

Viewpoint

Contents lists available at ScienceDirect

# Journal of Virus Eradication

journal homepage: www.sciencedirect.com/journal/journal-of-virus-eradication

# Polio eradication in Pakistan: Hope against hope or are we near eradication?

Tauseef Ahmad<sup>a,b,\*</sup>, Mukhtiar Baig<sup>c</sup>, Muhammad Khan<sup>d</sup>

<sup>a</sup> School of Public Health, Zhejiang University School of Medicine, Hangzhou, 310058, China

<sup>b</sup> Department of Epidemiology and Health Statistics, School of Public Health, Southeast University, Nanjing, 210009, China

<sup>c</sup> Department of Clinical Biochemistry, Faculty of Medicine, Rabigh, King Abdulaziz University, Jeddah, 81579, Saudi Arabia

<sup>d</sup> Department of Biotechnology and Genetic Engineering, Hazara University, Khyber Pakhtunkhwa, Mansehra, 21120, Pakistan

# ARTICLE INFO

Keywords: Polio Eradication Pakistan Afghanistan Challenges

#### Dear Editor

Globally Pakistan remains one of only two countries along with Afghanistan with ongoing endemic transmission of wild poliovirus (WPV). It has remained a threatening and challenging health issue in Pakistan over the years and an alarming threat to other countries.<sup>1–4</sup> Recently, according to the United Kingdom Health Security Agency, waste samples from London tested positive for vaccine-derived poliovirus, which creates another challenge for the polio-free world.<sup>5,6</sup> On July 18th, 2022, poliovirus was confirmed in an unvaccinated immunocompetent adult resident of New York hospitalized with flaccid lower limb weakness. Vaccine-derived poliovirus type 2 was isolated from the patient and identified from wastewater samples in two neighboring New York counties.<sup>7</sup> Health officials called it the "tip of iceberg" because detection of one such case meant that there might be many more undiagnosed ones in asymptomatic individuals.<sup>8</sup> At this time circulating vaccine derived poliovirus were detected in countries where poliomyelitis had long been eradicated.<sup>9</sup> Although coronavirus disease 2019 (COVID-19) pandemic (2020-2022) has globally decreased some of the routine immunizations and surveillance, polio eradication from Pakistan and Afghanistan remains imperative to achieve a polio-free world and cannot lead to further delays or complacency.<sup>10-12</sup> If poliovirus continues to spread in these endemic countries, others, particularly those with weak public health and immunization systems or with connections to countries where it remains endemic, are at risk of transmission, such

as the initial reports of WPV1 cases in 2022 in Malawi and Mozambique and undermine the polio success worldwide and the ultimate eradication goal.  $^{\rm 13-16}$ 

An online search was conducted in the Web of Science Core Collection database using the keyword "polio". The top leading countries in terms of publications were the United States of America (USA), India, England, Switzerland, and Sweden (Fig. 1a). Pakistan ranked 6th in polio research and had the strongest collaboration with the USA (Fig. 1b). Most studied topics were eradication, poliomyelitis, progress, children, immunization, and vaccine (Fig. 1c).

We suggest that Pakistan and Afghanistan would benefit from the experience in recent times of other polio-free countries from the region. Pakistan's polio eradication strategy faces numerous challenges, including low literacy, vaccine myths, conspiracy theories, people's skepticism, lack of facilities to maintain vaccine efficacy, and target killing of polio workers.<sup>17–19</sup> Besides public health measures for polio prevention and containment, policies such as increasing literacy, dispelling people's misconceptions, and engaging the local community with campaigns that raise awareness about the importance of polio immunization and other vaccine preventable diseases, identifying and involving local leaders including teachers, mosque chiefs, religious scholars, and politicians in planning and spreading awareness through seminars and debates, should be considered. Celebrities, and community influencers could advocate for immunization. Small incentives such as stickers or certificates for children who have received immunization

https://doi.org/10.1016/j.jve.2024.100371

Received 25 August 2022; Received in revised form 29 March 2024; Accepted 2 April 2024 Available online 7 April 2024

2055-6640/© 2024 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).





<sup>\*</sup> Corresponding author. School of Public Health, Zhejiang University School of Medicine, 866 Yuhangtang Road, Hangzhou, 310058, China. *E-mail address:* hamdard\_hu@yahoo.com (T. Ahmad).

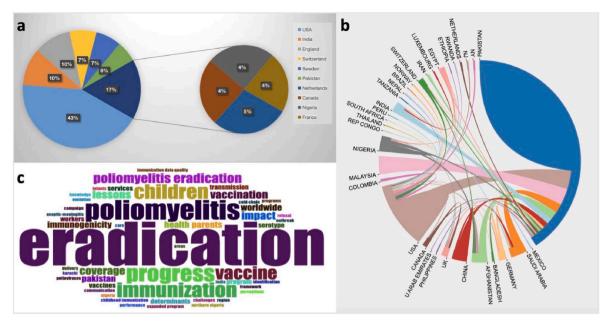


Fig. 1. a) Top 10 leading countries in polio research, b) Pakistan collaborates in polio research with other countries or regions, c) Most studied topics based on Keywords Plus.

could also be considered which could create a positive association with immunization.

Extensive social and mass media involvement will be required to disseminate information about polio immunization campaigns and to incorporate relevant basic information and immunization into school textbooks. We suggest offering parents incentives to get children vaccinated, such as a monthly cash allowance and linkage of their Computerized National Identity Card (CNIC) and Passport renewal with children vaccination certificates.<sup>20</sup> The government could also investigate providing free Umrah and Hajj (Pilgram to Mecca for a religious activity) packages to parents who have their children vaccinated through the balloting system and link the provision of utility connections to children's vaccination certificates.

Special strategies are needed to target "never immunized children" or the zero-dose children as these children are at high risk of contracting and spreading poliovirus. It can be achieved through data analysis of the areas with a high ratio of zero-dose children.<sup>21</sup> Furthermore, micro-planning, intensive community reach, and engaging religious and community leaders may help to reach zero-dose children.

Recent publications have emphasized the remaining issues and hopes. The next few years will determine if global polio eradication can indeed be achieved.  $^{22-25}$ 

#### **Funding Statement**

This work received no funding from any government or private organizations.

### CRediT authorship contribution statement

Tauseef Ahmad: Writing – review & editing, Writing – original draft, Visualization, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. Mukhtiar Baig: Writing – review & editing, Validation, Methodology. Muhammad Khan: Writing – review & editing, Validation, Methodology.

#### Declaration of competing interest

The authors declare that they have no known competing financial

interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

# Acknowledgements

The authors acknowledge the Southeast University, China for providing free online access to the databases.

#### References

- Global Polio Eradication Initiative. In: *Delivering on a Promise: GPEI Strategy* 2022–2026Geneva, Switzerland: World Health Organization; 2021. https://polioe radication.org/gpei-strategy-2022-2026/.
- Rana MS, Asghar RJ, Usman M, et al. The resurgence of wild poliovirus in Pakistan and Afghanistan: a new setback for polio eradication. J Infect. 2022;85:334–363.
- 3. Bagcchi S. Polio vaccination in Afghanistan. The Lancet Microb. 2022;3, e10.
- Rahim S, Ahmad Z, Abdul-Ghafar J. The polio vaccination story of Pakistan. Vaccine. 2022;40:397–402.
- Poliovirus detected in sewage from North and East London GOV.UK (www.gov.uk). Press release 22 June 2022.
- Gilchrist K. National incident declared after UK health officials detect polio virus in London sewage samples. JUN 22 CNBC; 2022. Online link: https://www.cnbc.com/ 2022/06/22/ukhsa-detects-polio-virus-in-london-sewage-declares-national-inci dent.html. Accessed July 7, 2022.
- Public health response to a case of paralytic poliomyelitis in an unvaccinated person and detection of poliovirus in wastewater — New York, June–August 2022. MMWR Morb Mortal Wkly Rep/August. 2022/71;19(33):1065–1068.
- CNN Health. In: Silent' Spread of Polio in New York drives CDC to Consider Additional Vaccinations for Some People; August 13, 2022. Online link: 'Silent' spread of polio in New York drives CDC to consider additional vaccinations for some people - CNN. Accessed August 13, 2022.
- Lee SE, Greene SA, Burns CC, et al. Progress toward poliomyelitits eradication worldwide, January 2021-March 2023. MMWR Morb Mortal Wkly Rep. 2023;72: 517–522.
- Sahito AM, Saleem A, Javed SO, Farooq M, Ullah I, Hasan MM. Polio amidst COVID-19 in Pakistan: ongoing efforts, challenges and recommendations. *Int J Health Plann Manag.* 2022;37:1907–1911.
- Wadood Z, Kassem AM, Ehrhardt D, Zomahoun D. The immediate impact of the COVID-19 pandemic on polio immunization and surveillance activities. *Vaccine*. 2023;41:A2–A11.
- Ali I, Hamid S. Implications of COVID-19 and "super floods" for routine vaccination in Pakistan: the reemergence of vaccine preventable-diseases such as polio and measles. *Hum Vaccines Immunother*. 2022;18, 2154099.

#### T. Ahmad et al.

- Davlantes E, Greene SA, Tobolowsky FA, et al. Update on wild poliovirus type 1 outbreak—southeastern Africa, 2021–2022. MMWR Morb Mortal Wkly Rep. 2023;72: 391–397.
- Bigouette JP, Henderson E, Traoré MA, et al. Update on outbreaks—worldwide, January 2021–December 2022. MMWR Morb Mortal Wkly Rep. 2023;72:366–371.
- Polio Cases in Provinces. Pakistan Polio Eradication Programme. Online link: https://www.endpolio.com.pk/polioin-pakistan/polio-cases-in-provinces (accessed on Feb, 2024).
- Mbaeyi C, Baig S, Safdar RM, et al. Progress toward poliomyelitis eradication Pakistan, January 2022-June 2023. MMWR Morb Mortal Wkly Rep. 2023;72: 880–885.
- The Express Tribune. In: *Polio Worker Injured in Firing in N Waziristan*; July 5, 2022. Online link: https://tribune.com.pk/story/2364474/polio-worker-injured-in-firin g-in-n-waziristan. Accessed March 5, 2024.
- Ataullahjan A, Ahsan H, Soofi S, Habib MA, Zulfiqar A, Bhutta ZA. Eradicating polio in Pakistan: a systematic review of programs and policies. *Expert Rev Vaccines*. 2021; 20(6):661–678.

- Rahim S, Ahmad Z, Abdul-Ghafar J. The polio vaccination story of Pakistan. Vaccine. 2022;40:397–402.
- Campos-Mercade P, Meier AN, Pope D, Schneider FH. Motivating vaccination with financial incentives. *Trends Cognit Sci.* 2023;27:1100–1101.
- Polio Global Eradication Initiative. Every last Child.https://polioeradication.org/ne ws-post/2023-zero-dose-children-in-seven-subnational-most-consequential-geogra phies-hold-key-to-success/(accessed Feb 2024).
- Faizan A, Rehman T, Mughal S. Re-emergence of polio in Pakistan: can the nation achieve the WPV1 eradication goal? *Health Sci Rep.* 2024;7, e1862.
- Polio is on the brink of eradication. Here's how to keep it from coming back. *Nature*. 2023;623:680–682.
  Weter C. Cost the world world and a state wild active here and of 20222 Margare 2023;
- Watson C. Can the world really stop wild polio by the end of 2023? Nature. 2023; 620:706–707.
- 25. Barrett ADT. Polio endgame finish is in sight. Nature. 2023;619:36–38.