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ASSESSMENT OF KNOWLEDGE, AWARENESS LEVEL ON PULSE POLIO IMMUNIZATION AMONG CARETAKERS OF CHILDREN IN URBAN BENGALURU

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ABSTRACT:

Introduction: Poliomyelitis, listed in the top 20 communicable diseases, is a highly contagious disease that mainly affects the central nervous system leading to paralysis. Lack of awareness and misconceptions may prevent the acceptance of this programme. Therefore, this study aims at assessing the knowledge, awareness level on pulse polio immunization among caretakers of children. **Methodology:** This cross-sectional study was undertaken using semi-opened questionnaire to collect the responses and each response to the questionnaire was given points, allowing for the computation of total scores and subsequent categorization of participants' levels of awareness into well, moderately, and poorly aware. The Chi-square test was employed to determine statistical significance. **Results:** 35% of the participants came to know about this PPI program through public banners, 27% through friends and family. 68.07% of the participants had the misconception that the polio vaccine should not be given to children with mild illness and 24.5% of the participants had misbelieved that the polio vaccine can prevent other diseases. Two third of them (62.2%) did not know that polio is a communicable disease. Graduates were accountable for 54.61% (71/130) of participants who were well aware of this programme and it was significant ($\chi 2$ =11.36, DF=7, P=0.043). The mothers had more awareness than the fathers (45.6% vs 41.07%, P=0.426). **conclusion:** Though India was declared a polio-free country, more than half of the participants in our study unaware that polio is a communicable disease and transmits through food and water. The dangerous misconception that two-third of them believed that the polio vaccine should not be given if children had a mild illness. Health care professionals, particularly local leaders, should be actively involved in dispelling popular myths and beliefs to keep up our India free of polio.

Keywords: Pulse polio programme, caretakers, immunization, Awareness, Knowledge

INTRODUCTION

Poliomyelitis, listed in the top 20 communicable diseases, is a highly contagious disease that mainly affects the central nervous system leading to paralysis. It is caused by poliovirus belonging to the Picornaviridae family and spread through the feco-oral route.[1]

In 1985, India launched Universal Immunization Programme (UIP) after reporting 1,50,000 polio cases of which most cases were seen in children aged six months to four years. In 1995, India had successfully launched Pulse Polio Immunization (PPI) to immunize all children below 5 years to make India a polio-free country.[2] This programme results were impressive, significantly covered all over India and cases were declined from 24000 cases in 1988 to 134 in 2003.[3]

There are two vaccines used to protect against polio disease; Oral Polio Vaccine (OPV) and Inactivated Poliovirus Vaccine (IPV). OPV must be administered orally and has been used to eradicate the disease whereas IPV is administered either subcutaneously or intramuscularly and provides protection against all three variants of poliovirus but cannot stop transmission of the virus.[4,5]

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In 2011, India reported its last case in West Bengal and thereafter no polio case has been reported in the country. The World Health Organization (WHO), on 24th February 2012, removed India from countries with wild polio cases and declared India as polio-free country in 2014.[6,7]

The factor that contributed to the successful eradication of polio disease includes community immunity, mandatory of vaccination to all international travelers during the campaign, development of rapid response team for reporting on any polio outbreak. But lack of awareness and misconceptions may prevent the acceptance of this programme.[8] Therefore, this study aims at assessing the knowledge, awareness level on PPI among caretakers of children.

METHODOLOGY:

Study design and approval:

This cross-sectional study was undertaken in January-February 2021 in Kumaraswamy layout, Ilyas Nagar in Bangalore City, Karnataka, India. Ethical approval was obtained by the institutional ethics committee of the college of pharmaceutical sciences, Dayananda Sagar University, Bengaluru.

Study selection:

Parents or caretakers who brought their children to polio booths and houses containing children less than 5 years of age during house-to-house surveys were considered. Data collected twice from the same parent/caretaker was removed.[9]

Study procedure:

Students of B. Pharm and Pharm D who were trained in interviewing and recording the information in predesigned proforma, deployed at polio booths on the first day and house to house survey in the next three days. Each student was asked to cover at least 20 people.

A semi-opened questionnaire was developed by RP in consultation with physicians involved in PPI and experts in the research field. Our students interviewed 384 people of which 184 people were interviewed at polio booths on the first day and 200 people during house to house visits. All the data was entered in MS Office Excel sheet and 30 duplicates were removed. The questions were based on the socio-economic distribution of study participants(age groups, provider education, occupation), awareness of participants about PPI (Sources of information about PPI, frequency of PPI) and knowledge about polio vaccine (transmission, prevention, types of vaccine, adverse effects, etc. [10,11]

Each response to the questionnaire was given points, allowing for the computation of total scores and subsequent categorization of participants' levels of awareness into well, moderately, and poorly aware. MedCalc was used to perform statistical analysis. The Chi-square test was employed to determine statistical significance, with a P-value of <0.05 considered significant.

RESULTS:

Socioeconomic data:

All 354 respondents agreed to be interviewed, resulting in a 100% response rate. Males made up 51.69% of the 354 vaccinated children, while females made up 48.31%, with a mean birth weight of 2.95 ± 0.69 kg. The majority of children belonged to the age group of above 4 years. Half of the children were born in a general hospital.

Mothers accounted for 61.8%, followed by fathers (31.6%). Caretakers aged 30-44 years old made up the majority of the participants, with 180 (50.8%) having an average (SD) age of 32 (7.81) years. The literacy rate among the providers was determined to be 87.9% (n= 312), with 157 (44.3%) graduates. Socio-demographic details were showed in **Table 1**.

Awareness about PPI:

Table 2 showed the awareness levels of all participants about the PPI programme. 80.2% of the participants were aware of the camp which was been held on 31st January 2021 and the rest 19.7% were not aware of this camp. 35% of the participants came to know about this PPI program through public banners, 27% through friends and family, 25.8% through media and 11% through other sources. The target group of polio vaccination was correctly answered by 91.8%.

83.15% of the participants had already vaccinated their children in the previous PPI programme. When the participants were asked about the frequency of the polio vaccination, 51.2% of the participants agreed that “it should be given twice every year”, 36.9% of the participants told that “once in a year is sufficient” and 11.8% responded that “it is not required to be administered every year”. Only 23.3% of the participants knew that the polio vaccine could be given through both routes, i.e. oral and parenteral.

68.07% of the participants had a misconception that the polio vaccine should not be given to children with mild illness. 24.5% of the participants had a misbelief that the polio vaccine can prevent other diseases. 11.8% of the participants

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reported that their children were suffered from mild illnesses such as fever, myalgia, vomiting, etc. after the administration of the vaccine.

Knowledge about polio:

Table 3 showed the knowledge level of all participants about polio. 76.8% of the participants believed polio was caused by a virus, while 20.1% believed it was caused by bacteria. Polio could be transmitted by contaminated food and water, according to 53.5% of the participants, whereas 46.8% of the participants disagreed. 45.3% of the participants answered correctly that polio cannot be completely cured, 78.5% of the participants knew that vaccine can prevent polio completely and two-third of them (62.2%) did not know that polio is a communicable disease. When the participants were asked whether they had seen any polio affected patients, 32.6% of the participants told that they haven't seen any polio affected patients and the rest of the participants told that they had seen the patients with the symptoms of paralysis (26.05%), immobility (14.6%), fever (6.01%), fainting(3.85%) and weak and thin(16.8%).

Table 4 showed an association between educational status and the level of awareness. Among all respondents, 36.7% were well aware, 59.03% were moderately aware and 4.23% were poorly aware of PPI and poliomyelitis. Graduates were accountable for 54.61% (71/130) of participants who were well aware of this programme and it was significant ($\chi 2$ =11.36, DF=7, P=0.043). 45.6% of mothers and 41.07% of fathers were well aware of the PPI programme and together accountable for 94.80% (146/154) of participants who were well aware and z- test defined there was no significant difference between mothers and fathers about awareness levels of this programme (*P*=0.426) (**Table 5**).

DISCUSSION:

In India, it is crucial to conduct routine immunization programs for polio disease as one dose of IPV or OPV can't give complete protection. Two doses of IPV in the first few months of life are 90% effective and a combination of four doses of IPV and OPV gives 99 to 100% protection. Immunization programmes not only protect children against polio disease but also keep them healthier longer.[12]

The house-to-house immunization campaign allowed researchers to analyse the knowledge, awareness level of the PPI programme among the caretakers of children in Bengaluru urban. Most of the participants were mothers or fathers of children under the age of five.

The majority (35%) of the caretakers in this study knew about the PPI through public banners. Friends and relatives (27%) and the media (25.8%) were also important in raising knowledge about the polio camp. In several studies, television was found to be the primary source of information. But studies done in Aurangabad, Tiwari S et al and Baghdad, Jawad FA et al showed contrast results where health workers played a major role in providing the information about the camp.[13,14]

When asked what age group the vaccine is administered to, 91.8 percent of responders knew the correct response. This finding was similar to that of Joseph N et al, who found that 75% of the participants knew the correct answer, but AL MN et al found that only 23.6 percent of the participants recognized the correct answer.[10,13]

The Polio vaccine is administered multiple times to ensure full protection. There is no risk of overdose; fully immunized children receiving extra doses of OPV will receive extra protection against polio. 51.2% of the caregivers in this study agreed about vaccination administered twice every year and 11.8% had a misconception about the polio vaccine and believed it is fine if the vaccine is not administered at all. Results were similar to studies by Kumar MN et al who believed in doses twice(75%) a year.[15]

The Polio vaccine is administered in different modes including oral polio vaccine (OPV) and Inactivated polio vaccine (IPV) given by injection. In addition to OPV, at least one dose of IPV must be introduced to protect against type 2 poliovirus and boost community immunity. According to our study, very few participants knew that the polio vaccine can be given in injection form which was similar to the study performed by Tiwari S et al where 5.4% knew the injection mode of administration.[14,16]

Polio can be prevented by immunizing a child with appropriate vaccination. 75.4% of caregivers believed that polio can be prevented by immunizing the children and 24.5% had a misconception that the polio vaccine can also prevent other diseases. This was similar to the study by Tiwari et al where 90% believed that polio could be cured by vaccine and 23.7% believed prevention of other diseases by administration of polio vaccine.[14]

Fever, redness, and rash are the most common side effects following polio vaccine injection. The majority of the participants (88%) stated that their child had no negative effects after receiving the immunization. According to research conducted in the semi-urban parts of South India, Joseph N et al, 57.8% of people said they were not getting their children vaccinated because of the risks.[10]

The majority of participants (76.8%) were aware that polio is caused by a virus. According to a survey done in Baghdad, Jawad FA et al, 55.2% of the participants were aware that polio is transmitted by a virus.[13]

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When we questioned the participants about how polio transmits, 53.5% of them answered through contaminated food and water. This was dissimilar to the study conducted in Syria, Mohammed et al, which mentioned that only 38.8% of the people knew the correct route of transmission.[17]
Only 45.3% of participants knew that polio cannot be cured. This statement was agreed by the 52% of the participants in a study conducted by Kumar et al in the urban areas of south India.[15]

In our study, two-third of the participants had personal experience with polio-affected children. 26% saw them with paralysis. A study conducted in Pune, Maharashtra in 2018, reported that 78.98% of the participants were aware of poliomyelitis and its signs and symptoms. Singh et al mentioned that 70.3% of participants told that polio causes paralysis of the legs.[18,19]
It was found that graduates were well aware of the PPI programme and poliovirus.
This statement was agreed by a study conducted in the urban areas of South India in 1995 stated that graduates were well aware of the pulse polio immunization programme. A study conducted in rural Maharashtra in 2000 by S.V. Chincholikar et al also mentions that graduates were well aware of the poliovirus.[15,20]
Through the study, it was found that the mothers were actively involved in immunizing their children. In a study conducted in East Delhi in 2007, Bhasin et al and Chandigarh in 1996, Swami et al also stated that mothers of the urban areas were well aware of the pulse polio immunization programme. [9,21]

CONCLUSION:

Though India has been proclaimed polio-free, more than half of the participants in our study were unaware that polio is a contagious disease that spreads through food and water. Public banners and media which were the main primary sources of information about the PPI programme, should be used to raise public awareness. The dangerous misconception that two-third of them believed that the polio vaccine should not be given if children had a mild illness. This may reduce the coverage of PPI. Covering areas inaccessible to medical institutions by house-to-house visits is one of the successful mantras to increase coverage. Moreover, health care professionals, particularly local leaders, should be actively involved in dispelling popular myths and beliefs to keep our India free of polio.

Abbreviations:
BBMP: Bruhat Bengaluru Mahanagara Palike; **IPV**: Inactivated polio vaccine; **OPV**: Oral polio vaccine; **PPI:** Pulse polio immunization programme; **WHO**: World Health Organisation

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Authors Contribution:
RP is the first and corresponding author who designed the protocol. SH, SV and PT have done a systematic literature search. SH and SV analyzed and reported all parameters. RP drafted the initial and final manuscript. SV and PT performed clinical revisions and made the article suitable for publication.

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Table 1: Socio-demographic data

S. No	Variable	Number	Percentage
1	**Gender of the child**		
	Male	183	51.69
	Female	171	48.31
2	**Age of the child**		
	<1	41	11.5

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	1-2	44	12.4
	2-3	59	16.6
	3-4	73	20.6
	>4	137	38.7
3	**Birth place**		
	General Hospital	178	50.28
	Maternity Hospital	160	45.2
	Home	16	4.45
4	**Provider education**		
	Illiterate	42	11.8
	Primary	35	9.8
	Secondary	57	16.1
	Higher secondary	63	17.7
	Graduate	157	44.3
5	**Occupation**		
	Employed	176	49.6
	Unemployed	168	47.4
	Retired	5	1.4
	Refusal	5	1.4
6	**Religion**		
	Hindu	291	82.2
	Muslim	50	14.1
	Christian	11	3.1
	Others	2	0.5
7	**Age of the provider**		
	15-29	151	42.6
	30-44	180	50.8
	45-59	17	4.8
	>60	6	1.6
8	**Provider relation with child**		
	Mother	219	61.8
	Father	112	31.6
	Grand Parents	14	3.9
	Others	9	2.5

Table 2: Awareness about PPI

S. No	Variable	Numbers	Percentage
1	**Were you aware of the camp**		
	Yes	285	80.2
	No	69	19.7
2	**How did you come to know about the camp**		

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	Media	101	25.8
	Friends and Family	107	27
	Public Banners	140	35
	Others	43	11
3	**To what age group is polio vaccination given**		
	0-5	325	91.8
	0-10	21	5.9
	0-15	2	0.56
	all	6	1.6
4	**Have you vaccinated your child before**		
	Yes	295	83.15
	No	59	16.8
5	**Is it compulsory to give polio vaccine twice every year**		
	Yes, it is compulsory	181	51.2
	Given once is sufficient	131	36.9
	No, not required	42	11.8
6	**Routes of administration of polio vaccine**		
	Oral	258	72.8
	Injection	12	3.3
	Both	84	23.3
7	**Polio vaccine can be given to children with mild illness. Is this statement true?**		
	Correct	113	31.9
	Incorrect	241	68.07
8	**Can polio vaccine prevent other diseases**		
	Yes	87	24.5
	No	267	75.4
9	**Did vaccine cause any ill effects in your child**		
	Yes	42	11.8
	No	312	88.1

Table 3: knowledge about polio

S. No	Variable	Number	Percentage
1	**What causes polio**		
	Virus	278	76.8
	Bacteria	73	20.1
	Fungi	11	3.04
2	**Is polio transmitted through contaminated food and water**		
	Yes	189	53.5
	No	165	46.8
3	**Can polio be completely cured**		

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	Yes	194	54.6
	No	160	45.3
4	**Can vaccine prevent polio completely**		
	Yes	278	78.5
	No	76	21.4
5	**Is polio a communicable disease**		
	Yes	134	37.7
	No	221	62.2
6	**Have you seen a polio-affected person? If yes what were their characteristics**		
	Paralysis	130	26.05
	Immobility	73	14.6
	Fever	30	6.01
	Fainting	19	3.8
	Weak and Thin	84	16.8
	No, Not seen	163	32.67

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

S. No	Educational status	Poorly aware	Moderately aware	Well aware
1	Illiterate (42)	8(19.04%)	30(71.4%)	4(9.5%)
2	Primary (35)	3(8.3%)	23(65.7%)	9(25.7%)
3	Secondary (57)	2(3.5%)	33(57.8%)	22(38.5%)
4	Higher Secondary (63)		39(61.9%)	24(38.09%)
5	Graduates (157)	2(1.2%)	84(53.5%)	71(45.2%)
	Total	**15(4.23%)**	**209(59.03%)**	**130(36.7%)**

($\chi 2$ =11.36, DF=7, *P*=0.043)

Table 5: Difference in knowledge status among the caretakers about Polio

S. No	Caretakers	Poorly aware	Moderately aware	Well aware
1	Fathers (112)	3(2.6%)	63(56.2%)	46(41.07%)
2	Mother (219)	18(8.2%)	101(46.11%)	100(45.6%)
3	Grandparents (14)		10(71.4%)	4(28.5%)
4	Others (9)	1(11.1%)	4(44.4%)	4(44.4%)
	Total	**22(6.21%)**	**178(50.28%)**	**154(43.5%)**

The z- test was done to find the association between fathers and mothers about their awareness. (Z=-0.79, *P*=0.426; Not significant)