

# Polio, PPI, polio vaccine-Injectable form and Global Polio Vaccine Switch—what do the caretakers know about it?

Shraddha Tiwari<sup>1</sup>, Kalpak Shirish Kadarkar<sup>1</sup>, Mohan Kondiba Doibale<sup>1</sup>, Sukarn Awasthi<sup>2</sup>, Aakash Sharma<sup>3</sup>

<sup>1</sup>Department of Community Medicine, Government Medical College, Aurangabad, Maharashtra, India.

<sup>2</sup>Department of Paediatrics, NSCB Medical College, Jabalpur, Madhya Pradesh, India.

<sup>3</sup>District Consultant for MCH, Family Planning, Immunisation, ARSH, SHP under National Health Mission, Rajnandgaon, Chhattisgarh, India.

Correspondence to: Shraddha Tiwari, E-mail: drshredz@gmail.com

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## Abstract

**Background:** Before Global switch of polio vaccine and inactivated polio vaccine (IPV) introduction, beneficiaries must have knowledge about the change and its benefits over the preexisting facilities. Through this study we are trying to assess the knowledge of the caretakers regarding polio, pulse polio immunization (PPI), polio vaccine switch and polio vaccine injection so that new knowledge can be hanged on the peg of their preexisting knowledge.

**Objective:** 1. To assess knowledge and practice of caretakers about PPI, polio disease, polio vaccine-injectable form, and polio vaccine switch. 2. To find association of the knowledge and practice of respondents about PPI, polio disease, polio vaccine-injectable form and polio vaccine switch with their literacy.

**Materials and Methods:** A cross-sectional study was carried out at pulse polio booth on NID, 2016. Caretakers were interviewed to assess their knowledge and practice about polio disease, polio vaccination, its availability in injectable form, and upcoming global polio switch through semi open-ended, pretested questionnaire. Data were entered in excel sheet, analyzed using SPSS version 20, and appropriate statistical tests were applied.

**Result:** Maximum children were brought to the PPI booth by their grandparents and mothers (73%), source of information to maximum respondents was health staff and television (69%), correct knowledge about the parameters such as whether polio drops be given with mild illness (54%) and signs and symptoms of polio (59%) was fair, but many still consider PPI an overdose (18%), and as a replacement to routine immunization (18%). Respondents' knowledge was poor about the mode of transmission of disease (7%), eradication status of polio (14%), injectable form of polio vaccine (5%), and polio vaccine switch (30%), and significant association was found between the literacy level and the knowledge of the respondents ( $p$ -value < 0.05).

**Conclusion:** Although government is ready to launch IPV and switch to bivalent oral polio vaccine but knowledge of the caretakers is poor, which can threaten its acceptability.

**KEY WORDS:** Knowledge, polio, polio vaccination, polio vaccine-injectable form, global polio vaccine switch

## Introduction

Polio is a viral disease and young children are usually affected by it. It can only be prevented by vaccination and cannot be treated. It is highly infectious and fecal–oral route is the

main mode of transmission of virus and rarely, by a common vehicle (e.g., contaminated food or water) and enter the nervous system after multiplication in the intestine and can cause paralytic illness. Headache, fever, vomiting, neck-rigidity, and pain are some of the initial symptoms. Small percentage of cases can suffer from the permanent outcome in the form of paralysis.<sup>[1]</sup>

Pulse polio immunization (PPI) consists of vaccination of children with oral polio vaccine (OPV) on two national immunization days (NID), at the interval of 6 weeks, during winter season, at pre-decided booths. Ambition of PPI is interrupting the wild virus transmission by immunizing the children with vaccine virus.<sup>[1]</sup>

In 2012 at least single dose of inactivated polio virus vaccine (IPV) is being recommended to be introduced in

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**Table 1:** Distribution of relation of child with caretaker

Relation	Number	Percentage (%)
Mother	54	24.54
Father	18	8.18
Grandparent	106	48.18
Relative	42	19.09
Total	220	100

**Table 2:** Distribution of Source of information about PPI

Source of information about PPI	Number	Percentage (%)
Health staff	102	46.36
Television	50	22.72
School rally	32	14.54
Neighbor	16	7.27
Newspaper	14	6.36
Poster	4	1.81
Friend	2	1
Total	220	100

**Table 3:** Distribution of knowledge and practice of caretakers about PPI, polio disease, polio vaccine-injectable form, and polio vaccine switch

Study question	Response	
	Yes (%)	No (%)
Every child brought for PPI	220 (100)	0 (0)
Missed previous PPI dose	55 (25)	165 (75)
Polio drops be given with mild illness	118 (53.63)	102 (46.36)
PPI an overdose	40 (18.18)	180 (81.81)
PPI can replace RI	40 (18.18)	180 (81.8)
Knowledge about polio disease	130 (59)	90 (41)
Knowledge about polio transmission	16 (7.27)	204 (92.72)
No. of visits declared for PPI	42 (19.1)	178 (80.9)
Next date of PPI	34 (15.45)	186 (84.54)
Is polio eradicated	30 (13.63)	190 (86.36)
Knowledge about injectable polio vaccine	12 (5.45)	208 (94.54)
Knowledge about polio vaccine switch	66 (30)	154 (70)

routine immunization schedule globally by WHO Strategic Advisory Group of Experts (SAGE), this will provide protection against type 2 polio virus paralytic polio, immunity against type 1 and type 3 virus will be boosted resulting in eradication of wild polio virus, also after the switch to bivalent OPV if any accidental cVDPV2 outbreak occurs better immune response is expected. SAGE is planning to switch from t-OPV to b-OPV in April 2016, and after the switch b-OPV should be used exclusively, and all remaining t-OPV will be discarded.<sup>[2]</sup>

Whole world is preparing for Global switch of polio vaccine from t-OPV to b-OPV and IPV is ready to get introduced in the National Immunisation Schedule shortly, and any change in

the preexisting long-term public health policy will be of great success only if the beneficiaries have knowledge about the change and its benefits over the preexisting facilities, then only they will show willful acceptance and complete participation. It is well known that community participation is the key to success of any National Policy. So, through this study we are trying to assess the knowledge of the beneficiaries regarding routine immunisation, global polio vaccine switch, and injectable polio vaccine so that new knowledge can be hanged on the peg of their preexisting knowledge.

## Materials and Methods

It was a cross-sectional study in which five pulse polio booths near government medical college, Aurangabad, Maharashtra were selected. Convenient sampling technique is applied and 15 interns were allotted the task of data collection under the direct supervision of authors. They were provided with the printed questionnaire format, which is semi-open-ended, pretested, and suitably modified to record the response of caretakers. Each intern was asked to record the response of 20 caretakers (considering the feasibility) following the children to the respective pulse polio booths on National Immunisation Day (January 17, 2016) based on their knowledge regarding polio, polio vaccination, availability of the vaccine in injectable form and the upcoming global polio vaccine switch, after taking verbal consent and maintaining the anonymity of the caretakers. The data were entered in excel sheet. Of the 15 interns, three did not submit the data, whereas data of one intern was rejected due to inadequate information. Study period was from January to March 2016. The final sample analyzed consisted of 220 people. Proportions of responses were calculated. Analysis was carried out using SPSS version 20. Chi-square test, odds ratio, and Fischer Exact Test (wherever required) were used to analyze the association between literacy and knowledge and practice about polio vaccination and polio switch, and  $p$ -value < 0.05% was considered as significant.

## Result

On analysis results found by the study are 130 (59.1%) respondents were illiterate, 20 (9.1%) have got middle school certificate, 40 (18.18%) had got secondary education, and 30 (13.6%) were graduate. None of the respondents were postgraduate and age distributions of the children brought to the booth were 142 (64.5%) children less than 12 months of age, 18 (8.18%) were between 13 and 24 months, 10 (4.5%) were between 25 and 36 months, 16 (7.3%) between 37 and 48 months, and 34(15.45%) were between 49 and 60 months of age. Among them 116 (53%) were females and 104 (47%) were males.

Study has found most of the interviewees were grandparents [106 (48.18%)], or mothers [54 (24.54%)]. Among

**Table 4:** Association of knowledge and practice of respondent with literacy level

Responses Illiterate		Literacy		OR (confidence interval)	p-Value
			Literate		
Missed previous PPI	No	80 (61.5)	85 (94.4)	0.094 (0.036–0.25)	<0.001*
	Yes	50 (38.5)	5 (5.6)		
PPI with mild illness	No	64 (49)	38 (42.2)	1.33 (0.77–2.28)	0.3
	Yes	66 (50.8)	52 (57.8)		
PPI- an overdose	No	98 (75.4)	82 (91.1)	0.29 (0.13–0.68)	0.003*
	Yes	32 (24.6)	8 (8.9)		
PPI replace RI	No	114 (87.7)	66 (73.3)	2.59(1.28–5.22)	0.007*
	Yes	16 (12.3)	24 (26.7)		
Knowledge about Polio	No	64 (49.2)	26 (28.9)	2.38 (1.35–4.22)	0.003*
	Yes	66 (50.8)	64 (71.1)		
Knowledge about transmission <sup>#</sup>	No	130 (100)	74 (82.2)	-	0.001*
	Yes	(0.00)	16 (17.8)		
Correct no. of visits declared for PPI	No	114 (87.7)	64 (71.1)	2.89 (1.44–5.79)	0.002*
	Yes	16 (12.3)	26 (28.9)		
Knowledge about polio eradication state	No	114 (87.7)	76 (84.4)	1.3 (0.60–2.84)	0.49
	Yes	16 (12.3)	14 (15.6)		
Knowledge about injectable polio vaccine <sup>#</sup>	No	130 (100)	78 (86.7)	-	<0.01*
	Yes	0 (0)	12 (13.3)		
Knowledge about polio vaccine switch <sup>#</sup>	No	130 (100)	24 (26.7)	-	<0.01*
	Yes	0 (0)	66 (73.3)		

\*Statistically significant association.

<sup>#</sup>Fischer Exact Test is applied as one of the cell has value <5.

220 respondents, 102 (46.36%) got information about PPI day from health worker and television was the source of information for 50 (22.72%) respondents.

**Knowledge and Practice of Caretakers about PPI, Polio Disease, Polio Vaccine-Injectable Form and Polio Vaccine Switch**

All 220 (100%) respondents told that every child in their house got PPI drops in this session. Of all, 165 (75%) respondents told that their child has not missed previous PPI dose, 118 (53.63%) respondents opine that OPV can be given with mild illness, according to 40 (18.18%) respondents PPI is an overdose, 40 (18.18%) opine that PPI can replace routine immunization. Of all, 130 (59%) respondents were having knowledge about polio disease, but mode of polio transmission was told by only 16 (7.27%) respondents, only 42 (19.1%) were knowing about the visits declared for PPI session, and only 32 (13.63%) respondent knew that polio has been eradicated from India, only 12 (5.45%) knew that polio vaccine is available in injectable form also. Opine is available whereas 66 (30%) respondents had heard about polio vaccine switch.

**Association of Knowledge and Practice of Respondents with Their Literacy**

Significant association of literacy level was found with number of children missed previous PPI ( $p$ -value < 0.001), knowledge

about not considering PPI an overdose ( $p$ -value = 0.003), knowledge that PPI cannot replace OPV given in routine immunization ( $p$ -value = 0.007), knowledge about signs and symptoms of polio disease ( $p$ -value = 0.003), knowledge about transmission of polio disease ( $p$ -value = 0.001), knowing correct number of visits declared for pulse polio immunization 2016 ( $p$ -value = 0.002), knowing that polio vaccine is available in injectable form also ( $p$ -value = <0.01), and knowledge about the upcoming global polio switch ( $p$ -value = <0.01).

**Discussion**

Data collection was done on the National Immunisation Day 2016, as per Pulse Polio Campaign and it was found that maximum children were brought to the polio booth by their grandparents and mother; similar findings were found in a study carried out by Sharma and Bhasin<sup>[3]</sup> where maximum children were brought for immunization by their parents and grandparents, nearly two-thirds (64%) of the caretakers were mother or father of the beneficiary and 11% children were accompanied by their grandparents.

Health staff (46.36%), television (22.72%), school rally (14.54%) were the major sources of information about routine immunization and pulse polio immunization found by our study Angadi *et al.*<sup>[4]</sup> in a study at Bijapur, Karnataka mentioned

family members (42.8%) and health personnel (51.6%) as the major source of information. Comparable findings were found in a study carried out by Dayama et al.<sup>[5]</sup> where school education (31%) and health personnel (30%) were major sources of knowledge for our mothers. Singh et al.<sup>[6]</sup> also mentioned health worker as a major source of information in another study. ANM and paramedical staff were the major source according to Bholanath et al. (48%–51%).<sup>[7]</sup>

Every child among the participants were given polio drops during pulse polio immunization round and maximum respondents (75%) told that their children did not miss the previous dose. Joseph et al.<sup>[8]</sup> also found that all the children in the house of respondents were vaccinated during the previous PPI and that most were immunized on the booth day itself. Similar findings were found in studies done in West Bengal and Assam, where about 75% children were given polio drops at the booth itself.<sup>[9]</sup>

Polio drops can be given with mild illness to 118 (53.63%) participants, PPI was considered as an overdose by 40 (18.18%), 40 (18.18%) believed that PPI can replace routine immunization. Joseph et al.<sup>[8]</sup> also found that 128 (40%) caretakers opined that polio drops can be given with mild illness at the time of vaccination, 2.2% participants had misconception that repeated OPV administration under PPI result in over dosage, same findings were observed in a study carried out by Dobe et al.<sup>[10]</sup> where 2.2%–6.3% respondents feared of over dose so they did not vaccinate their children. PPI is a supplement and not a substitute to RI was known to 258 (80.6%) participants.<sup>[11]</sup>

Knowledge about sign and symptoms of polio disease was known to 130 (59%) respondents, knowledge about polio transmission was limited upto 16 (7.27%) individuals. Study carried out by Chincholikar et al.<sup>[12]</sup> showed that only 60% respondents knew about polio inspite of fair literacy. Similar findings were reported by another study where only 56% knew about polio.<sup>[13]</sup> Number of visits declared for PPI were known to 42 (19.1%) individuals, and the next date of PPI was known to only 34 (15.45%) people. A study carried out in Delhi also found similar findings with only 18.1% respondents enumerated PPI days precisely<sup>[14]</sup> whereas according to the study by Joseph et al. 65% to 75% respondents correctly stated the number of rounds and the season in which PPI is held.<sup>[8]</sup>

Eradication status of polio was known to 30 (13.63%) participants, knowledge about injectable polio vaccine availability was with 12 (5.45%) individuals, whereas knowledge about polio vaccine switch was observed in 66 (30%) individuals. Significant association of literacy level was found with number of children who missed previous PPI, knowledge about not considering PPI an overdose, knowledge that PPI cannot replace OPV given in routine immunization, knowledge about signs and symptoms of polio disease, knowledge about transmission of polio disease, knowing correct number of visits declared for pulse polio immunization 2016, knowing that polio vaccine is available in injectable form also, knowledge about the upcoming global polio switch. Joseph et al. in their

study found the performance scores of participants by finding their awareness about poliomyelitis and PPI, which was found significantly associated with literacy ( $\chi^2 = 13.668$ , DF = 6,  $P = 0.033$ )<sup>[8]</sup>; significant association was also found in the studies carried out by Chincholikar et al. and Rasanias et al.<sup>[12,15]</sup>

### Limitation

The respondents were the caretakers who were motivated enough and can be presumed to have high level of knowledge as they already brought their children for vaccination in pulse polio booth on NID, so the results cannot be generalized to the whole population as people living in slums and outreach areas where access to schools, health facility is poor and source of public information such as radio, television, and print media are ill-functioning, thus the actual findings for whole community can be lower than the finding of our study.

### Conclusion

Children living with their grandparents get more attention and care and are more likely to avail the health services such as visiting the nearby pulse polio booth. Nearly half of the caretakers got information about PPI through health workers, that is, health workers are utilizing the opportunity for giving information about PPI when parents visit the health facility for any other cause. Every child in the family of respondent was given OPV in PPI, and many are aware about the signs and symptoms of polio disease, still most of them consider PPI an overdose and presume it can be replaced with OPV in routine immunization, knowledge about polio transmission, visits declared for PPI, next date for PPI, eradication status of polio disease, IPV, and polio switch is very low, and literacy has significant association with knowledge about polio disease and polio vaccination, specially the recent changes in the government policies.

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## Abbreviations

IPV- inactivated polio virus vaccine

PPI- pulse polio immunisation

OPV- oral polio vaccine

t- OPV, b-OPV – trivalent, bivalent OPV

cVDPV2- circulating vaccine derived polio virus, type 2 strain

WPV- wild polio virus

RI- routine immunisation.

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