

## How Well Informed are Our Pediatric Trainees About Polio When the World Prepares for the End Game Strategy?

Deepanjan Bhattacharya<sup>1\*</sup>, Koyel Chakraborty<sup>2</sup> and Bhavneet Bharti<sup>1</sup>

<sup>1</sup>Department of Pediatrics, Advanced Pediatric Centre, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

<sup>2</sup>Regional Institute of Ophthalmology, Medical College and Hospital, Kolkata, India

**\*Corresponding Author:** Deepanjan Bhattacharya, Senior Resident, Department of Paediatrics, Advanced Pediatric Centre, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, India.

**Received:** September 16, 2022

**Published:** November 08, 2022

© All rights are reserved by **Deepanjan Bhattacharya, et al.**

### Abstract

**Introduction:** Polio Eradication and Endgame Strategic Plan addresses the eradication of all polio disease, whether caused by wild poliovirus or circulating vaccine-derived poliovirus. In this backdrop, present study was conducted among resident pediatric doctors to evaluate their knowledge about polio along with various nuances of the strategic plan.

**Materials and Methods:** This was an observational cross-sectional study. Residents responded to 21-item predesigned, pre-tested MCQ format awareness questionnaire with binary scoring (correct1, incorrect0). Bivariate and multivariate analyses were carried out for finding association of awareness scores with various predictors using R software.

**Results:** Total of 89 residents were enrolled out of whom 40.4% (n = 36) were from first three semesters, 36% (n = 32) were from 4-6<sup>th</sup> semester and remaining 23.6% (n = 21) were post MD Senior Residents. Median awareness score was 10 (IQR 4) with minimum and maximum scores of 4 and 16.

Senior Residents had significantly better scores than Junior Residents (p = 0.045). Less than half could correctly state the year of initiation of pulse polio immunization and schedule of IPV, while only 15% could demonstrate correct use of vaccine vial monitor.

There was statistically significant positive correlation between the semester of the resident and the total awareness score (Spearman rho 0.25; p = 0.02). Only 22.4% residents reported active participation during national pulse polio campaigns. All the participants (n = 20) in Pulse polio program had better awareness with mean scores of 10.7 (2.4) when compared to non participants 9.5 (3) and this difference showed a trend for significance.

**Conclusion:** Given the low awareness regarding polio strategic plan, it is imperative that pediatric trainees be sensitized early during their training to improve their active participation in the national programmes.

**Keywords:** Pulse Polio Immunisation; Polio; Inactivated Polio Vaccine (IPV)

### Introduction

Poliomyelitis is an infectious disease caused by single stranded RNA virus, poliovirus of the Enteroviridae family. It is transmitted through feco-oral route, with paralysis occurring in less than

1%. There is no specific treatment, and affected individuals have significant long term neurological morbidity.

Since human is the only known reservoir, it is possible to eliminate poliomyelitis by immunization.

The first effective vaccine was a killed one developed by Salk in 1952, followed by Sabin who developed a live attenuated trivalent vaccine in 1957. Inactivated polio vaccine (IPV) was introduced in 1987, following which WHO, UNICEF and Rotary International initiated global immunization drives against polio.

Immunisation in India started in 1978 as a part of the Expanded Programme on Immunisation, and successively got incorporated in Universal Immunisation Programme (UIP) in 1985, Child Survival and Safe Motherhood (CSSM) in 1992 and Reproductive and Child Health (RCH) Programme in 1997.

Pulse Polio Immunisation was launched in 1995 aiming for 100% coverage of polio vaccine. It aimed at simultaneous immunization of all children irrespective of vaccination status on a single day, along with a high level of surveillance.

India achieved polio free status in 2016, following the last reported case of poliomyelitis in January, 2011 [1].

Pulse polio immunization has been continued to improve herd immunity and reduce rates of indigenous transmission. The trivalent vaccine has been replaced with bivalent vaccine, after excluding type 2 strain which was associated with cases of Vaccine Associated Paralytic Polio (VAPP). Inactivated Polio Vaccine (IPV) has been introduced in the National Immunisation Schedule alongside the OPV.

The Polio Eradication and Endgame Strategic Plan was developed in 2013 by Global Polio Eradication Initiative, and has laid down specific steps for eradication. It aims to detect and interrupt transmission of wild poliovirus transmission, switch over to bivalent OPV, and then phase over to IPV, containment and certification of polio eradication, and mainstream polio functions, infrastructure and learnings.

However, the level of awareness among medical professionals is unclear, although it is of paramount significance for the overall success of the programme.

## Review of Literature

In 1996, Gomber, *et al.* evaluated the awareness of the general population about pulse polio immunization. 225 adults were interviewed after massive information, education and

communication (IEC) measures. It was found that 60.4% were aware about the launch of the programme and 31% about its objectives. The programme covered >90% of the children upto 3 years in the area, and the success was attributed to creation of awareness [2].

In 1998, Sengupta, *et al.* interviewed 656 mothers with children less than 3 years of age, and found that while 70% of them knew the correct name of the vaccine, only 3.5% could state the purpose of oral polio vaccine [3].

In 2001, Singh, *et al.* interviewed 182 accompanying persons of the vaccinees during pulse polio immunization, and found that 92.9% of them were aware of the programme and 86% about its preventive aspect. More than 70% of them knew about the associated paralysis and 45% were aware about no cure being available [4].

In 2004, Misra, *et al.* evaluated 329 families in a slum area, and reported awareness about poliomyelitis in 56% of the population. 62.3% of the informants were aware about the role of OPV and 82% knew about the target age group. There was no association between literacy status and coverage of pulse polio immunization [5].

In 2007, Chudasama interviewed 277 healthworkers during pulse polio immunization programme in 81 booths. Only 18.4% of the healthworkers could identify OPV correctly (including more than half of Group A health workers), and more than half of them were unaware about vaccine vial monitor (VVM). He had recommended proper education and training of healthworkers, since their lack of knowledge can severely affect the programme [6].

In 2011, Joseph, *et al.* interviewed 320 adults who had under-5 children in their houses. 90% of the population was aware about polio vaccination. However 11% could correctly identify the mode of transmission and 35% of them had misconceptions, commonest of which was that OPV prevents other diseases [7].

A comprehensive assessment of awareness about Pulse Polio Immunization Programme among nursing staffs and doctors is lacking.

## Research question

What is the level of awareness about pulse polio immunization programme among nursing pediatric resident doctors?

## Hypothesis

Pulse Polio Immunisation Programme is an important part in the eradication of polio, and is carried out annually. However, the awareness about the aspects of the programme is variable. This study will reveal the awareness among resident doctors of Pediatric Medicine Department of a tertiary care hospital in Northern India.

## Aim of the Study

To assess the awareness and knowledge of resident doctors of Pediatric Medicine department regarding Pulse Polio Immunization

## Objectives

To assess the awareness regarding

- Etiology and transmission of poliovirus
- Role of vaccines
- Polio vaccination in National Immunisation Schedule
- Pulse Polio campaigns

## Methodology

### Study design

Observational cross-sectional study.

### Study setting

Department of Pediatrics, Advanced Pediatrics Centre, Postgraduate Institute of Medical Education and Research, Sector-12, Chandigarh.

### Study period

28<sup>th</sup> - 30<sup>th</sup> January, 2018 (during Pulse Polio Immunization).

### Inclusion criteria

Junior and Senior Residents, Department of Pediatrics, PGIMER, Chandigarh.

### Exclusion criteria

- Individuals refusing to give consent
- Resident doctors and healthcare staff absent during study period.

Awareness about PPI was obtained using separate pre-designed, pre-tested questionnaire for resident doctors during the aforesaid period.

Data was entered in a Mastersheet. Statistical analysis was done using SPSS version 23. Quantitative variables were reported as mean (SD), median and inter-quartile range for skewed data and qualitative variables were reported as proportions. Comparisons were made by using student t test, ANOVA and chi square test, as appropriate. Correlation coefficient was obtained by Pearson's test. A p value of <0.05 was considered significant.

## Results

68 pediatric Junior Residents participated in the study among whom 20% had previously participated in pulse polio immunization programme. Mean score was  $9.42 \pm 2.9$  (95% CI 8.607 - 10.05). Type of virus causing polio was identified by 81%, and 83% could correctly identify the ambassador.

Only 30% could state the correct year of initiation of PPI, and 44% could define VAPP properly. Only 18.5% could demonstrate correct use of Vaccine Vial Monitor, and 36% could state the correct schedule of IPV.

There was no significant difference between scores of junior residents according to semester ( $p = 0.77$ ).

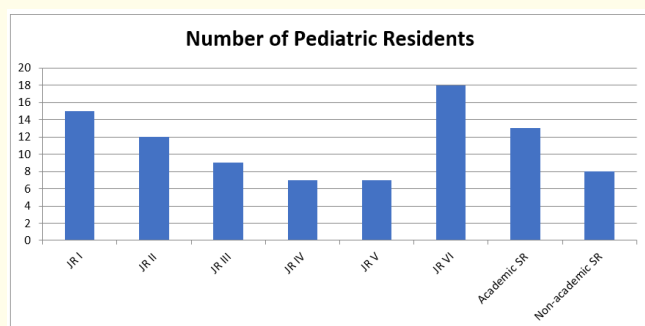
Among 21 Senior Residents who participated, 13 were academic while 8 were non-academic. Mean score was  $10.8 \pm 2.89$ . 95% could identify the correct strain of virus, and 81% could identify the ambassador. Only 33% could state the correct year of initiation of PPI, and 58% could define VAPP properly. Only 3.8% could demonstrate correct use of Vaccine Vial Monitor, and 36% could state the correct schedule of IPV.

While there was no significant difference between scores of academic and non-academic senior residents ( $p = 0.25$ ), scores were significantly higher of senior residents as compared to junior residents ( $p = 0.045$ ).

All the participants ( $n = 20$ ) in Pulse polio program had better awareness with mean scores of 10.7 (2.4) when compared to non participants 9.5 (3) and this difference showed a trend for significance.

Semester	JR-I	JR-II	JR-III	JR-IV	JR-V	JR-VI	Academic SR	Non-academic SR
N	15	12	9	7	7	18	13	8
Mean	8.87	9.00	9.89	10.43	8.86	9.89	10.2	11.8
Median	9.000	9.000	10.00	11.0	8.000	10.50	10.0	12.0
SD	2.92	3.46	2.20	2.51	3.02	2.99	2.83	2.92
95% CI	7.338-10.40	7.291-10.71	7.93-11.86	8.191-12.67	6.620-11.09	8.494-11.28	8.568-11.89	9.631-13.87

**Table 1:** Distribution of scores of pediatric residents (semester wise).



**Figure 1:** Column graph showing number of Junior and Senior Residents who participated.

## Discussion

Pulse polio immunisation is one of the most important projects undertaken in India, as a result of which India has been declared polio free.

Although there was no significant differences between score of Junior Residents ( $p = 0.77$ ), Senior Residents scored significantly better than them ( $p = 0.045$ ).

However, the general knowledge of residents was poor; less than half could correctly state the year of PPI initiation and schedule of IPV, and correctly define VAPP. Very few could correctly demonstrate the use of vaccine vial monitor.

However, all those who had participated in Pulse polio program had better awareness than their counterparts.

Our study is the first of its kind as it assesses the awareness among pediatric residents as well as nursing staff.

## Conclusion

Although we have come a long way in immunization against poliomyelitis and have been successful in its eradication, awareness remains one of the drawbacks even among medical staff. Probably more emphasis on awareness campaigns and participation in PPI is required.

## Financial Support Used for the Study, Including any Institutional Departmental Funds

None.

## Conflict of Interest

None.

**Figure 2:** Box and whisker plot showing score of Junior and Senior Residents.

A - Semester I JR; B - Semester II JR; C - Semester III JR;  
D - Semester IV JR; E - Semester V JR; F - Semester VI JR;  
G - Academic SR; H - Non-academic SR.

**Annexure**

Questionnaire for resident doctors on polio

Name: \_\_\_\_\_ Semester: \_\_\_\_\_ Junior/ Senior Resident \_\_\_\_\_

Have you ever participated in Pulse polio campaign : Yes/ No

If yes when and where \_\_\_\_\_

Tick the correct choice/choices ( Multiple responses are possible )

1. Polio is caused by
  - a. Single stranded RNA virus
  - b. Double stranded RNA Virus
  - c. Single stranded DNA Virus
  - d. Double stranded RNA virus
2. In which of the following countries polio is still prevalent?
  - a. Afghanistan
  - b. Bangladesh
  - c. Pakistan
  - d. Nepal
  - e. Nigeria
3. What is the name of the last polio case detected in India?
  - a. Sabina from Belur in West Bengal
  - b. Shabida Bibi from Shahpura village in West Bengal
  - c. Rukhsar Khatoon from Shahpura village in West Bengal
  - d. Rubaiya Sayeed from Shantiniketan West Bengal
4. National Immunization Days (NID) rounds are conducted in
  - a) In UP and Bihar only

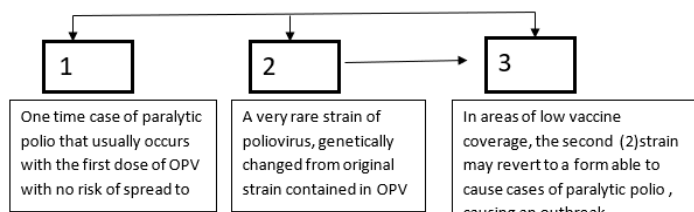
- b) Nation wide
  - c) Only in high risk areas
  - d) Border states
5. Which of the following is not a strategy for Polio eradication
- a. Strengthening Routine Immunization
  - b. AFP surveillance
  - c. Intensive Pulse Polio Immunization Campaigns
  - d. Polio Corrective surgeries
6. For stool samples to be labeled as adequate in AFP cases. They have to be collected
- a) 1 sample within one week of onset of paralysis
  - b) 1 sample within 2 weeks of onset of paralysis
  - c) 2 samples within 1 week of onset of paralysis
  - d) 2 samples within 2 weeks of onset of paralysis
7. Fractional IPV (f IPV) dose refers to
- a) 0.5 ml dose Intramuscular
  - b) 0.1ml dose Intramuscular
  - c) 0.1ml dose Subcutaneous
  - d) 0.1ml dose Subcutaneous
  - e) 0.1ml dose Intradermal
  - f) 0.5ml dose Intradermal
8. Which of the following houses will not be marked as “P “ House in House to House in Polio campaign
- a) All eligible children vaccinated
  - b) No eligible child in the house
  - c) Eligible children gone to school
  - d) All children above 5 years of age

9. What is Catch-up vaccination schedule for IPV as per IAP guidelines
- 2 doses at one a month apart followed by booster after 2 months of previous dose
  - 3 doses at one a month apart followed by booster after 2 months of previous dose
  - 2 doses at one a month apart followed by booster after 3 months of previous dose
  - 2 doses at 2 months apart followed by a booster after 6 months of previous dose.

10. What is the current National Immunisation Schedule for IPV?

- Two doses of Intradermal IPV at 6 weeks and 14 weeks
- Three doses of Intrademal IPV at 6, 10 and 14 weeks
- Three doses of Intrademal IPV at 6, 10 and 14 weeks followed by booster at 18months
- Two doses of Intramuscular IPV at 6weeks and 14 weeks

11. 10 billion doses of OPV have protected 2.5 billion children in last 10 years from polio. In extremely rare cases, OPV can lead to



The correct sequence for 1, 2 and 3 is

- 1-VDPV, 2- VAPP 3- cVDPV
- 1 VAPP, 2- VDPV, 3- cVDPV
- 1-cVDPV 2-VAPP, 3-VDPV
- 1-cVDPV, 2-VDPV,3- VAPP

Which strain of Polio is associated with Vaccine associated Poliomyelitis?

- Type 1
- Type 2
- Type 3
- Type 2 and Type 1

12. The “switch” in polio immunization which took place globally in 2016 refers to

- a. OPV to IPV switch
- b. IPV to OPV switch
- c. Bivalent OPV to Trivalent OPV
- d. Trivalent OPV to Bivalent OPV

After cessation of type 2 vaccine use in 2016, any reported vaccine-derived poliovirus type 2 (VDPV2) is being treated as a public health emergency requiring outbreak response with monovalent type 2 oral vaccine and/or IPV. Which states reported the isolation of VDPV2 from a sewage sample following this change

- a. Telangana
- b. West Bengal
- c. Gujarat
- d. Delhi

13. A formal process for the certification of global polio eradication was set up based on the experience gained during smallpox eradication. For certification, all countries in the WHO Region need to have no case of wild polio for \_\_\_\_ consecutive years in presence of high quality AFP surveillance systems

- a. 3 yrs
- b. 5 yrs
- c. 7 yrs
- d. 10 yrs

14. In which year was Pulse Polio Immunization started in India ?

- a. 1990
- b. 1993
- c. 1995
- d. 1997

15. Who is the ambassador of pulse polio immunization in India?

- a. Amitabh Bachhan
- b. Shatrughan Sinha
- c. Madhuri Dixit



d. Hema Malini

16. Match the following and select the correct choice

Last case of poliovirus in India

- |                        |   |
|------------------------|---|
| 1. Type 1 (WPV1) case: | a 13 January 2011, Howrah, West Bengal  |
| 2. Type 2 (WPV2) case: | b. October 1999, Aligarh, Uttar Pradesh |
| 3. Type 3 (WPV3) case: | c. 22 October 2010, Pakur, Jharkhand    |

a. 1 (a) 2 (b) 3 (c)

b. 1(b) 2(c) 3 (a)

c. 1 (c) 2 (b) 3 (a)

d. 1 (a) 2 (a) 3 (b)

17. As an important step towards a polio-free world, the Global Commission for the Certification of Poliomyelitis Eradication (GCC) concluded that wild poliovirus type 2 (WPV2) has been eradicated worldwide. The GCC reached its conclusion after reviewing formal documentation submitted by Member States, global poliovirus laboratory network and surveillance systems.

Mention the year when this was certified

a 2011   b.2012   c 2013   d 2014   e 2015

18. World Health Organization has described VVMs as crucial in the spread of polio vaccination programs. There are four types of VVM, which are assigned based on the different stability characteristics of the products which types are known to use . All OPV match the category VVM2 but manufactures commonly use VVM7 or VVM 14. The meaning of VVM14 is the number of days that it would take a VVM to reach its end-point if it were exposed continuously to

a. Temp 37°C,

b. Temp 25°C

c. Temp 5°C

d. Temp 2-8°C

## Bibliography

1. Bahl S., *et al.* "Polio-free certification and lessons learned-- South-East Asia region, March 2014". *MMWR Morbidity and Mortality Weekly Report* 63.42 (2014): 941-946.
2. Gomber S., *et al.* "Awareness of pulse polio immunisation". *Indian Journal of Pediatrics* 63.1 (1996): 99-103.
3. Sengupta B., *et al.* "Perception and practice regarding pulse polio immunisation in an urban community of Calcutta". *Journal of Indian Medical Association* 96.8 (1998): 247-248.
4. Singh MM., *et al.* "Awareness about pulse polio immunization among the general population in Delhi". *Indian Journal of Medical Science* 55.8 (2001): 453-457.
5. Chudasama RK. "Awareness about vaccine vial monitor at pulse polio booths". *Indian Pediatrics* 44.12 (2007): 919-920.
6. Misra P., *et al.* "A study of the perception, communication and coverage of pulse polio immunization programme in a Delhi slum". *Indian Journal of Public Health* 48.4 (2004): 216-217.
7. Joseph N., *et al.* "A study of the knowledge and attitude towards pulse polio immunization in semi urban areas of South India". *Australasian Medical Journal* 4.2 (2011): 81-86.