Vol 4 | Issue 3 | July - September | 2024

ORIGINAL ARTICLE - PUBLIC HEALTH

# TELEPHONIC SURVEY TO ASSESS VACCINATION COVERAGE IN INTENSIFIED PULSE POLIO IMMUNISATION CAMPAIGN 2024, TAMIL NADU: A RAPID ASSESSMENT

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**ABSTRACT**

**INTRODUCTION :** Despite India being declared polio-free, the risk of poliovirus importation and vaccine-derived poliovirus (VDPV) remains. Tamil Nadu has been polio-free since 2004, and in March 2024, an Intensified Pulse Polio Immunization (IPPI) campaign was conducted. A telephonic dipstick survey was initiated to assess OPV coverage and identify barriers to vaccination.

**METHODS :** Directorate of Public Health and Preventive Medicine conducted a telephonic survey of mothers using systematic random sampling from the Pregnancy and Infant Cohort Monitoring and Evaluation (PICME) portal. A sample of 1,200 mothers across 46 Health Unit Districts (HUDs) was targeted to assess polio vaccination coverage and reasons for non-vaccination during 3rd day of IPPI.

**RESULTS :** : Out of 2,235 calls, 1,174 (52.5%) mothers responded, with 1073 (91.3%) reporting their children received OPV. Most vaccinations occurred at Anganwadi centres (59%). Among the unvaccinated (8.6%), the reasons included child illness (30%), being out of town (29%), and lack of awareness (23%). Subsequent follow-up increased OPV coverage to 1120 (95.4%).

**CONCLUSION:** The survey showed high OPV coverage but highlighted gaps in urban areas like Chennai and the need for targeted community outreach for absentee and unaware families. This rapid assessment method provided actionable insights for future campaigns to ensure sustained polio-free status.

**KEYWORDS :** Poliomyelitis, Oral vaccine, Sabin vaccine, Mass vaccination, Primary care

## INTRODUCTION

Poliomyelitis remains a public health concern in several regions worldwide despite significant progress towards its eradication. Humans are the only reservoir/ carrier of the wild poliovirus. It has three types: 1, 2, and 3. In India, the type 2 wild poliovirus was declared eradicated in September 2015, with the last virus detected in 1999. The type 3 wild poliovirus was declared eradicated in October 2019. It was last detected in November 2012. Only type 1 wild poliovirus remains.[1] The strategy for elimination/ eradication of type 1 virus is to have an equally vital system of 4 components. These are robust routine immunisation, conducting supplemental immunisation, selective /focal mop-up rounds & a sensitive & responsive Acute Flaccid Paralysis (AFP) surveillance system.[2,3]

Oral Poliovirus Vaccine (OPV) is central to the goal of polio eradication in many countries where affordable and easily administered vaccination can facilitate the prevention of disease. Widespread use of Oral Poliovirus Vaccine (OPV), whether administered in Routine Immunisation (RI) schedules or Supplementary Immunisation Sessions, has led to the control and eradication of wild poliovirus in the industrialised world and three regions of the World Health Organization.[4] In settings with low immunisation coverage, live vaccine viruses used in OPV can multiply for a long and undergo mutations to gain neuro-virulence. This vaccine-derived poliovirus (VDPV) can cause paralysis and circulate in the community, causing outbreaks.[5] Increasing polio immunization coverage rates is among the strategies to minimize the risk of wild poliovirus and cVDPV transmission.

Since 2000, more than 10 billion doses of OPV have been administered to nearly 3 billion children globally. As a result, more than 13 million polio cases have been prevented, and the disease has been reduced by more than 99%. Until 2015, over 90% of circulating Vaccine-Derived

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Polio Virus (cVDPV) cases were due to the type 2 component in OPV. As wild poliovirus type 2 had already been successfully interrupted since 1999, in April 2016, a switch was implemented from trivalent OPV (tOPV) to bivalent OPV (bOPV) in routine immunisation programmes. The removal of the type 2 virus from OPV was associated with a reduction of the risk of cVDPV2. Circulating VDPVs in the past have been rapidly stopped with 2–3 rounds of high-quality immunisation campaigns. To avert all sorts of polio outbreaks, every child should be vaccinated with the oral vaccine and fractional inactivated polio vaccine (fIPV) to prevent polio transmission.[6,7]

South-East Asia of the WHO region, including India, was certified as polio-free on 27th March 2014. India has continued to maintain a polio-free status since January 2014.[2] with the last case reported in 2011. There is no evidence of VDPVs circulating in the community. India continues to face the threat of importing wild poliovirus (WPV) and vaccine-derived polioviruses (VDPV) from countries that are still reporting cases. To maintain its polio-free status, India maintains high levels of herd immunity against polio through Routine Immunization (RI) and National Immunization Days (NIDs), when all children under five years are vaccinated against the virus. Bivalent OPV (bOPV) and fractional inactivated polio vaccine (fIPV) are currently used in India's Universal Immunisation Program (UIP). The bOPV contains two serotypes of live attenuated poliovirus (type 1 and 3) and is delivered through Routine Immunisation (RI) days, National Immunization Days (NID), and Sub-National Immunizations Days (SNID) in which two drops of bOPV were administered to all children under five years of age irrespective of the previous vaccination status. A fractional dose of inactivated polio vaccine (fIPV) contains the three serotypes of the polio vaccine, thus preventing all polioviruses (type 1, 2, and 3) and does not result in VDPV. It is delivered through RI days to all infants in the 6th and 14th week, 0.1 ml intradermally.

Tamil Nadu attained a 'Polio Free Status' in 2004; for the past 19 years, no polio cases have been reported in the state. In 2024, Intensified Pulse Polio Immunization (IPPI) was conducted on March 03rd, 2024, and 59.20 lakhs of children aged 0-5 years benefitted.[8]

A dipstick survey is a rapid assessment tool to gather preliminary data on a specific issue. This method is often employed in public health, market research, and social sciences to collect data efficiently and cost-effectively. In the context of the IPPI campaign, it provides a snapshot of vaccination coverage and its gaps, if any, in a community. Tamil Nadu's polio dipstick survey is conducted after each IPPI campaign. It offers a rapid and efficient means of detecting beneficiaries' coverage after each yearly IPPI campaign. In 2024, the Directorate of Public Health and Preventive Medicine (DPH&PM) telephonically conducted a polio dipstick survey after the pulse polio day on two specific dates, on the 05th and 13th March 2024, i.e. on third day and tenth day of IPPI for all 46 Health Unit Districts (HUDs) of Tamil Nadu to understand the vaccine coverage and reasons for receiving and not-receiving the OPV during the IPPI.

## METHODS

A list of pregnant mothers who had delivered in the past four years with their contact numbers and residing district details was obtained from the Pregnancy and Infant Cohort Monitoring and Evaluation (PICME) portal. Using Systematic Random Sampling (SRS), telephonic interviews were attempted to achieve a sample of 1,200 mothers (25 mothers from each HUD and 75 from Chennai corporation). During this interview, the mother's name and the health unit district where they resided were confirmed after obtaining the mother's informed consent. Mothers were asked about their awareness of Pulse Polio Immunisation, whether their children received polio drops, and, if so, where the drops were administered. If not, the reasons for not receiving vaccination were recorded. Mothers who reported that their children were not vaccinated were contacted again on the 13th of March, 2024, for further inquiry. The data collected were compiled and analysed to assess the extent of poliovirus vaccine coverage.

**Ethics consideration:** This annual survey is part of routine public health surveillance programmatic activity to assess the OPV coverage and reasons for the non-uptake of vaccines and identify areas of improvement during the IPPI campaign. Thus, it is a program evaluation rather than research aiming to generate new knowledge. Further, voluntary participation, non-collection of personally identifiable information, and obtained verbal consent ensure transparency of this survey. The collected data is de-identified and used only for programmatic assessment. Hence, this may be exempted from ethics committee approval.

## RESULTS

1174 (52.5%) have responded out of 2,235 unique calls to eligible mothers (Figure 1). Of these, 1,073 (91.3%) received OPV from 03rd to 09th March 2024 during the IPPI campaign (Table 1).

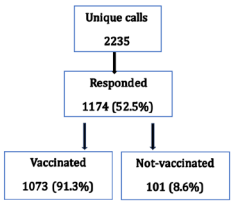



*Figure 1: Number of unique mothers reached and their responses on 5th March 2024, IPPI, Tamil Nadu*

*Table 1: Number of unique mothers and response for receipt of OPV during the IPPI campaign, 3rd to 9th March 2024, Tamil Nadu*

| Health Unit District | No. of calls attempted | Total Responded | Vaccinated | Not Vaccinated |
|---|---|---|---|---|
| Aranthangi | 50 | 25 | 25 | 0 |
| Ariyalur | 44 | 25 | 25 | 0 |
| Attur | 50 | 24 | 21 | 3 |
| Chengalpattu | 44 | 25 | 21 | 4 |
| Chennai | 123 | 73 | 52 | 21 |
| Cheyyar | 50 | 23 | 23 | 0 |
| Coimbatore | 50 | 24 | 23 | 1 |
| Cuddalore | 43 | 20 | 18 | 2 |
| Dharmapuri | 49 | 23 | 22 | 1 |
| Dindigul | 50 | 27 | 26 | 1 |
| Erode | 47 | 29 | 25 | 4 |
| Kallakurichi | 50 | 22 | 20 | 2 |
| Kancheepuram | 38 | 25 | 24 | 1 |
| Kanniyakumari | 50 | 27 | 21 | 6 |
| Karur | 50 | 25 | 25 | 0 |
| Kovilpatti | 51 | 24 | 23 | 1 |
| Krishnagiri | 41 | 25 | 25 | 0 |
| Madurai | 50 | 25 | 25 | 0 |
| Mayiladuthurai | 50 | 27 | 26 | 1 |
| Nagapattinam | 50 | 21 | 19 | 2 |
| Namakkal | 50 | 25 | 24 | 1 |
| Nilgiris | 37 | 27 | 25 | 2 |
| Palani | 43 | 14 | 13 | 1 |
| Paramakudi | 39 | 32 | 25 | 7 |
| Perambalur | 50 | 24 | 23 | 1 |
| Poonamalle | 50 | 25 | 24 | 1 |
| Pudukottai | 50 | 28 | 24 | 4 |
| Ramanathapuram | 50 | 22 | 21 | 1 |
| Ranipet | 41 | 26 | 25 | 1 |
| Salem | 50 | 24 | 21 | 3 |
| Sivagangai | 50 | 21 | 19 | 2 |
| Sivakasi | 44 | 25 | 24 | 1 |
| Tenkasi | 30 | 25 | 23 | 2 |
| Thanjavur | 48 | 25 | 19 | 6 |
| Theni | 50 | 23 | 22 | 1 |
| Tirunelveli | 50 | 26 | 24 | 2 |
| Tirupattur | 48 | 27 | 21 | 6 |
| Tiruppur | 50 | 25 | 25 | 0 |
| Tiruvallur | 44 | 25 | 25 | 0 |
| Tiruvannamalai | 50 | 22 | 21 | 1 |
| Tiruvarur | 50 | 20 | 15 | 5 |
| Trichy | 37 | 24 | 22 | 2 |
| Tuticorin | 50 | 24 | 24 | 0 |
| Vellore | 50 | 22 | 22 | 0 |
| Villupuram | 50 | 29 | 28 | 1 |
| Virudhunagar | 44 | 25 | 25 | 0 |
| **Grand Total** | **2235** | **1174** | **1073** | **101** |

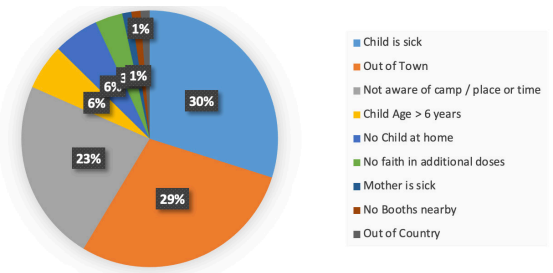
Integrated Child Development Scheme (ICDS) - Anganwadi centres (AWC), erstwhile called Anganwadi centres (59%), are the most common place where children receive OPV drops, followed by (15%) health facilities and schools (14.7%) (Table 2). Of the 101 (8.6%) unvaccinated, 21% are from Chennai, followed by Paramakudi, Kanniyakumari, Thanjavur and Tirupathur districts (Table 1).

*Table 2: Place of vaccination in IPPI campaign, 3rd to 9th March 2024, Tamil Nadu*

| HUD Name | Booth Type for vaccinated (N=1073) | | | | | |
|---|---|---|---|---|---|---|
| | Health facility | Home Visit | ICDS (Anganwadi Centre) | Public Places (Religious places/ Malls/ etc.) | School | Transit (Bus stand/ Railways/ Toll etc.) |
| Aranthangi | 3 | | 17 | | 5 | |
| Ariyalur | 2 | | 16 | 2 | 4 | 1 |
| Attur | 2 | | 11 | 2 | 4 | 2 |
| Chengalpattu | 9 | | 4 | 2 | 4 | 2 |
| Chennai | 16 | 1 | 15 | 13 | 7 | |
| Cheyyar | 1 | | 15 | | 7 | |
| Coimbatore | 3 | | 11 | 3 | 5 | 1 |
| Cuddalore | 3 | | 11 | 2 | 2 | |
| Dharmapuri | 2 | 1 | 15 | | 3 | 1 |
| Dindigul | 3 | | 19 | 1 | 3 | |
| Erode | 3 | | 13 | 1 | 6 | 2 |
| Kallakurichi | 8 | | 9 | 1 | | 2 |
| Kancheepuram | 1 | | 19 | 3 | 1 | |
| Kanniyakumari | 3 | | 12 | 1 | 5 | |
| Karur | 2 | 1 | 15 | 3 | 4 | |
| Kovilpatti | 5 | | 14 | 2 | 1 | 1 |
| Krishnagiri | 1 | | 13 | | 10 | 1 |
| Madurai | 2 | | 22 | 1 | | |
| Mayiladuthurai | 2 | | 18 | 1 | 5 | |
| Nagapattinam | 3 | | 12 | | 3 | 1 |
| Namakkal | | | 24 | | | |
| Nilgiris | 7 | | 13 | 1 | 2 | 2 |
| Palani | 1 | | 10 | 1 | 1 | |
| Paramakudi | 3 | | 15 | 2 | 4 | 1 |
| Perambalur | 13 | | 9 | | 1 | |
| Poonamalle | 3 | 1 | 10 | 3 | 5 | 2 |
| Pudukottai | 6 | | 15 | | 1 | 2 |
| Ramanathapuram | 2 | 1 | 12 | 1 | 5 | |
| Ranipet | 4 | 1 | 14 | | 1 | 5 |
| Salem | 5 | | 7 | 5 | 4 | |
| Sivagangai | | | 18 | | | 1 |
| Sivakasi | 6 | | 12 | 1 | 4 | 1 |
| Tenkasi | 1 | | 17 | 2 | 2 | 1 |
| Thanjavur | 1 | | 11 | 1 | 6 | |
| Theni | 5 | | 11 | 1 | 3 | 2 |
| Tirunelveli | 7 | 1 | 10 | | 4 | 2 |
| Tirupattur | 1 | | 13 | 3 | 4 | |
| Tiruppur | 3 | | 17 | 1 | 4 | |
| Tiruvallur | 4 | | 11 | 3 | 6 | 1 |
| Tiruvannamalai | | | 20 | | 1 | |
| Tiruvarur | 1 | | 7 | 3 | 4 | |
| Trichy | 2 | | 11 | 4 | 3 | 2 |
| Tuticorin | 1 | | 20 | 1 | 2 | |
| Vellore | 4 | | 12 | 1 | 4 | 1 |
| Villupuram | 4 | 1 | 16 | 2 | 5 | |
| Virudhunagar | 4 | | 15 | 2 | 3 | 1 |
| Grand Total | 162 | 8 | 631 | 76 | 158 | 38 |

Figure 2, Child's sickness (30%), being out of state (29%), and not being aware of the place and date of pulse polio (23%) were the primary reasons quoted for not receiving the OPV during the IPPI campaign.

*Figure 2: Reasons for not receiving OPV in IPPI campaign, 3rd to 9th March 2024, Tamil Nadu*



## DISCUSSION

The findings of this dipstick survey highlight the success of the Intensified Pulse Polio Immunization (IPPI) campaign in Tamil Nadu. With over 91% of respondents reporting that their children received the oral polio vaccine (OPV), the coverage reflects the effectiveness of the public awareness campaign and logistical execution during the immunisation day—however, the 8.6% of children who remained unvaccinated on third day of IPPI highlight gaps that need targeted interventions.

The reasons for non-vaccination, such as being out of state, sickness of the child or mother, and lack of awareness, indicate that more tailored outreach efforts, including communication about the vaccination schedule and alternative provisions for absentee children, could enhance coverage. Those who reported not being vaccinated on 3rd day of IPPI were followed by district administration through community health workers, and subsequently, 47 children were vaccinated during mop-up days. This resulted in cumulative OPV coverage of 95.4% at the end of the IPPI campaign.

The reasons for not receiving the OPV for the remaining 54 (4.6%) were (5-No child at home, 5- age more than six, 14- the child is sick, 1- out of the country).

This survey affirms the role of ICDS-Anganwadi centres as key vaccination hubs. It stresses the importance of addressing coverage disparities, especially in regions like Chennai, which had a higher rate of non-vaccination. These insights should inform future IPPI campaigns, allowing for better planning and resource allocation to maximise vaccine uptake.

The dipstick survey provides a rapid and efficient method of assessing vaccination coverage after an IPPI campaign. A large sample size (1,174 responses) offers a robust snapshot of vaccination uptake across Tamil Nadu, including data from urban and rural districts. Telephonic interviews ensure timely data collection and broad coverage, facilitating immediate action where necessary.

The survey relies on maternal self-reporting, possibly introducing recall bias. The method does not capture qualitative data about more profound barriers to vaccination, such as mistrust or logistical challenges beyond the immediate reasons provided. This approach aligns with the survey's goals, providing actionable insights for future public health campaigns.

## CONCLUSION

The survey highlights the importance of continuous public engagement through IEC and other community-oriented activities, particularly in areas with lower vaccine uptake, and underscores the need for ongoing surveillance. By leveraging rapid assessment tools like dipstick surveys, public health authorities can make data-driven decisions to fine-tune their immunisation strategies, ultimately contributing to the global goal of polio eradication.

## DECLARATION OF INTEREST

The authors declare no conflict of interest

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