Research Paper Medical Science

# Poliomyelitis eradication in India-Past, Present and Future

**Dr. Dewesh Kumar** | Senior Resident, AIIMS, Jodhpur

**Dr. Neelesh Kapoor** | SRTL-Lucknow Subregion, NPSP-WHO, UP(India

**ABSTRACT**

India started getting applause from all over the world when India's name was removed from the list of polio-endemic countries when it achieved the monumental feat of nil wild polio virus for one year in January 2012. And now India is polio free for three continuous years which makes India and South East region eligible for the Certificate of Polio eradication by World Health Organization. But the success should become a learning lesson for the rest three endemic and re-infected countries and replicate the strategies adopted in India for hastening the eradication initiatives. As polio anywhere in the world may lead to resurgence in newer areas and the greatest public health achievement may become the most expensive public health failure. The VDPVs and total extermination of all types of viruses from the world is already a cause of concern but experts may find a perfect solution in due course of time with innovative approach and research.

**KEYWORDS** | Poliomyelitis, Wild Polio Virus, Oral Polio Vaccine, Eradication

**Background**

In 1988, the 41st World Health Assembly (WHA), following encouragement and funds made available by Rotary International, unanimously launched a global goal to eradicate polio by 2000 but in India the polio eradication drive gained momentum only in 1995, when Indians used to watch a bollywood celebrity Amitabh Bachchan campaigning for polio drops on television and it had then motivated many families to come forward and vaccinate their under five children with the polio drops. Intensive Pulse Polio immunisation under the aegis of Ministry of Health and Family Welfare, Government of India(GOI) got a great boost with such advertisements on television but the viewers of those ads were very few and then the same voice was heard on radio to disseminate it amongst masses especially rural people. But that was not enough as there were people belonging to remotest areas who were unaware of these campaigns and considered flaccid paralysis as God's curse bestowed upon them. World Health organisation then took a great initiative in 1997 and launched National Polio Surveillance Project(NPSP) in collaboration with GOI in owning the Acute Flaccid Paralysis(AFP) surveillance into their stride and it in turn recruited Surveillance Medical Officers(SMOs) to provide technical and logistic assistance to the GOI and state governments. This was a great move towards the polio eradication initiative as it provided an insight to the then existing programme and proved to be an asset in establishing a strong surveillance network and rapid response of polio case. During the year 1999, experts recommended the formation of The India Expert Advisory Group (IEAG) as a group of national and international experts on polio eradication, who would 1) Monitor progress toward polio eradication in India 2) Provide technical advice to the Ministry of Health & Family Welfare, Government of India, on immunization and surveillance activities for polio eradication and 3) Monitor the quality of immunization activities, AFP surveillance and laboratory performance [1].

**Eradication movement**

Trend analysis of Wild Polio Viruses showed that India was a major contributor of Poliomyelitis worldwide. Before the launch of Global Polio Eradication Initiative, polio was estimated to cripple 200,000 children each year. In year 1998, India had 1934 cases which decreased to 265 cases in 2000 and the greatest success was eradication of P2 from India which was last isolated in October 1999 from Aligarh, Uttar Pradesh[2]. It was this year when India's National Expert Review Committee (ERC) for polio eradication was established in preparation for the transition in January 2000 from clinical classification to virologic classification of acute flaccid paralysis (AFP) cases. The role of the ERC is to provide expert advice on the final classification of AFP cases from which adequate stool specimens could not be obtained, resulting in a lack of virologic evidence to classify a case as polio or non-polio AFP. But in year 2002, India's eradication initiative seems dwindling when WPV cases rose to 1600 cases. Then the polio eradicators understood the fact that steps taken were not enough and needed a more intense drive. With the intensification of SIA efforts, again the hard work started showing good results and the load of wild polio cases in India started showing declining trend, the toll decreased to 66 in 2005. However, the number increased to 676 in 2006 considering this to be the 4-year cycle of the polio virus in India. By this time, India had realised that despite vigorous activities, it was not easy to completely wipe out WPV from community. A major decision was taken in 2005 to introduce monovalent vaccines i.e. MOPV1/MOPV3 where SNIDs were conducted to ensure the effectiveness of vaccine against specific strains. Although the strategy reaped fruitful results in some parts of country in relation to controlling the spread of WPV1 but still it seemed to be lacking somewhere because it was noted that use of MOPV1 alone led to surge in P3 virus strains and vice-versa. Now the think tanks were confused whether to use MOPV or TOPV, but as it happened, the discovery of BOPV led to a total change in the trends of polio statistics. For the first time in history of Polio eradication, India realised that it was very close to eradication in 2010 when the incidence of poliomyelitis was 42(P1=18, P3= 24) the lowest ever. It was this year when the last case of WPV3 was found in Pakur, Jharkhand in October. Now this was the time when complacency was not allowed to creep in the frontline workers and implementers.[3] The strategies adopted was use of bivalent OPV (type1&3) coupled with strong oversight from state, high quality supplemental immunisation activities, covering hitherto unreached areas such as Kosi river basin and mobile and migrant populations, coverage of populations in transit during major events, help of social mobilisers network to overcome community resistance which helped in having just one case of Polio in the whole country due to WPV (type 1) during 2011which occurred on 13th January in Howrah district of Bengal[4].

**Strategies towards a bigger goal**

To judge whether the nation was going in the right direction or not and were we able to detect all the WPVs in the community or not, it was decided that Environment sampling in India should be undertaken which started from Mumbai in 2001 and till date Delhi, Patna(Bihar), Howrah(West Bengal) and Punjab are getting their sewage samples checked for WPV and no WPV has been isolated during 2011 onwards. It actually corroborates with the AFP surveillance findings in India as no WPV was found to be isolated from stool samples of AFP patients in India after Jan 2011[5].

In 2009, the 107 High Risk Block Plan was also made after analysing WPV1 cases of the 6 years 2003-08 to provide a geographic tailored approach for the polio eradicators to develop strategically specific plans to cover 66 blocks in UP and 41 blocks in Bihar[6]. This plan proposed the adoption of multipronged strategy that includes cross-cutting activities to minimize the factors facilitating continuous transmission of WPV in these areas. Here the immunisation activities done were of the highest possible quality with intense monitoring from WHO, focussed social mobilization by UNICEF and true supportive supervision government counterparts.

To establish the efficacy and success of OPV, NPSP carried out various Vaccine immunogenicity and seroprevalence studies starting from 2007 in various parts of the country which gave insight to the experts in planning the effective strategy required for polio eradication. The innovative research considered to be the father of all studies was the seroprevalence study in 10 HR blocks(UP &Bihar) in 2010-12 and it was noted that BOPV had given a boost to the immunity of inhabitants of high risk areas. Of late NPSP also initiated several other studies to generate reliable evidence in our own settings such as comparing mucosal immunity generated following the use of OPV and IPV and introduction of IPV phase wise in community settings[7].

**An Unforgotten saga**

The success story in India was not a fairy tale; it took a toll of people's sheer hard work, compromised social bonding, displacing career's priorities and sleepless nights and weary days. Each time, a WPV was diagnosed in stool sample, people started questioning on polio vaccine's efficacy, cold chain and coverage. India's victory over polio has given a an apt answer to the queries of intellectual critics all over the world who considered the time and resources spent in polio eradication initiative would go in vain as polio was non eradicable in India considering low standards of sanitation and hygiene or WPVs cannot be eradicated using OPV due to its huge genetic biodiversity and a host of other unexplained reasons. Some erudite had a viewpoint that it was a low priority disease but with a very high cost of eradication. The issues raised above were long neglected by India's policymakers resulting in delays in interruption of WPVs originally targeted for 2000, but achieved 11 years later[8].

In South East Asia, only India continued to carry the burden of WPV after 2007 which once was considered to be a formidable task but the continued political will, stewardship approach, intense monitoring and owning the program by community helped this daunting task give fruitful results. Now it has been 3 years since the last WPV found in India and WHO will soon declare India (country) and South East Asia(WHO region) to be polio free and certify the same in due course of time. This seems to be a great achievement because the biomedical hurdles and technical obstacles in polio eradication were thought to be insurmountable till very late in many international forums but the same have started appreciating the efforts and now India has become a role model for whole world and remaining endemic countries. [9]

**Current Challenges**

But the battle is still not over because polio anywhere is polio everywhere. Resurgence of poliomyelitis in countries which were free of WPV in past is a major menace contemporarily and risk of importation into India from endemic or reinfected countries is high. In the past the spread of WPVs from one place to other parts of country and even to other country characterise the highly contagious nature of WPV. So our currently excellent OPV coverage is no guarantee against importation. Vaccination coverage can drop rapidly in some locations among our large annual cohort and so any gaps in the same may lead to spread of imported WPVs. This is the state responsibility to re-ensure that immunity gaps due to any reasons shall not be allowed to develop now or in near future. The other challenge in polio eradication is that of Vaccine Derived Polio Viruses (VDPVs) and Vaccine associated paralytic polio (VAPP). Vaccine viruses are not only genetically prone to mutate and become neurovirulent causing VAAP but their tendency to transmit to unvaccinated children causing polio outbreaks are also cause of concern for the experts[10].

**Future strategy**

The strategy leading to final eradication of polio will depend on the eradication phase:

**Table1: Different phases leading to final eradication of polio**

| Eradication phase | Polio due to WPV | Polio due to vaccine viruses | Vaccine to be used |
|---|---|---|---|
| Pre-eradication | Yes | Yes | OPV |
| Eradication Phase 1 | No | Yes | OPV+IPV |
| Eradication phase2 | No | No | IPV only |
| Post eradication phase | No | No | No vaccine |

Although the roadmap for phase 2 has been clearly contemplated by the experts but the implementation strategy needs a tedious exercise to be done at ground level and IPV schedule in UIP during this phase is yet to be decided[2]. Currently the academia and researchers are divided over the timing of incorporation of IPV in the routine immunization schedule. While some believe it would be prudent to give it along with DPT1 as it would reduce the incidence of VAPP, the other school of thought advises to give it along with DPT3 as the benefit of higher seroconversions will outweigh the risks, but again such complex issues need more brain storming sessions, evidence based practice and further research to decide on the future course of action.

**Exemplary for generations to come**

A disease which had been crippling the inhabitants since the birth of mankind seems to be on the verge of eradication. This is the second disease after small pox which will be completely eradicated from this world and itself sets an example that with the strong administrative and political will, hassle free financing, adequate monitoring and stewardship approach can work wonders despite all the odds working against the motive [11]. It is an example of one of those cases where the collective faith of a nation to succeed against all adversities overpowered the fear of failure. Although there were positive aspects of this disease which made thinkers to consider it for eradication but learning from the experience shared can ignite younger and new minds to take up research with more enthusiasm and positive attitude. It has caught the imagination of a generation of new India which has not learnt to bow down and will always serve as nectar to those knowledge thirsty minds who would venture into the newer realms of never ending war of conquest of humanity over illness.

**Impending Threat**

Reaching so near to eradication is itself a key note to the appreciable efforts put in it. It is presumed that we will never be so close to the benchmark again and ignoring the importance of strict vigilance as of now or of dropping the guard which was held firmly till recently in future may lead to resurgence of polio, indigenous or imported, wild or vaccine and success that has been achieved on account of decades of determina-

tion, hard work and intensive efforts will go in vain. At the same time it would be the most expensive public health failure in history, with far reaching consequences on overall global immunization efforts and serious undermining the credibility of public health efforts with donors and stakeholders, especially in an era of global economic uncertainty[12].

## REFERENCES

1. Polio eradication in India and National Polio Surveillance Project. [Online] Available from: http://www.npspindia.org/. Accessed on February 21, 2014. | | 2. John TJ, Vashishtha VM. Eradicating poliomyelitis: India's journey from hyperendemic to polio-free status. Indian J Med Res 137, May 2013, pp 881-894 | | 3. Yadav AK, Kotwal A, Gupta H, Kulkarni A, Verma AK. India without poliomyelitis: Time to make it a reality. Indian J Community Med 2012; 37:1-4 | | 4. Chaturvedi S. Vaccines, social mobilisation or any other game changer: Polio eradication is an unfinished narrative. Indian J Community Med 2013;38:67-9 | | 5.AFP Alert January 2014, National Polio Surveillance Project. [Online] http://www.npspindia.org/AFPAlert.pdf .[Accessed on February 21, 2014] | | 6. The 107 Block Plan. [Online]. Available from: http://www.searo.who.int/india/topics/poliomyelitis/Polio_107_block_plan_Mar_2010.pdf. [Accessed on March1,2014] | | 7. The journey to a polio-free India.[Online] Available from: http://www.unicef.org/india/Polio_Booklet-final_(22-02-2012)V3.pdf. [Accessed on February 23, 2014] | | 8. Paul Y. Why has polio eradication program failed in India? Indian Pediatrics 2008;45:381-8 | | 9. Polio Eradication. [Online]. Available from: http://www.unicef.org/india/health_3729.htm. [Accessed on February 27, 2014] | | 10. Global polio eradication initiative. Vaccine Derived Polio Viruses(VDPV). [Online]. Available from: http://www.polioeradication.org/Polioandprevention/Thevirus/Vaccinederivedpolioviruses.aspx. [Accessed on February 27, 2014] | | 11. Lahariya C. Global eradication of polio: the case for "finishing the job".Bull World Health Organ 2007;85:487-92 | 12. Bhatnagar N, Grover M, Sinha S, Kaur R. Poliomyelitis eradication: Rhetoric or reality. Asian Pac J Trop Dis 2013; 3(3): 240-241