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Original Research Article

Childhood immunisation knowledge and timeliness among caregivers of children 0-5 years, attending immunisation clinic of a medical college in West Bengal

Suman Das*, Tapas K. Sarkar, Nirmal K. Mandal

Department of Community Medicine, Malda Medical College, Malda, West Bengal, India

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***Correspondence:**
Dr. Suman Das,
E-mail: suman.4ever@rediffmail.com

ABSTRACT

Background: Routine Immunization among children ensures nationally scheduled regular administration of vaccine dosages to infants at specified ages. Unequivocal knowledge and perceptions are essential at individual as well as community level about vaccinations throughout the country to achieve high immunisation coverage. Besides appropriate timeliness regarding childhood immunisation is also desirable. Present study was planned to assess knowledge and timeliness regarding childhood immunization among the caregivers as well as associated factors in relation to their current practice, if any.
Methods: Cross-sectional study was conducted at immunisation clinic of a Medical College. Considering 73% of parents were with good knowledge about immunization from previous study, sample size was calculated as 158. The data was collected administering a pre-designed, pre-tested schedule; in every visit at least 26 study subjects were selected in first-come-first basis after applying exclusion criteria. Descriptive statistics and Chi-square test were applied.
Results: Majority of the children (53.2%) were female and 1st baby in term of birth order (71.5%). Knowledge regarding certain aspects of immunization was reported varied from 95% (Pulse Polio should be given besides routine immunisation) to as low as 36.1% (vaccines can be given in minor illness). Overall, seven children (4.4%) missed their age appropriate immunisation and 38.6% of children was immunised in last quartile. Child immunisation in last quartile was found significantly associated with socioeconomic class (p=0.018) and occupation (p=0.019) of caregivers.
Conclusions: Knowledge about certain aspects of childhood immunisation among caregivers was not satisfactory. Inappropriate timeliness regarding immunisation was noted in substantial portion of children.

Keywords: Childhood immunisation, Knowledge, Timeliness

INTRODUCTION

Immunisation is one of the greatest scientific inventions ever made as it prevents an individual from different dreadful diseases.[1] Again, it is one of the most cost-effective interventions regarding child survival and practiced throughout the world.[2]

Proper utilization of this immunization has made our world free from smallpox.[3] Beyond smallpox with a holistic approach to reduce childhood mortality and morbidity, WHO launched Expanded Programme of Immunization (EPI) in 1974 against six preventable diseases namely diphtheria, measles, pertussis, poliomyelitis, tetanus, and tuberculosis.[4] It was came into

practice in India by 1978 against the mentioned 6 vaccine preventable diseases (VPD). Later it was replaced by Universal Immunization Programme (UIP) in 1985.[5] With the inputs from National technical advisory group of immunizations (NTAGI) currently in India Hepatitis-birth dose, OPV, BCG, Pentavalent (Penta), IPV, MR, DPT, TT etc. are administered to child through Routine Immunization ensuring nationally scheduled regular administration of vaccine dosages to infants at specified ages.[6,7] However, one of the milestone achieved through this UIP in India is that our country has been declared non-endemic for poliomyelitis in 2012.[3]

The main aim of routine immunization in childhood is to induce immunity against the targeted diseases through provision of high immunisation coverage.[8] Vaccination history in India reveals that the reluctance, opposition and a slow acceptance of vaccination contributes significantly to create hindrance to achieve high immunisation coverage. These challenges keep the immunisation coverage in the country inequitable.[3] So, there is necessity for the caregivers or parents as well as community to develop unequivocal knowledge and perceptions about vaccinations throughout the country.[1]

According NFHS-4 in India, 62.0% children aged 12-23 months are fully immunized with BCG, measles and 3 doses each of polio and DPT.[9] Though in West Bengal higher proportion (84.4%) than national coverage is reported with inter-district disparity.[9] To address such gap of childhood immunisation as well as high prevalence of vaccine-preventable diseases in a developing country like India, adequate information on immunization to caregiver or parent is essential. Besides appropriate timeliness regarding childhood immunisation is also desirable in approach to fill the gap. Studies on knowledge and timeliness regarding childhood immunisation among caregivers or parents may provide information to improve immunisation coverage in West Bengal as well as across the country also. In this background present study was planned at immunisation clinic of a medical college in West Bengal to assess knowledge about childhood immunization among the caregivers of children from 0 to 5 years. Besides this study was planned to find out timeliness regarding their child's immunisation as well as associated factors in relation to their current practice, if any.

METHODS

A cross-sectional study was conducted at immunisation clinic of the Medical College from 1st of November to 21st November 2019 among caregivers of 0 to 5 years aged children. Study subjects who denied to be included as well as aged less than 18 years without accompanying with child's mother, were excluded.

Kumar et al noted in a study at immunization clinic of Pulianthope urban health centre, Tamil Nadu that "73% of parents have good knowledge about immunization like routine vaccination prevent child from some infectious disease and its complications".[10] Thus considering 73% as P, 95% confidence level and a relative precision of 10%, the minimum required sample size for this study was calculated as follows:

$$n = [(Z1 - \alpha/2)2 * P * (1 - P)]/d2$$
$$= [(1.96)2 * 0.73 * 0.27]/ (0.1 * 0.73)2 \approx 143$$

Further adding for an anticipated dropout of 10%, the final sample size came to be 158.

Ethical approval was taken from the institutional ethics committee of the Medical College. The immunisation clinic of the Medical College was visited for two weeks as three times a week i.e. Monday, Wednesday and Friday. Considering feasibility in every visit at least 26 study subjects were selected in first-come-first basis after applying exclusion criteria. The purpose and nature of the study was briefed to the study subjects and informed consent was obtained from the respondents before data collection. They were assured about the confidentiality and anonymity of information. Maximum possible effort was made to take information only from the caregiver or mother, not allowing any third party. A pre-designed, pre-tested schedule was administered by the researcher to collect necessary data by interviewing the subjects as well as review of available relevant records was done.

In present study no child had been given DPTB-2/ Measles-2 beyond 2 years of age. Considering this, at first, median age of vaccination in days (IQR) was calculated only in respect to Penta-1, Penta-2, Penta-3 and Measles-1 among the children. For those who were contraindicated for Penta or DPT as well as in non-availability of DaPT administration date; Penta1, Penta-2 and Penta-3 date were imputed with OPV-1, OPV-2 and OPV-3 date respectively. Overall number of study subjects falling in the last quartile for at least one vaccine (among Penta-1, Penta-2, Penta-3 and Measles-1) were calculated. They were considered as immunised in last quartile. For this operational definition, opinion of public health experts were granted. Any association between immunisation in last quartile and socio-demographic characteristics was assessed by Chi-square test.

RESULTS

Among the total caregivers, majority (78.5%) were belonging to 21-30 years age group while mean age (±SD) was 25.39 (±4.303) years. Most of them were belonging to Hindu religion (82.3%), general/unreserved caste (51.3%), joint family (69.6%) as well as lower and lower middle socio-economic class (42.4%). Again, 34.2% of caregivers completed graduation while 4.4% and 3.2% were illiterate and non-formally educated respectively. On the basis of occupation most of them were homemaker (88%) while the rest were involved in

service (8.2%), in small business (3.2%) and as maid (0.6%) (Table 3).

Table 1: Distribution of children whether missed any vaccine, recommended by routine schedule (n= 158).

Routine immunisation	Frequency	%
Not missed	151	95.6
Missed*	7	4.4
BCG/Hep-B/OPV-0	4	2.5
OPV-1, Penta-1, (F) IPV-1	3	1.9
OPV-2, Penta-2	3	1.9
OPV-3, Penta-3, (F) IPV-2	1	0.6

* Multiple response

More than half of the children (53.2%) were female and rest (46.8%) were male. Majority of them were <12 months aged (55.1%) as well as 1st baby in term of birth order (71.5%) (Table 3).

Regarding prevention of diseases through immunization, 94.3% of caregivers knew it while the rest (5.7%) didn't know it. On further query they said that it was nutritious agent to child leading to batter growth. Regarding vaccination from birth, 90.5% of caregivers knew to the fact, 6.3% didn't know and the rest (3.2%) didn't know anything about it. Remarkably more than half of caregivers (58.2%) were not known that vaccines can be given in minor illness; 36.1% were known to it and 5.7% were known nothing about it. However, Pulse Polio should be given beside routine immunization, was known to most of the study subjects (95%).

Table 2: Distribution of vaccinated children (multiple responses).

Vaccine	Total no. of children vaccinated	Median age in days (IQR)	Children immunised in last quartile N (%)
Penta-1	141	53 (47-64.5)	35 (24.8)
Penta-2	131	88 (80-101)	32 (24.4)
Penta-3	117	124 (113-143)	29 (24.7)
Measles-1	84	290.5 (277-315.25)	21 (25.0)

Table 3: Association of respondents' socio-demographic characteristics and timeliness regarding childhood immunization.

Characteristics	Total N (%)	Vaccination to child (%)		$\chi 2$ (df) p value
		In first three quartile	In last quartile	
Religion				
Hindu	130 (82.3)	77 (59.2)	53 (40.8)	1.446 (1) 0.229
Muslim	28 (17.7)	20 (71.4)	8 (28.6)	
Caste				
General	81 (51.3)	49 (60.5)	32 (39.5)	0.057 (1) 0.812
Others**	77 (48.7)	48 (62.3)	29 (37.7)	
Type of Family				
Joint	110 (69.6)	67 (60.9)	43 (39.1)	0.036 (1) 0.850
Nuclear	48 (30.4)	30 (62.5)	18 (37.5)	
Socio-economic class##				
Lower and lower middle class	67 (42.4)	34 (50.7)	33 (49.3)	5.563 (1) 0.018¥
Middle, upper middle and upper class	91 (57.6)	63 (69.2)	28 (30.8)	
Educational status				
Illiterate and non-formal schooling	12 (7.6)	6 (50.0)	6 (50.0)	1.667 (2) 0.452*
Class I-X	54 (34.2)	31 (57.4)	23 (42.6)	
Class XI and above	92 (58.2)	60 (65.2)	32 (34.8)	
Occupation				
Homemaker	139 (88.0)	90 (64.7)	49 (35.3)	5.492 (1) 0.019¥
Others#	19 (12.0)	7 (36.8)	12 (63.2)	
Gender of child				
Male	74 (46.8)	45 (60.8)	29 (39.2)	0.020 (1) 0.888
Female	84 (53.2)	52 (61.9)	32 (38.1)	
Birth order of child				
1st child	113 (71.5)	65 (57.5)	48 (42.5)	2.507 (1) 0.113
2nd child or more	45 (28.5)	32 (71.1)	13 (28.9)	

Note: ¥ p value < 0.05 considered statistically significance, * Fisher's exact test, ** Others backward caste, Schedule caste and Schedule tribe, # Maid, service and small business holder, ## Modified B. G. Prasad Scale CPI (IW) March, 2019: 309.

Again, about one third of caregivers (32.9%) didn't know that more than one vaccine can be given at a time without negative impact to child. Whether all vaccines should be administered at appropriate age of baby; 88.0% of study subjects knew it, 11.4% didn't know it and 0.6% knew nothing about it (Figure 1).

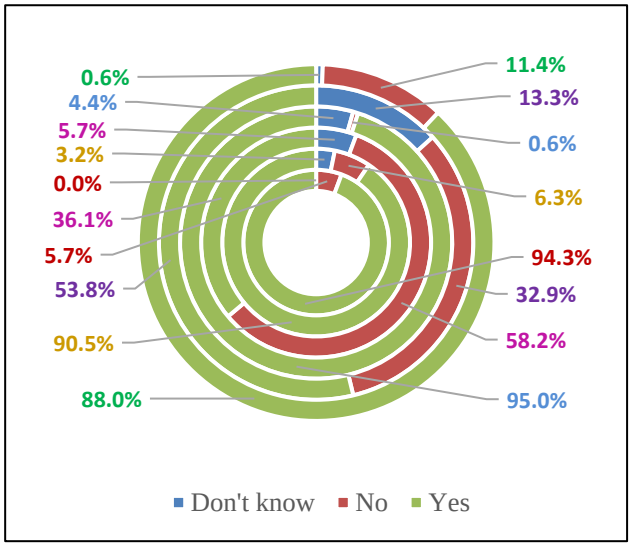

Figure 1: Doughnut diagram showing knowledge regarding certain aspects of childhood immunization among caregivers (n=158).

Circles from inside to outside: 1st: Prevention of diseases by immunization to children, 2nd: Vaccines to be given from birth, 3rd: Vaccines can be given in minor illness, 4th: Pulse Polio should be given besides routine immunisation, 5th: More than one vaccine can be given at a time without negative impact to child, 6th: All vaccines should be administered at appropriate age of baby.

In present study it was reported that health workers (48.1%) played major role to create knowledge about different aspects of childhood immunisation among the caregivers/parents; followed by social media (31.6%), family members (13.9%) and friends (13.9%).

As a whole, seven children (4.4%) missed their age appropriate immunisation (Table 1). On interview to respective caregivers, main reason for missed immunisation was reported as child-birth at local private facility following which no immediate vaccination was done (42.8%). Other reasons were caregivers didn't know about the program (28.6%) and illness of the child (28.6%).

Among all children, 141 received Penta-1 through routine immunisation at a median age (IQR) of 53 days (47-64.5). Interesting nearly one-fourth (42.8%) of them were vaccinated at more than 64.5 days i.e. in last quartile. Likewise 24.4%, 24.7% and 25.0% received vaccination in last quartile among the children who received DPT-1, DPT-2, DPT-3 and Measles-1 respectively (Table 2). Overall, immunisation in last quartile were noted among more than one-third children (61/158*100=38.6%) considering penta-1, penta-2, penta-3 and measles-1 vaccination date. Further analysis showed that only 5 (3.2%) children were immunised in last quartile for all the four considered vaccines; while for any one, two and three vaccines it was noted among 15 (9.5%), 25 (15.8%) and 16 (10.1%) children respectively.

Child immunisation in last quartile was found significantly associated with socioeconomic class (p=0.018) and occupation (p=0.019) of caregivers (Table 3).

DISCUSSION

Present study revealed that 94.3% of study subjects knew that immunisation prevent diseases of childhood. In a study conducted in outpatient department of Paediatrics, Kakinada, Mugada et al found that 97.61% of study subjects knew the fact.[1] Lower proportion was reported by Kumar et al in a study, conducted in parents attending immunization clinic in Tamil Nadu. According to their observation 90% of parents knew that routine vaccination prevent children from some infectious diseases though 78% had good knowledge about immunisation.[10] Present study revealed that 6.3% of study subjects did not know that vaccine should be given from child's birth, 3.2% knew nothing about it. Kumar et al at Pulianthope urban health centre found that 4.7% of study subjects did not know that vaccine should be given from child's birth, 9.3% knew nothing about it.[10] Though much lower proportion were noted in outpatient department of Paediatrics, Kakinada viz. 1.59% of study subjects did not know the fact, 1.32% knew nothing about it.[1] In present study only about one-third caregivers (36.1%) were found to know that vaccination can be done in minor illness. On contrary 338 out of 501 i.e., nearly two-third (67.5%) study subjects were known that vaccination can be done in minor illness in the study in an immunization clinics of Pondicherry.[6] In present study 94.9% of care-givers knew that Pulse Polio should be given besides routine immunisation. In corroboration with present study Joseph et al at immunization clinic at Vanivilas Hospital, Bengaluru revealed that, according to 96% parents vaccination to child during OPV campaigns was required even though the child was fully vaccinated.[2] But in the study conducted in Tamil Nadu, 68% study subjects knew the importance to vaccinate children during immunization campaigns.[10] In present study 53.8% of caregivers knew that more than one vaccine can be given at a time without negative impact to child; 32.9% didn't know it and 13.3% knew nothing about it. At Pulianthope urban health centre in Tamil Nadu 57.3% of study subjects knew that more than one vaccine at the same time had no negative impacts on child immunity, 12.7% did not know it and 30% had no idea about it.[10] Present study reported that 88% of study subjects knew that all vaccines should be administered at appropriate age of baby, 11.4% didn't know it. However, 96% and 90% of parents respectively thought that compliance to immunisation schedule was important in the study conducted at Vanivilas Hospital,

Bengaluru and at Pulianthope urban health centre, Tamil Nadu.[2,10]

Present study showed that 95.6% of children received all the vaccines recommended by routine immunisation. Ramaswamy et al reported nearly similar finding regarding immunization coverage (95%) at a rural primary health centre (PHC) of Puducherry.[11] Again, 86% of children received three doses of DPT, OPV each and single dose of BCG and measles at immunization clinic of Vanivilas Hospital, Bengaluru.[2] In this study for DPT-1, DPT-2, DPT-3 and Measles-1 median age of vaccination in days (IQR) was 53 (47-64.5), 88 (80-101), 124 (113-143) and 290.5 (277-315.25) respectively. Yadav K et al reported in a study in Ballabgarh, India that for DTP-1 median age of vaccination in weeks (IQR) was 8.4 (6.5-11.5), for DTP-2 14.1 (11.7-19.0); for DTP-3 20.1 (16.7-26.7) and for measles 44.2 (40.2-50.0).[12] Present study revealed that overall 61 (38.6%) children were vaccinated in last quartile for anyone of DPT-1, DPT-2, DPT-3 and Measles-1; while most of them (15.8%) were vaccinated in last quartile for any two among the four considered vaccines. Ramaswamy G et al found that 7.4%, 41.9%, 64.5% and 38.8% of children vaccinated with more than 2 weeks of delay for DPT-1, DPT-2, DPT-3 and Measles-1 respectively.[11] In short it was evident that, like other studies across the country present study also documented inappropriate timeliness regarding immunisation in significant number of children.[11,12] Again, in this study; child immunisation in last quartile was found significantly associated with socioeconomic class and occupation of caregivers. In corroboration of finding of Ramaswamy et al present study also reported no significant difference in timeliness of immunization based on gender of the children.[11]

However, a key limitation of this study was that it was conducted among the care givers who were attending Immunization clinic, were supposed to be already motivated with at least few knowledge to come to the immunization clinic. It may under estimate the true scenario in community. Instead of all vaccine, only Penta each and measles date were considered for immunisation in last quartile. No required sample size was calculated to assess such timeliness regarding immunisation in this study.

CONCLUSION

This study revealed that in spite of high immunisation coverage in the study setting, knowledge about certain aspects of childhood immunisation was not satisfactory at all. Even in presence of high immunization coverage, timing of vaccination was widely dispersed for different child. Future research at community level may better explore underlying determinates of these issues as well as initiative programme should be taken to address it. On the other hand, to ensure good quality of immunization; delay in vaccination should be defined in universally acceptable way as well as may be incorporated as a performance/ monitoring indicator for vaccination programme.

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