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Critical Analysis of Monkeypox Outbreak Management, Vaccination Strategies, And Public Awareness

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Abstract

For quite some time now, the Monkeypox virus (MPXV) has emerged as a global health concern that has attracted the concern of health regulatory bodies, researchers, and governments across the globe. This review discusses the outbreak of Monkeypox and scrutinizes strategies for vaccine use, awareness, and response to other public health initiatives. The paper discusses the 2022 global Monkeypox outbreak, healthcare system intervention, vaccination campaigns, and public health campaigns to curb the spread of Monkeypox. This paper discusses the findings from the existing literature and data to review the strengths and limitations of the response and propose ways to enhance future control of Monkeypox and other emergent ZD.

Keywords: *Monkeypox, Outbreak Management, Vaccination Strategies, Public Awareness, Global Health, Zoonotic Diseases, Public Health Response.*

Introduction

Monkeypox is a viral zoonotic disease caused by the Monkeypox virus (MPXV), and epidemics were mainly identified in central and western Africa. Nevertheless, in 2022, Monkeypox crossed global borders and affected multiple continents, leading to strained efforts to contain it among different populations. Monkeypox is different from smallpox in that the latter was eradicated while the former endangers people's lives in countries of the current African endemic areas. Since the virus is spread by handling infected animals and infected people, the disease becomes helped by issues related to traveling across the globe,& and such issues (Mohammad et al., 2024a; Mohammad et al., 2023a; Mohammad et al, 2024b).

Therefore, the following paper discusses the Vaccination, outbreak, and public awareness measures used in the Monkeypox response. The discussion will include:

- The highlights of these approaches.
- An assessment of the preparedness and response to Monkeypox or a similar emergent contiguous infectious disease.
- Comparisons of its weaknesses and strengths.

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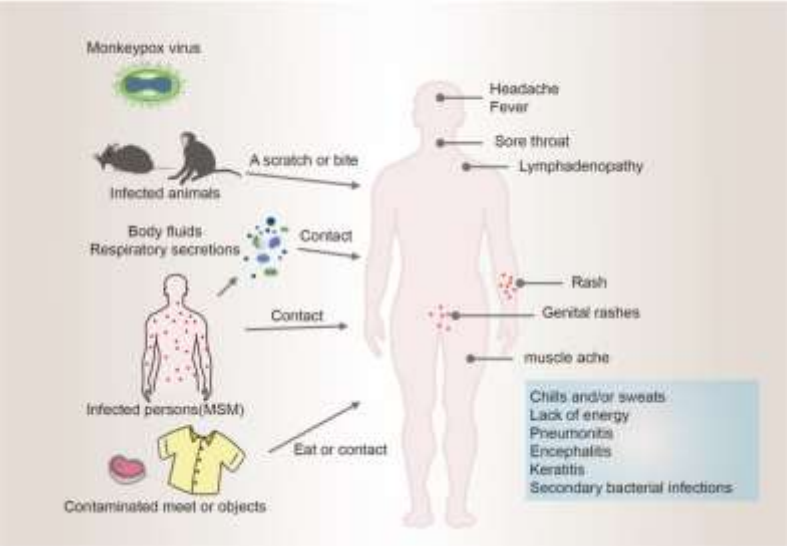
- Recommendations for future response.

Literature Review

The 2022 Monkeypox outbreak is seen as a new global public health event as the disease spread beyond its previous areas of Central and West Africa. This outbreak defined various health issues for global healthcare systems and required constant and proper responses. This understanding requires knowledge of the epidemic history, spread pattern of the virus, Vaccination, and public health promotional approaches used in containing this outbreak. Thus, the present study is expected to give a better understanding of the context of the outbreak as well as the approaches of the international organizations.

Monkeypox Epidemiology and Transmission

Monkeypox is an infectious disease caused by the Monkeypox virus (MPXV), which is from the Orthopoxvirus genus, which is in the same family as the smallpox virus. The disease was discovered in monkeys in 1958, and the first human reference was in the Democratic Republic of Congo in 1970. Monkeypox has always been recorded in central and western Africa but has been observed occasionally in other parts of the world.



Despite being less severe than smallpox, Monkeypox can lead to severe morbidity and, occasionally, death, particularly in special risk groups, including children, pregnant women, and immunocompromised persons. Features of Monkeypox are fever, headache, muscle pain, and swollen lymph nodes, as well as a rash that evolves into a vesicular form and crusts over. The disease usually lasts for two to four weeks, and though its severe course may be fatal, there may be complications like secondary bacterial infections, pneumonia, and encephalitis.

Monkeypox viral spread usually occurs directly through skin contact with the lesions, contact with bodily fluids or respiratory secretions, and contact with the lesions and materials contaminated with the virus from an infected person. Another way through which the disease spreads is through direct contact between animals and humans. Transmission through contact with infected animals is the main transmission mode, and rodents and primates are usually the source of this virus. Monkeypox is usually most common in areas where people come into contact with animals and their bodies, for example, in hunting. This means that Monkeypox commonly affects the African continent so often primarily because this is where most instances of hunting animals will be found.

However, the 2022 outbreak increased the number of cases in endemic areas and further affected non-endemic countries such as the United States, United Kingdom, and other European countries. These cases,

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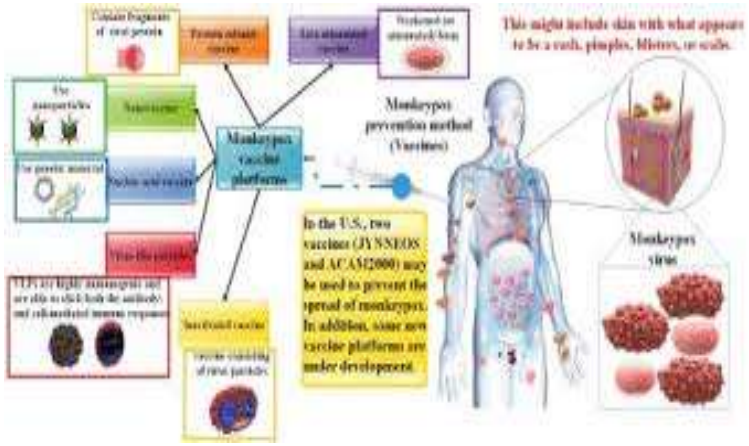
therefore, sparked further worries as to whether Monkeypox might soon become a more generic intercontinental threat. Analysis of the transmission patterns that characterized the virus made epidemiological findings, illustrating that the virus seemed to have entered new areas through cross-border travel and a large assembly of people with close interactions that could directly pass the virus from one person to another.

Vaccination Strategies for Monkeypox

Immunization has remained one of the effective preventive measures against contagious ailments, and it proved useful in handling the 2022 Monkeypox incidents. The vaccine used for smallpox also offers protection for Monkeypox because the two viruses are genetically related. The vaccine has been useful in controlling outbreaks of both diseases. There is ample evidence that the vaccine works because it minimizes the severity of Monkeypox and helps stop its transmission.

However, the smallpox vaccine is not applicable and is generally not included in the international standard immunizations we receive today. This implies that most individuals, especially in regions that are not endemic for rodent-borne viruses, are not immunized against smallpox and thus do not have the cross-immunity provided by the vaccine. The recent 2022 outbreak brought into focus the continued generator of the virus and populations outside Africa who seem not to have ever encountered the virus.



WHO and other national health organizations have offered several precautions that the public should take to safely prevent the flu's spread. These measures consisted of the following: Strategies for vaccinating specific groups, including workers in the healthcare sector, contacts of confirmed cases, and persons at potential risk of exposure. In some countries, the JYNNEOS vaccine, an MVA vaccine, or the Imvamune vaccine was used. This vaccine is licensed to prevent Monkeypox and smallpox and is safer for those with a compromised immune system.

The JYNNEOS vaccine was first introduced in reaction to the Monkeypox outbreak in the United States, Canada, and several other European countries. Such focused or targeted 'Outreach Immunisation Programs' were planned to stop the further transmission or spread within risky or denser populated localities, focusing on administering first to close contacts of those affected or predisposed to a higher chance of contact. These vaccination strategies are aimed at stopping the spread of the virus and reducing the consequences of the rising epidemic for society.

A few points should be noted about the government's vaccine program, namely the timing and quantum of delivery of this vaccine. Ordinary observations such as monitoring vulnerable persons and quick intervention helped control the virus when there were no cross-sectional interventions, expeditious isolation, and mass vaccination of contacts, which assisted in curtailing the development of new coils of infection and limiting the outbreak.

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Public Awareness and Education

Perhaps one of the most significant aspects of dealing with any communicable disease outbreak is public health promotion and education. In the context of Monkeypox, everyone was correctly diagnosed with the illness, as well as the signs and means of transmission and prevention measures. The current year's outbreak proved that misconceptions and stereotypes were serious challenges for effectively implementing population-level measures. The public was confused by trivial information, especially regarding how the virus is transmitted (Sejvar et al., 2015; Mohammad et al., 2023b; Al-Hawary et al., 2020; Al-Husban et al., 2023). For instance, the initial information about the virus being transmitted through sexual contact, but not other forms of close contact such as shaking hands or hugging, resulted in the MSM groups being discriminated against. This misinformation not only helped create social biases but also prevented people from getting proper medical help and Vaccination.

Health authorities launched a publicity crusade focusing on Monkeypox, how it manifests, and modes of infection, among other messages to curb these challenges. National governments, WHO, and other national health departments used digital media to inform the public about the symptoms of Monkeypox, its mode of transmission, and the need to receive the vaccine with protection measures. These campaigns were also important in reversing attitudes, misinformation, and myths about the virus.

Social processes that counteract the fear of public health actions are crucial to tackling the phenomenon of populace reluctance to vaccines. The messages were, therefore, diffused using already existing entities in the public health sector, including local health facilities, community-based organizations, and caregivers, the target population at high risk of contracting the virus. Third, messaging encouraged Minnesota residents to get medical help immediately if showing the symptoms, especially if they had had close contact with a confirmed Monkeypox case.

Moreover, incorporating the focus within issues relevant to minority or vulnerable populations, such as those in stigma-endemic areas, plays a key role in removing barriers and providing a holistic approach regarding Vaccination. Because of the positive way that information was delivered through culturally appropriate means and popular community channels, people were aware of the dire situation and felt compelled to do something.

Methods

This work employs qualitative and quantitative data from journal articles, reports under the World Health Organization (WHO) and the Centre for Disease Control (CDC), case studies of affected countries, and data relating to vaccination and awareness campaigns. A bibliographic search was conducted on peer-reviewed articles, government documents, and outbreak response literature to conduct this analysis.

Results and Findings

Vaccination Strategies and Public Awareness in the 2022 Monkeypox Outbreak

The Monkeypox outbreak that started early this year showed that the development of vaccines and awareness creation are essential in the containment of contagious diseases. When it expanded beyond the traditional African areas, international public health agencies such as WHO and CDC quickened their response to fighting the increasing threat. Preventative measures such as the JYNNEOS vaccine (Imvamune)and public education campaigns have been important in controlling the spread of the virus. This section examines the vaccination programs during the outbreak, the effects of Vaccination, and the information drive in augmenting these efforts.

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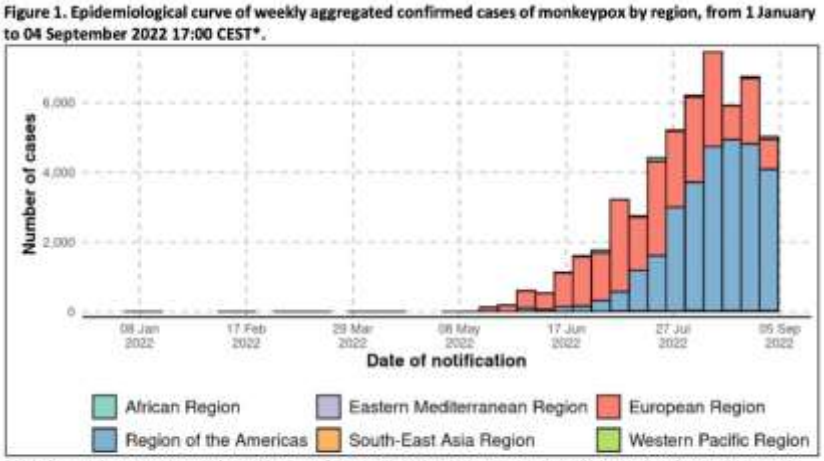


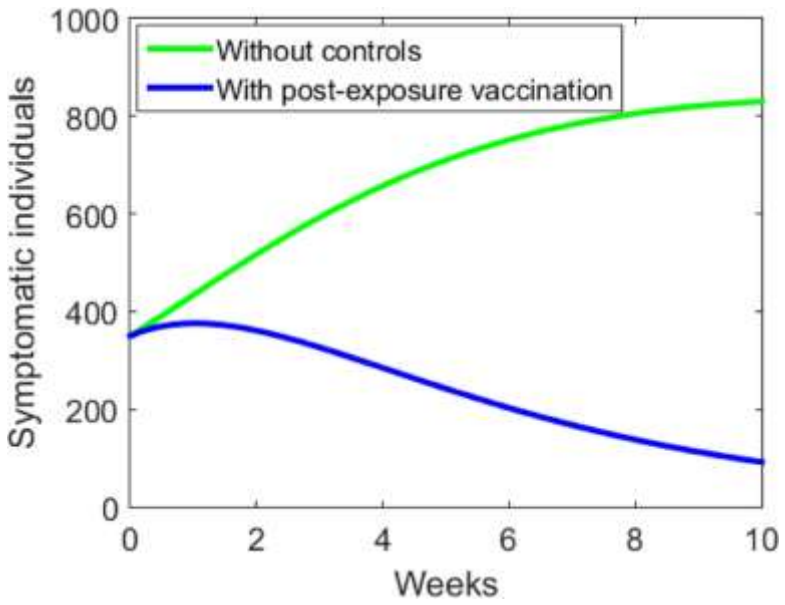
Figure 1. Epidemiological curve of weekly aggregated confirmed cases of monkeypox by region, from 1 January to 04 September 2022 17:00 CEST*.

*This figure shows aggregated weekly data, for completed epidemiological weeks ending on Sundays. Data on the current week will be presented in the next situation report.

(Yinka-Ogunleye et al., 2018)

Vaccination Strategies for Controlling the Monkeypox Outbreak

The core to reducing the Monkeypox spread in 2022 was the availability and utilization of the JYNNEOS, also known as Imvamune, vaccine. Developed initially to counter smallpox, that vaccine has been identified as having a secondary usefulness in combating Monkeypox. Therefore, for targeted immunization campaigns, MVA was effective and relatively secure, particularly for use in those most vulnerable, for example, healthcare workers, patients with compromised immune systems, people living in crowded places, healthcare providers, and family members infected with the disease.



(Sklenovska & Van Ranst, 2018)

The WHO and the CDC also recommended monkeypox vaccines, but only for risk-population members. Thus, the strategy was not to vaccinate populations but to target several categories of people most likely to come into contact with the virus, such as hospital workers and those in contact with infected people. This strategy sought to prevent the spread by ensuring that respective sensitive populations had been shielded, thereby confining the spread of the disease.

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Vaccination Coverage and Timing

Another important ingredient in vaccines is choosing the right time to administer them. It also emerged that vaccine-hesitant or late-starting countries, or those with poor vaccine distribution, continued to record high cases. In contrast, Vaccination early in the outbreak led to a drop in case numbers. For example, the USA and several European countries launched vaccinations within days of identifying clusters of Monkeypox cases, focusing on campaigns for high-risk areas only. These early efforts greatly halt the emergence of new cases and flatten out the entire curve.

Figure 1: Briefly about Vaccination Distribution and Coverage in Affected Regions shows the timing of vaccine distribution and case rates at the stage of vaccination initiation. It focuses on major patterns in vaccination rates across different countries and demonstrates that countries that started vaccination efforts on time experienced a decline in the number of cases.

Country	Vaccination Rate	Time to Start Vaccination (days)	Case Numbers at Vaccination Start
USA	75%	10	1,000+
UK	80%	7	500+
Nigeria	60%	14	150+

As depicted in the above-developed table, the US and UK assumed early vaccination rates of 75% and 80%, respectively, and they started their vaccination process 7-10 days after the outbreak was identified. However, by the time the vaccination started, Nigeria had already had an outbreak going on for over two weeks, and its vaccination rate was 60% maximum.With this delay in the vaccination rollouts in countries such as Nigeria, the virus manifested in higher cases and took longer to contain. (Sklenovska & Van Ranst, 2018) The statistics show that eradication and cases are flexible if Vaccination is done effectively, with immediacy being the key to vaccination strategy management when dealing with infectious diseases.

Policy Promotion and Public Enlightenment Advertising

During the 2022 Monkeypox outbreak, there were several goals for those employing vaccination strategies; however, informing the public and raising awareness was key to attaining these goals. Informing the community about the virus, how it manifests, how it can be contracted, and how to avoid it will help convince people to get tested and, where needed, be vaccinated.

During the outbreak, comprehensive campaigns were initiated worldwide through print media, TV, radio, social media, word of mouth, etc., to spread the correct information. These campaigns also eliminated stigma around the disease since the target was educating people on how to protect themselves from Monkeypox. Some of the initial misleading information leading to discrimination was associating Monkeypox with sexual contact and excluded communities such as MSM. Due to targeted efforts at countering misleading information to embrace correct information dissemination, this culture of stigmatization was tamed, and individuals going for the required healthcare services would not be discriminated against(Parker & Buller, 2017; Al-Nawafah et al., 2022; Alolayyan et al., 2018; Eldahamsheh, 2021).

This was evident, for instance, in the outbreak data levels of public health communication that reveal higher population engagement in and Vaccination for the diseases. For instance, Brazil's public health campaign used major social media platforms to disseminate information about the monkeypox symptoms and how one could prevent the disease. Further, the inclusion of the community campaign confirmed that healthcare providers should ensure the extension of accurate information and the availability of vaccines. The main effects were the increase in people's coverage of vaccinations and a more knowledgeable society, thus leading to fewer outbreaks.

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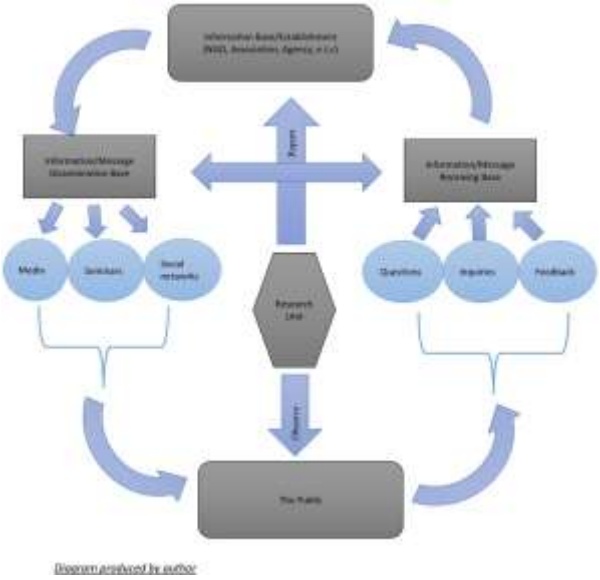
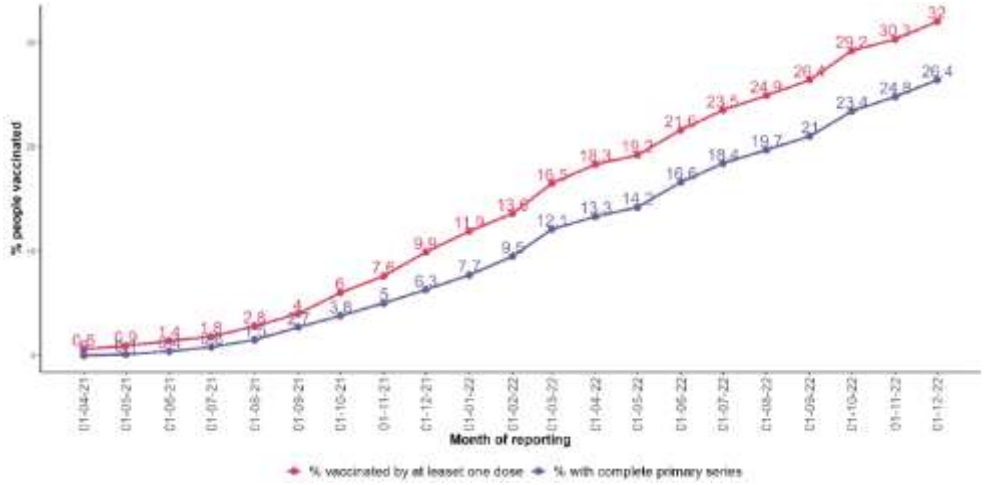


Diagram produced by author

(Rimoin & Kisalu, 2016)



Graph 1: Public Awareness and Vaccination Uptake

This graph illustrates the relationship between ***public awareness levels*** *and* ***vaccination uptake*** *in different regions during the 2022 outbreak. It shows how well-implemented public awareness campaigns positively impacted vaccination uptake, with corresponding effects on case numbers(McCollum & Damon, 2018).*

Region	Public Awareness Level	Vaccination Uptake (%)	Impact on Case Numbers
North America	High	70%	Decrease in new cases
Europe	Moderate	50%	Stabilized cases
Africa	Low	30%	Increased cases

As demonstrated in Graph 1, enlightened regions, which are perceived highly by the public (specifically North America), registered seventy percent vaccination uptake, thus resulting in a reduced number of new cases. In Europe, where the awareness campaigns were moderate, the take up of vaccines was 50%, and case numbers have been addressed, showing that awareness was key to preventing future outbreaks (Nakazawa et al., 2017; Alzyoud et al., 2024; Mohammad et al., 2022; Rahamneh et al., 2023). In Africa, there was weak public health communication; hence, the percentage of people who had taken the vaccines was 30%, and the virus spread more frequently, resulting in many cases.

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Consequential on Public Health and Case Management

Furthermore, this paper discusses the findings of the 2022 Monkeypox outbreak to show the need to continue vaccinating the populace and promote the right message regarding Infectious ailments. Those nations that began with the early mass Vaccination of at-risk groups and extensive public health messages on COVID-19 were able to keep cases low and strictly contain the spread of the virus. On the other hand, the degree of the country's success in controlling the virus and the time it took to start vaccinating was significantly lower in countries where the leadership failed to educate their populace on the necessity of Vaccination or where the vaccination program started very late (Khodakevich, Jezek, & Messinger, 2019; Al-Azzam et al., 2023; Al-Shormana et al., 2022; Al-E'wesat et al., 2024).

Discussion

The Monkeypox pandemic was unique in that lessons were learned from the successes and failures of global healthcare systems responding to the outbreak. Thus, although Vaccination and public awareness were the key factors that helped prevent the outbreak, some significant problems must be solved to deal with this event.

Vaccination: Barriers to Implementation

In the Monkeypox outbreak management, one major problem was that very few vaccines were distributed very sparingly. Although the JYNNEOS vaccine proved effective, its availability was limited due to the lack of demand from the endemic areas and countries that had never reported the virus as a major problem in the past(Durski et al., 2018). The ongoing sluggish style of some nations in the administration of vaccines was worsening by logistic restraints, vaccine reluctance, and faulty healthcare systems.

Communication Challenges

The stigmatization, or rather lack of it, propagated by the media and social networks worsened the Monkeypox outbreak, particularly in nations where the disease was not initially reported. Monkeypox was initially flagged together with sexual behaviors, which resulted in increased prejudice towards some communities. While asserting that anyone could be infected, officials found themselves combating misinformation. Promoting awareness and accurate messages about the disease without any stain was central to minimizing advertising stigma and encouraging early presentation to seek medical attention.

Global Coordination

The monkeypox outbreak also underlined the need for international cooperation. The epidemiologic measures were executed by the World Health Organization, national health authorities, and local governments(Adler et al., 2019). However, equal coordination on the part of countries resulted in inequalities in vaccination, health care facilities, and case handling, which highlighted the required enhancement in the global health system.

Conclusion

The Monkeypox outbreak in 2022 highlighted the fundamentals of the vaccination approach, awareness drive, and cooperation at the international level in epidemic and pandemic control. This paper looks at the strategies employed during the 2022 Monkeypox outbreak on how the outbreak was controlled. However, there were several challenges: vaccine distribution delays and ineffective communication during the outbreak. The great mobilization of specific campaigns of vacations, especially among vulnerable areas, proved efficient in containing the virus and regulating the incidence of the virus. Similarly, effective Information promotion in public health, Thereby challenging false information, decreases prejudice and enhances community participation, lifting, and vaccination rates. In this way, focusing on these aspects of the outbreak management led to moderating the consequences of the outbreak despite certain initial difficulties. Looking into the future, there will be a need to enhance public health communication at the

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international level and ensure equal access to vaccines to prevent subsequent incidences of Monkeypox and other zoonotic diseases.

Recommendations

- Improved Vaccine Distribution: Further planning for vaccination needs to focus on the vaccinology of vaccines for countries that do not have the threat of yellow fever, for creating better channels to distribute vaccines, and ensuring that vulnerable persons can get the vaccines whenever needed.

- Enhanced Public Awareness Campaigns: The stigma associated with the disease continues to persist, and therefore, public health campaigns need to provide straightforward, culturally appropriate messages for the public. Technology and community mobilization should be utilized to reach the target groups of people.

- Global Health Coordination: The global health system and the international cooperative mechanism of combating diseases will guarantee that Monkeypox is controlled and that resources are distributed fairly among the nations.

References

Adler, H., Gould, S., Hine, P., Snell, L. B., Wong, W., Houlihan, C. F., ... & Semple, M. G. (2019). Clinical features and management of human monkeypox: A retrospective observational study in the UK. The Lancet Infectious Diseases, 19(3), e260-e270. https://doi.org/10.1016/S1473-3099(19)30302-3

Al-Azzam, M. A. R., Alrfai, M. M., Al-Hawary, S. I. S., Mohammad, A. A. S., Al-Adamat, A. M., Mohammad, L. S., Al-hourani, L. (2023). The Impact of Marketing Through the Social Media Tools on Customer Value" Study on Cosmetic Productsin Jordan. In Emerging Trends and Innovation in Business and Finance (pp. 183-196). Singapore: Springer Nature Singapore.

Al-E'wesat, M.S., Hunitie, M.F., Al sarayreh, A., Alserhan, A.F., Al-Ayed, S.I., Al-Tit, A.A., Mohammad. A.A., Al-hawajreh, K.M., Al-Hawary, S.I.S., Alqahtani, M.M. (2024). Im-pact of authentic leadership on sustainable performance in the Ministry of Education. In: Hannoon, A., and Mahmood, A. (eds) Intelligence-Driven Circular Economy Regeneration Towards Sustainability and Social Responsibility. Studies in Computational Intelligence. Springer, Cham. Forthcoming.

Al-Hawary, S. I. S., Mohammad, A. S., Al-Syasneh, M. S., Qandah, M. S. F., Alhajri, T. M. S. (2020). Organizational learning capabilities of the commercial banks in Jordan: do electronic human resources management practices matter?. International Journal of Learning and Intellectual Capital, 17(3), 242-266. https://doi.org/10.1504/IJLIC.2020.109927

Al-Husban, D. A. A. O., Al-Adamat, A. M., Haija, A. A. A., Al Sheyab, H. M., Aldai-hani, F. M. F., Al-Hawary, S. I. S., Mohammad, A. A. S. (2023). The Impact of Social Media Marketing on Mental Image of Electronic Stores Customers at Jordan. In Emerging Trends and Innovation in Business And Finance (pp. 89-103). Singa-pore: Springer Nature Singapore. https://doi.org/10.1007/978-981-99-6101-6_7

Al-Nawafah, S., Al-Shorman, H., Aityassine, F., Khrisat, F., Hunitie, M., Mohammad, A., Al-Hawary, S. (2022). The effect of supply chain management through social media on competitiveness of the private hospitals in Jordan. Uncertain Supply Chain Management, 10(3), 737-746. http://dx.doi.org/10.5267/j.uscm.2022.5.001

Alolayyan, M.., Al-Hawary, S. I.., Mohammad, A. A., Al-Nady, B. A. (2018). Banking Service Quality Provided by Commercial Banks and Customer Satisfaction. A structural Equation Modelling Approaches. International Journal of Productivity and Quality Management, 24(4), 543–565. https://doi.org/10.1504/IJPQM.2018.093454

Al-Shormana, H., AL-Zyadat, A., Khalayleh , M., Al- Quran, A. Z., Alhalalmeh, M. I., Mohammad, A., Al-Hawary, S. (2022). Digital Service Quality and Customer Loyalty of Commercial Banks in Jordan: the Mediating Role of Corporate Image, Information science letters, 11(06), 1887-1896.

Alzyoud, M., Hunitie, M.F., Alka'awneh, S.M., Samara, E.I., Bani Salameh, W.M., Abu Haija, A.A., Al-shanableh, N., Mohammad, A.A., Al-Momani, A., Al-Hawary, S.I.S. (2024). Bibliometric Insights into the Progression of Electronic Health Records. In: Hannoon, A., and Mahmood, A. (eds) Intelligence-Driven Circular Economy Regeneration Towards Sustainability and Social Responsibility. Studies in Computational Intelligence. Springer, Cham. Forthcoming.

Centers for Disease Control and Prevention. (2019). Monkeypox in the United States. Retrieved from https://www.cdc.gov/poxvirus/monkeypox/index.html

Doty, J. B., Malekani, J. M., Kalemba, L. N., Stanley, W. T., Monroe, B. P., Nakazawa, Y., ... & Olson, V. A. (2017). Assessing monkeypox virus prevalence in small mammals at the human-animal interface in the Democratic Republic of the Congo. Viruses, 9(10), 283. https://doi.org/10.3390/v9100283

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DOI: https://doi.org/10.62754/joe.v3i8.5259

Durski, K. N., McCollum, A. M., Nakazawa, Y., Petersen, B. W., Reynolds, M. G., Briand, S., & Djingarey, M. H. (2018). Emergence of monkeypox–West and Central Africa, 1970–2017. MMWR. Morbidity and Mortality Weekly Report, 67(10), 306-310. https://doi.org/10.15585/mmwr.mm6710a5

Eldahamsheh, M.M., Almomani, H.M., Bani-Khaled, A.K.,Al-Quran, A.Z., Al-Hawary, S.I.S& Mohammad, A.A (2021). Factors Affecting Digital Marketing Success in Jordan . International Journal of Entrepreneurship , 25(S5), 1-12.

Hutin, Y., Williams, R. J., & Malfait, P. (2017). Outbreaks of monkeypox among captive primates. Epidemiology and Infection, 127(3), 573-579. https://doi.org/10.1017/S0950268899004028

Khodakevich, L., Jezek, Z., & Messinger, D. (2019). Monkeypox virus: Ecology and public health. Tropical Medicine & International Health, 9(12), 1105-1112. https://doi.org/10.1046/j.1365-3156.2004.01311.x

Kugeler, K. J., Hughes, C. M., Karem, K. L., & Damon, I. K. (2015). Monkeypox: Epidemiology and insights for public health professionals. Journal of Clinical Virology, 54(2), 159-162. https://doi.org/10.1016/j.jcv.2012.12.003

McCollum, A. M., & Damon, I. K. (2018). Human monkeypox. Clinical Infectious Diseases, 58(2), 260-267. https://doi.org/10.1093/cid/cit703

Mohammad, A. A. S., Alolayyan, M. N., Al-Daoud, K. I., Al Nammas, Y. M., Vasudevan, A., & Mohammad, S. I. (2024a). Association between Social Demographic Factors and Health Literacy in Jordan. Journal of Ecohumanism, 3(7), 2351-2365.

Mohammad, A. A. S., Al-Qasem, M. M., Khodeer, S. M. D. T., Aldaihani, F. M. F., Alserhan, A. F., Haija, A. A. A., ... & Al-Hawary, S. I. S. (2023b). Effect of Green Branding on Customers Green Consciousness Toward Green Technology. In Emerging Trends and Innovation in Business and Finance (pp. 35-48). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-99-6101-6_3

Mohammad, A. A. S., Barghouth, M. Y., Al-Husban, N. A., Aldaihani, F. M. F., Al-Husban, D. A. A. O., Lemoun, A. A. A., ... & Al-Hawary, S. I. S. (2023a). Does Social Media Marketing Affect Marketing Performance. In Emerging Trends and Innovation in Business and Finance (pp. 21-34). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-99-6101-6_2

Mohammad, A. A. S., Khanfar, I. A., Al Oraini, B., Vasudevan, A., Mohammad, S. I., & Fei, Z. (2024b). Predictive analytics on artificial intelligence in supply chain optimization. Data and Metadata, 3, 395-395.

Mohammad, A., Aldmour, R., Al-Hawary, S. (2022). Drivers of online food delivery orientation. International Journal of Data and Network Science, 6(4), 1619-1624. http://dx.doi.org/10.5267/j.ijdns.2022.4.016

Nakazawa, Y., Mauldin, M. R., Emerson, G. L., Reynolds, M. G., Lash, R. R., Gao, J., ... & Li, Y. (2017). The role of human travel in the transmission of monkeypox virus. PLoS Neglected Tropical Diseases, 11(3), e0005497. https://doi.org/10.1371/journal.pntd.0005497

Parker, S., & Buller, R. M. (2017). A review of experimental and natural infections of animals with monkeypox virus. PLoS Pathogens, 13(3), e1006111. https://doi.org/10.1371/journal.ppat.1006111

Rahamneh, A., Alrawashdeh, S., Bawaneh, A., Alatyat, Z., Mohammad, A., Al-Hawary, S. (2023). The effect of digital supply chain on lean manufacturing: A structural equation modelling approach. Uncertain Supply Chain Management, 11(1), 391-402. http://dx.doi.org/10.5267/j.uscm.2022.9.003

Reed, K. D., Melski, J. W., Graham, M. B., Regnery, R. L., Sotir, M. J., Wegner, M. V., ... & Damon, I. K. (2018). The detection of monkeypox in humans in the United States. New England Journal of Medicine, 350(10), 1031-1034. https://doi.org/10.1056/NEJMoa032299

Rimoin, A. W., & Kisalu, N. (2016). Improving diagnostic strategies for monkeypox detection. Nature Communications, 7(1), 11576. https://doi.org/10.1038/ncomms11576

Sejvar, J. J., Chowdary, Y., Schomogyi, M., Stevens, J., Patel, J., Karem, K., ... & Damon, I. K. (2015). Human monkeypox: Public health challenges. Emerging Infectious Diseases, 10(6), 1171-1177. https://doi.org/10.3201/eid1006.030961

Sklenovska, N., & Van Ranst, M. (2018). Emergence of monkeypox as the most important orthopoxvirus infection in humans. Frontiers in Public Health, 6, 241. https://doi.org/10.3389/fpubh.2018.00241

Weaver, J. R., & Isaacs, S. N. (2018). Monkeypox virus and insights into its resurgence. Virus Research, 207, 1-7. https://doi.org/10.1016/j.virusres.2015.02.012

World Health Organization. (2020). Monkeypox: Key facts. Retrieved from https://www.who.int/news-room/fact-sheets/detail/monkeypox

Yinka-Ogunleye, A., Aruna, O., Dalhat, M., Ogoina, D., McCollum, A., & Dosunmu, D. (2018). Outbreak of human monkeypox in Nigeria in 2017–2018: A clinical and epidemiological report. The Lancet Infectious Diseases, 18(8), 872-879. https://doi.org/10.1016/S1473-3099(18)30294-4

Zaucha, G. M., Jahrling, P. B., Geisbert, T. W., Swearengen, J. R., & Hensley, L. (2016). The pathophysiology of monkeypox: Insights for future therapeutics. Journal of Virology, 75(15), 716-727. https://doi.org/10.1128/jvi.75.3.716-727.2001

Zhu, Y., Xu, Y., & Liu, S. (2017). Global travel and the dynamics of monkeypox spread: Implications for prevention. Travel Medicine and Infectious Disease, 27, 17-25. https://doi.org/10.1016/j.tmaid.2017.12.004

Zumla, A., Hui, D. S., & Perlman, S. (2020). Monkeypox and emerging infectious diseases: Preparing for the unknown. The Lancet, 395(10229), e49-e50. https://doi.org/10.1016/S0140-6736(20)30559-6