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Cross-Border Healthcare Collaboration and Surveillance Systems for MPOX Control between Kenya and Uganda: A Case Study of Busia County

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Abstract: Recent Mpox (Monkeypox) cases in Kenya, particularly in Busia County bordering Uganda, highlight challenges in cross-border infectious disease control. Despite its increasing prevalence, research and awareness of Mpox remain limited, with misinformation hindering prevention efforts. This study assessed the effectiveness of cross-border healthcare collaboration in Mpox response, focusing on surveillance, challenges, and strategies for improvement. Using a descriptive cross-sectional approach, 200 healthcare workers (100 from Kenya, 100 from Uganda) were selected via stratified random sampling. Data were collected through structured questionnaires and analyzed using R software, employing descriptive statistics and chi-square tests. Findings revealed that 55.6% of respondents believed Kenya and Uganda share resources fairly, while border health posts were viewed as similarly effective in both countries. However, a lack of trained personnel was a major barrier, cited by 30% of Kenyan and 28% of Ugandan respondents. Additionally, 75% supported infrastructure improvements and enhanced border health monitoring for better Mpox control. Despite existing collaboration, poor infrastructure, insufficient funding, and corruption weaken its effectiveness. Communication and data exchange remain limited, and gender disparities exist in healthcare roles. While border health posts aid Mpox detection, gaps persist in contact tracing and community engagement. The study recommends strengthening Kenya-Uganda agreements for standardized Mpox response, investing in digital surveillance technologies, training healthcare personnel, and utilizing mobile health solutions for improved reporting and case tracking.

Keywords: *misinformation, surveillance, R software and tracing.*

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I. INTRODUCTION

The U.S.-Mexico Border Health Commission supports disease surveillance, disaster preparedness, and health promotion initiatives worldwide, according to Moya et al., 2021. According to Kim and Cho's 2021 study, there are still difficulties in integrating healthcare systems in such a politically and economically varied area. According to a study by Kim and Cho (2021), the United States and Canada worked together to stop the COVID-19 epidemic from spreading. According to the report, limiting the virus's cross-border transmission was made possible by efficient communication and collaborative decision-making over border closures and quarantine regulations. Notwithstanding these achievements, the study identified deficiencies in the distribution of vaccines and the coordination of healthcare resources, which were made worse by disparate national healthcare systems and regulations.

According to earlier studies, the area along the South American border between Brazil and Peru has been a hotspot for the spread of tuberculosis (TB). Ohkado et al. (2024) looked at cross-border TB control health programs. The study came to the conclusion that preventing the spread of tuberculosis required cooperative surveillance, the exchange of diagnostic tools, and coordinated public awareness efforts. However, complete collaboration is still hampered by uneven healthcare facilities and political unrest.

Heenan investigated the UK-Ireland health cooperation in 2021, with a special emphasis on cross-border medical services for COVID-19 control. The study underlined the value of cooperative immunization campaigns, common health insurance agreements, and shared healthcare services. Nonetheless, the researchers found that maintaining long-term cooperation was hampered by the political unpredictability that followed Brexit. Carpenter et al.'s 2022 study on the management of foot-and-mouth disease (FMD)

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along the France-Spain border emphasized effective collaboration between the human and animal health departments, with a focus on common vaccination programs, public awareness campaigns, and cooperative surveillance networks.

Oliveira (2021) investigated the difficulties in treating multi-drug-resistant tuberculosis (MDR-TB) along the border between Germany and Poland. The study found that despite strong cooperation between public health institutions in the two countries, resource limitations, cross-border migration, and healthcare system inequalities remained significant barriers to disease management. The report encouraged improving the health infrastructure and bolstering the region's capacity to carry out cooperative research.

Public health efforts between the Asian nations of India and Pakistan have historically failed due to political and cultural barriers. In 2022, Nunes looked into cross-border health initiatives to reduce cholera and HIV/AIDS. The report claims that due of ongoing political difficulties and the lack of a formal bilateral health agreement, the overall impact has been little, even though cross-border clinics and cooperation immunization initiatives have been successful. Chu et al., 2022 examined joint initiatives to improve border health surveillance and combat infectious diseases in China, with a focus on China-Mongolia border health networks.

The study found that the containment of epidemics like avian flu was facilitated by coordinated emergency responses, cross-border vaccination efforts, and the sharing of health information. However, issues including cultural disparities and inadequate medical facilities in isolated border villages were identified as obstacles to more fruitful collaboration. The 2021 study by Yek et al. concentrated on cross-border health programs to stop malaria and dengue fever along the Thailand-Cambodia border. The study emphasized the importance of combining resources and working together on research projects to combat these diseases. Cooperative epidemiological monitoring, healthcare professional training, and joint health postings proved to be highly beneficial despite logistical challenges and linguistic barriers.

Hrynick et al.'s 2021 study on the collaboration between Cameroon and Nigeria in combating cholera outbreaks along their shared border in Africa. The study found that collaborative immunization efforts, pooled water cleanliness programs, and integrated surveillance networks all helped to contain the outbreaks. However, the study also highlighted the challenges in coordinating among national health authorities due to differences in health system capabilities.

Affected countries including Guinea, Sierra Leone, and Liberia improved their cross-border collaboration during the West African Ebola outbreak in 2014–2016. The focus of Ojo and Adedayo's 2022 analysis was the Economic Community of West African States' (ECOWAS) regional health security framework. The study demonstrated that regional emergency response mechanisms, cooperative disease monitoring, and cross-border information exchange were essential in halting the spread of Ebola. Notwithstanding these achievements, efforts were nevertheless hampered by political unpredictability and a lack of adequate healthcare resources.

The East African Community (EAC) has initiated several initiatives to address cross-border health threats such as HIV/AIDS and malaria. In 2022, Ssengooba et al. examined the regional health strategy of the EAC, focusing on cooperative disease surveillance, pooled resources, and coordinated responses. According to the study, regional cooperation greatly enhanced public health results; however, complete integration was hampered by disparities in healthcare facilities among member states. Given their lengthy shared border, Kenya and Uganda have a history of working together on cross-border healthcare initiatives to stop the spread of infectious illnesses. Kitenge's 2024 study examined the joint efforts of the two countries to fight malaria, cholera, and HIV/AIDS. The study emphasized the importance of shared health posts in border regions, which played a key role in the early identification and management of these illnesses. In order to enhance coordination in disease surveillance and control, the East African Community (EAC) framework has also made it easier for health authorities from the two nations to meet on a regular basis. But obstacles like poor health infrastructure, particularly in isolated border areas, and disparities in healthcare financing and regulations have prevented this partnership from reaching its full potential. In 2023, Tasha and Elessa conducted a study on cross-border health activities focused on maternity and child health, malaria control, and immunization campaigns.

The Eastern Africa Public Health Network's efforts to coordinate health operations across the Kenya-South Sudan border are still beset by significant challenges, the study found. These include a lack of skilled healthcare personnel, poor infrastructure, and sporadic communication between the two administrations. Nonetheless, the effectiveness of border health posts and mobile vaccination teams in containing measles and cholera epidemics highlights the potential of cross-border health initiatives to address these problems.

The importance of cross-border healthcare collaboration has been further highlighted by the 2024 Mpox (Monkeypox) outbreak in East and Central Africa, which included Kenya. According to a 2022 World Health Organization (WHO) assessment, the outbreak was closely linked to cross-border transmission, especially between countries like Kenya, Uganda, and the Democratic Republic of the Congo (DRC), where Mpox had been common. According to research like Mutua and Felix (2023), Kenya and Uganda worked together to create joint monitoring systems with their shared border regions. These systems included the use of shared diagnostic facilities and data interchange for prompt reaction. Regional cross-border task groups formed during the outbreak were successful in containing the spread, although logistical challenges like population movement and resource shortages at border health posts hindered more effective responses. The latest outbreak also underscored the need for improved border health protocols, more investment in health infrastructure, and enhanced disease surveillance to stop the cross-border transmission of novel diseases like mpox.

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A. Statement of the Problem

Recent Mpox (Monkeypox) instances in Kenya, especially in Uganda-bordering Busia County, have brought attention to the serious difficulties in preventing the cross-border spread of infectious illnesses. The County Government of Busia is in charge of managing the Alupe sub-county hospital, which was first placed under quarantine during the COVID-19 pandemic, and the Busia County Referral Hospital. In contrast, the MoH Uganda is in charge of the Busia District Hospital, Nambale Health Center IV, and Masafu Hospital, which are all under the supervision of the Busia District Health Office (DHO). Research and knowledge of Mpox are lacking in the area, despite the disease's increasing prevalence. Efforts to stop the spread of Mpox are made more difficult by the prevalence of myths and false information about the disease. This research sought to assess the effectiveness of cross-border healthcare collaboration in addressing the Mpox outbreak, with a focus on understanding the challenges, opportunities, and recommendations for improving the joint surveillance, prevention, and response mechanisms in the border regions. The findings could inform better strategies for Mpox control in the region and offer insights into improving cross-border health systems to prevent future outbreaks of similar diseases.

B. Purpose of the Study

The purpose of this study is to evaluate cross-border healthcare collaboration and surveillance systems for mpox control between Kenya and Uganda: a case study of Busia County.

C. Objectives

- To assess the effectiveness of cross-border healthcare collaboration between Kenya and Uganda in controlling Mpox.
- To examine the role of border health posts and surveillance systems in the early detection and prevention of Mpox at the Kenya-Uganda border.
- To identify challenges and barriers in cross-border healthcare cooperation and Mpox surveillance between Kenya and Uganda.
- To propose strategies for enhancing cross-border Mpox surveillance and healthcare coordination to prevent future outbreaks between Kenya and Uganda.

II. EMPIRICAL REVIEW

Recent Mpox (Monkeypox) instances in Kenya, especially in Uganda-bordering Busia County, have brought attention to the serious difficulties in preventing the cross-border spread of infectious illnesses. The County Government of Busia is in charge of managing the Alupe sub-county hospital, which was first placed under quarantine during the COVID-19 pandemic, and the Busia County Referral Hospital. In contrast, the MoH Uganda is in charge of the Busia District Hospital, Nambale Health Center IV, and Masafu Hospital, which are all under the supervision of the Busia District Health Office (DHO). Despite Mpox's rising incidence, there is a dearth of research and understanding about the disease in the region. The abundance of myths and inaccurate information about Mpox complicates efforts to curb its spread. Cooperative frameworks, such as regional health networks and cooperative epidemic response efforts, have often been linked to effectiveness, despite the fact that WHO and CDC's global and regional responses to Mpox have differed. It has been established that improving disease surveillance and control necessitates constructive and effective means of exchanging data among neighbors, particularly in regions with open borders, high levels of mobility, and insufficient medical facilities. Mpox is a significant issue in Africa, particularly in West and Central Africa, where the virus frequently spreads across country borders. In Central Africa, where Mpox has been endemic in countries like Cameroon and the Democratic Republic of the Congo (DRC), a 2025 study by Abdulrahim et al. examined how cross-border collaboration can aid in the disease's control. This study found that the lack of coordinated surveillance and healthcare infrastructure along borders contributed to the continued spread of Mpox. The study pointed out that although a number of countries in the region have established joint health programs and border surveillance systems, uneven funding and policies have prevented them from reaching their full potential. According to a similar study done in Nigeria by Amoo in 2024, health systems near borders often lack the capacity to address cross-border sickness epidemics, particularly when there are logistical challenges, political upheaval, and cultural obstacles. However, regional health cooperation frameworks like the Economic Community of West African States (ECOWAS) have been seen as crucial tools for improving epidemic response and health surveillance. These findings emphasize the need for better inter-country communication and integrated disease management initiatives to prevent the spread of Mpox and other infectious diseases in Africa. Studies on border health, disease surveillance, and public health interventions have shed light on Kenya's challenges in managing outbreaks that cross international borders, despite the fact that there is currently little research on Mpox in the country. Border health posts and mobile health units are crucial for the early detection and prevention of infectious diseases, including Mpox, according to a study by Lamarque and Brown (2022). Kenya's cross-border health cooperation with Tanzania and Uganda was also examined in the study. The study did note that these jobs often lack medical supplies, have insufficient staffing, and have limited diagnostic capabilities.

A study by Gwacham et al. (2023) claims that early detection and response to Mpox outbreaks have been hampered by the absence of integrated disease surveillance networks between Kenya and Uganda, especially in areas like Busia. Effective Mpox surveillance is nevertheless hampered by issues including political disagreements, a lack of shared data systems, and poor cross-border communication, even with attempts to strengthen regional collaboration through programs like the East African Community (EAC) health frameworks. To address these issues, the report suggests creating cross-border health protocols and common regional

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health data systems to enhance response to Mpox epidemics and boost readiness for upcoming public health crises.

III. THEORETICAL REVIEW

➢ *Health Systems Strengthening Theory*

The Health Systems Strengthening Theory is endorsed by the World Health Organization (WHO) and other global health organizations. The concept gained popularity in the early 2000s after the WHO made it a public priority in its 2007 framework for strengthening health systems. This concept highlights the necessity of strengthening healthcare systems at all levels in order to improve disease control and public health outcomes. For infectious diseases like Mpox to be detected early, responded to quickly, and contained in Kenya and Uganda—particularly at border health posts—health systems must be strengthened. Crucial components such as infrastructure, diagnostic equipment, and the ability of the healthcare workforce are necessary for an efficient response. Since WHO stresses that strong health systems are necessary for controlling outbreaks, incorporating preventative measures, and monitoring diseases, this hypothesis is highly relevant to the study.

➢ *Surveillance Theory*

Using frameworks like the Integrated Disease Surveillance and Response (IDSR) system, organizations such as the World Health Organization (WHO) and the African Union (AU) have promoted the Surveillance Theory, which is based on the ideas of public health epidemiology. WHO first developed the IDSR framework in 1998 and then updated it in 2010 to enhance disease surveillance, especially in African regions. In order to monitor and control diseases within communities, this theory highlights the significance of collecting and evaluating health data. In border regions like Busia, effective monitoring systems are crucial for early disease detection, containment, and public health action planning. The IDSR framework, backed by the WHO and AU, promotes rapid outbreak response, information sharing, and cross-border collaboration to successfully manage diseases like Mpox. Without efficient surveillance, outbreaks in border regions can get worse, putting the health of both neighboring countries at risk.

➢ *International Cooperation and Collaboration*

The World Health Organization (WHO) actively supports the International Cooperation and Collaboration Theory, which has its roots in global health governance notions, through frameworks such as the International Health Regulations (IHR). The IHR was revised in 2005 to enhance global cooperation in preventing and managing medical emergencies after it was first adopted in 1969. According to this hypothesis, cross-border collaboration is necessary to address transnational health threats like Mpox. Despite the strength of each nation's health system, collaboration is necessary to manage diseases that transcend national borders. The IHR framework promotes coordinated epidemic responses, information sharing, and resource mobilization to prevent and control the spread of illness in Kenya and Uganda. Coordinated containment strategies, surveillance data exchange, and coordinated health assessments are some of the coordinated actions needed to improve regional public health security.

IV. RESULTS AND DISCUSSION

➢ *Introduction*

R software was used to do statistical analysis on the information gathered from the questionnaires. The data was analyzed using the following techniques: To give a general picture of the demographics of the study population and their answers to the questions about surveillance systems, cross-border healthcare collaboration, and Mpox knowledge, descriptive statistics (mean, median, standard deviation, and frequencies) were computed.

➢ *Gender vs. Role in the Hospital*

The table 1 below shows gender against role in the hospital for the respondents

Table 1 Gender vs. Role in the Hospital

Role	Male	Female
Healthcare Worker	63.64% (21)	36.36% (12)
Public Health Officer	64.71% (11)	35.29% (6)
Border Security Staff	75% (9)	25% (3)
Government Official	62.5% (5)	37.5% (3)
Other	50% (5)	50% (5)
Total	63.75% (51)	36.25% (29)

Based on table 1, 63.64% of healthcare workers were Male respondents and 36.36% were of Female respondents. 64.71% of Male respondents and 35.29% of Female respondents were Public Health Officers. 75% of Male respondents and 25% of Female respondents were Border Security Staff. 62.5% of Male respondents and 37.5% of Female respondents were Government Officials. However, the percentage is evenly split between Male and Female respondents, each at 50%.

➢ *Roles of respondents in the Hospital*

The table 4.3 below shows the gender against role in the hospital.

Table 2 Roles of respondents in the Hospital

Role in the Hospital	***Percentage***	***Female Percentage***
Healthcare Worker	63.64% (21)	36.36% (12)

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Public Health Officer	64.71% (11)	35.29% (6)
Border Security Staff	75% (9)	25% (3)
Government Official	62.5% (5)	37.5% (3)
Other	50% (5)	50% (5)
Total	63.75% (51)	36.25% (29)

Based on table 1, the male respondents dominated in the Healthcare Worker, Public Health Officer, and Border Security Staff roles. However, female respondents are more evenly distributed across roles, with a particularly balanced split (50/50) in the other category. However, the Border Security Staff category has the largest proportion of Male respondents (75%).

➢ *Effectiveness of Cross-Border Healthcare Collaboration*

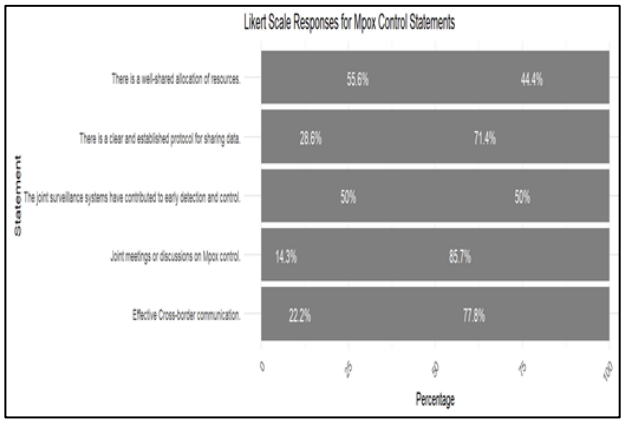

Fig 1 Effectiveness of Cross-Border Healthcare Collaboration

According to figure 1 above, 55.6% of the respondents concurred that Kenya and Uganda share resources fairly. The integrated surveillance system has helped with early identification and control, according to 50% of respondents. Nonetheless, 28.6% of those surveyed concurred that there is a well-defined and well-established mechanism for data exchange. A modest percentage of respondents (22.2%) highly agreed with the effectiveness of cross-border communication, indicating that they think health authorities' communication efforts are strong and effective. Additionally, 14.3% of respondents agreed on the joint meeting or discussion on MPOX virus containment. Effective cross-border communication appears to be difficult in this situation.

The majority of respondents (23) either feel neutral or disagree with the statement, despite a small minority (15) believing it to be effective. This suggests that a sizable percentage of respondents believe that communication attempts are not totally successful. This could be because of inadequate infrastructure, a lack of money, or other constraints that make it difficult for health authorities to communicate effectively across national boundaries.

Especially in low- and middle-income nations, the efficiency of cross-border communication in health systems is a crucial concern. In order to respond to threats to public health, such as disease outbreaks, communication amongst health authorities is essential. Numerous studies have been conducted on this subject, with some supporting and others criticizing efforts at cross-border communication. According to the WHO, effective cross-border communication is essential in the fight against threats to global health since technology allows for quick information sharing. For example, from 2014 to 2016, coordinated communication across neighboring countries helped contain the spread of the Ebola outbreak in West Africa. However, the WHO acknowledged the existence of communication barriers like delays and insufficient data transmission in some regions. The WHO's findings indicate that cross-border communication coordination can significantly improve disease control.

➢ *Border Health Posts and Surveillance Systems.*

Effective are border health posts in detecting Mpox cases

Table 3 Border Health Posts and Surveillance Systems

Country	Very Effective	Effective	Less Effective	Total
Kenya	11	21	8	40
Uganda	8	16	16	40
Total	19	37	24	80

According to table 3, the Chi-Square statistic was 3.8158, and the critical value at a 0.05 significance level was 5.991. Since the calculated statistic is less than the critical value, the null hypothesis is not refuted. This suggests that there is little difference in perceptions of the effectiveness of border health posts in Kenya and Uganda. The data suggests that Kenyan and Ugandan perspectives on the effectiveness of border health posts in identifying Mpox cases are comparable. The survey's findings show no statistically significant differences, indicating that perceptions of these health posts' effectiveness are similar in the two nations.

According to the World Health Organization (WHO), effective border health stations are necessary to combat cross-border diseases like mpox and ebola. However, the WHO study found that border health posts in Kenya and Uganda have a similar role in early detection and provide crucial support in stopping the spread of disease. The similar sentiments in the two countries may be explained by the fact that, despite the importance of cross-border health authorities' cooperation, its effectiveness typically depends on infrastructure, political stability, and financial allocation. A study on cross-border health cooperation between Kenya and

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Uganda was carried out by the East African Health Research Consortium.

Despite challenges with resource allocation and logistical support, the study found that both countries showed comparable efforts and outcomes in the diagnosis and management of cross-border illnesses. This corroborates the finding that border health stations in Kenya and Uganda are equally effective in identifying Mpox patients. A 2018 African Union study on Kenya-Uganda health cooperation found that even when both countries take part in cooperative health programs, personnel and training disparities affect the effectiveness of their health posts.

Specifically, it was found that Kenyan border health stations were more equipped than Ugandan ones, leading to different evaluations of their effectiveness. Although the study recognized the value of cross-border health cooperation, it also identified variances in the public's and health officials' perceptions of these posts' efficacy, which may account for the perceptional differences that were not statistically significant in this case.

The Chi-Square test results, which show no appreciable difference in attitudes, usually corroborate studies showing that Kenyan and Ugandan perspectives on the effectiveness of border health posts in detecting Mpox were similar. However, discrepancies observed in studies on the resources and facilities of health posts suggest that there may be underlying differences that the statistical analysis overlooked. Therefore, there may be slight variations in the effectiveness of these health posters that necessitate further study, even if the analysis shows no appreciable variances.

- *Challenges and Barriers in Cross-Border Healthcare Cooperation.*

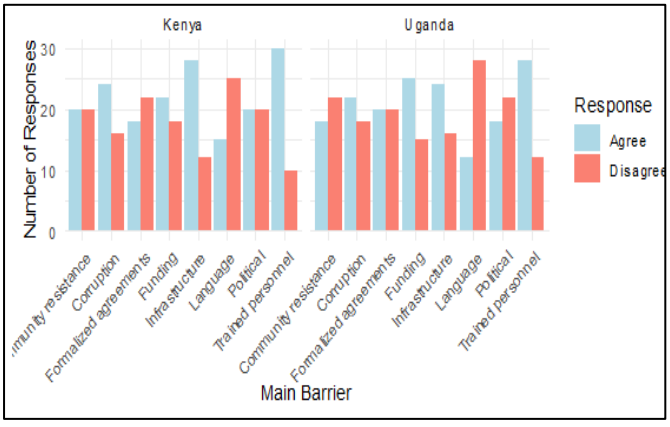

Fig 2 The challenges and barriers in cross-Border healthcare cooperation.

Based on figure 2, the lack of trained personnel or health workers is the most significant barrier in both countries.

Thirty percent (12) of Kenyan respondents and twenty-eight percent (11) of Ugandan respondents concur with this barrier. Both nations see this as a significant obstacle, indicating that a shared problem impeding efficient healthcare delivery in border regions may be the lack of qualified healthcare personnel. Another significant obstacle is inadequate infrastructure, such as border posts and highways. 60% (24) of respondents in Uganda and 70% (28) of respondents in Kenya concur. Geographical or infrastructural differences in the two countries' border regions could be the cause of the discrepancy in agreement, with Kenya being marginally more concerned.

Another important problem that surfaced was the lack of funding for cross-border health activities. Uganda states that 62.5% (25) of respondents agree, compared to 55% (22) in Kenya. This implies that obtaining funding for cross-border health initiatives is seen as a bigger obstacle in Uganda. The distribution of political disputes between the two nations is more evenly distributed. In both nations, 45% (18) of Ugandan respondents and 50% (20) of Kenyan respondents concur. Although political obstacles exist, opinions in both nations regarding the importance of this problem appear to be evenly split. In both nations, linguistic or cultural barriers seem less significant. Thirty percent (12) of Kenyans and 37.5% (15) of Ugandans agree. Curiously, the vast majority of responders in both nations reject this obstacle, suggesting that cultural differences might not be the main obstacle to international healthcare collaboration.

Corruption or mismanagement of resources is identified as a challenge in both countries, with 60% (24) Kenyan respondents agreeing and 55% (22) Ugandan respondents agreeing. This suggests that corruption might be a shared concern in both countries' healthcare sectors, potentially affecting cross-border health cooperation efforts.

The absence of official agreements or procedures indicates that both nations are comparatively equally concerned. Uganda has 50% (20) agreeing, compared to 45% (18) in Kenya. Both nations concur that cooperation may be hampered by the lack of explicit, formal agreements. According to 50% (20) of Kenyan respondents and 45% (18) of Ugandan respondents, community resistance to interventions seems to be a common worry. This obstacle is a reflection of possible social or cultural issues that could reduce the efficacy of community-level health treatments. Kenya and Uganda agree that a lack of funding, a lack of qualified personnel, and poor infrastructure are the main barriers to effective cross-border healthcare cooperation. This suggests that regional collaboration between the two countries may focus on addressing these shared issues in order to improve the effectiveness of cross-border healthcare. The relatively low number of respondents who agreed suggests that neither country views the language/cultural differences barrier as a major impediment to cross-border collaboration. This conclusion might be supported by the ease of communication between medical experts in the two countries or the use of the same language in certain border districts. Regarding corruption or resource mismanagement as a barrier, both nations exhibit a comparatively high degree of agreement. This suggests that improved resource

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management, control, and transparency may be required for cross-border health initiatives.

According to the East African Community's (EAC) 2020 Health Cooperation Report: According to the research, two common challenges in cross-border healthcare that the EAC's member nations have are a lack of infrastructure and a skilled labor scarcity. The paper states that the underfunding of healthcare programs is a regional issue. The World Health Organization, or WHO: The WHO has repeatedly identified inadequate funding and facilities as the primary problems facing East African health systems. It is often emphasized how critical it is to resolve these problems in order to improve the effectiveness of cross-border disease control. The 2019 East African Community Health Study. Even while medical professionals may not consider cultural differences to be as important, community opposition remains a big issue in rural places, according to a study on community-based health interventions in Kenya and Uganda. The research states that improved community involvement and education are necessary. A 2018 Transparency International study found that public discourse often exaggerates corruption and bad management, and that because corruption often takes place deeper inside the political system, governance improvements may not immediately address systemic health issues. Based on the findings, Kenya and Uganda both consider certain similar barriers—like a lack of funding, a shortage of qualified staff, and inadequate infrastructure—to be significant barriers to cross-border healthcare collaboration.

➢ *Surveillance Activities Are Currently Conducted*

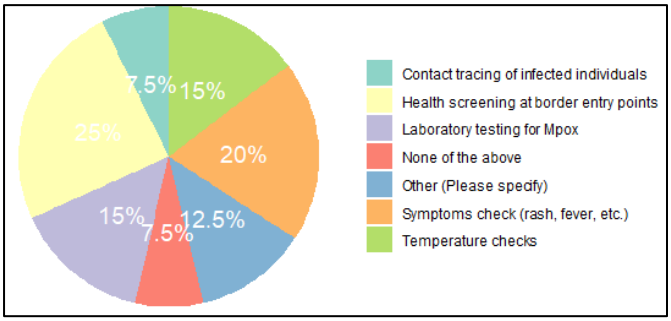

Fig 3 Surveillance Activities Are Currently Conducted

The pie chart visually represents the distribution of responses to the survey question regarding the surveillance activities conducted at the border for detecting Mpox, based on 40 respondents. Each activity is represented by a bar, and the length of the bar corresponds to the number of respondents who selected that activity. The percentages give insight into how prevalent each surveillance activity is perceived to be. Health screening at border entry points is the most commonly reported surveillance activity, with 25% of respondents indicating its use at the border. This suggests that border health screening is a primary measure for detecting Mpox. Symptoms check (rash, fever, etc.) follows closely behind, with 20% of respondents stating that symptoms are actively monitored. This implies that health workers are focused on identifying individuals with visible signs of Mpox at border points. Temperature checks and laboratory testing for Mpox both received 15% of responses, suggesting that these are moderate but essential practices, especially for confirming the presence of the virus or identifying fever as a symptom. Contact tracing of infected individuals was reported by a smaller portion of respondents (7.5%), highlighting that this activity is either less commonly employed or less prioritized at the border for Mpox detection. A small number of respondents (7.5%) indicated that no surveillance activities are being carried out at the border, which suggests that some respondents may have felt that there is a lack of adequate measures in place. Other specified activities received 12.5% of responses, indicating that respondents may have mentioned additional surveillance practices not listed in the survey options.

The prominence of health screening (25%) and symptoms checks (20%) highlights a proactive approach at border entry points to detect Mpox early. This is a standard measure in epidemic control, as it helps identify individuals who may be symptomatic and prevent the spread of disease. The equal percentage (15%) for temperature checks and laboratory testing suggests that these activities are also seen as significant, though perhaps not as heavily emphasized as symptom checks and screenings. Laboratory testing is essential for confirming the diagnosis of Mpox, while temperature checks can quickly identify individuals with fever, a common symptom of the disease. The relatively low number of respondents (7.5%) indicating the use of contact tracing suggests a gap in follow-up measures. The inadequate use of contact tracing, which is an essential component of managing Mpox epidemics, may indicate problems with personnel, resource allocation, or cross-border collaboration. It is concerning because 7.5% of respondents said that none of the actions are taking place at the border. This would suggest that some border crossings lack the manpower or funding necessary to conduct effective monitoring operations. The usage of non-standard or regionally specific techniques not included in the study may be the reason why 12.5% of respondents mentioned other activities. This implies that localized attempts may be being performed at some border places even while common approaches are in place. WHO recommendations and studies consistently stress the importance of health screening and symptom checks at borders during infectious disease epidemics, including Mpox. The survey's findings are in line with these best practices because participants strongly agreed with health screening and symptom check.

According to the EAC, border health checkpoints ought to give priority to early detection techniques including taking temperature readings and identifying symptoms. This supports the results showing that these behaviors are typical for border Mpox detection. According to some research, especially in settings with limited resources, laboratory testing and contact tracing should take precedence over early symptom-based surveillance since they yield more precise results for stopping the spread of the disease. The very low percentage of respondents (7.5%) who said contact tracing was a routine practice would suggest that these more sophisticated methods are not given enough attention, which could understate how crucial they are to outbreak

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containment. According to certain research, in some places where epidemics are detected through local networks and informal reporting, community-based surveillance may be more successful. There may be a gap between official health surveillance initiatives and community monitoring at the grassroots level, as this stands in contrast to the more structured, clinical-based surveillance methods described below. According to the data, health screening and symptom checks are given priority in border surveillance operations to identify Mpox in the surveyed regions, which generally adhere to best standards. However, as laboratory testing and contact tracing are essential for halting the disease's spread, their restricted utilization may be an area for improvement. Although the results are in line with the WHO and other international health organizations' guidelines, they might not be as focused as studies that support more thorough surveillance methods, such as contact tracing. The shortcomings in cross-border healthcare coordination require more research and enhancements.

- *Strategies for Enhancing Cross-Border Surveillance and Healthcare Coordination*

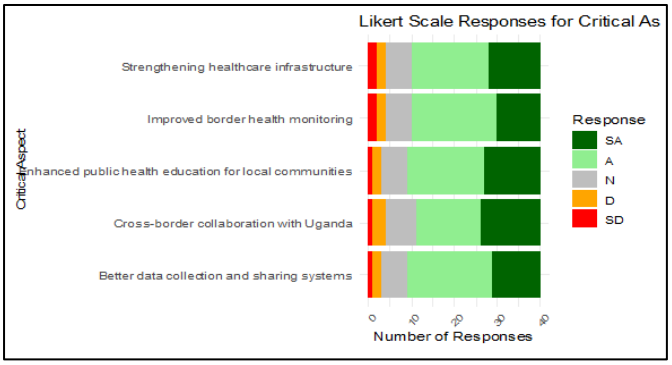

Fig 4 Strategies for Enhancing Cross-Border Surveillance and Healthcare Coordination

Based on figure 4, a majority (75%) of respondents agree that enhancing healthcare infrastructure is essential for effective Mpox control. 75% of respondents also support the idea of improving border health monitoring systems to detect and control Mpox at entry points. 72.5% of respondents emphasize the importance of cross-border collaboration between Kenya and Uganda to effectively manage Mpox outbreaks. 77.5% agree that educating local communities is crucial for preventing and managing Mpox, indicating a need for more public health awareness. Better data collection and sharing systems: 77.5% of respondents agree that improving data collection and real-time sharing is vital for Mpox preparedness and response.

There is broad agreement that border health monitoring and healthcare infrastructure are the most important factors. Cross-border cooperation and public health education are likewise regarded as essential, but their successful execution may require additional focus and funding. Although there are some reservations regarding governance and the efficacy of these systems, data gathering and sharing are emphasized as being crucial.

The findings are corroborated by studies conducted by the East African Community (EAC) and the World Health Organization (WHO), which highlight the need of efficient data systems, cross-border cooperation, and a robust healthcare infrastructure. To properly address the obstacles in Mpox preparedness, certain studies, including those published in the Journal of Global Health and Transparency International, warn that issues including poor management and community-based health initiatives must also be taken into account

Analyzing research with a hypothesis typically involves several steps that include both descriptive and inferential statistical methods. Below is a general guide to how you can analyze your research with hypotheses, with a focus on testing the hypotheses you've formulated in your study.

V. CONCLUSIONS

The study focused on the cross-border healthcare collaboration, surveillance systems, and Mpox awareness among healthcare workers, public health officers, border security staff, and government officials in Kenya and Uganda. The results show that although there is cross-border healthcare collaboration, issues including poor infrastructure, a paucity of skilled workers, a lack of money, and corruption make it less successful. According to the study, the majority of participants recognized that Kenya and Uganda are working to share resources, but communication and data exchange are still not very effective. Furthermore, border health posts are essential for identifying Mpox cases, however Kenya and Uganda do not differ greatly in how effective they are.

The positions of respondents within healthcare systems vary by gender, according to statistical study. Male respondents are more likely to work in border security and healthcare occupations, whereas female respondents are more evenly distributed throughout a variety of roles. Even when surveillance measures like laboratory testing, symptom checks, and health screenings are used, there are still gaps in contact tracking and community engagement. Moreover, political conflicts and corruption are two important factors impacting cross-border healthcare collaboration.

In line with regional and global findings on cross-border healthcare, the study emphasizes similar challenges faced in East African health collaborations. Both countries agree that cross-border surveillance and cooperation are important, but in order to improve disease control efforts—particularly in the face of emerging threats like Mpox—institutional and structural issues need to be fixed.

RECOMMENDATIONS

The study recommended a need to strengthen an MoU or agreement between Kenya and Uganda to improve data exchange and standardized protocol for reporting and responding to Mpox and other cross-border health threats.

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There is need for Kenya and Uganda to invest in modern surveillance technologies, including digital health systems for real-time monitoring and reporting with advanced diagnostic tools.

There is need for continuous seminar and training programs for healthcare workers, border security staff, and public health officers on Mpox detection and management. This will strengthen epidemiological training to improve disease surveillance and outbreak response.

There is need for utilization of mobile health (mHealth) solutions to facilitate information sharing and case reporting between border health posts. This will develop digital tracking systems for contact tracing to improve response to outbreaks.

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