BRIEF COMMUNICATION

Epidemiological and clinical characteristics of mpox: a retrospective study in Lima, Peru

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ABSTRACT

The World Health Organization (WHO) began to receive reports of mpox cases from non-endemic countries in 2022. In Peru, the number of cases increased to the point where it ranked among the top 10 countries in the world with the most confirmed cases. The objective of this study was to determine the clinical and epidemiological characteristics of patients with a confirmed diagnosis of mpox treated at a hospital in Lima from July to December 2022. A total of 124 cases were confirmed with molecular testing. The mean age was 34 years. The vast majority of reported mpox cases were among males, men who have sex with men, homosexuals and people with HIV. Moreover, the majority of people with HIV were receiving antiretroviral therapy at the time of diagnosis. Exanthem rash prevailed as a clinical manifestation, followed by fever, headache and chills. The most common skin lesion was crust/scab (83.06 %) and most patients (98.39 %) did not require hospitalization. No deaths were reported in this study. It is necessary to educate the population in preventive actions, especially aimed at the most affected individuals. Additionally, eliminating stigmas will contribute to its early detection and control of the disease in future outbreaks.

Keywords: Mpox; Exanthema; Peru (Source: MeSH NLM).

INTRODUCTION

The first human case of mpox was detected in 1970 in the Democratic Republic of the Congo, with subsequent cases reported across other African countries. The first case outside of Africa was recorded in the United States in 2003 and was related to contact with infected prairie dogs. While the exact reservoir of the virus remains unidentified, it has been isolated in animals such as squirrels, rats, dormice and primates, among others [(1)]. Since 2017, there has been a significant increase in cases in both endemic and non-endemic countries.

Mpox is a reemerging zoonotic disease that can be transmitted from animals to humans. It is caused by a virus of the *Orthopoxvirus* genus in the *Poxviridae* family. Although generally self-limiting, with most cases resolving in two to four weeks, mpox can cause severe illness [(2)]. Transmission occurs through close or intimate contact with an infected person or animal, or with virus-contaminated materials such as blood, body fluids or respiratory droplets [(2)].

The incubation period ranges from 5 to 21 days. Common signs and symptoms include fever, headache, myalgia, fatigue, painful exanthem rash and lymphadenopathy, with potential for various complications.

In May 2022, the WHO began to receive reports of cases occurring in non-endemic countries across Europe [(3)]. In Peru, the first case of mpox was reported on June 26, 2022; by July 15, the number of cases had risen to 64 [(4)], and by November 2, a total of 3,110 confirmed cases had been recorded. Globally, Peru followed the United States, Brazil and Colombia, which had 28,651, 9,260 and 3,523 cases, respectively. As a result, Peru ranked among the top 10 countries in the world with the most confirmed cases [(5)].

At the Hospital Nacional Guillermo Almenara Irigoyen, patients suspected of having mpox were directed to a differentiated triage area, specifically designated for diagnosis and medical treatment.

THE STUDY

A descriptive, observational and retrospective study was conducted to determine the clinical and epidemiological characteristics of patients with a confirmed diagnosis of mpox treated at the Hospital Nacional Guillermo Almenara Irigoyen in Lima. A total of 210 patients with suspected mpox, all registered under the ICD-10 code B04, were observed between July and December 2022; each patient

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was evaluated in the differentiated triage area. Molecular testing for mpox deoxyribonucleic acid (DNA) was performed at the Instituto Nacional de Salud (INS – National Institute of Health), resulting in 124 positive cases.

Data were sourced from digital medical records and epidemiological data sheets, accessible only to the researcher. Patient identification was maintained under strict confidentiality. The database was compiled using the patient's initials and national identity card (DNI) number. The variables were extracted and analyzed in Excel to calculate the respective frequencies, which were documented according to the *Ficha de Investigación Clínica Epidemiológica de la Viruela del Mono (Viruela Símica)* [Monkeypox Clinical and Epidemiological Research Data Sheet], considering its three versions [4-7], as well as additional information from the digital medical records.

As for the findings, among the 124 positive cases, 122 were Peruvian (98.39 %), while two were Venezuelan. The youngest patient was 19 years old and the oldest 54; 75.81 % of the patients were between 21 and 40 years old, with a mean age of 34 years. There were two female patients (1.61 %) and 122 male patients (98.39 %). The most common sexual orientation was homosexual, reported by 55 patients (44.35 %), followed by heterosexual, with 40 patients (32.26 %). Regarding sexual risk behavior, men who have sex with men (MSM) accounted for 61.29 %. No cases of transgender individuals or sex workers were reported. Out of the 124 patients who tested positive, 71 had a history of human immunodeficiency virus (HIV), accounting for 57.26 % of the total; among these, 58 were receiving antiretroviral therapy (ART) (81.69 %). Syphilis was also noted as a medical history in 12 patients (9.68 %). In terms of demographic distribution, 68 patients reported residing in the districts of San Juan de Lurigancho, Lima Cercado and Ate (54.84 %) (Table 1).

Table 1. Demographic characteristics of patients with mpox

Characteristics	Total (*N* = 124)
Mean age in years (range)	34 (19-54)
Age in years by decades [n (%)]	
≤ 20	2 (1.61)
21-30	45 (36.29)
31-40	49 (39.52)
41-50	25 (20.16)
≥ 51	3 (2.42)
Nationality [*n* (%)]	
Peruvian	122 (98.39)
Foreign	2 (1.61)
Gender [*n* (%)]	
Male	122 (98.39)
Female	2 (1.61)
Sexual orientation [*n* (%)]	
Homosexual	55 (44.35)
Heterosexual	40 (32.26)
Bisexual	21 (16.94)
No information available	8 (6.45)
MSM [*n* (%)]	
Yes	76 (61.29)
No	48 (38.71)
HIV [*n* (%)]	
Positive	71 (57.26)
Negative	43 (34.68)
Unknown	10 (8.06)

Characteristics	Total (*N* = 124)
ART for HIV-positive individuals [*n* (%)]	
Yes	58 (81.69)
No	13 (18.31)
History of syphilis [*n* (%)]	
Yes	12 (9.68)
No	112 (90.32)
District of residence [*n* (%)]	
San Juan de Lurigancho	34 (27.42)
Lima Cercado	22 (17.74)
Ate	12 (9.68)
San Martín de Porres	8 (6.45)
El Agustino	7 (5.65)
Independencia	6 (4.84)
Santa Anita	6 (4.84)
Rímac	5 (4.03)
San Luis	4 (3.23)
Breña	3 (2.42)
Surquillo	3 (2.42)
La Victoria	3 (2.42)
Surco	2 (1.61)
Lurigancho	2 (1.61)
San Miguel	1 (0.81)
Chorrillos	1 (0.81)
San Borja	1 (0.81)
San Juan de Miraflores	1 (0.81)
Callao	1 (0.81)
Carabayllo	1 (0.81)
Los Olivos	1 (0.81)

Risk behavior data was recorded for 71 patients. Of these, 30 were categorized as having "no risk," 18 had "engaged in sexual relations with a stranger or multiple partners," and five had "contact with individuals who developed exanthem rash or skin lesions."

Regarding the clinical characteristics, 43.55 % received a final diagnosis four to six days after symptom onset. The most common symptoms were fever (66.13 %), headache (50.81 %) and chills (45.97 %). Less frequent symptoms included myalgia (28.23 %), back pain and asthenia (both at 20.16 %). The most frequent clinical sign was generalized polymorphic exanthem rash (87.10 %). Lymphadenopathy, proctitis, diarrhea and pruritus were less common (Table 2).

Samples were taken from active skin lesions (vesicles, pustules) in 123 patients, while one sample was taken from a patient during crusting/scabbing. A total of 98.4 % of patients did not require hospitalization; only two were admitted (Table 2).

Table 2. Clinical characteristics of patients with mpox

Characteristics	Total (*N* = 124) *n* (%)
Onset of symptoms to diagnosis (in days)	
≤ 3	10 (8.06)
4-6	54 (43.55)
7-9	35 (28.23)
≥ 10	25 (20.16)
Fever	
Yes	82 (66.13)
No	42 (33.87)
Headache	
Yes	63 (50.81)
No	61 (49.19)
Chills	
Yes	57 (45.97)
No	67 (54.03)
Myalgia	
Yes	35 (28.23)
No	89 (71.77)
Asthenia	
Yes	25 (20.16)
No	99 (79.84)
Back pain	
Yes	25 (20.16)
No	99 (79.84)
Lymphadenopathy	
Localized	19 (15.32)
Generalized	9 (7.26)
No	96 (77.42)
Proctitis	
Yes	6 (4.84)
No	118 (95.16)
Diarrhea	
Yes	2 (1.61)
No	122 (98.39)
Pruritus	
Yes	1 (0.81)
No	123 (9.19)
Distribution of exanthem rash	
Localized	15 (12.10)
Generalized	108 (87.10)
Not registered	1 (0.81)

Characteristics	Total (*N* = 124) *n* (%)
Type of exanthem rash	
Polymorphic	70 (56.45)
Monomorphic	52 (41.94)
Not registered	2 (1.61)
Hospitalization	
Yes	2 (1.61)
No	122 (98.39)
Type of sample	
Skin lesion swab	123 (99.19)
Sphacelated skin or crust/scab	1 (0.81)
Oropharyngeal swab	0 (0.00)

The types of skin lesions identified at the time of sampling are presented in Table 3.

Table 3. Types of skin lesions

Lesion	*n* (%)
Crust/scab	103 (83.06)
Pustule	66 (53.22)
Papule	15 (12.09)
Vesicle	3 (2.41)
Macule	2 (1.61)
Not recorded/not specified	21 (16.93)

DISCUSSION

In Peru, according to Epidemiological Alert 014-2022, a confirmed case of mpox is defined as a person who meets the criteria for a probable case, with the presence of the virus confirmed by laboratory results through molecular testing [8]. All cases considered in this study adhere to such definition.

Our study included patients from various districts of Lima. Among them, 98.39 % were in good general condition and did not require hospitalization; however, no data were available regarding their complications or evolution. The studies conducted by Benites-Zapata et al. [9] and León-Figueroa et al. [10] in 2022 indicated that male and younger patients were the most affected, which aligns with our findings. Notably, the present study did not include minors, in contrast to the study by Benites-Zapata et al., which included patients as young as two days old.

In our study, a high frequency of homosexuals, MSM and patients with a history of HIV infection was observed, consistent with findings from the systematic review by León-Figueroa [10]. These specific populations should be further studied to take preventive actions.

Both this study and that of Benites-Zapata et al. identified exanthem rash as the predominant clinical finding. However, while those authors reported pruritus as another prevalent manifestation, we found it to occur at a low frequency (0.81 %). These discrepancies in clinical characteristics should be interpreted considering the fact that the majority of the population in the Benites-Zapata et al. study was of African descent. Additionally, our sources of information indicated incomplete recording of the exanthem rash location.

In our research, most patients reported not having engaged in risk behavior, contrasting with the first cases reported globally by Thornhill et al. [11], where sexual activity was considered as a risk behavior. They noted that transmission likely occurred through sexual contact in 95 % of the cases.

The first global mpox study, published in August 2022, included 528 patients from 16 countries, revealing high percentages of men and homosexuals living with HIV. Anogenital exanthem rash was the predominant clinical manifestation, noted in 73 % of the cases. Furthermore, 61 patients experienced anorectal mucosal involvement,

including pain, proctitis, tenesmus or diarrhea, in contrast to our findings, which reported proctitis in six cases and diarrhea in two. It should be taken into account that the white population (75 %) prevailed in that study [11].

In the studies by León-Figueroa et al. and Thornhill et al., diagnoses were predominantly confirmed using swab samples of skin lesions analyzed by polymerase chain reaction (PCR) tests. In contrast, our research did not detail the anatomical regions from which the samples were obtained.

In a Peruvian case report published in 2022, Pampa-Espinoza et al. [12] highlighted the characteristics of the first nine patients suspected of having mpox, out of whom seven were male and two did not present fever. Unlike our study and the other aforementioned reports, the majority (seven cases) did not have HIV infection. Subsequently, two cases of mpox were confirmed in male patients aged 33 and 58 years; the other seven were diagnosed with various conditions, including hand-foot-and-mouth disease caused by coxsackievirus A6, chickenpox, acute leukemia, oral herpes, secondary syphilis, contact dermatitis and nosological entities that remind us of the importance of considering other differential diagnoses or the presence of coinfections.

The findings from our research, as well as the results of the aforementioned studies, differ from those reported in the Democratic Republic of the Congo, which is classified as an endemic country. In a study conducted on 104 individuals during the 2013 outbreak [13], children were the most affected group, including those under five years of age. In addition, the actual number of affected individuals could be higher, since several family members were infected, but only one sought medical attention.

In terms of mortality, no deaths were reported in our study population. In endemic countries in Africa, 72 deaths had been reported up to August 2022. Similarly, deaths were documented in non-endemic countries in Europe, Asia and the Americas, according to Sah et al. [14]. However, the accuracy of mortality data may be compromised due to the selection biases inherent in such studies, making it difficult to draw definitive conclusions.

From an epidemiological perspective, there are demographic characteristics that align with other studies and international reviews [9,10,15]. While the clinical manifestations vary, this variability is a common theme across most studies, according to Bunge et al [16]. However, the results presented here do not represent the broader population and limit comparative analyses, which is a disadvantage of this type of study.

Peru ranks among the 10 countries with the highest number of mpox cases globally; therefore, continued research on the subject is essential, particularly focusing on the most vulnerable populations: people with HIV infection, homosexuals and MSM. This research will help promote hygienic habits and preventive measures to protect other population groups from the spread of the disease. In addition, health professionals should receive training in the diagnosis and management of mpox for early detection and possible complications, especially given the lack of knowledge surrounding certain aspects of this disease [17]. The population should be made aware of the importance of eliminating stigmas—as a strength—to encourage openness about the disease [18], which will impact early detection of potential outbreaks, a challenge that persists even in more developed health systems [19,20].

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