A study of the knowledge and attitude towards pulse polio immunization in semi urban areas of South India

Joseph N[1], Subba SH[2], Nelliyanil M[3], Kotian SM[4], Haridath AC[5], Kishor N[5], Attavar S[5], Poornima P[5], Rane DV[5], Chaithali H[5], Husain J[5]

1 Assistant Professor, 2 Associate Professor, 4 Selection Grade Lecturer, 5 M.B.B.S students, Department of Community Medicine, Kasturba Medical College, Manipal University, Light house hill road, Mangalore, India

3 Post graduate student, Department of Community Medicine, Bangalore Medical College, Bangalore, India

RESEARCH

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Corresponding Author:
Dr. Nitin Joseph, MD (Community Medicine), Assistant Professor, Department of Community Medicine, Kasturba Medical College, Manipal University, Light House Hill Road, Mangalore 575001, India.
drnitinjoseph@gmail.com

Abstract

Background
The government of India launched the pulse polio immunization (PPI) programme in 1995 with the aim of eradicating poliomyelitis by the end of 2000. Despite this, 733 children with polio were reported in 2009 alone. Therefore, there is a need to understand the reason underlying such high numbers of cases after so many years of programme implementation. This study was performed to assess the knowledge of the general population about poliomyelitis and PPI and their attitude and practice towards PPI.

Method
This cross-sectional study was undertaken in two semi-urban areas of Mangalore city. Only houses in which children under five lived were included in the study. Data was collected by interviewing any adult member of the household using a pretested questionnaire.

Results
The literacy rate of study participants was 99%. Only 35(10.9%) participants knew the correct mode of transmission of polio. More than one quarter of the study population were under the misconception that polio is a curable disease. The primary source of information about PPI in majority of participants was the television (n = 192; 60%). Two-hundred and eighty eight (90%) participants knew that the purpose of PPI was to eradicate polio. Only 128 (40%) participants knew that polio drops can be given to children with mild illnesses and an identical number of participants knew that hot food stuff should not be given for at least half an hour following vaccination administration. Misconceptions such as PPI causing vaccine overdose was identified among 7 (2.2%) participants, it is a substitute for routine immunization was believed among 30 (9.4%) participants and that oral polio vaccine prevents other diseases was seen among 76 (23.7%) participants. The educational status of the participants was significantly associated with their awareness level ($\chi 2$ =13.668, DF=6, P=0.033).

Conclusion
This study identified a few important misconceptions associated with polio and PPI which need to be addressed by large scale awareness campaigns in order to achieve polio eradication in the near future.

Key Words
Polio, PPI, Awareness, Mangalore

Background
Poliomyelitis is a feared disease in some countries of the world due to its tragic legacy of paralysis and deformity. In 1988, the World Health Assembly and its members committed to the goal of eradication of poliomyelitis by the year 2000. [(1)] This global initiative to eradicate polio was the largest international disease control effort ever. Polio virus transmission has been interrupted in most parts of the world except for few foci in ten countries located in South Asia and Central/Western Africa. [(2)]
The Government of India launched the pulse polio immunization (PPI) programme on a country wide basis in 1995. The term “pulse” describes the simultaneous, mass administration of oral polio vaccine (OPV) on a single day to

all children aged below 5 years.[3] PPI consists of vaccination of children at fixed booths on two national immunization days (NID), separated by six weeks, during the winter season.

The main aim of PPI is to interrupt the transmission of wild polio virus by exposing children to the vaccine virus. [3] However, 5-6% of children were being missed in the PPI. Therefore, during 1999-2000, in addition to booth immunization, a house-to-house search of missed children was undertaken to vaccinate them over the 2-3 days following each NID.

In spite of the extensive PPI introduced by the government, the aim of making India a 'polio free state' still remains farfetched with 733 children with polio reported in 2009.[4] This makes India the largest polio endemic country in the world.[2] Resistance by the general population appears to prevent acceptance of this programme. Misconceptions and myths regarding the vaccine, concern about its ill effects and lack of awareness about poliomyelitis and PPI are the major obstacles. [5] Our study aims to identify these misconceptions to better inform future implementation of this programme. This study was thus conducted to assess the awareness of the target population about polio and PPI, and to assess their attitude and practice towards PPI.

Method

This cross-sectional study was undertaken in January 2009 in two semi-urban areas, Jeppinamogaru and Attavar, situated in Mangalore city in the Karnataka state of South India. The ethical approval for conducting this study was obtained from the institutional ethical clearance committee. The sample size was calculated using 95% confidence limits and 90% power. Assuming an awareness level of poliomyelitis and PPI among people as being about 56% from a previous study, [6] the sample size was calculated as approximately 315 households. Only houses containing children under five years old were included in the study. A total of 320 such households were covered by convenience sampling during the study period. Data was collected by interviewing any adult member (aged above 18 years) of the household using a pretested, semi-structured questionnaire after taking their informed consent.

Participants were asked about signs and symptoms of poliomyelitis, the age groups most susceptible to this disease, the mode of disease transmission, the sources of information about PPI, the number of and seasons in which the PPI rounds are held, the benefits of PPI and reasons for non-immunization during PPI rounds. Each answer given to the questionnaire was assigned points which enabled the calculation of cumulative scores and subsequent categorization of the level of awareness of participants into well, moderately and poorly. All the data collected were analysed using version 11.5 of the Statistical Package for Social Sciences software package (SPSS Inc., Chicago, IL). Chi-square was used for testing statistical significance and P value <0.05 was considered as significant.

Results

The response rate was 100 % as all the 320 participants agreed to be interviewed by our team. Of the total 320 participants, 234(73.1%) were females. Literacy rate among participants was near total at 99 % (n = 317) with 134 (41.9%) educated up to secondary school. (See Table 1)

Table 1: Socioeconomic distribution of study participants. (n=320)

Educational status	*No.*	*Percentage*
Illiterate	3	1
Primary school (1 - 5 std)	42	13.0
Secondary school (6-10)	134	41.9
Pre University (11-12)	45	14.1
Graduation & above	96	30
Occupational status		
Not working	8	2.5
House wife	191	59.7
Unskilled	45	14.1
Skilled	47	14.7
Retired	29	9.0
Religion		
Hindus	265	82.8
Muslims	34	10.6
Christians	21	6.6

Table 2: Awareness of participants about poliomyelitis (n=320).

Characteristics	*No. (%)*
Heard about poliomyelitis	
Yes	320(100)
No	0(0)
High risk groups	
Children	249(77.8)
Adults	21(6.6)
Don't know	50(15.6)
Signs & symptoms	
Fever	35(10.9)
Paralysis of limbs	202(63.1)
Others	89(27.8)
Don't know	6(1.9)
Mode of transmission	
Contaminated food & water	35(10.9)
Mosquitoes	16(5.0)
Don't know	269(84.1)
Preventable disease	
Yes	288(90)
No	13(4.1)
Don't know	19(5.9)
Curable disease	
Yes	87(27.2)
No	209(65.3)
Don't know	24(7.5)

Awareness about the disease

All of the participants had heard about poliomyelitis. However, only 35 (10.9%) participants knew that the disease is spread by contaminated food and water. Although 288 (90%) knew that poliomyelitis is a preventable disease, 87 (27.2%) were under the misconception that it is curable. (See Table 2)

Table 3: Awareness of participants about PPI (n=320).

Characteristics	*No. (%)*
Heard about PPI	
Yes	320(100)
No	0(0)
Primary source of information about PPI	
Television	192(60)
Newspapers	70(21.9)
Radio	35(10.9)
Health workers	23(7.2)
Target age group	
0-5 years	240(75)
1-5 years	29(9.1)
>5 years	16(5)
Don't know	35(10.9)
No. of annual rounds	
One	55(17.2)
Two	208(65)
>2	57(17.8)
When PPI is held	
November to February (Winter)	217(67.8)
March to October	97(30.3)
Every month	6(1.9)
Purpose of PP	
Polio eradication	288(90)
Don't kno	32(10)
Repeated vaccination causes over dosage	
Yes	7(2.2)
No	278(86.9)
Don't kno	35(10.9)
Mild illnesses are contraindications	
Yes	128(40)
No	128(40)
Don't know	64(20)
Hot food stuffs within 30 minutes of vaccination	
Can be given	120(37.5)
Should not be given	128(40)
Don't know	72(22.5)
PPI with respect to routine immunization	
One is in addition to the other	258(80.6)
One can substitute for the other	30(9.4)
Don't know	32(10)
Participations in both annual rounds	
Is a must	294(91.9)
One of them is sufficient	7(2.2)
Don't know	19(5.9)
OPV can prevent other diseases	
Yes	76(23.7)
No	140(43.8)
Don't know	104(32.5)

Awareness about the PPI programme

All the participants said that they had heard about PPI. Television was found to be the primary source of information about PPI among 60% participants.

None of the participants knew what the term "pulse" in PPI meant. The target age group of 0-5 years for PPI was correctly answered by 240 (75%) participants. The purpose of PPI being to eradicate polio was known by 288(90%) participants. Seven (2.2%) participants had the misconception that repeated vaccination under PPI leads to over dosage and is thus harmful to children.

Only 128(40%) participants knew that polio drops can be given to children even if they were suffering from a mild illness at the time of vaccination. Another 128(40%) participants knew that hot food stuff should not be given for at least 30 minutes following vaccination. The fact that PPI is a supplement to routine immunization and is not a substitute was known to 258(80.6%) of participants. Interestingly, 76(23.7%) participants had the misconception that the oral polio vaccine can prevent other diseases as well. (Table 3)

Performance scores of participants showed that 150(46.9%) were well aware, 125(39.1%) were moderately aware and 45(14.1%) were poorly aware of poliomyelitis and PPI and this was significantly associated with the level of education ($\chi 2$ =13.668, DF=6, P=0.033). (See Table 4)

Table. 4: Association between the educational status of the participants and their level of awareness about PPI.

Educational status	*Poorly aware*	*Moderately aware*	*Well aware*	*Total*
Illiterate	0	3	0	3
Primary(1-5 std)	9(21.4%)	14(33.3%)	19(45.3%)	42
Secondary(6-10)	19(14.2%)	44(32.8%)	71(53%)	134
PUC(11-12)	10(22.2%)	16(35.6%)	19(42.2%)	45
Graduation and above	6(6.2%)	48(50%)	42(43.8%)	96
Total	45(14.1%)	125(39.1%)	150(46.9%)	320

($\chi 2$ =13.668, DF=6, P=0.033)

Attitude towards PPI

Among the participants, 265(82.8%) indicated that they had their child immunised through the PPI programme due to their belief that it will help in polio eradication. Very few indicated that their children were vaccinated forcibly under government compulsion, due to media hype or had been blindly led by others. (Table 5)

Table 5: Probable reasons stated by participants towards acceptance of PPI by people.

Reasons	*No.*	*Percentage*
Eradicates poliomyelitis	265	82.8
Others are following	26	8.1
Government compulsion	16	5.0
Highly publicized	13	4.1
Total	320	100

Reasons for people's non participation during PPI as perceived by the participants were that repeated OPV administration causes harm to children (n = 185; 57.8%) and ignorance about the programme (n = 146; 45.6%). (Table 6)

Moreover 42(13.1%) participants preferred vaccination to be delivered at home rather than at polio booths.

Table no.6: Probable reasons stated by participants towards non immunization of children by parents under PPI (n=320).

Reasons	*No.*	*Percentage*
Causes harm to children	185	57.8
Not aware of its importance	146	45.6
No faith in PPI	15	4.7

Practice towards PPI

All the children from these 320 households were reported to be vaccinated with OPV during the previous immunization round held in December 2008 and 280 (87.5%) reported that this occurred on the first booth day of the pulse vaccination. Among those children who missed vaccination doses on the booth day, causes were reported as being due to inconvenience as stated by (n = 28; 8.7%) families and not present in the city as stated by (n = 12; 3.8%) families. None of the participants reported any adverse effect following vaccination among the children of their households during this PPI round.

Discussion

PPI has been designed to eradicate polio. If this can be achieved it will also set pace for the eradication of other diseases such as measles. Such a major initiative requires cooperation from all sectors, particularly members of the general population. Thus their perception and acceptance of PPI becomes very vital for its success.

This study revealed that all the participants had heard about polio and PPI. Regarding awareness of the disease, the majority of participants knew that children are most susceptible to polio, that paralysis is an important sequel and that the disease is preventable. These findings were similar to a study done by Singh et al where 70.3% of the participants knew that polio leads to paralysis of legs and 86.2% knew that polio is preventable by vaccination.[7] However, a study done by Chincholikar et al showed that in spite of a good literacy status only 60% of the respondents knew about polio.[8] Similar findings were reported by Misra et al where only 56% knew about polio and only 63% knew that it is preventable.[6] The differences between studies may be because the latter two studies were undertaken in a rural and slum area respectively while the former study and ours were done in urban areas. This could indicate that level of knowledge about polio differs depending upon the area of residence.

In spite of a good knowledge regarding most aspects of the disease, more than quarter of participants in our study had the misconception that polio is curable and 89% did not know the right mode of disease transmission. Even in the study done by Singh et al 30.7% of respondents thought polio to be a curable disease. [7]

The primary source of information about PPI in this study was mainly from the television. In several other studies too television was found to be the commonest source of information for participants. [7-11] This indicates that television is a key resource to use when wishing to disseminate information of public health importance.

The role of health workers as providers of primary information about PPI was very limited (7.2%) in our study. This was in contrast to results of studies done in West Bengal and Agra where health workers were the main source of information in about 70% participants. [12, 13] Health workers are supposedly the most effective means to improve the success of the programme. This is because they are chosen from the community and are known to influence the knowledge of local people by interpersonal approach during door-to-door campaign as also observed in a study done by Manjunath et al. [14]

Sixty five to 75% participants in our study knew the target population, number of rounds of PPI and the season during which PPI is held. This was similar to observation of Bhasin et al where 75% respondents knew the target group correctly. [15] Whereas in a study done among Delhi slum population, 82% of respondents knew the correct target group for PPI which was more than our study results. [6] This could be because the main source of information on PPI among participants in their study was health workers (67.2%). As discussed earlier inter-personal communication is the most efficient means of information dissemination. In another study done in Delhi only 18.1% of respondents knew the PPI days correctly. [7]

In our study, almost 24% participants had a misconception that OPV can prevent other diseases as well. This belief could lead to poor uptake of immunizations for diseases.

A further misconception was identified in 2.2 % participants in our study, as they believed that repeated vaccination under PPI results in over dosage. This was comparable to the finding of Dobe et al where 2.2 to 6.3% respondents in various districts did not vaccinate their children due to the fear of over dosage. [12]

Forty percent of the participants in our study did not know that polio drops can be given to children with mild illnesses. This could also be a factor causing under coverage of PPI in certain areas. Again only 40% participants knew that child should not be given anything hot for at least 30 minutes following vaccination. This was similar to the findings of Misra et al where 43% participants knew this fact. [6] Faulty practices such as eating hot food soon after vaccination could result in child not being sufficiently protected by the vaccination as the potency of live vaccine is reduced by this activity.

Educational status was found to be significantly associated with level of awareness about the PPI programme in our study; this is similar to the findings of Chincholikar et al and Rasania et al where also significant association was seen. [8, 11]

Participants' perceptions regarding reasons for non immunization among the general population included the misconception that it is harmful to children followed by ignorance and lack of faith in PPI. Inconvenience (38.8%), misconception that it is harmful (25.2%) and ignorance (9.7%) were the commonest reasons stated by Manjunath et al.[14] In a study done in Chandigarh too, the commonest reason was inconvenience (46.7%) followed by lack of faith in PPI (20%).[9] In a study done in Delhi and Calcutta, the

main reason for non immunization was ignorance.[6, 10] A survey done by Jugal Kishore identified a fear of infertility among those vaccinated to be another cause of non immunization.[16] From the various reasons for non immunization it appears that people have not fully understood the importance of PPI. This needs to be addressed by aggressive campaigning and dissemination of information during future PPI rounds in order to minimize chances of non immunization. Few participants preferring PPI at home over booths in spite of booths being placed conveniently within city limits indicate that they have misunderstood the true purpose of house to house immunization initiative of government.

It was encouraging to learn that all the children from the households of study participants were vaccinated during the previous immunization round and that most were immunised on the booth day itself. Only 12.5% children received vaccination at home. This is less in comparison to studies done in West Bengal and Assam, where about 25% beneficiaries were vaccinated at home. [12]

These findings reveal that in spite of a high literacy rate and relatively good knowledge about the disease and the programme, misconceptions still exist in the minds of the people. These issues need to be addressed to improve the success of this programme.

Conclusion

The educational level of all the participants in the study areas was good but their awareness level with respect to the disease and the programme was unsatisfactory in more than half of them. Very few participants knew that polio is transmitted by contaminated food and water.

Misconception that it is a curable disease was seen in more than a quarter of them. Also with respect to the programme a number of misconceptions were highlighted. A quarter of our participants did not know the beneficiaries of PPI or said it wrongly. A few participants felt that repeated vaccination in PPI causes over dosage and is thus harmful for children. Misconceptions like mild illnesses are contraindication for vaccination and routine vaccination under national immunization programme can substitute for vaccination under PPI programme are few other reasons which can reduce the coverage of PPI. Another misinformation identified was hot food stuffs can be given immediately following vaccination as said by almost 38% of our participants. This faulty practice will make the live vaccine ineffective. Dangerous misconceptions like OPV can prevent other diseases in addition to poliomyelitis can reduce the coverage of immunization against other diseases. Television which was the most popular primary source of information needs be utilised to generate awareness about the importance of PPI. In addition to this a network of health workers should be effectively trained and mobilized to remove the misconceptions and misinformation about poliomyelitis and PPI through counselling of parents and care givers just before immunization rounds. The best approach would be interpersonal communication by house to house visits in households having under-fives. For reluctant families focus group discussion can be arranged involving Medical Officer, local leaders and representatives from women self-help groups. This will further improve the acceptance of PPI in the community and foster the goal of poliomyelitis eradication from India as soon as possible in the near future.

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PEER REVIEW

Not commissioned, externally peer reviewed

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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Questionnaire

1. Gender
2. Age
3. Occupation
4. Religion
5. Educational status
6. Have you heard of the disease poliomyelitis?
7. Who are people most susceptible to it?
   Children / Adults
8. What are the symptoms and signs of poliomyelitis?
9. What is its mode of transmission?
10. Is it curable?
11. Is it preventable?
12. Have you heard of the PPI?
13. Source of first information about PPI
    T.V / Radio / Newspapers / Health workers / Others
14. What is the purpose of PPI?
15. Can polio drops prevent other diseases also?
16. What is the target age group for PPI?
    0-5 years/ 1-5 years />5 years
17. How many rounds of PPI are held every year?
    1 / 2 / >2
18. During which part of the year are these rounds held?
    Nov-Feb / Mar-Oct / every month/others
19. Can polio drops be given to a child having diarrhoea, mild fever or cold?
20. Can hot foodstuff be given just after (within half an hour) administration of polio drops?
21. Do you think PPI is required along with routine OPV doses?
22. Why is the word 'pulse' used in PPI?
23. Is it necessary to receive OPV during both the rounds of PPI every year up to the age of 5 years?
24. Do you think repeated vaccination under PPI causes overdosage?
25. You immunized your child through this programme because:
    a) Friends and relatives are following it.
    b) Government compulsion.
    c) It is highly publicized.
    d) It prevents poliomyelitis.
    e) Other reasons.
26. Why do you think people don't get their children immunized?
    a) Harmful for children.
    b) No faith in this activity.
    c) Ignorance
    d) Oral polio vaccine is of poor quality or is adulterated.
    e) Other reasons.
27. Where would you prefer to get your child immunized during PPI rounds? Polio booth / at home.
    If at home, why?
28. Were the children in your household vaccinated during the previous round of PPI held in Dec 2008?
29. If yes, was it on booth day (1st day)/ on other days?
30. If on other days, why was the child not taken to the polio booth for vaccination on the first day?
31. Did the children vaccinated in your household suffer from any adverse reaction following vaccination during the last PPI round?