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Symptomatology of Mpox Disease and Implications for Surveillance in Imo State, Nigeria

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Adeniran Adeniyi A[1]*, Eronini Ebubechi C[2], Olugbenga Asaolu[1], Simisola Adedeji[3], Ugwu, Adaeze Joy[4], Marcus Oluwadare[5], Faith Ehiaghe Ugba[6], Aibinuomo Ayomide Oluwaseyi[7], Tella Adedamola[8], Dania Oluyinka[9], Olayiwola Olanike Suliat[7], Oladele Tinuola[10], Daniel Musa Haruna[11], Adebayo O Amao[12], John O Ibitoye[13], Oluwagbemiga Obembe[7], Christopher Obanubi[14] and Abdulmalik Abubakar[4]

[1]Department of Public and Allied Health, Babcock University, Ilishan-Remo, Nigeria

[2]Department of Public Health, University of Suffolk, Waterfront Building, United Kingdom

[3]Department of Public Health, EUCLID University, Greater Bajul, The Gambia

[4]Department of Public Health, Liverpool John Moores University, Liverpool, UK

[5]College of Medicine, Obafemi Awolowo University, Ile-Ife

[6]University of Ibadan, (Public Health, Environmental Health)

[7]Department of Public Health, Texila American University, Georgetown, Guyana

[8]School of Public Health, University of Port Harcourt, Nigeria

[9]Department of Community Medicine, University College Hospital, Ibadan, Nigeria

[10]Department of Nursing, Adeleke University, Ede, Nigeria

[11]Department of Public Health, Central University of Nicaragua

[12]Lagos State, University College of Medicine, Lagos State, Nigeria

[13]Catholic Relief Services, Abuja, Nigeria

[14]Bayero University Kano, Kano State, Nigeria

***Corresponding Author:** Adeniran Adeniyi A, Department of Public and Allied Health, Babcock University, Ilishan-Remo, Nigeria.

Abstract

Mpox disease, caused by Mpox virus, a double-stranded DNA virus, genus Orthopoxvirus of the family Poxviridae has an incubation period of 6 to 13 days but can range from 5 to 21 days. The symptoms are quite diverse and this makes a number of rash-associated illnesses close differential diagnosis. This study aims to review the common symptoms associated with the disease during outbreaks in Imo State between 2017 and 2023 and the implications for surveillance.

Surveillance data from the Surveillance Outbreak Response Management and Analysis System (SORMAS) was extracted between January 2017 and December 2023 across the 27 Local Government Areas (LGAs) of Imo State. A line list of 231 suspected cases was downloaded into an

excel template and analyzed using SPSS ® version 20 software. Analysis was done using descriptive statistics and associations were tested using Fischer's exact at 0.05 level of significance.

Of the 231 suspected cases, 57.1% (132) were males, 42.9% (99) were females and the modal age group was between the ages of 0-4 (32.5%). About one-fifth (21.2%, n = 49) were confirmed positive, 27 males (55.1%) and 22 females (44.9%), (p>0.05). Modal age group was 20-24 (22.4%, n=11), 18% (9) were children under 14 years, p>0.05.

Fever was a constant presentation with 68.4% (n=158) and 65.3% (n=32) of suspected and confirmed cases respectively presented with varying degrees of fever. Other modes of presentation among the confirmed cases are conjunctivitis (12.2%, n=6), cough (16.3%, n=8), photosensitivity (14.3%, n=7), fatigue (36.7, n=18 and headache (45%, n=22). Only 5.6% and 4% of suspected and confirmed cases, respectively, had knowledge of contact with an infectious source. Only 12.2% (n=6) presented with one form of lymphadenopathy contrary to literature. This might be associated with the clinical skills of the cadre of health workers who are responsible for surveillance activities at the LGA (district) level in the State. This study has been able to describe the symptomatology of Mpox during outbreaks between 2017 and 2023 Imo State. The findings have significant implications for capacity building of surveillance actors in order to improve early case detection and response.

Keywords: Mpox; Symptomatology; Outbreak; Surveillance

Background

Mpox disease is caused by a double-stranded DNA virus, genus Orthopoxvirus of the family Poxviridae. Four of the orthopoxvirus species are responsible for causing diseases in man (Eskild Petersen et al; 2019). The virus was first detected in1958 among monkeys being used for research purposes, hence, the nomenclature. The first case in human was however identified in 1970 in a 9-year-old child with smallpox-like vesicular rash in the Equatorial region of Zaire, now, Democratic Republic of Congo (Marennikova, S. S. et al, 1972). In 2022, when there was an increase in Mpox outbreak, racist and stigmatizing languages were reported to WHO and both individuals and countries raised concerns which led the changing of nomenclature from Monkey pox virus to Mpox virus. The re-naming was also important because rodents, and not monkeys, have been found as the largest animal reservoir of the virus (WHO, 2022). The incubation period is usually 6 to 13 days but can range from 5 to 21 days while symptoms and signs may persist for 2 to 5weeks (WHO, 2022).

The WHO discontinued small pox vaccinations in 1978. This has since led to a drop in the cross-protection to other orthopox viruses, more pronounced among the younger and the unvaccinated population. A mathematical model has however suggested that following the cessation of small pox vaccination, human to human transmission would not be able to sustain the Mpox infection in humans without repeated re-introduction of the virus from the animal reservoirs, hence, a justification for the discontinuation of small pox vaccination (Fine PE, Jezek Z, Grab B, 1988).

There was a global re-awakening and media attention to Mpox following the diagnosis of 3 cases in the United Kingdom in 2018. Two of the three patients had a recent travel history to Nigeria while the third was a health worker who was involved in the care of one of the other two patients. (Petersena, Eskild, Ibrahim Abubakar, Chikwe Ihekweazu, David Heymann, Francine Ntoumi, Lucille Blumberg, 2018).

Prior to the recent and ongoing outbreak, Nigeria had her last confirmed case of Mpox in 1978 (Gromyko AI, 1979) On the 22nd of September, 2017, an 11-year old child was identified with suspected Mpox in Nigeria (Eteng WE, Mandra A, Doty J, Yinka-Ogunleye A, Aruna S, 2018). Genomic studies of Mpox virus isolates from infected humans in Nigeria suggest that the index case was not imported into Nigeria and outbreaks in Nigeria are considered to be a spillover from multiple sources of introduction into the human population. It is also interesting to note that the clustering observed within the various States thus far have not shown any epidemiologic linkages

between them (Elsevier Monkeypox Information Center, 2018).

In Imo State, there has been a changing epidemiology of the disease in the last 6 years and the frequency and geographic distribution of Mpox cases have progressively increased. The State, with a 2023 projected population of 6,721,844 (NBS) occupies a total area of 5,530 square kilometer sharing boundaries with Abia State to the East, Delta State and River Niger to the West, Anambra State to the North and Rivers State to the South. Imo state is made up of 27 Local Government Areas (LGAs) and 418 political wards. In the State, poverty, civil crises, displacement, farming, climate change like flooding and population movement, are also likely risk factors to Mpox infection by increasing exposure to wild rodents which may carry Mpox (Quiner et al., 2017, Sklenovská & Van Ranst, 2018).

Although, the clinical features are usually less severe when compared to the deadly smallpox, the disease can be fatal with case fatality rate between 1% and 10% (Jezek Z, et al, 1988). The illness begins with non-specific symptoms and signs that include fever, chills, headaches, lethargy, asthenia, lymph nodes swellings, back pain, and myalgia. It is believed that the virus gains access into the host body through broken skin, respiratory tract or the mucous membranes (eyes, nose, or mouth. Secondary transmission, i.e., human-to-human, is presumably through large respiratory droplets or contact with body fluids, skin lesion and contaminated surfaces (Hutin et al., 2001, Z. Jezek, I. Arita, et al, 1986, Jezek et al., 1988).

To clinically distinguish between Mpox and Chicken-pox during outbreaks has also been challenging (Eskild Petersen, et al., 2019). Studies have also established similar genetic and antigenic properties between various orthopox virus species hence, the possibility of one infection conferring significant protection against infection by the other species. (Yasuo Ichihashi, 1987). This study aims to conduct a review of the disease symptomatology during outbreaks in Imo State between 2017 and 2023 and the implications for surveillance.

Method

Surveillance data from the Surveillance Outbreak Response Management and Analysis System (SORMAS) was extracted between January 2017 and December 2023 across the 27 Local Government Areas (LGAs) of Imo State. SORMAS is an open source mobile eHealth system adopted by the Nigeria Centre for Disease control (NCDC) for real-time digital surveillance covering peripheral health care facilities and laboratories. SORMAS facilitates the implementation of disease control and outbreak management procedures including surveillance and early detection of outbreaks. The line list of 231 suspected cases was downloaded from SORMAS and exported into an excel template. Data was visualized and exported for analysis into SPSS ® version 20 software. Analysis was done using descriptive statistics and associations were tested using Fisher's exact method at 0.05 level of significance. Ethical approval was sought and obtained through the epidemiology unit of the State Ministry of Health.

Results

Of the 231 suspected cases within the 6 year period, 57.1% (132) were males while 42.9% (99) were females and the modal age group was children between the ages of 0-4 (32.5%). About a half of all suspected cases were children under the age of 14 years (47.3%). Eight (8) LGAs (districts)- Orlu, Aboh-Mbaise, Ehime-Mbano, Ideato South, Owerri North, Owerri West, Owerri Municipal and Mbatoli LGAs account for 71% (n=164) of all the suspected cases and 4,3% (n=10) of all the suspected cases were from correctional facilities (prisons).

Out of the 231 suspected cases, 21% (n=49) came out as positive, confirmed cases following laboratory investigation. There were 27 males (55.1%) and 22 females (44.9%). There was no significant association between test positivity and sex of suspected cases ($p>0.05$). Young adults between the age of 20-24 form the modal age group among the positive cases (22.4%, n=11) while 18% (n=9) were children under 14 years and 8%, (n=4) were between 0-4 years. Association between positive test result and age group was not significant ($p>0.05$).

Only 5.6% (n=13) and 4% (n=2) of suspected and confirmed cases, respectively, had knowledge of contact with an infectious source. Fever seem to be a constant presentation with almost 68.4% (n=158) and 65.3% (n=32) of suspected and confirmed cases respectively presented with varying degrees of fever. Other modes of presentation among the confirmed cases are conjunctivitis (12.2%, n=6), cough (16.3%, n=8), photosensitivity (14.3%, n=7), fatigue (36.7%, n=18 and headache (45%, n=22).

Symptom	***Suspected cases (N= 231)***	***Confirmed cases (N=49)***
Knowledge of contact with infectious source	3 (5.6%)	2 (4%)
Rash	231 (100%)	49 (100%)
Fever	158 (68.4%)	32 (65.3%)
Conjunctivitis		6 (12.2%)
Photosensitivity		7 (14.3%)
Fatigue		18 (36.7%)
Headache		22 (45%)
Lymphadenopathy		6 (12.2%)

Expectedly, all the confirmed cases (100%, n=49) presented with various forms of cutaneous rash. More than half (57.1%, n=28) presented with rash which covers the entire body surface. There was involvement of the arms in 81.2% (n=40), deep seated rashes in65.3% (n=32), face 75.5% (n=37), genitals 61.2% (n=30), legs 75.5% (n=37), palms 59.2% (n=29), soles 0% (n=0), same sized lesions 59.2% (n=29), itchy lesions 79.6% (n=39).

Only 12.2% (n=6) presented with one form of lymphadenopathy with inguinal lymphadenopathy most predominant albeit not significant (6%, n=6, p>0.05). Others are axillary (10.2%, n=5) and cervical lymphadenopathy10.2%(n=5). Myalgia was present in 24.5% (n=12), oral ulcer, 8.2% (n=4) and sore throat, 24.4 (n=12).

Discussion

Only 5.6% and 4% of suspected and confirmed cases, respectively, had knowledge of contact with an infectious source. Available data in the literature also suggest that human cases are most times not epidemiologically linked during outbreaks. Studies suggest that it is either a multisource outbreak with limited human to human transmission or an outbreak that has arisen from increased human contact with previously undetected endemically infected humans (Nigeria Centre for & Control, 2019, Kara N Durski, et al, 2018, Petersena, et al, 2018).

Lymphadenopathy has been described in several literature as a common and clinical distinguishing feature of Mpox diseases (Petersena et al, 2018) . In this study however, barely only 12.2% of cases reported lymphadenopathy as a presenting symptom or sign. This might be associated with the clinical skills of the cadre of health workers who are responsible for surveillance activities at the LGA (district) level in the State. Mpox symptomatology in Nigeria has also shown that all parts of the body can be affected. The parts of the body most affected by rashes are documented to be in the following order from most affected to the least affected; the face, legs, trunk, arms, palms, genitalia and the soles (Nigeria Centre for & Control, 2019).

Conclusion

This study has been able to describe the symptomatology of Mpox during the outbreaks between 2017 and 2023. Fever and rash are constant features that could be in included in the community case definitions for early identification and notification to the surveillance network. Improving the capacity of surveillance officers in detecting lymphadenopathy during physical examinations could improve the sensitivity of the surveillance system in improving case detection and description of case definition.

Limitations

Reliance on secondary created some limitations in assessing the severity and progression of symptoms; incomplete documentations also gave the study a small sample size reducing the power of the study.

Ethical considerations

No conflict of interest is reported. Ethical approval was obtained from the Epidemiology Unit, Ministry of Health, Imo State. All data used are available and accessible through the Epidemiology Unit of the Ministry of Health.

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