

Monkeypox cases in Brazil, a possible pandemic?

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Abstract

Monkeypox, a zoonotic disease caused by an *Orthopoxvirus*, results in a Smallpox-like disease in humans. Since monkeypox in humans was initially diagnosed in 1970 in the Zaire, it has spread to other regions of Africa - West and Central, and cases outside Africa have emerged in recent years. An emerging outbreak of Monkeypox infection is quickly spreading worldwide, being currently reported in more than 70 countries, with more than 14 thousand confirmed cases. In the present preliminary report, we collected and synthesized early data concerning epidemiological trends and clinical features of the ongoing outbreak and we compared them with those of previous outbreaks. In Brazil, the number of cases has been increasing alarmingly, although compared to other European countries, for example, the number of infected in the national territory is still, until the moment of this report, low and controllable (1025 confirmed cases).

Keywords: *Orthopoxvirus*, Smallpox, Disease, Pandemic, Zoonotic disease.

Resumo

Varíola do macaco é uma doença zoonótica causada por um *Orthopoxvirus*, onde resulta em uma doença semelhante à Varíola em humanos. Desde que a Varíola nos macacos foi diagnosticada inicialmente em 1970 no Zaire, ela se espalhou para outras regiões da África - Ocidental e Central, e casos fora da África surgiram nos últimos anos. Um surto emergente de infecção por Varíola dos macacos está se espalhando rapidamente pelo mundo, sendo atualmente relatado em mais de 70 países, com mais de 14 mil casos confirmados. No presente relatório preliminar, coletamos e sintetizamos dados iniciais sobre tendências epidemiológicas e características clínicas do surto em andamento e os comparamos com os de surtos anteriores. No Brasil, o número de casos vem aumentando de forma alarmante, embora comparado a outros países europeus, por exemplo, o número de infectados no território nacional ainda seja, até o momento deste relatório, baixo e controlável (1.025 casos confirmados).

Palavras-chave: *Orthopoxvirus*, Varíola, Doenças, Pandemia, Doenças zoonóticas.

Resumen

La viruela del mono es una enfermedad zoonótica causada por un *Orthopoxvirus*, que resulta en una enfermedad similar a la Viruela en los humanos. Desde que la Viruela en los monos se diagnosticó por primera vez en 1970 en Zaire, se ha extendido a otras regiones de África, Occidental y Central, y en los últimos años han surgido casos fuera de África. Un brote emergente de infección por viruela del simio se está propagando rápidamente por todo el mundo y actualmente se informa en más de 70 países, con más de 14.000 casos confirmados. En el presente informe preliminar, recopilamos y sintetizamos datos iniciales sobre las tendencias epidemiológicas y

las características clínicas del brote en curso y los comparamos con los de brotes anteriores. En Brasil, el número de casos ha ido aumentando de manera alarmante, aunque en comparación con otros países europeos, por ejemplo, el número de infectados en el territorio nacional sigue siendo, hasta el momento de este informe, bajo y controlable (1.025 casos confirmados).

Palabras clave: *Orthopoxvirus*, Viruela, Enfermedades, Pandemia, Enfermedades zoonóticas.

Monkeypox (MPV) is considered among virologists and national and international health agencies as a zoonotic pathology caused by the *Orthopoxvirus*, belonging to the same family as the *Human Smallpox Virus* f. Poxiviridae, which was eradicated in 1980 through mass vaccination. There are in some laboratories Level 4 strains of this virus for clinical study and research.

Pathologies at a global level arise and afflict humanity for thousands of years, where we can mention the Spanish Flu Virus, Tuberculosis, Cholera, HIV, Zika, Covid-19 and now Monkeypox, where some of these are linked to culture, social, hygiene and sex (Santos et al., 2021). According to recent published studies, the World Health Organization (WHO) has been following the cases registered all over the world, including Brazil.

The MPV subfamily Chordopoxvirinae (Bunge et al., 2022) popularly known as Monkeypox (The name monkeypox originates from the initial discovery of the virus in monkeys in a Danish laboratory in 1958) (von Magnus et al., 1959), was isolated and initially identified in Democratic Republic of the Congo (DRC), Africa in 1970 (sub-Saharan Africa) in a 9-month-old baby in Zaire. It is still a mystery about the reservoir for the currently unknown MPV, however, there are data to suggest that apes bear certain similarities to humans, these being incidental hosts, and that the reservoir is likely to be one or several species of rodent or squirrel inhabiting its secondary forests of Central Africa (Nalca et al., 2005; McCollum; Damon, 2014), and is currently being recorded on all continents, where it was only known and with a control number of records of this viral disease only in a few countries on the continent African. In Africa, cases were registered only for people and health professionals who deal with infected animals, until then with a low activity of occurrence and inter-human transmission.

Studies show that MPV can be related to gays, bisexuals and men who have sex with other men and also in bisexuals with men and women (Morais et al., 2022; WHO, 2022a). WHO data recorded for the UK MPV infection in 2022, the UK Health Safety Agency (UKHSA) determines that although this viral disease has not previously been classified as a sexually transmitted infection, it is suggested that transmission may occur with a high rate of infections through sexual contact. First recorded in 1970, Monkeypox was recognized as a distinct infection in humans and was previously eradicated in many African countries, although in regions where there is a greater vaccine decline, the disease is spreading, including beyond African borders in countries of the North America and Europe, including the Middle East (Israel) and the Australian continent, where there are records of sexual infection superior to intra-human records (Bragazzi et al., 2022).

Data from July 18, 2022 by Fiocruz, 14,718 confirmed cases of MPV are recorded in 70 countries, especially the United Kingdom, Germany, Spain and the United States, where the clinical picture presented is fever, lymphadenomegaly, followed by a skin rash. with centrifugal evolution. Atypical features are low lesion rate, lesions that appear at different (asynchronous) stages of development, and the appearance of lesions before the onset of fever, malaise, and other constitutional symptoms.

According to the website Our World in Data (Monkeypox) 2022, Figure 1, until 21 July 2022, 14,720 cases were recorded worldwide, with five deaths (WHO, 2022b).

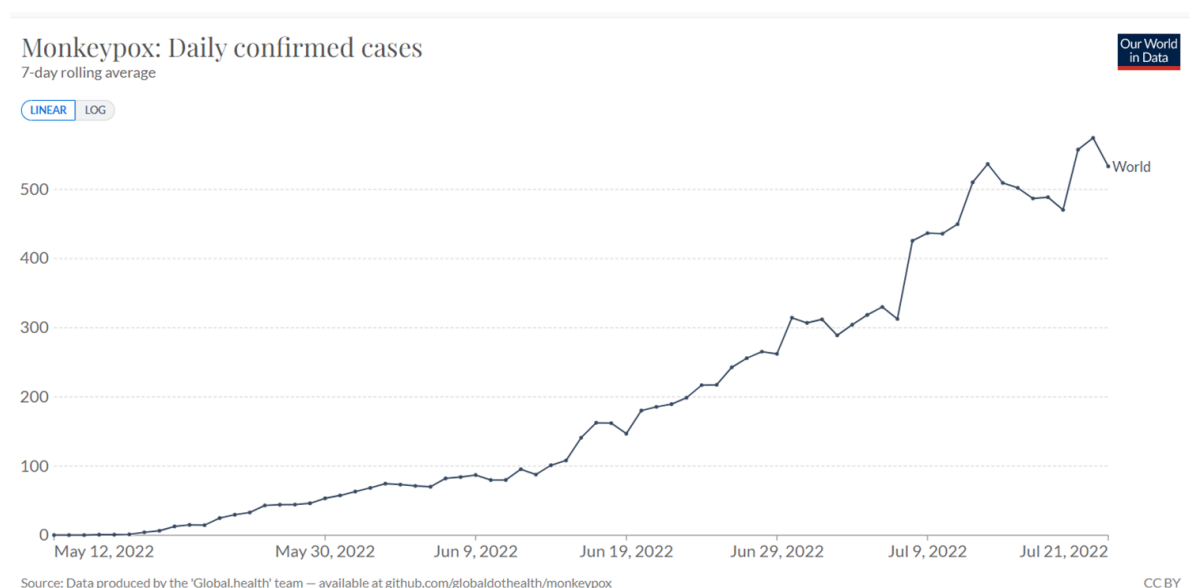


Figure 1. Monkeypox: Daily confirmed cases. Source: Our World in Data, Monkeypox, 2022.

In Brazil, the news was released on May 30, 2022 by Jornal O Globo, warning about possible cases of MPV in individuals in the city of Porto Alegre in the Rio Grande do Sul State, among other registered cases, however still under clinical verification by the Agência Nacional de Vigilância Sanitária “Ministry of Health and the National Health Surveillance Agency” (ANVISA) (Yoneshigue; Lopes, 2022). However, the first case recorded in Brazil dates from June 14, 2022 in the Rio de Janeiro State, Brazil by the Instituto Nacional de Infectologia Evandro Chagas (INI) (Fiocruz, 2022). We have registered for Brazil until July 20, 2022, 1025 cases, with 592 confirmed. The states in Brazil with the highest number of cases are Rio de Janeiro with 85, Minas Gerais 32, Distrito Federal 12, Paraná 10, Goiás 12, Bahia 4, Espírito Santo 2, Ceará 2, Rio Grande do Sul 2, Pernambuco, Santa Catarina and Mato Grosso do Sul with 1 case each (Fiocruz, 2022).

Human individuals who have already been vaccinated against Smallpox, have up to 85% vaccine protection against MPV, it is known that people under the age of 45 have a higher critical condition of acquiring this viral disease of international scope. and at a pandemic level. There is cross-protection for viruses of the *Orthopox* genus (smallpox, monkey pox, vaccinia and cowpox) (who, 2022b).

Greater chance of this MPV circulating among humans, greater chances of becoming a pandemic, because the MPV is of the order of DNA viruses that are more stable and with greater chances of circulation among 100% of the world population. MPV is a double-stranded DNA virus. The poxviruses are known to have a brick-shaped or oval structure measuring 200-400 nm (Kumar et al., 2022).

Diagnosis for Monkeypox can be performed by: Viral culture/isolation (live virus is grown and characterized from a patient specimen); Electron microscopy (negative staining produces a clear image of a brick-shaped particle, allowing for visual classification of a poxvirus, other than Parapoxvirus); Immunohistochemistry (tests for the presence of Orthopoxvirus-specific antigens); PCR, including real-time PCR (tests for the presence of monkeypox-specific DNA signatures); Anti-Orthopoxvirus IgG (tests for the presence of Orthopoxvirus antibodies); Anti-Orthopoxvirus IgM (tests for the presence of Orthopoxvirus antibodies), and Tetracore Orthopox BioThreat Alert (tests for the presence of Orthopoxvirus antigens) (Eres et al., 2018).

There are studies that evaluate some promising drugs such as Cidofovir (inhibits DNA polymerase); CMX-001 (modified Cidofovir compound; inhibits DNA polymerase), and ST-246 (inhibits release of intracellular virus) (McCollum; Damon, 2014). In addition to some vaccines: ACAM2000 (live Vaccinia Virus); Modified Vaccinia Ankara; Imvamune (US); Imvanex (Europe); Attenuated Vaccinia virus, and LC16m8, attenuated Vaccinia Virus (McCollum; Damon, 2014).

Brazil remains on alert with the increases in cases!

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