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Abdul Rehman Shah Syed , Syeda Sadia Masood Raza , Muhammad Abubakar Shahid Chishti ,  
Shahzaib Ahmad , Hadin Darain Khan , Zain ul Abadeen , [Asif Khalig](#) \*

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*Review*

# Mission of Polio Eradication in Pakistan-A Review on Challenges and Future Recommendations.

Abdul Rehman Shah Syed <sup>1</sup>, Syeda Sadia Masood Raza <sup>2</sup>, Muhammad Abubakar Shahid Chishti <sup>3</sup>, Shahzaib Ahmad <sup>4</sup>, Hadin Darain Khan <sup>5</sup>, Zain ul Abadeen <sup>6</sup> and Asif Khaliq <sup>7,\*</sup>

<sup>1</sup> Dow University of Health Science, Karachi, Pakistan.

<sup>2</sup> Karachi Medical and Dental College, Karachi, Pakistan.

<sup>3</sup> King Edward Medical University, Lahore, Pakistan.

<sup>4</sup> Mayo Hospital Lahore, Pakistan, Lahore, Pakistan

<sup>5</sup> Shalamar Medical and Dental College Lahore, Pakistan

<sup>6</sup> D.G. Khan medical college, Dera Ghazi Khan, Pakistan

<sup>7</sup> School of Public Health & Social Work, Queensland University of Technology, Brisbane, 4059, Australia

\* Correspondence: asif.khaliq@hdr.qut.edu.au

**Abstract:** Poliomyelitis, commonly known as “polio” is a paralytic and perilous disease caused by the poliovirus. Due to its highly contagious nature, the virus was a challenge to the world in the late 1980s. Since 1988 the collective work of the Global Polio Eradication Initiative (GPEI), Centre for Disease Control and Prevention (CDC), and World Health Organization (WHO) through immunizations, communication awareness, and monitoring have helped the world exonerate polio. The mission of polio-free Pakistan was herculean and had confronted enormous challenges in different ways but came out with positive results. In 2019, with only two remaining polio-endemic countries, Pakistan and Afghanistan, GPEI launched an “Endgame strategy 2019-2023” which aims to eradicate polio globally, with a targeted focus, especially on polio-endemic countries, the plan emphasizes the early detection of polio cases for complete eradication and to restrict the spread of polio. Pakistan has achieved a milestone in combating polio despite having a web of factors that have thwarted Pakistan’s polio eradication efforts, but this is not the end, the struggle continues until we really get an internationally verified certification of Polio free nation, for this WHO has designed a multidisciplinary strategy 2022-2026 to really end this polio for once and for all.

**Keywords:** pandemics; immunization programs; poliovirus; Pakistan; World Health Organization

## INTRODUCTION

Poliomyelitis, commonly known as “polio” is a paralytic and perilous disease caused by the poliovirus. The virus is a part of the enterovirus family, Picornaviridae. Being known for its simplest composition, the virus is (+) sense RNA genome covered under the capsid. [1] The capsid alongside guarding genetic material also gives three identities to this virus which are; poliovirus type 1 (PV1), type 2 (PV2), and type 3 (PV3), in which PV1 is the most famous for paralysis. [2] Polio is divided into major and minor infections based on its symptoms and CNS involvement. In immunocompetent individuals, the disease is mainly asymptomatic or infrequently involves the upper respiratory tract presenting as sore throat and fever. [3] Paralysis caused by the virus can be of different types depending on the site of CNS tissue, but it mostly involves the anterior horn of the spinal cord and causes acute flaccid paralysis. [4] The virus spread through the fecal-oral route as it is excreted in the feces for several weeks following the infection. [5]

Due to its highly contagious nature, the virus was a challenge to the world in the late 1980s. Since 1988 the collective work of the Global Polio Eradication Initiative (GPEI), Centre for Disease Control and Prevention (CDC), and World Health Organization (WHO) through immunizations, communication awareness, and monitoring have helped the world exonerate polio. Despite that, two

countries, Pakistan and Afghanistan, were still found to have a frequent surge of this disease. [6] Failure of proper immunization in these areas due to misbeliefs, rumors about the war agenda, political issues, targeted killing of the health care provider, and lack of insight about the disease and treatment protocols were some major issues faced to completely eradicate polio from the world. [7] It is impressive to mention that Pakistan is on the edge to expunge polio as only one case of wild polio was reported in 2021. This article is an insight into the success story of Pakistan to eradicate Polio. [8]

## DISCUSSION

The mission of polio-free Pakistan was herculean and had confronted enormous challenges in different ways but came out with positive results. The year 1997 marks the dawn of success when Pakistan reported the last case of wild poliovirus 2 (WPV2) under the surveillance of the Pakistan polio eradication program found in 1994. [9] Following the hope to eliminate polio, the country implemented different strategies like house-to-house vaccination and the stop transmission of polio (STOP) program between 1998 and 1999. [10] In 2001 sudden incident of the 9/11 attacks in the US took place due to which the law-and-order situation at the border of Afghanistan and Pakistan were under serious conflict and from there emerged a threat to polio workers' safety. To address terrorism in Pakistan, drone strikes began in the newly merged districts of Khyber Pakhtunkhwa (known at that time as the Federally Administered Tribal Area), which escalated the suspicion of having a concealed motive behind the vaccination programs. [11] Between 2003 to 2012 the World Bank funded 961 million oral polio vaccines (OPV) under the partnership project launched by the government of Pakistan. [12–14] Another milestone was achieved at the end of 2012 in the shape of the eradication of wild poliovirus 3 (WPV3). To ameliorate the vaccination system in Pakistan there was an increment in the workforce with 10,000 vaccinators, 6000 lady health visitors, and 100,000 lady health workers under the supervision of the national immunization technical advisory group. In addition, 6000 fixed EPI centers at different locations were the centerpiece of this initiative. [14]

Moreover, the security concern was also a substantial risk which led to a halt in door-to-door vaccinations and SIA surveys. However, in 2015 cooperative effort of Pakistan's security forces and polio eradication campaign provided more access to vaccinators in the prohibited areas and improved community interactions. [15] The Pakistan government had also taken steps for the betterment of the campaign by improving vaccinator training and increasing their pay and payment methods. To control the surge of polio the government also hierarchies the 12 red zone districts to receive immediate and intense immunization. [16] To minimize the denial of vaccination, UNICEF collaborated with imams to promote immunization in schools and madrasas all over the country and also started an awareness campaign on social media. [17]

Despite bogus religious beliefs, worries about vaccine-induced infertility, and security concerns, the Pakistani military's 2015 territorial hold over FATA gave the teams an option to keep pace where they had previously been prohibited. In the meantime, the Khyber Pakhtunkhwa province administration started the "Alliance for Health" program to boost community involvement in FATA and secure the security of vaccination teams. In 2015, there were 80 percent fewer new cases of polio due to the government and the Polio eradication campaign working together, [18] compared with the record of 2014. [19]

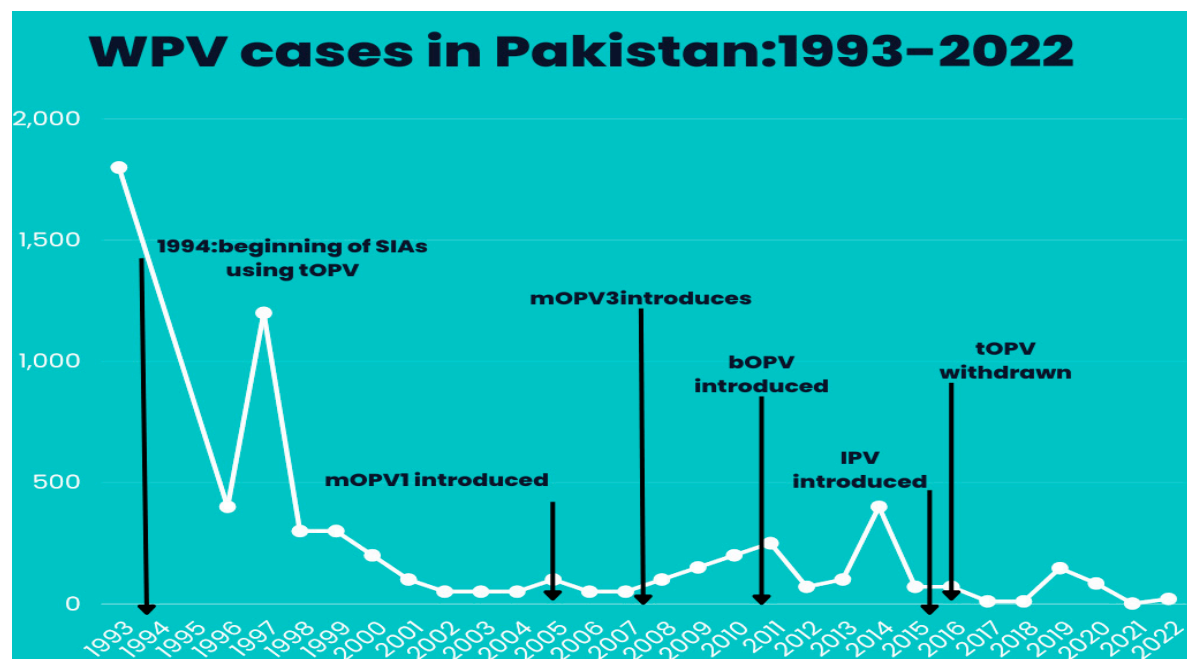
The "National immunization support program" was introduced in 2016 to offer additional financing to the Government of Pakistan to expand the national EPI program, as well as to boost routine vaccination and halt wild poliovirus transmission by the end of 2015 and certify Pakistan as polio-free by the end of 2018. [20] A series of partnerships were formed between the polio program and public and private organizations between 2016 and 2019 to raise awareness and support the national EPI program and highlight the importance of polio. [21–23]

Aiming to eradicate polio globally with a targeted focus, particularly on polio-endemic countries, GPEI launched an "Endgame strategy 2019-2023" in 2019, with only two polio-endemic countries still left. The plan emphasizes early detection of polio cases for complete eradication and to limit the spread of polio. To guarantee the complete eradication of polio from Pakistan, a strong

immunization system would be needed, one to integrate surveillance with other vaccine-preventable illness surveillance systems. [24] The provincial plan of action supports the continuing national and international programs, accelerating the eradication of polio through the combined efforts of both. The Sehat ka Insaaf (Justice for Health) campaign was launched in Khyber Pakhtunkhwa in 2014 with the goal of protecting kids from nine diseases that can be prevented by vaccination, including polio. The KPK's Sehat Ka Ittihad (Health Unity) program launched two more initiatives in 2015: Khyber Pakhtunkhwa (2015) and Khyber Pakhtunkhwa Immunization Support Project. According to AFP and environmental surveillance data, recent wild poliovirus outbreaks originate in FATA and KP, with an alarmingly greater incidence among internally displaced people (IDPs) who have migrated elsewhere in the nation. [25]

In April 2020, polio vaccination campaigns and routine immunization programs across Pakistan came to a halt to diminish the spread of COVID-19. Staff and resources from the polio program were diverted to combat the COVID-19 spread, this strategy has involuntarily put the children in jeopardy of increased risk of vaccine-preventable diseases (VPD) such as polio. [26] Pakistan seemed to be on the verge of success as there were 147 cases in 2019, and 84 cases in 2020 despite having a global crisis of the COVID-19 pandemic and a new threat to polio eradication efforts.

As of January 2022, it was announced by WHO officials, the polio-free free year in Pakistan. An entire year without the detection of the Wild polio case. It is indeed a breakthrough achievement in a country where children were paralyzed annually approximately 20,000 in the early 1990s. [27] Just right after 15 months, there is an increased surge of polio cases reports making a tally of six infected children all belonging to the North Waziristan tribal district of KPK. According to the news report, it is a worrisome situation as new cases will be reported in the coming weeks especially when the virus becomes more active during hot weather i.e., from May-September. [28] Cases of wild poliovirus are summarized in Figure 1.



**Figure 1.** WPV cases in Pakistan 1993-2022 (Wild Poliovirus).

Pakistan is now dealing with a multitude of potentially emerging infectious diseases, including measles, WHO and UNICEF warn that a sharp spike in measles cases in January and February 2022 should raise serious concerns about the risk of the spread of diseases that can be prevented by vaccination which could result in larger outbreaks, particularly those that affect millions of children. [29] Particularly the cholera outbreak, the cases coming out of Karachi appear to be dominated by the Ogawa strain. The city's continuous heatwave, poor sanitation, environmental pollution, and lack of access to safe drinking water are the main causes of cholera in the area. [30]

Consequently, concerns over VPD outbreaks are crucial to highlight for the necessary strategic planning for the nation's future. On the one hand, there were restrictions on outdoor activity, lockdown protocols, and people's fear of getting COVID-19 through physical contact, and the government stopped the mass immunization campaigns because of its concentration on the COVID-19 pandemic. Besides that, Pakistan condemns the socio-cultural, economic, and (geo) political profile which is shown by the nation's prevalent communicable diseases, such as newborn tetanus, measles, and polio, while its immunization program encounters several significant but resolvable problems. Low acceptance and uptake of vaccines have been caused by rumors, conspiracies, rejections of vaccinations, and dissatisfaction. [31]

## **FUTURE RECOMMENDATIONS AND STRATEGIES:**

Pakistan has been facing a handful of infectious outbreaks recently, despite successfully getting a hold of covid19 pandemic side by side mass vaccinating the population regardless of having negligible resources and already burdened hospitals, healthcare professionals continued to provide their services. Few recommendations can be considered, as a multidisciplinary approach is the only solution to rectify the declining medical standards of Pakistan.

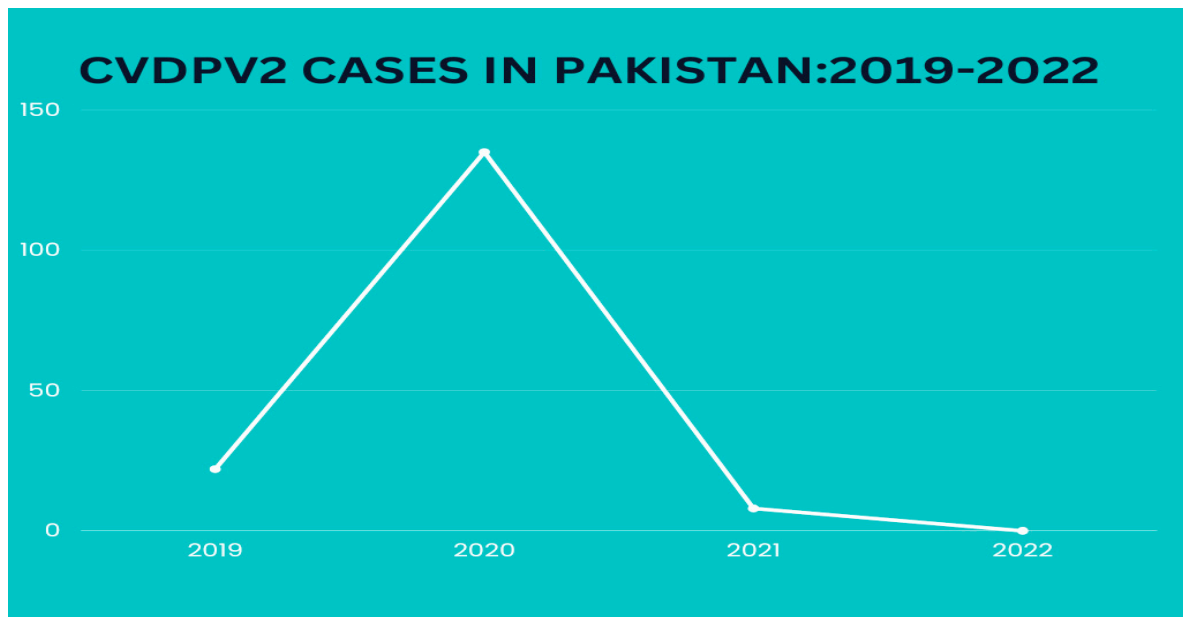
Medical anthropologists should be invited to participate. Because of their distinctive theoretical perspective, which enables them to comprehend an issue at the junction of micro and macro dimensions, they can assist from the design of a vaccine campaign to its execution. They are well-versed in the interactions between political, psychological, economic, and sociocultural issues. Furthermore, the country should ensure that there are door-to-door vaccination services, well-funded vaccinators, effective monitoring and surveillance of vaccination programs, and an emphasis on remote rural areas to strengthen routine immunizations. [31]

Digital health, or the use of technology in all health disciplines, has gained attention globally, particularly in settings with limited resources. It can be a flexible solution for enhancing health outcomes locally and at the grassroots level, especially in low and middle-income countries. Therefore, the Ministry of Health, IT, and Telecommunications in Pakistan must take a proactive role in regulating, mobilizing, and expanding the digital health sector for the improvement of healthcare systems. [32] Digital health is extremely well-positioned to transform how we identify and treat infectious diseases, as was previously noted in a study, among them are data-driven illness surveillance, screening, triage, diagnostics, and monitoring. [33]

According to a study, instead of boosting routine immunization and focusing on improving sanitary facilities, authorities focus more on funding and repetitive campaigns in regions of the world with weak healthcare systems to eradicate polio. There are 68 environmental monitoring sampling locations in Pakistan. In 2020, 407 out of 768 sewage samples were positive for WPV1, or 53%. As of 2021, 61% out of 513 samples have tested positive for WPV1, versus 55% of 566 samples in 2020. In addition, 136 sewage samples (18%) in 2020 tested positive for cVDPV2, in comparison to 40 (5%) in 2019 and 32 (6%) in 2021 to date. In Pakistan, there have been 165 instances of cVDPV2 between July 2019 and July 2021. [34] As shown in Figure 2.

There have recently been governance and supervision issues with the polio program. Activities to eradicate polio have been impeded by political meddling, and since the 2018 elections, leadership has been unstable. The situation is now worse as a result of this. Before these elections, the international community expressed worry that political shifts could thwart efforts to eradicate polio. More studies on fostering trust between citizens and authorities could greatly impact polio operations. [14]





**Figure 2.** CVDPV2 cases in Pakistan 2019-2022 (Circulating Vaccine-Derived Polio Virus-2).

## CONCLUSION

Polio and other vaccine-preventable diseases must be eradicated, and just as the government has made substantial efforts to battle COVID-19, a comparable and more aggressive policy is needed. By stopping oral polio drops and switching to injectable polio, CVDPV2 can be eradicated; otherwise, if not properly planned out and implemented, it could have devastating effects. A major sanitation infrastructure is required in order to prevent the spread of not only poliovirus but also cholera, typhoid, and other infectious germs, and one endemic disease might lead to a global pandemic if not addressed and stopped in time. In addition, despite a myriad of circumstances impeding Pakistan's efforts to eradicate polio, we have made progress in the fight against the disease, but this is not the end, the struggle continues until we get an internationally verified certification of Polio free nation, for this WHO has designed a multidisciplinary strategy 2022-2026 to end this polio for once and for all. [35]

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