ORIGINAL ARTICLE

Clinical and epidemiological characteristics of mpox among the insured population of La Libertad, 2022

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ABSTRACT

Objective: To describe the clinical and epidemiological characteristics of monkeypox (mpox) among the insured population of La Libertad at Seguro Social de Salud (EsSalud - Social Health Insurance System).
Materials and methods: A descriptive study, whose data were collected from clinical-epidemiological records and medical records; the cases with symptoms and positive PCR results were considered. The study variables were *signs and symptoms, duration of the disease, medical history, sex, age, sexual orientation* and *place of contact with someone with mpox*. Absolute and relative frequencies and confidence intervals were calculated.
Results: Mpox was developed by the insured population between July 15 and December 31, 2022, and 48 cases were reported. The clinical characteristics were fever (54.17 %), asthenia and lymphadenopathy (52.08 %) (in the inguinal [25 %], cervical [12 %] and axillary [5 %] areas), myalgia and back pain (43.75 %), sore throat (37.50 %), chills (5 %) and polymorphous and centrifugal rash (100 %). In addition, there were complications (6.25 %) and one person died (case fatality rate 6.25 %). HIV immunosuppression, history of syphilis, genital herpes and genital warts occurred in 23 (47.92 %), four (8.33%), three (6.25 %) and two (4.17 %) cases, respectively. It affected 47 men (97.92 %), including 28 homosexuals (58.33 %), 13 heterosexuals (27.08 %) and seven bisexuals (14.58 %). Ten of them had contact with someone with mpox at home (20.83 %), seven at work (14.59 %), five at a party (10.42 %) and two at a bar (4.17 %).
Conclusions: Mpox occurred mainly in homosexual and bisexual men not vaccinated against human smallpox. The most common symptoms were fever, asthenia and lymphadenopathy, mainly in the inguinal area. Moreover, all cases developed polymorphous rash, the duration of the disease was 17 to 45 days, complications were exceptional, 50 % of the cases had HIV immunosuppression and the case fatality rate was 6.25 %.

Keywords: Monkeypox; Epidemics; Humans (Source: MeSH NLM).

INTRODUCTION

Monkeypox (mpox) [1] is a disease whose causal agent is a virus [2]. Such virus consists of a 190 kb double-stranded DNA and belongs to the genus *Orthopoxvirus*, which also includes human smallpox virus of the *Poxviridae* family [3]. There exist two clades: clade I, also called Central African clade and clade II, called West African clade [4]. The genetic characteristics of each of them would allow us to explain the differences in pathogenesis; clade I has been associated with a more severe and more lethal disease [4,5]. A reservoir is not known, in relation to the fact that striped mice, dormice and primates, squirrels and giant rats may be reservoirs, with monkeys and humans considered as accidental hosts [6]. It is an infection that primarily spreads from person to person and rarely from objects and surfaces touched by a patient. Moreover, transmission can occur from infected animals to people in regions where wild animals are sick [2,7].

Mpox can cause signs and symptoms after a 5-21 day incubation period [8], some people may have less severe symptoms, and other may experience more serious illness and need medical care at a health facility. It may start with a fever, headache, muscular aches, back pain, low energy and adenopathy. Skin rash is one of the main symptoms, may last between 2 and 4 weeks, looks like skin blisters or lesions and can affect the face, palms of the hands, soles of the feet, groin and genital or anal regions. Furthermore, they may also be observed in the mouth, throat, anus, rectus, vagina or eyes. The number of lesions may range from one to several thousands. Some people have proctitis and inflammation of the genitalia [7]. There has also been evidence of atypical manifestations, in some cases without the invasive stage and with skin lesions only at the point of sexual contact [9].

In most cases, symptoms go away by their own within few weeks with symptomatic treatments; however, in some people, it can cause complications and even death. Newborns, children, pregnant women and people with underlying immunodeficiencies may be at increased risk of

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more severe symptoms and death due to the disease [7]. The real-time polymerase chain reaction (PCR) assay was used on skin lesion samples to confirm the diagnosis [10].

The first case in the world occurred in a child from Democratic Republic of the Congo in 1970, just nine months after the eradication of human smallpox in that country. Subsequently, there were sporadic cases in Central and West Africa, and outbreaks were then detected [11]. In 2003 the first cases outside Africa—i.e., in the United States—were reported [12] in people with a history of contact with prairie dogs sold as pets, which, in turn, were in contact with infected rodents imported from Ghana; and person-to-person transmission was not identified [11]. In 2018, imported cases were reported from the United Kingdom and Israel of individuals who became infected in Nigeria [13].

From May 2022, a breakout of this disease started in various countries, with person-to-person transmission occurring. It was considered the most important *Ortopoxvirus* infection to affect humans since the eradication of human smallpox [14]. On June 26, the first case was reported in Peru. A total of 3,812 people were affected, resulting in 20 deaths across 19 departments. The department of La Libertad reported 165 cases and one death [15].

Mpox appeared for the first time in the country in the department of La Libertad, and it had a negative impact on the population and healthcare services. In view of this health problem and considering that scientific literature containing local and national information remains scarce and varies among countries, this research is highly relevant to contribute to timely diagnosis and treatment, particularly due to the risk of the reemergence of this disease. Likewise, it would be particularly useful for the planning and implementation of public health measures [16]. The objective is to describe the clinical and epidemiological characteristics of mpox among the insured population of La Libertad during the outbreak that occurred in 2022.

MATERIALS AND METHODS

Study design and population

The study is non-experimental and descriptive and developed at Red Asistencial La Libertad (La Libertad Healthcare Network). Census sampling was used. It studied 48 cases, and the used technique was documentary, i.e., data were collected from the patients' clinical-epidemiological sheets and medical records. Confidentiality and anonymity of individuals were respected; and the cases included those with symptoms compatible with mpox and positive confirmatory PCR test [17].

Variables and measurements

The study variables were signs and symptoms, duration of the disease, medical history, hospitalizations, deaths as well as sex, age, sexual orientation and place of contact with someone with mpox in the past 21 days. The variables are expressed in absolute numbers and percentages.

Statistical analysis

Absolute and relative frequences and their respective confidence intervals were calculated.

Ethical considerations

The research study was approved by the Research and Ethics Committee of Hospital Víctor Lazarte Echegaray and collected data from clinical-epidemiological sheets. Therefore, there were no risks for patients or authors. Data confidentiality and patient identification were preserved in accordance with the Declaration of Helsinki [18].

RESULTS

Mpox occurred in the insured population between July 15 and December 31, 2022, spanning epidemiological weeks 26 to 52, with a total of 48 confirmed cases reported (Figure 1).

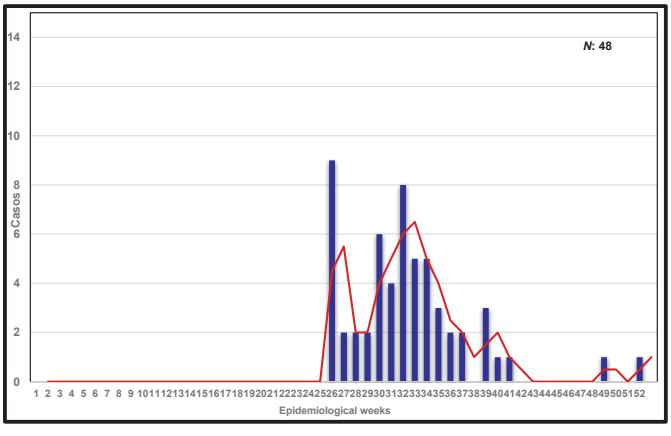

Figure 1. Epidemiological curve of mpox among the insured population in the department of La Libertad, 2022

The invasive stage or systemic disease occurred in 26 individuals (54.17 %): 54.17 % with a fever, 52.08 % with asthenia and lymphadenopathy (found in the inguinal [25 %], cervical [12 %] and axillary [5 %] areas), 43.75 % with myalgia and back pain, 37.50 % with sore throat and 5 % with chills. During the eruptive stage, 100 % of the patients had polymorphous and centrifugal rash: 40 (83.33 %) located on the face, 37 (77.08 %) the chest, 33 (68.75 %) the genitalia, 12 (25 %) the lips and 11 (22.92 %) the extremities. Three patients (6.25 %) had complications with proctitis and secondary skin infections. Some patients were hospitalized and one of them died (case fatality rate of 6.25 %) (Table 1).

Table 1. Clinical characteristics of mpox among the insured population of the department of La Libertad, 2022

Clinical characteristics	*n*	%	95 % CI	
Invasive stage				
Fever	26	54.17	37.67 %	66.49 %
Asthenia	25	52.08	37.95 %	66.21 %
Lymphadenopathy	25	52.08	37.95 %	66.21 %
Inguinal	12	25.00	12.75 %	37.25 %
Cervical	8	16.67	6.13 %	27.21 %
Axillary	5	10.42	1.78 %	19.06 %
Myalgia	21	43.75	29.72 %	57.78 %
Back pain	21	43.75	29.72 %	57.78 %
Sore throat	18	37.50	23.80 %	51.20 %
Chills	5	10.42	1.78 %	19.06 %
Eruptive stage				
Rash	48	100.00		
Simultaneous invasive phase and rash	14	29.17	16.31 %	42.03 %
Polymorphous lesions	48	100.00		
Site of lesions				
Face	40	83.33	72.79 %	93.87 %
Chest	37	77.08	65.19 %	88.97 %
Genitalia/perineum	33	68.75	55.64 %	81.86 %
Mouth, lips	12	25.00	12.75 %	37.25 %
Extremities	11	22.92	11.03 %	34.81 %
Complications				
Proctitis	3	6.25	-0.60 %	13.10 %
Secondary skin infection	3	6.25	-0.60 %	13.10 %
Duration of the disease				
Range	17 to 45 days			
Mean	26.52 days			
Hospitalizations	3	6.25	-0.60 %	13.10 %
Deaths	1			

In the medical history, the treating physician considered 23 cases (47.92 %) of patients with immunodepression (all of them with HIV infection), 36 (75 %) of whom were on anti-retroviral therapy. None of the patients were vaccinated against human smallpox. In the past six months, 4 patients (8.33 %) reported a history of syphilis, 3 (6.25 %) genital herpes, 2 (4.17 %) genital warts, and 1 (2.08 %) gonorrhea (Table 2).

Table 2. Medical history of mpox among the insured population in the department of La Libertad, 2022

Medical history	*n*	%	95 % CI	
Immunosuppression due to disease	23	47.92	33.79 %	62.05 %
HIV infection				
Anti-retroviral therapy	36	75.00	62.75 %	87.25 %
Not vaccinated against human	36	75.00	62.75 %	87.25 %
smallpox	48	100.00		
Infections in the past 6 months				
Syphilis	4	8.33	0.51 %	16.15 %
Genital herpes	3	6.25	-0.60 %	13.10 %
Genital warts	2	4.17	-1.49 %	9.83 %
Gonorrhea	1	2.08	-1.96 %	6.12 %

Concerning the epidemiological characteristics, 47 (97.92 %) were males, most of them between 30 to 39 years, mean of 33 years, range of 21 to 55 years; 28 (58.33 %) were homosexuals, 13 (27.08 %) heterosexuals and 7 (14.58 %) bisexuals. They informed that they had contact with someone with mpox in the past 21 days: 10 (20.83 %) at home, 7 (14.59 %) at work, 5 (10.42 %) at a party 2 (4.17 %) at a bar, sauna, sex club or discotheque (Table 3).

Table 3. Epidemiological characteristics of mpox in the insured population of the department of La Libertad, 2022

Epidemiological characteristics	*n*	%	95 % CI	
Males	47	97.92	93.88 %	101.96 %
Females	1	2.08	-1.96 %	6.12 %
Age group				
20 to 29	15	31.25	18.14 %	44.36 %
30 to 39	20	41.67	27.72 %	55.62 %
40 to 49	12	25.00	12.75 %	37.25 %
50 to 59	1	2.08	-1.96 %	6.12 %
Sexual orientation				
Homosexual	28	58.33	44.38 %	72.28 %
Heterosexual	13	27.08	14.51 %	39.65 %
Bisexual	7	14.59	4.60 %	24.56 %
Place of contact with someone				
with mpox in the past 21 days				
Home	10	20.83	9.34 %	32.32 %
Workplace	7	14.58	4.60 %	24.56 %
Party	5	10.42	1.78 %	19.06 %
Bar	2	4.17	-1.49 %	9.83 %
Sauna	2	4.17	-1.49 %	9.83 %
Sex club	2	4.17	-1.49 %	9.83 %
Discotheque	2	4.17	-1.49 %	9.83 %

The patients with HIV exhibited various important characteristics: a higher percentage of the disease in the systemic stage, more complications, infections prior to mpox, immunodepression and hospitalizations. The mean duration of the disease is similar in patients with and without HIV, with one death occurring in the HIV group (Table 4).

Table 4. Clinical and epidemiological characteristics of mpox in patients with and without HIV among the insured population of the department of La Libertad, 2022

Characteristics	Patients with HIV				Patients without HIV			
	n	%	95 % CI		*n*	%	95 % CI	
Systemic stage	20	41.67	27.72 %	55.62 %	6	12.50	3.14 %	21.86 %
Mean duration of the disease	26.40 days				26.45 days			
Complications	6	12.50	3.14 %	22.44 %	0			
Infections	7	31.25	18.14 %	44.36 %	0			
Immunodepression	23	47.92	33.79 %	62.05 %	0			
Hospitalizations	3	6.25	-0.60 %	13.10 %	0			
Deaths	1	2.08	-1.96 %	6.12 %	0			

DISCUSSION

The clinical and epidemiological characteristics of 48 patients with mpox were described during the outbreak of 2022. These patients were insured individuals of EsSalud Red Asistencial La Libertad. Initially, it was difficult to diagnose the disease since physicians had not received training on it during their academic studies. Also, they lack prior exposure to it and often mistook it for chickenpox.

During the invasive or systemic stage, notable symptoms included fever, asthenia, myalgia, lymphadenopathy and sore throat, as previously described [11,19,20]. Lymphadenopathy primarily occurred in the inguinal, cervical and axillary areas, consistent with findings from other publications [19,20].

In the eruptive stage, the rash was polymorphous, i.e., it progressed through stages of macule, papule, vesicle, pustule and crust, and was centrifugal in all cases. These characteristics differ from those reported by other authors, who describe monomorphous and polymorphous rashes with varying percentages in the analyzed series [11,19]. In most cases, the invasive stage preceded the eruptive stage, consistent with various publications [11,19-21]. The invasive stage and rash occurred simultaneously in approximately one-third of the cases. This condition is rarely published [22]; however, the invasive stage may also occur after the eruptive one [23,24], and even the invasive stage may not occur [22]. Rash was more frequently observed on the face, chest and genital/perineal region, contrarily to various reports that indicated the genital region as the most frequent location [19,20,22]. The distribution of lesions is probably related to sexual practices; mild traumas in the inguinal and perianal regions during intercourse could lead to local vasodilation and higher density of skin lesions in these areas [25]. Sero-epidemiological analyses have evidenced asymptomatic or subclinical infections; nevertheless, there is currently no data either supporting or refuting the hypothesis that these patients can transmit the infection [26].

The duration of the disease, from symptoms onset to skin restoration (i.e., without crusts) ranged from 17 to 45 days, with an average duration of 26 days. This information is important for determining the isolation period for the patient in order to issue the medical certificate. Though, it is generally accepted that the duration of the disease ranges from two to four weeks [7,19,27].

Proctitis and secondary skin infections were observed in three patients. In addition, complications included severe penile oedema, tonsillar abscess, secondary skin infections, abscesses, proctitis, rectal perforation, encephalitis and pneumonia [11,19,20,22,26]. The patients with complications were hospitalized and one of them died. While hospitalizations are not very frequent, when they occur, they have implications for resources allocation in healthcare [28]. Moreover, there is a risk of intrahospital transmission [28]. The case fatality rate was 6.25 %, the disease is self-limited, and fatal cases are sporadic [23], with low mortality [19,28,23]. According to the available data, between 0.1 % and 10 % of the patients die due to this disease. It is important to understand that mortality rates may be different from one place to another because of numerous factors, e.g., the access to healthcare and underlying immunodepression [13].

The medical history showed that, according to the treating physician, the immune status was depressed due to HIV infection on anti-retroviral therapy in near half of the patients, which agreed with various reports [19,22]. None of the patients was vaccinated against human smallpox; on the other hand, it was reported that those vaccinated had crossed protection against mpox in 85 %. Furthermore, the

protection can last for 20 years [24] and protects against severe disease for life [29].

Before acquiring the disease, the patients had sexually transmitted infections such as syphilis, genital herpes, genital warts and gonorrhea, similar to other series [9], but none of them occurred as a coinfection, in contrast to other research papers that state various percentages of this condition [19,20].

Almost all of the patients were males, and this data is agreed upon by most of the authors [30,31]. The most affected age group was that comprised of patients between 30 and 39 years, with an average of 33 years; and no cases were reported in children, as previously stated [32,33]. The outbreak focused on young homosexual and bisexual males, in accordance with various research studies [3,19,20].

More than half of the patients had previous exposure to or contact with somebody with mpox, either at home or at work, and showed findings similar to those stated in other studies [20]. This information was useful to carry out interventions. Other infection sites such as saunas, bars, festivals or gyms were reported [20,32].

Patients with HIV exhibited unusual characteristics compared to those without HIV: a higher percentage of disease in the systemic stage, more complications, prior infections, immunodepression and hospitalizations, with one death occurring in the HIV group. On the other hand, the average duration of the disease was similar in patients with and without HIV.

In conclusion, mpox mainly occurred in homosexual and bisexual males who were not vaccinated against human smallpox, with the most affected age group being 30-39 years old. The main symptoms were fever, asthenia and lymphadenopathy, with inguinal prevalence, rash was polymorphous in all the cases. Furthermore, the duration of the disease was 17 to 45 days, complications were rare, 50 % of the cases had HIV immunosuppression, there were no coinfections, and the case fatality rate was 6.25 %.

The study limitations are inherent to the retrospective and observational design, and medical records show data variability. Likewise, the lack of prospective collection criteria led to underreporting of data.

Based on the results, it is recommended to provide information targeted at higher risk of transmission or serious disease, facilities for early diagnosis and contact tracing [31], isolation of cases, measures for the prevention and control of infection transmissions at healthcare centers [34] and vaccination [24,35].

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