd July 2022, a total of 16,836 cases have been reported out of which 16,593 are reported in areas which have not historically reported Monkeypox. There are a total of 68 areas all around the world which have been affected by this virus. For now, Pakistan has reported none though countries around it have been infected, with India reporting 2 cases, Turkey 1 and Saudi Arabia reporting 2 cases as well. Spain has reported the highest number of cases so far mounting up to 3125, closely followed by United States of America with 2890. The statistics displayed in the following table shows why WHO declared Monkeypox as a Global Health Emergency.

The vaccine used against smallpox made use of vaccinia virus which is another orthopoxvirus. Since all three of the orthopoxvirus are closely related, statistics have

Table 2: *Number of Monkeypox Cases per Area (8)*

| Location | Cases | Category |
|------------------------------|-------|-------------------------------|
| Argentina | 18 | Has not historically reported |
| Australia | 42 | Has not historically reported |
| Austria | 99 | Has not historically reported |
| Bahamas | 1 | Has not historically reported |
| Barbados | 1 | Has not historically reported |
| Belgium | 311 | Has not historically reported |
| Benin | 3 | Has not historically reported |
| Bosnia and Herzegovina | 1 | Has not historically reported |
| Brazil | 592 | Has not historically reported |
| Bulgaria | 3 | Has not historically reported |
| Cameroon | 6 | Has historically reported |
| Canada | 681 | Has not historically reported |
| Central African Republic | 8 | Has historically reported |
| Chile | 20 | Has not historically reported |
| Colombia | 10 | Has not historically reported |
| Costa Rica | 1 | Has not historically reported |
| Croatia | 8 | Has not historically reported |
| Czechia | 15 | Has not historically reported |
| Democratic Republic of Congo | 107 | Has historically reported |
| Denmark | 51 | Has not historically reported |
| Dominican Republic | 3 | Has not historically reported |
| Ecuador | 2 | Has not historically reported |
| Estonia | 4 | Has not historically reported |
| Finland | 13 | Has not historically reported |
| France | 1567 | Has not historically reported |
| Georgia | 1 | Has not historically reported |
| Germany | 2268 | Has not historically reported |
| Ghana | 19 | Has historically reported |
| Gibraltar | 5 | Has not historically reported |
| Greece | 20 | Has not historically reported |
| Hungary | 33 | Has not historically reported |
| Iceland | 9 | Has not historically reported |
| India | 2 | Has not historically reported |
| Ireland | 69 | Has not historically reported |
| Israela | 105 | Has not historically reported |

| | | |
|--------------------------|------|-------------------------------|
| Italy | 407 | Has not historically reported |
| Jamaica | 1 | Has not historically reported |
| Latvia | 3 | Has not historically reported |
| Lebanon | 4 | Has not historically reported |
| Luxembourg | 14 | Has not historically reported |
| Malta | 17 | Has not historically reported |
| Martinique | 1 | Has not historically reported |
| Mexico | 52 | Has not historically reported |
| Morocco | 1 | Has not historically reported |
| Netherlands | 712 | Has not historically reported |
| New Caledonia | 1 | Has not historically reported |
| New Zealand | 2 | Has not historically reported |
| Nigeria | 101 | Has historically reported |
| Norway | 46 | Has not historically reported |
| Panama | 1 | Has not historically reported |
| Peru | 143 | Has not historically reported |
| Poland | 40 | Has not historically reported |
| Portugal | 588 | Has not historically reported |
| Qatar | 1 | Has not historically reported |
| Republic of Congo | 2 | Has historically reported |
| Romania | 19 | Has not historically reported |
| Russia | 1 | Has not historically reported |
| Saudia Arabia | 2 | Has not historically reported |
| Serbia | 5 | Has not historically reported |
| Slovakia | 3 | Has not historically reported |
| Slovenia | 27 | Has not historically reported |
| South Africa | 3 | Has not historically reported |
| South Korea | 1 | Has not historically reported |
| Spain | 3125 | Has not historically reported |
| Sweden | 77 | Has not historically reported |
| Switzerland | 216 | Has not historically reported |
| Taiwan | 2 | Has not historically reported |
| Thailand | 1 | Has not historically reported |
| Turkey | 1 | Has not historically reported |
| United Arab Emirates | 13 | Has not historically reported |
| United Kingdom | 2208 | Has not historically reported |
| United States of America | 2890 | Has not historically reported |

shown that the smallpox vaccination has been approximately 85% effective against monkeypox.

However, the problem that arises is that with the eradication of smallpox in 1980, the Smallpox Vaccination Programme soon came to a halt resulting in no immunity for people born after that time. According to several peer reviewed case studies, the first 2 decades when monkeypox virus was reported, about 80-96% of individuals infected with monkeypox were not vaccinated with the smallpox vaccinia-vaccine. Therefore, it will not be wrong to assume that a cease in the vaccination program resulted in lack of immunity against this disease.

The original vaccine for smallpox is no longer in production and is not available anywhere. However, in 2019 a new vaccine with certain modifications in the vaccinia virus was prepared and is being distributed to prevent monkeypox. Recently in 2022, European Medicines Agency has approved an antiviral agent known as Tecovirimat SIGA for treating orthopoxvirus like smallpox, monkeypox and cowpox. However, Food and Drug Administration (FDA) has not approved this medicine to be suitable for treating monkeypox. Due to a lack of sufficient data of the efficacy of Tecovirimat, European Union has restricted its use only for Exceptional Cases.

Pakistan, fortunately is among the few countries in the world which has not yet reported a single case of Monkeypox. Therefore, it is must for the country's government and medical institutions to utilize this fact to prevent the spread of this virus. Vaccination campaigns take a long period of time to have an effect and with no universally approved medicine available, Pakistan will have to rely on prevention as its key strategy. Since many countries in Europe, United States of America and Middle East have been affected, people travelling from and to these countries should be regularly and strictly monitored for signs and symptoms of Monkeypox. Training sessions should be conducted in all government and private hospitals to train doctors and medical personnel regarding how to treat patients diagnosed with this virus. In the case where Pakistan starts to report cases, all patients should be quarantined and background checks on their activities to pin point the people and/or animals who interacted with the diagnosed person. Such people and/or animals should be quarantined and tested for this disease. A strict and

careful planning must be done in order to restrict the spread of this disease.

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