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MPOX: EPIDEMIOLOGICAL PROFILE AND FACTORS ASSOCIATED WITH ITS EMERGENCE IN THE ISANGI TERRITORY, DEMOCRATIC REPUBLIC OF CONGO

KOMBOZI YAYA Dieu-Merci.[1], BOLEKALEKA SINGA Valentin.[1], BEFENO LIANDE Ley.[1], EPENDJA TOWAKA Antoine.[1], AMOSI KIKWATA Guild.[1], KAKULE LWANGA.[3], FERUZI KIKUNI Venance.[4], MALOKO LOTOMBA Théopiste.[5], MEBWA MOHALA Franck[6], BASANDJA LONGEMBE Eugène.[2], TAGOTO TUNGIPAME Alliance.[2], PANDA LUKONGO KITRONZA[2] and LOSIMBA LIKWELA Joris.[2]

[1]Higher Institute of Medical Techniques of Yangambi, DRC (Email: komboziyaya1@gmail.com).
[2]Department of Public Health, Faculty of Medicine and Pharmacy, University of Kisangani, DRC (Email: alliance.tagoto@unikis.ac.cd).
[3]University of Ikela, DRC (Email: lwrisefempires@gaim.com).
[4]Higher Institute of Medical Techniques of Kisangani, DRC (Email: venanceferuzi8@gmail.com).
[5]Health zone of Yakusu
[6]Provincial Health Division/Tshopo, DRC (Email: mwebafranck@gmail.com)

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ABSTRACT

Introduction: The Mpox epidemic in non-endemic regions is now attracting global attention. The DRC alone reports nearly 85% of known human cases. In the Tshopo province, the Isangi Territory has experienced outbreaks of this disease in recent years. The objective of this study was to assess the link between the disease and various associated factors.

Methods: An analytical cross-sectional study was conducted in three health zones of the Isangi territory (Yakusu, Yahisuli, and Yabaondo health zone) from January 2023 to January 2024. It included 460 subjects, and data was collected using investigation forms and guided interviews with a survey questionnaire. A bivariate analysis was conducted to determine the factors associated with Mpox infection. With a significance level of 5%, odds ratios were calculated with their corresponding confidence intervals.

Results: Factors associated with Mpox infection were hunting, fishing, agriculture, Wildlife Trade, poverty, contact with an infected animal, interaction with a sick person, and sharing a bed with a sick person. **Conclusion:** Mpox epidemics are recurrent in Isangi due to various identified factors. Community

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sensitization, case investigation, and notification are essential for the prevention and control of this disease in Isangi.

KEYWORDS: Mpox, epidemiology, associated factors, emergence

INTRODUCTION

Monkeypox, now known as Mpox, is a zoonosis caused by the Mpox virus (MPXV), a double-stranded DNA virus belonging to the Orthopoxvirus genus of the Poxviridae family [1]. Clinically, it presents with a prodrome of fever and headache, accompanied by myalgia, persistent cough, lymphadenopathy, and sore throat, followed by a cutaneous and mucosal rash characterized by papules that evolve into vesiculopapules and resolve into crusts [2]. These lesions are preferentially located on the face, scalp, palms, soles, trunk, perineum, and oral mucosa [3].

Long considered a rare and self-limiting disease, endemic to Central and West Africa, the unexpected outbreak and rapid spread of Mpox to non-endemic regions has now attracted global attention [1, 4]. In June 2022, 3,340 confirmed cases of Mpox were reported worldwide, prompting the World Health Organization (WHO) to declare this outbreak a Public Health Emergency of International Concern. The US Centers for Disease Control and Prevention (CDC) reported that as of September 13 of the same year, more than 57,995 confirmed cases had been documented in 100 countries worldwide [5].

In Europe, out of 1,796 confirmed cases reported by the European surveillance system, 99.4% were males, and the majority of cases were between 31 and 40 years old (792/1796). The United Kingdom Health Security Agency (UKHSA) reported that 151 out of 152 men interviewed identified as homosexual. Most of these cases were reported through sexual health services in the United Kingdom [6].

In Africa, Mpox outbreaks are frequent. In the West and Central regions where it is endemic, the increase in the number of human cases since 2005 has been fueled by climate change, deforestation, war, human migration, and the decline in collective immunity due to the distant vaccination against smallpox [7, 8, 9]. In September 2017, the largest Mpox outbreak was recorded in Nigeria, caused by a strain belonging to the West African clade [10]. This resurgence occurred after 40 years without any reported cases. Between 2017 and 2019, Nigeria recorded a record of 424 suspected cases of MPXV and 155 confirmed cases. The largest number of these confirmed cases was recorded during the 2017 outbreak for ages ranging from 21 to 40 years, whereas historically the disease was more common in those under 15 years of age [11, 12]. In 2022, 25 cases including 3 deaths were reported in Cameroon and 6 cases including 2 deaths in the Central African Republic for the same period [13, 14].

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The case fatality rate of Mpox in endemic countries varies from 0 to 11%, and a previous study found a pooled estimate of the case fatality rate to be 8.7% [15]. From 1970 to 1999, 100% of deaths occurred in children under 10 years of age, whereas in 2000-2009, only 37.5% of deaths occurred in this age group. In recent years, deaths have also been noted in adults with an average age of 27 years [15].

The DRC alone has reported nearly 85% of all known human cases of monkeypox in recent years, in several epidemics [16]. Between 1981-1986 and 2006-2007, the number of cases multiplied by 20 (from 0.72 to 14.42 per 10,000) [17]. From 1996 to 1997, an unprecedented epidemic occurred in the DRC with a peak incidence in August 1996. Of the 511 cases recorded during this period, the majority of cases were secondary, resulting from human-to-human transmission [11]. In 2018, 2850 suspected cases (case fatality rate of 2.1%) were reported; in 2019, 3794 suspected cases and 73 deaths were reported in 120 health zones of 16 provinces of the DRC; in 2020, 4594 suspected cases of simian orthopoxvirus including 171 deaths, for a case fatality rate of 3.7%, were reported in 127 health zones of 17 of the 26 provinces of the DRC. Kwilu and Tshopo provinces had the highest mortality rates in the country, respectively with 16.7% and 8.1% during the same year. From October 2021 to the end of 2022, 6032 suspected cases of Mpox including 233 deaths were reported in 23 of the 26 provinces of the country [18].

Several studies have been conducted on Mpox disease worldwide and in the Democratic Republic of Congo [20], however, the need for local research is still felt following the resurgence of Mpox outbreaks in the Isangi territory. In the Tshopo province, the Isangi Territory has experienced repeated Mpox outbreaks over the past three years, mainly in the Yakusu health zone. In 2020, 12 cases were reported in the Yaosenge health area with 4 deaths, all children under 5 years of age with a history of measles and/or malnutrition. The Yaboya health area, on the other hand, recorded 8 cases in 2021 including 1 death. In 2022, the Yakusu General Hospital reported 11 cases including 1 death [19].

Faced with this resurgence of outbreaks and in the absence of a previous, robust study conducted in the Tshopo province and particularly in the Isangi territory, taking into account the environmental context conducive to the occurrence of Mpox epidemics, this study was initiated to reflect on the sociodemographic, anthropological, and economic factors that could be involved in the construction of the Mpox pathogen system.

The objective of this study was to assess the link between the disease and various associated factors in order to improve the prevention and control of Mpox outbreaks in the Isangi territory.

MATERIAL AND METHODS

1. Study Setting

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This multicenter study was conducted in three health zones of the Isangi territory: Yakusu, Yahisuli, and Yabaondo. The Isangi territory extends west of the city of Kisangani, at 0° 47' North, 24° 14' East. Its surface area is 15,770 km², with an estimated population of 701,548 inhabitants and a density of 24 inhabitants/km². It is a vast territory of the Tshopo province, crossed from north to south by the Congo River. To the east, the Lomami River flows into it at the city of the same name. The climate is equatorial with a dense forest. The population mainly lives from fishing, hunting, gathering, and traditional agriculture.

2. Study Population

The study population consisted of inhabitants of these 3 health zones who were exposed to Mpox infection during the study period.

3. Study Type and Period

This was an analytical cross-sectional study covering the period from January 1, 2023, to January 1, 2024.

4. Sampling

The sampling was probabilistic, stratified at the level of these three health zones. We used a comparison group (non-diseased), selected from households to better understand the association between various factors and Mpox infection. The Schwartz formula was used to calculate the sample size as follows:

$$N = \frac{Z^2 \; X \; P \; X \; Q}{d^2}$$

With n = sample size, Z = 1.96 for a 95% confidence level, p = 0.5, the prevalence of Mpox infection being unknown in the study setting, q = 1-p, d = margin of error (0.05).

The minimum sample size was 384 subjects. Adding 20% for non-respondents, the sample size is therefore 460 subjects, including 230 cases and 230 non-cases (simple matching of cases).

4.1. Selection of sick individuals:

To find the number of sick individuals to be investigated per health zone, we calculated the ratio of the number of reported or notified cases per zone to the total number of reported or notified cases for the three zones (693), the product obtained was multiplied by 230. Thus, the 230 cases to be investigated were distributed in three strata as follows: Out of a total of 693 notified cases in all three health zones, the YAKUSU health zone recorded 284 cases, YABAONDO 267 cases, and YAHISULI 142 cases. YAKUSU 284/693= 0.41 X 230= 94 cases to investigate, YABAONDO 267/693=0.39 X 230= 90 cases

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to investigate, YAHISULI 142/693= 0.20 X 203= 46 cases to investigate. The total population for all three health zones was estimated at 532,092 inhabitants in 2023.

At the level of a health zone, a second stratification was done pro rata to the number of cases reported by each health area. Thus, we had the number of people to investigate per health area (26 health areas were concerned, including 10 for Yakusu health zone, 9 for Yabaondo health zone, and 7 for Yahisuli health zone).

At the level of a health area, we proceeded by simple random sampling of cases. Households containing at least one case of monkeypox (confirmed or probable) were numbered; then, a random draw of these households was carried out to obtain the first household to be investigated, the second, and so on, until the required number of cases for the health area was reached.

4.2. Selection of non-sick individuals

The 230 non-cases were selected by simple matching of cases, at the household level or in the nearest neighboring household and according to their ages [witness age (year) = or +- 2 case age (year)].

4.3. Inclusion criteria

4.3.1. Sick Individuals

- Have developed or are developing a laboratory-confirmed Mpox infection (results sheet returned from National Institute for Biomedical Research) during the study period or have an epidemiological link to a confirmed or probable, and investigated case (probable case).
- Reside in a health area of the three selected health zones.
- Agree to answer our survey questionnaire.

4.3.2. Non-Sick Individuals

• Have not developed a monkeypox infection and reside in a health area of the three selected health zones.
• Agree to answer our survey questionnaire.
Individuals who did not meet these criteria were not included in the study.

5. Data Collection

Data for this study were collected using the investigation form for Mpox cases from the national program for the control of Mpox and hemorrhagic fevers in the DRC [21] adapted to local realities. This was a guided interview using a complete survey questionnaire, supplemented by documentary analysis (case investigation file or consultation sheet), which enabled us to obtain information related to the antecedents and/or complications that occurred in the cases. The level of financial income was constructed based on

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the distribution of the population by quintile of economic well-being according to the EDS 2013-2014 criteria model [22]. Subjects were divided into two classes: those with low financial income and those with high financial income. The impact of immunosuppression on the occurrence of complications was constructed based on the search for a history of measles and/or malnutrition in the population. After receiving explanations about the rationale and objectives of this study, the registered nurses (RNs) and the Plan MASHAKO supervisor, equipped with survey questionnaires on KoboToolbox, were deployed in the field, at the level of each household containing one or more individuals included in this study. For those who were unable to answer our questionnaire, the parent or household head helped them do so. The questions asked were related to sociodemographic, anthropological, or cultural parameters.

6. Statistical Analysis

Data were entered into Excel and analyzed using STATA 13 software. The characteristics of the study participants, including anthropological and/or cultural factors, are described using proportions for categorical variables, the median (interquartile range) for the quantitative variable (age), as the distribution is skewed. The analysis of factors associated with Mpox infection (bivariate analysis) was conducted using Pearson's chi-squared test or Fisher's exact test (for categorical variables) depending on the conditions of application. With a significance level of 5%, odds ratios were calculated with their corresponding confidence intervals.

7. Ethical Considerations

The protocol for this study was approved by the ethics committee of the Faculty of Medicine and Pharmacy of the University of Kisangani. Subject participation was free and informed. The acceptance rate was 100%.

RESULTS

1. Extent of Mpox Infection in the Isangi Territory

Table I: Prevalence of Mpox

	N= 532 092	%
Yakusu	94	0,017
Yabaondo	90	0,017
Yahisuli	46	0,009
Total	230	0,043

Table I indicates an overall Mpox infection rate of 0.043% in the Isangi territory, which equates to 43 cases per 100,000 inhabitants.

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2. Sociodemographic Characteristics of the Surveyed Population

Table No. II Distribution of Respondents by Sociodemographic Characteristics

Characteristics	Total	Yabaondo	Yahisuli	Yakusu	P
Age(year) N	460	180	92	188	0,004*
Median(p_{75}-p_{25})	17(25-5)	10(17-5)	17(30-5)	17(24.5-5)	
0-5 frq (%)	138(30)	58(32,22)	26(28,26)	54(28,72)	
6-11 frq (%)	76(16,52)	40(22,22)	8(8,70)	28(14,89)	
12-17 frq (%)	99(21,52)	43(23,89)	20(21,74)	36(19,15)	
≥ 18 frq (%)	147(31,96)	39(21,67)	38(41,30)	70(37,23)	
Sex					0,637*
M frq(%)	210(45,65)	81(45,00)	46(50,00)	83(44,15)	
F frq (%)	250(54,35)	99(55,00)	46(50,00)	105(55,85)	
Education level					0,541**
Unschooled frq (%)	154(33,48)	62(34,44)	31(33,70)	61(32,45)	
Primary frq (%)	221(48,04)	82(45,56)	40(43,48)	99(52,66)	
Secondary frq (%)	73(15,87)	32(17,78)	17(18,48)	24(12,77)	
University frq (%)	12(2,61)	4(2,22)	4(4,35)	4(2,13)	
occupation					
unschool child frq(%)	137(29,78)	57(31,67)	26(28,26)	54(28,72)	0,776*
student frq(%)	102(22,17)	57(31,67)	11(11,96)	34(18,09)	0,001*
hunting frq (%)	60(13,04)	25(13,89)	7(7,61)	28(14,89)	0,215*
fishing frq(%)	81(17,61)	20(11,11)	20(21,74)	41(21,81)	0,014*
wildlife trade frq(%)	37(8,04)	14(7,78)	6(6,52)	17(9,04)	0,756*

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cultivator frq(%) 0,000*	43(9,35)	7(3,89)	22(23,9)	14(7,45)
Financial income				0,479*
Low frq (%)	239(51,96)	91(50,56)	53(57,61)	95(50,53)
High frq(%)	221(48,04)	89(49,44)	39(42,39)	93(49,47)
Smallpox vacination				
NO frq(%)	452(98,26)	178(98,89)	89(96,74)	185(98,40)
YES frq(%) 3(1,60)	8(1,74)	2(1,11)	3(3,26)	

** Pearson's x^2 ** fischer's exact test*

The median age of participants, as presented in Table II, was 17 years with an interquartile range of 5 to 25 years. This data suggests that a majority of respondents were aged 17 or younger. Additionally, the vast majority of participants reported not having received the smallpox vaccine.

3. Mpox complications and spread

Table III: Factors associated with Mpox complications and the spread of infection

Variables	COMPLICATIONS			
	YES	NO	TOTAL	P
Age(year)N	102	128	230	0,001*
0-5 frq(%)	42(41,18)	27(21,09)	69(30)	
6-11 frq(%)	23(22,55)	15(11,72)	38(16,52)	
12-17 frq(%)	19(18,63)	33(25,78)	52(22,61)	
≥ 18 frq(%)	18(17,65)	53(41,41)	71(30,87)	
History of measles and/or				0,001**

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malnutrition			
measles frq(%)	32(31,37)	0(0)	32(13,91)
malnutrition frq(%)	14(13,73)	2(1,56)	16(6,96)
measles and malnut no history	8(7,84)	0(0)	8(3,48)
	48(47,06)	126(98,44)	174(75,65)
	SPREAD		
Therapeutic pathway	230		
Hospital frq (%)	61(26,52)		
House of prayer	88(38,26)		
Traditional healer	81(35,22)		
Isolation			
Always isolated	61(26,52)		
Sometime isolated	169(73,48)		

Number rooms/house	Mpox+	Mpox -	Total	P
	230	230	460	0,001*
One frq(%)	78(33,91)	12(5,22)	90(19,57)	
two frq(%)	87(37,83)	36(15,65)	123(26,74)	
Three frq(%)	48(20,87)	141(61,30)	189(41,09)	
Four frq(%)	17(7,39)	41(17,83)	58(12,61)	

**** Pearson's x^2 , ** Fischer's exact test***

Table III indicates that the majority of complications occurred in children aged 5 years and under. More than half of the complications (52.94%) occurred in children with a history of measles and/or malnutrition. Only a quarter of cases sought healthcare directly in their treatment

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pathway and were still isolated, while 3/4 either went to a house of prayer (38.26%) or a traditional healer (35.22%). Two-thirds of cases lived in either a one-room or two-room house.

4. Frequency of Mpox infection according to risk factors

Table IV. Risk factors for Mpox infection

Variables	N=230 (%)	Or unadjusted	CI	P
Age(year)		-	-	0,617*
Median(p75p25)	16,5(25-5)			
0 à 17	159(69,13)			
≥ 18	71(30,87)			
Sex		-	-	0,851*
F	126(54,78)			
M	1O4(45,22)			
Education level		-	-	0,827*
Unschooled	77(33,48)			
Primary	114(49,57)			
Secondary	33(14,35)			
University	6(2,61)			
Smallpox vaccination	2(0,87)			0,285**
hunting	44(19,13)	3,16	[1,16 6,19]	0,001*
fishing	9(3,91)	0,08	[0,03 0,18]	0,001*
Wildlife Trade	26(11,30)	2,53	[1,17 5,83]	0,010*
Cultivator	34(14,78)	4,25	[1,93 10,32]	0,001*
Poverty	195(84,78)	23,55	[14,08 39,54]	0,001*

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Contact with an animal	74(32,17)	11,64	[5,57	27,15]	0,001*
	156(67,87)	23,41	[13,25	42,50]	0,001*
Contact with sick person	106(67,95)	5,9	[1,86	22,01]	0,001*
sharing a bed with a sick person					

** Pearson's x^2, ** Fischer exact test*

The practice of fishing has been shown to be a protective factor, while hunting and other factors have increased the risk of contracting Mpox infection. Poverty and interaction with an ill person have shown a strong association with Mpox infection, and significant secondary transmission has been noted during this outbreak.

DISCUSSION

The prevalence of monkeypox infection in the Isangi territory is 0.043%. While most studies on monkeypox in the DRC report annual incidences (past incidence from 0.64/100,000 inhabitants in 2001 to 2.82/100,000 inhabitants in 2013 [41], [28]), our study provides additional insight by estimating the prevalence during the study period, an approach that better captures the disease burden in the studied population. However, the prevalence in our series may be underestimated due to the many cases that have never been investigated and reported, owing to constraints on the mobility of surveillance teams and the remoteness of certain health areas from their central offices, however, the incidence in our series could be underestimated given that many cases have never been investigated and reported due to constraints on the mobility of surveillance teams and the remoteness of certain health areas from their central offices.

In this study, the practice of hunting was a risk factor for contracting Mpox infection in the Isangi territory (OR 95% CI 3.16 [1.16-6.19]). In the DRC, Quiner C.A et al, in a study conducted in 2017 on the prevention of Mpox risk factors in a rural community, noted that people who identified themselves as hunters or as people engaged in hunting activities were at higher risk of contracting monkeypox [26]. Sklenovská N et al had found that primary zoonotic transmission of the virus can occur through contact with blood, bodily fluids, and lesions of infected animals, which most often occurs during hunting [20]. The same finding was made by Durski KN et al in a study conducted in 2018 on the emergence of Mpox in West and Central Africa [7]. Hunters come into direct contact with wild animals, which are the natural hosts of the Mpox virus. This contact can occur during hunting, skinning animals, or preparing meat. The

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monkeypox virus can be transmitted by contact with the blood, raw meat, or other bodily fluids of infected animals. Hunters are more likely to be exposed to these bodily fluids when handling killed animals.

The practice of fishing was revealed as a protective factor against the disease (OR 95% CI 0.08 [0.03 0.18]). Several hypotheses can explain this result: The practice of fishing could involve reduced exposure to wild animals, particularly non-human primates and rodents, which are implicated in the occurrence of Mpox infection. Fishermen often operate in aquatic areas that are less frequented by primates and rodents than forest areas where hunting and the wildlife trade are practiced. Fishing methods, such as the use of nets or rods, can limit direct contact with infected animals, unlike hunting which often involves close contact with killed animals.

In our series, the wildlife trade was a risk factor for contracting the disease in the three health zones of the Isangi territory (OR IC 95% 2.5 [1.17 - 5.83]). This result is corroborated by studies conducted in other regions of Africa, which have also shown a strong association between the trade in wild animals and Mpox. Alakunle E et al note that the increase in the trade of rodents and other wild animals, fueled by a growing demand for bushmeat (grilled rodents and wild mammals) in Nigeria, has been identified as a possible factor in the re-emergence of monkeypox in the country [12]. For epidemics in non-endemic regions, the trade in exotic animals was identified as a risk factor for the occurrence of Mpox in these regions [27]. The wildlife trade often involves close contact between humans and wild animals, which increases the risk of exposure to the Mpox virus. This contact can occur during the capture, transport, sale, or handling of animals. The Mpox virus can be transmitted through contact with the blood, raw meat, or other bodily fluids of infected animals. People involved in the wildlife trade are more likely to be exposed to these bodily fluids when handling animals. The growing demand for bushmeat in the region could lead to increased hunting and trade of wild animals, thus increasing the risk of exposure to the virus. The lack of adequate regulation of the wildlife trade can facilitate the spread of the virus, as infected animals can be sold and transported without sanitary control. Traditional practices of handling and preparing bushmeat, which may involve direct contact with the blood and bodily fluids of animals, could also contribute to the risk of infection.

Our study found that agriculture was a risk factor for developing Mpox infection in the three health zones of Isangi territory (OR 95% CI 4.25 [1.93 -10.32]). In the DRC, Quiner C.A et al. also found that individuals who identified themselves as farmers (or as people engaged in agricultural activities) were at a higher risk of contracting monkeypox [26]. Agriculture is a significant factor contributing to the incidence of monkeypox due to the increased contact between humans and small mammals that are potential carriers of MPXV. This occurs when humans encroach on jungles and forests, the natural environment of the likely reservoir species.

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In our study, poverty was a risk factor for contracting Mpox in the territory of Isangi (OR 95% CI: 23.5 [14.08-39.54]). In the DRC, Quiner C.A et al. noted in 2017, in a study on the prevention of risk factors for Mpox in a rural community, that poverty and persistent civil unrest force people to hunt small mammals (bushmeat) to obtain protein-rich food, thus increasing exposure to wild rodents, which may carry monkeypox [26]. Rimoin Anne W et al. also noted in their study that poverty forced the affected population to flee and seek shelter deeper in the tropical forest, and to rely more on bushmeat (monkeys, small rodents, etc.) [27].

The results of this study confirm that 32.17% of cases involved contact with alive or dead wild animal within three weeks of symptom onset. Contact with animals was a significant risk factor for developing Mpox infection (OR 95% CI 11.6 [5.57-27.15]). Our findings align with those of Soheili M et al., who reported in a 2021 study in the DRC that 36.9% of cases had contact with animals, further emphasizing the frequency of primary transmission [23]. Kantele A et al. noted that significant anthropogenic and demographic changes in the DRC since 1980 may have increased the local population's exposure to monkeypox virus reservoir species. Tropical forest logging increases the likelihood of human exposure to displaced animals, thus facilitating zoonotic transmission of the monkeypox virus [29, 30]. In Nigeria, Yinka-Ogunleye et al. reported an 8.2% proportion of cases involving animal contact during the 2017 outbreak [11]. In non-endemic regions, daily exposure to sick animals (adjusted odds ratio [aOR]: 4.0, 95% CI: 1.2-13.4) or cleaning their cages/litter (aOR: 5.3, 95% CI: 1.4-20.7) have been identified as risk factors for contracting monkeypox during the 2003 US outbreak [31, 32]. MPXV is typically transmitted from animals to humans. Human infection with MPXV is primarily caused by bites from infected animals or direct contact with the blood, body fluids, and pox lesions of infected animals, and consumption of undercooked infected animals can also lead to the virus spreading to humans [33, 34].

In our series, the majority of cases (67.87%) acquired the virus through human-to-human transmission. Contact with an infected individual (Mpox positive) was a risk factor for developing Mpox infection in the Isangi territory (OR 95% CI: 23.4 [13.25-42.50]). This result is similar to that found by Aplogan A et al. in a survey of 419 cases in the DRC in the 1990s, where 78% of cases were secondary (i.e., disease occurring in a person who had been in contact with an infected person 7 to 21 days before the onset of the disease) [35]. Significant human-to-human transmission has also been reported in the Central African Republic [38, 39, 40], the Republic of Congo [36], and South Sudan [37]. Data from the Nigerian epidemic (September 2017-September 2018) revealed that transmission was unknown for 62.3% (76/122) of cases. Of the remaining 46 cases, 36 (78.3%) had an epidemiological link to individuals with similar lesions before the onset of monkeypox [11]. The high prevalence of human-to-human transmission (67.87%) in our series can be explained by the nature of the Mpox virus and its preferred modes of transmission. The

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virus is primarily transmitted through close contact with an infected person, via skin lesions, bodily fluids, or respiratory droplets. In our context, close and frequent contacts between community members, particularly within households, facilitate the spread of the virus.

Our study found that sharing a bed or room with a sick individual is a risk factor for contracting Mpox (OR 95% CI 5.9 [1.86 22.01]).

In a systematic review on the epidemiological evolution of monkeypox, Bunge EM et al noted that sleeping in the same room or bed with a person with Mpox infection was a risk behavior associated with human-to-human transmission [15]. This same finding was previously made by Nolen LD and Jezek Z in their respective studies on the introduction of monkeypox into a community and a household: risk factors and zoonotic reservoirs in the Democratic Republic of Congo and Monkeypox: secondary attack rate [24, 42].

Sleeping in the same room or bed promotes the sharing of contaminated air. The Mpox virus can persist in the air over short distances, especially in closed and poorly ventilated spaces. Additionally, sharing contaminated bed linen or towels can also transmit the virus through direct contact with the skin or mucous membranes.

Individuals with Mpox develop skin lesions that can ooze an infectious fluid. Direct contact with these lesions or the contaminated fluid, for example, by sharing a bed or touching soiled clothing or bedding, can spread the virus.

Scientific studies, such as those previously mentioned (Bunge EM et al., Nolen LD, Jezek Z), have clearly established a link between sharing a bed or room with someone who has Mpox and an increased risk of infection. These studies, conducted in various epidemiological settings, demonstrate the consistency of this increased risk and reinforce the need to take precautions to limit transmission.

CONCLUSION

The study conducted in Isangi, Democratic Republic of Congo, has highlighted several risk factors associated with Mpox infection. Hunters and individuals involved in the wildlife trade were most exposed to the virus due to their direct contact with infected animals. Poverty was also a significant risk factor, as it forces populations to hunt and consume bushmeat for sustenance. Human-to-human transmission plays a major role in the spread of the virus, particularly within households. Awareness campaigns on preventive measures, vaccination of at-risk groups, and the development of support programs for poor populations to

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enable them to obtain food more safely are interventions that can be implemented to reduce the resurgence of Mpox epidemics in the Isangi territory.

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