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Clinical characterization and Disease Severity of Mpox Cases in Sierra Leone 2025 Outbreak

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ABSTRACT

Background:
Mpox presents with a wide range of clinical manifestations, yet limited evidence exists on clinical characteristics and disease severity in African outbreak settings. This study aimed to describe the clinical presentation and severity of mpox cases in Sierra Leone and assess differences by immunosuppression status.

Methods:
A retrospective analysis was conducted among confirmed mpox cases. Clinical symptoms, lymphadenopathy, and disease severity were assessed using descriptive statistics. Severity was categorized into mild, moderate, and severe, and a severity score was computed. Associations between immunosuppression status and clinical features were evaluated using Fisher's exact test.

Results:
A total of 201 mpox cases were included. Fever (93%), skin or mucosal lesions (75%), headache (76%), fatigue (74%), and muscle pain (73%) were the most commonly reported symptoms. Gastrointestinal symptoms such as vomiting (4.6%) and diarrhea (3.9%) were uncommon. Localized lymphadenopathy was reported in 23% of cases and generalized lymphadenopathy in 15%. Clinical features were broadly similar across immunosuppression groups, with no

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statistically significant differences observed ($p > 0.05$). However, a higher proportion of severe disease was observed among immunosuppressed individuals (86%) compared to non-immunosuppressed individuals (44%). Mean severity scores were also higher among immunosuppressed individuals (mean = 6.0) compared to non-immunosuppressed individuals (mean = 5.14).

Conclusion:
Mpox cases in Sierra Leone were characterized by classical symptoms, including fever and rash, with consistent clinical presentation across groups. Although immunosuppression was not significantly associated with clinical features, a trend toward increased severity was observed. These findings highlight the need for close monitoring of vulnerable populations and improved clinical management strategies.

Keywords: clinical manifestation; mpox; Sierra Leone; immunosuppression

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INTRODUCTION

Mpox is a zoonotic orthopoxvirus that presents various clinical symptoms, ranging from the typical, broad rash-based disease to atypical, localized, and often asymptomatic presentations during recent worldwide epidemics (Chika-Igwenyi et al., 2024). While historically linked to severe, generalized rashes and high mortality rates—ranging from 10% to 15% for Clade I—in Central Africa, recent outbreaks primarily involving Clade IIb have demonstrated significantly lower death rates, with figures as low as 0.2% in certain regions (Brüssow, 2025; Mitjà et al., 2025). This decline in mortality is accompanied by a notable increase in transmission through sexual networks. Although the disease has typically been recorded in endemic African locales, recent outbreaks have shown clinical heterogeneity, including unusual symptoms and varying severity across communities (Zahmatyar et al., 2023; Abejegah et al., 2024) (Abejegah et al., 2024).

Recent outbreaks have demonstrated that mpox can manifest with a range of clinical features, varying from mild illness to severe disease accompanied by complications (Ahmed et al., 2023). Factors such as immune status, age, and comorbidities have been identified as potential influences on the severity of the disease (Ugwu et al., 2025). However, most of the existing evidence is drawn from high or moderate-income nations, with few data points from low-income countries like Sierra Leone where distinct transmission patterns and demographic characteristics may influence clinical outcomes. The 2025 mpox outbreak in Sierra Leone provided an opportunity to investigate the clinical characteristics and severity of infection in laboratory confirmed cases. Understanding the clinical profile of these cases and identifying risk factors for

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severity is crucial, as it is essential for improving case management and informing better public health initiatives.

The study aimed to describe the clinical characteristics of mpox cases and assess disease severity, including the relationship between immunosuppression status and clinical outcomes.

Study Methodology

A retrospective investigation was conducted on confirmed mpox cases. The clinical data gathered from the DHIS 2 included systemic symptoms such as fever, headaches, lymphadenopathy, and other key variables. Before analysis, the data was cleaned and checked for missing values, inconsistencies, and entry errors. The data was analyzed using the R statistical tool. Descriptive analyses such as frequencies and percentages were performed on categorical variables. Clinical characteristics were categorized by immunosuppression status. Immunosuppression status was defined based on reported underlying medical conditions recorded in the dataset. Individuals were classified as immunosuppressed if they had any documented condition associated with impaired immune function, including HIV infection, diabetes, cancer, or other chronic illnesses as recorded in the case investigation form or DHIS2. Fisher's exact test was employed to examine the relationship between immunosuppressive status and clinical characteristics. Severity was measured with both categorical and continuous severity scores. Severity categories (mild, moderate, and severe) were derived from a composite severity score based on the number and type of reported symptoms. Cases with lower scores were classified as mild, intermediate scores as moderate, and higher scores as severe. The

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severity score was calculated using symptom data recorded in the dataset.

RESULTS

Clinical Characteristics of Mpox Cases

Table 1 shows the clinical characterization of confirmed cases. From the below Table, skin or mucosal lesions were reported in 114/151 cases (75%), while 30/151 cases (20%) did not report lesions and 7/151 cases (4.6%) were classified as unknown. Fever was the most commonly reported symptom, present in 141/152 cases (93%), while 10/152 cases (6.6%) reported no fever and 1/152 (0.7%) was classified as unknown. Systemic symptoms were frequently reported. Headache was present in 116/152 cases (76%), fatigue in 112/151 cases (74%), muscle pain in 110/151 cases (73%), and back pain in 94/150 cases (63%). Asthenia was reported in 45/150 cases (30%). Upper respiratory symptoms were less common. The Table also shows that sore throat was reported in 48/152 cases (32%), while cough or other respiratory symptoms were reported in 29/152 cases (19%). Conjunctivitis was uncommon, reported in 11/151 cases (7.3%). The Table further revealed that vomiting or nausea was reported in 7/151 cases (4.6%), and diarrhea in 6/152 cases (3.9%). Lymphadenopathy was reported in a subset of cases. Localized lymphadenopathy was present in 35/150 cases (23%), while generalized lymphadenopathy was reported in 22/150 cases (15%).

Clinical Features by Immunosuppression Status

Clinical characteristics were compared according to immunosuppression status to assess whether immune status influenced symptom presentation among mpox cases. Table 2 revealed that among non-immunosuppressed individuals 123/132

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(93%) reported fever, 8/132 (6.1%) reported no fever, and 1/132 (0.8%) was classified as unknown. Among individuals with unknown immunosuppression status, 11/13 (85%) reported fever, while 2/13 (15%) reported no fever. All immunosuppressed individuals (7/7, 100%) reported fever. Missing data were recorded for 41 observations in the non-immunosuppressed group and 8 observations among immunosuppressed individuals. There was no statistically significant association between immunosuppression status and fever presentation ($p = 0.4$), indicating that fever was a consistent clinical manifestation regardless of immune status. The Table also revealed that among non-immunosuppressed individuals, 97/131 (74%) reported skin or mucosal lesions, 29/131 (22%) reported no lesions, and 5/131 (3.8%) were classified as unknown. Also, among individuals with unknown immunosuppression status (N = 13), 12/13 (92%) reported skin or mucosal lesions, while 1/13 (7.7%) reported no lesions. Among immunosuppressed individuals (N = 7), 5/7 (71%) reported skin or mucosal lesions, while 2/7 (29%) reported no lesions. Although lesion prevalence appeared slightly higher among individuals with unknown immune status, there was no statistically significant association between immunosuppression and skin lesion presentation ($p = 0.12$).

Among non-immunosuppressed individuals (N = 130), 31/130 (24%) reported localized lymphadenopathy, 88/130 (68%) reported no localized lymphadenopathy, and 11/130 (8.5%) were classified as unknown. Among individuals with unknown immunosuppression status (N = 13), 3/13 (23%) reported localized lymphadenopathy, 8/13 (62%) reported no localized lymphadenopathy, and 2/13 (15%) were classified as unknown. Among

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immunosuppressed individuals (N = 7), 1/7 (14%) reported localized lymphadenopathy, 5/7 (71%) reported no localized lymphadenopathy, and 1/7 (14%) was classified as unknown. No statistically significant association was observed between immunosuppression and localized lymphadenopathy ($p > 0.9$). For generalized lymphadenopathy, 20/130 (15%) of non-immunosuppressed individuals reported the condition, while 97/130 (75%) reported no generalized lymphadenopathy and 13/130 (10%) were classified as unknown. In the group with unknown immunosuppression status, 2/13 (15%) reported generalized lymphadenopathy, 9/13 (69%) reported no generalized lymphadenopathy, and 2/13 (15%) were classified as unknown. Among immunosuppressed individuals 2/7 (29%) reported generalized lymphadenopathy, while 5/7 (71%) reported no generalized lymphadenopathy. observations were again present for 43 non-immunosuppressed cases and 8 immunosuppressed cases. There was no statistically significant association between immunosuppression and generalized lymphadenopathy ($p = 0.8$). Fatigue was reported by 97/131 (74%) of non-immunosuppressed individuals, while 33 (25%) reported no fatigue and 1 (0.8%) was classified as unknown. In the group with unknown immunosuppression status 9/13 (69%) reported fatigue, while 4/13 (31%) reported no fatigue. Among immunosuppressed individuals 6/7 (86%) reported fatigue, while 1/7 (14%) reported no fatigue. No statistically significant association was observed between immunosuppression status and fatigue ($p = 0.8$).

Disease Severity by Immunosuppression Status

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Diseases severity was categorized based on a composite symptom score, as described in the methodology Disease severity was categorized as mild, moderate, or severe as seen in Table 3. Table 3 shows that among no-immunosuppressed individuals, 12/124 cases (9.7%) were classified as mild, 57/124 cases (46%) as moderate, and 55/124 cases (44%) as severe. Among individuals with unknown immunosuppression status, 1/13 case (7.7%) was mild, 5/13 cases (38%) were moderate, and 7/13 cases (54%) were severe. Among immunosuppressed individuals, 1/7 case (14%) was moderate, and 6/7 cases (86%) were severe. Despite the higher proportion of severe disease among immunosuppressed individuals, the association between immunosuppression status and disease severity was not statistically significant ($p = 0.4$). Missing severity data were present for 49 non-immunosuppressed individuals and 8 immunosuppressed individuals.

Severity Score Comparison by Immunosuppression Status

Severity scores were summarized to provide a quantitative assessment of disease severity. It is revealed in Table 4 that the mean severity score among non-immunosuppressed individuals was 5.14, with a median score of 5. Individuals with unknown immunosuppression status had a mean score of 5.38 and a median score of 6. Immunosuppressed individuals had a higher mean severity score of 6.0 and a median score of 6. These findings suggest a trend toward increased severity among immunosuppressed individuals compared with non-immunosuppressed individuals.

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DISCUSSION

The paper provides an in-depth description of the clinical presentation and disease severity of mpox cases in Sierra Leone. The results reveal that mpox cases were primarily characterized by fever, skin or mucosal lesions, and systemic symptoms such as headache, fatigue, and muscle pain. These findings are consistent with the typical clinical picture of mpox described in prior research Wang & Lun, (2023), which confirms our understanding of mpox as a febrile rash illness with systemic involvement. The majority of cases had skin or mucosal lesions, although a significant number of cases had no lesions. This could be due to variations in clinical presentation or documentation issues throughout the case investigation. The presence of cases with no recorded lesions indicates that clinical presentation may not always follow the typical pattern, which has an impact on case identification.

Systemic symptoms such as headache, fatigue, and muscle pain were regularly reported, showing that mpox infection is typically linked with generalized conditions beyond dermatological manifestations (Jalloh et al., 2025). In contrast, gastrointestinal and respiratory symptoms were rare, implying that these characteristics are less prevalent in this setting. Lymphadenopathy, which is commonly regarded as a distinguishing hallmark of mpox, was found in a subgroup of patients. The reduced frequency reported when compared to classical descriptions could imply variations in clinical presentation or changes in clinical examination procedures.

The analysis of clinical features based on immunosuppression status revealed no significant differences in most symptoms,

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implying that the overall clinical presentation may be similar regardless of immunological status. Individuals with immunosuppression, on the other hand, had a higher proportion of severe disease and severity scores. This pattern is consistent with the expected impact of immunological function on illness progression and severity (Luster et al., 2004). Although no statistical significance was identified, the observed trend of increased severity among immunosuppressed individuals highlights the necessity for vigilant clinical monitoring in this population. These findings suggest that, while symptom presentation may be comparable, the progression of illness may differ.

LIMITATIONS

Several limitations should be considered when interpreting the findings of this study. First, a substantial proportion of clinical variables had missing data, which may affect the accuracy and completeness of the reported clinical profile. Second, the number of immunosuppressed individuals in the dataset was relatively small, limiting the ability to detect statistically significant differences in clinical presentation and disease severity.

Third, clinical data were collected as part of routine outbreak investigations and may be subject to variability in documentation and reporting. Finally, as this study was based on observational data, the findings describe associations but do not establish causal relationships.

CONCLUSION

Mpox cases in Sierra Leone were characterized by classical clinical features, including fever, skin lesions, and systemic symptoms. While clinical presentation was broadly similar across groups, a trend toward

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increased disease severity was observed among immunosuppressed individuals. These findings highlight the importance of careful clinical assessment and monitoring, particularly for individuals who may be at higher risk of severe disease.

Declaration of interest

We declare no competing interest

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List of Tables

Table 1: Clinical characterization of mpox cases

Characteristic	N = 201
Skin-mucosal_-lesions	**151**
Yes	114 (75%)
No	30 (20%)
Unknown	7 (4.6%)
Missing	50
Fever	**152**
Yes	141 (93%)
No	10 (6.6%)
Unknown	1 (0.7%)
Missing	49
Asthenia	**150**
Yes	45 (30%)
No	99 (66%)
Unknown	6 (4.0%)
Missing	51
Muscle-pain	**151**
Yes	110 (73%)
No	40 (26%)
Unknown	1 (0.7%)
Missing	50
Backpain	**150**
Yes	94 (63%)
No	55 (37%)
Unknown	1 (0.7%)
Missing	51
Fatigue	151
Yes	112 (74%)
No	38 (25%)
Unknown	1 (0.7%)
Missing	50
Sore throat	**152**
Yes	48 (32%)
No	103 (68%)
Unknown	1 (0.7%)
Missing	49
Conjunctivitis	**151**
Yes	11 (7.3%)
No	127 (84%)
Unknown	13 (8.6%)
Missing	50
Chills or sweats	**151**
Yes	66 (44%)

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Characteristic	N = 201
No	78 (52%)
Unknown	7 (4.6%)
Missing	50
Headache	**152**
Yes	116 (76%)
No	34 (22%)
Unknown	2 (1.3%)
Missing	49
Vomiting nausea	**151**
Yes	7 (4.6%)
No	144 (95%)
Unknown	0 (0%)
Missing	50
Cough-respiratory-symptoms	**152**
Yes	29 (19%)
No	123 (81%)
Unknown	0 (0%)
Missing	49
Localized lymphadenopathy	**150**
Yes	35 (23%)
No	103 (69%)
Unknown	12 (8.0%)
Missing	51
Generalized lymphadenopathy	**150**
Yes	22 (15%)
No	114 (76%)
Unknown	14 (9.3%)
Missing	51
Diarrhea	**152**
Yes	6 (3.9%)
No	145 (95%)
Unknown	1 (0.7%)
Missing	49

[1]n (%)

Table 2: Immunosuppression and Clinical features

Characteristic	**No** immunosuppression N = 173[1]	**Unknown** N = 13[1]	**Yes** immunosuppressed N = 15[1]	**p-value**[2]
Fever	**132**	**13**	**7**	0.4
Yes	123 (93%)	11 (85%)	7 (100%)	
No	8 (6.1%)	2 (15%)	0 (0%)	
Unknown	1 (0.8%)	0 (0%)	0 (0%)	
Missing	41	0	8	
Skin mucosal lesions	**131**	**13**	**7**	0.12
Yes	97 (74%)	12 (92%)	5 (71%)	
No	29 (22%)	0 (0%)	1 (14%)	

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Characteristic	No immunosuppression N = 173[1]	Unknown N = 13[1]	Yes immunosuppressed N = 15[1]	p-value[2]
Unknown	5 (3.8%)	1 (7.7%)	1 (14%)	
Missing	42	0	8	
Localized lymphadenopathy	**130**	**13**	**7**	>0.9
Yes	31 (24%)	3 (23%)	1 (14%)	
No	88 (68%)	9 (69%)	6 (86%)	
Unknown	11 (8.5%)	1 (7.7%)	0 (0%)	
Missing	43	0	8	
Generalized lymphadenopathy	**130**	**13**	**7**	0.8
Yes	19 (15%)	1 (7.7%)	2 (29%)	
No	98 (75%)	11 (85%)	5 (71%)	
Unknown	13 (10%)	1 (7.7%)	0 (0%)	
Missing	43	0	8	
Fatigue	**131**	**13**	**7**	0.8
Yes	97 (74%)	9 (69%)	6 (86%)	
No	33 (25%)	4 (31%)	1 (14%)	
Unknown	1 (0.8%)	0 (0%)	0 (0%)	
Missing	42	0	8	

[1]n (%)
[2]Fisher's exact test

Table 3: Clinical Severity by Immunosuppression

Characteristic	No immunosuppresses N = 173[1]	Unknown N = 13[1]	Yes immunosuppressed N = 15[1]	p-value[2]
severity category	**124**	**13**	**7**	0.4
Mild	12 (9.7%)	1 (7.7%)	0 (0%)	
Moderate	57 (46%)	5 (38%)	1 (14%)	
Severe	55 (44%)	7 (54%)	6 (86%)	
Unknown	49	0	8	

[1]n (%)
[2]Fisher's exact test

Table 4: Severity Score Summary by Immunosuppression

Immunosuppressed	N	mean score	median score
No	173	5.137097	5
Unknown	13	5.384615	6
Yes	15	6.000000	6

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