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BEYOND UNIVERSAL IMMUNIZATION PROGRAMME: A STUDY ON THE AWARENESS OF CAREGIVERS AND UTILIZATION OF OPTIONAL VACCINES IN CHILDREN AGED 18-35 MONTHS IN KANPUR

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Abstract

Background: *In India, the newer vaccines are at present being offered as 'optional vaccines'. Studies regarding optional vaccines in India are scarce and parents need to make informed decision regarding administration of these vaccines.*

Objective: ***(1.)*** *To assess the knowledge of optional vaccines among caregivers of children attending the outpatient department of Pediatrics.*

(2.) *To assess the utilization of optional vaccines in children aged 18-35 months attending the outpatient department of Pediatrics*

Design: *Cross-sectional Study*

Setting: *Outpatient department of Pediatrics, in 2013*

Participants: *342, Systematic random sample*

Results: *The overall knowledge about the optional vaccines was poor with 68.4% of the respondents having no knowledge regarding any of the optional vaccines. All the optional vaccines were prescribed and administered at the private hospitals except 40% of the MMR vaccine. A significantly higher proportion of children from urban locality, general caste, upper socioeconomic class, birth order of less than 2 and having parents with higher education were immunized with optional vaccines than their respective counterparts.*

Conclusions: *It is time for looking into the issues of newer vaccines for the control of emerging childhood illnesses.*

Key words: *Drop out, newer vaccines, Optional Vaccines*

Introduction

Immunization has been recognized as one of the most successful and cost effective strategy for improving child survival all over the world.(1) Over the past few years, a host of newer vaccines have been developed leading to better protection of children from life threatening illnesses. These vaccines were initially introduced in developed countries and have proved effective in reducing their disease burden.

Unfortunately, those most in need – individuals in developing countries– are the last to receive these powerful disease preventing products. [2,3]

In India, the newer vaccines are at present being offered as 'optional vaccines' since they have not yet been incorporated in the universal immunization programme. It has been suggested by Indian Academy of Pediatrics Committee on Immunization (IAPCOI) that National Immunization Schedule (NIS) should be supplemented by newer vaccines- Hepatitis B, Mumps, Measles, Rubella (MMR) and Typhoid. [4]

Hepatitis B vaccine has already been introduced in the Armed forces' immunization programme for children as well as in the national immunization schedule in certain states. Vaccines against MMR, H. Influenza, Typhoid, Varicella and hepatitis A hold great potential for combating the ill effects of associated diseases. Various other newer vaccines have been developed to decrease side effects (acellular pertussis vaccine), improve compliance (combination vaccines), and enhance efficacy (conjugated pneumococcal vaccine).

Knowledge, attitude and practices regarding the vaccines administered under the National Immunization Programme have been studied in different settings[5], however studies regarding optional vaccines in India are scarce. The optional vaccines are available in the market and are also been prescribed by the doctors. Many vaccines are being promoted directly by the vaccine companies which are many times unethical since there is disclosure of only selective scientific information[6]. The high cost of the vaccines and their non-incorporation in the National Immunization schedule due to various factors such as efficacy, effectiveness, long term effects, side effects and indications and contraindications require informed decision making by the parents. This paper will review the knowledge and use regarding some of the available optional vaccines, the sociodemographic characteristics associated with the same and the reasons for non-immunization.

Material &Methods

This cross-sectional study was conducted at the Out Patient Department (OPD) of the Pediatrics, GSVM Medical College, Kanpur from June 2013 to September 2013. The hospital caters to the health needs of the urban and rural people residing within approximately 10 kilometers. Apart from this it also serves as the referral centre for the people from the far flung areas... Children up to 12 years attend the Paediatric OPD. We selected children in the age group 18-35 months for our study. Those children admitted in the wards were excluded from the study. The daily attendance of the OPD in the pediatrics department is around 150-250 patients in summers and 70-100 patients in winters. During summers about 50-60 patients in the age group 18 to 35 months come to the OPD per day, while in winters it is around 20 to 25 patients. The selection of the patients for the study was done by systematic sampling from June 2013 to September 2013. On each day we had approximately 3 hrs i.e.180 minutes for conducting the interview. One interview took about 15 minutes to be completed. Therefore we could complete about 10-12 interviews each day. Since 50-60 patients in the age group 18 to 35 months come to the OPD per day, we had to interview every 5th child (60 / 12). If the caregiver with the fifth child refused to participate, we moved on to the next fifth child. Thus, in 4 months 342 caregivers who consented to participate were interviewed using a pre-tested structured questionnaire to elicit the information. Those children requiring admission to the wards were excluded from the study.

After obtaining informed verbal consent from the participants, information was collected about the immunization status with respect to the optional vaccines, age and doses of vaccination, various socio-demographic factors, and reasons for nonimmunization of the child. The method used for the determination of the vaccination status was by seeing the vaccination card and by the recall method. If the child had received even one dose for the vaccines requiring multiple doses, he was considered as immunized. The primary respondent was the mother of the child. If the mother was

not available then the adult accompanying the child was interviewed.

Data was tabulated on Microsoft Excel sheet and analyzed using the software SPSS 10.0.1 for Windows. Discrete data was analyzed using Pearson's Chi-square test for normal distribution and continuous data was analyzed using mean and standard deviation. P values < 0.05 were considered significant. In case the expected values in some cells were <5, Fischer's Exact test was used in place of Chi-square test.

Results:

Knowledge (27.5%) and use (18.7%) of MMR vaccine was found to be highest among the respondents. Awareness regarding Hepatitis A was found to be absent in the respondents and so was their child's immunization status. 68.4% of the respondents had no knowledge regarding any of the optional vaccines and 75.7% of the respondents had not vaccinated their child against any of the optional vaccines (Not shown in Table).

A majority of the respondents who had vaccinated their child had completed the schedule of vaccination for vaccines requiring multiple doses and the drop out were not significant. However the mean age of vaccination was delayed as compared to the recommendations for the respective vaccines (Table 1). The mean age of administration of MMR vaccine was 18.8 months with a standard deviation of 2.9 months. All the optional vaccines were prescribed and administered at the private hospitals except 40% of the MMR vaccine. (Not shown in Table).

Table 1:
Number of doses and Age-wise distribution of children received Optional Vaccines

	3 doses		2 doses		1 dose		Age of 1st dose	Age of 2nd dose	Age of 3rd dose
Antigen	**No.**	**%**	**No.**	**%**	**No.**	**%**	**(Mean ± SD) in wks**	**(Mean ± SD) in wks**	**(Mean ± SD) in wks**
Hep B (42)	36	85.7	2	4.8	4	9.5	8.6 ± 3.5	12.4 ± 3.5	20.7 ± 15.8
HiB (38)	36	94.7	2	5.3	0	0	7.3 ± 1.5	11.4 ± 2.3	15.8 ± 2.4
Rota virus (10)	0	0	6	60	4	40	11 ± 1.1	12.0 ± 0.0	-
IPV (12)	8	66.6	2	16.7	2	16.7	7 ± 1.0	11.2± 1.0	15 ± 1.0

On stratifying the knowledge regarding the various optional vaccines according to the socio-demographic characteristics, we observed that it was significantly higher among urban people. Similarly a significant difference in the knowledge was found between birth order of the child, caste and education of the respondents. The illiterate respondents had no knowledge regarding any of the optional vaccines. Knowledge in the high school pass respondents was also very poor except that regarding MMR vaccine. Knowledge pertaining to the vaccines was not found to be associated with the religious status of the respondents. (Table 2)

Table 2:
Association of socio-demographic Characteristics of the respondents with the use of Optional Vaccines -Part 1.

Socio-demographic characteristics		Vaccines					
		IPV	MMR	Hib	Hep B	Varicella	Rota
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Locality	Urban (200)	16(8.0)	74(37.0)	38(19.0)	58(29.0)	4(2.0)	26(13.0)
	Rural (142)	0(0.0)	20(14.1)	0(0.0)	2(1.9)	0(0.0)	0(0.0)
	x^2	11.92	21.88	30.35	43.70	2.87	19.98
	p-value	0.00	0.00	0.00	0.00	0.09	0.00
Religion	Hindu (294)	16(5.4)	84(28.6)	36(12.2)	56(19.0)	4(1.4)	24(8.2)
	Muslim (48)	0(0.0)	10(20.8)	2(4.2)	4(8.3)	0(0.0)	2(4.2)
	x^2	1.66	1.24	2.73	3.27	0.01	0.46
	p-value	0.14	0.27	0.09	0.07	0.93	0.56
Caste	General (174)	16(9.2)	70(40.2)	34(19.5)	50(28.7)	4(2.3)	26(14.9)
	Others (168)	0(0.0)	24(14.3)	4(2.4)	10(6.0)	0(0.0)	0(0.0)
	x^2	16.21	28.86	25.48	30.67	2.17	27.17
	p-value	0.00	0.00	0.00	0.00	0.14	0.00
SES*	Upper class (66)	6(9.1)	32(48.5)	18(27.3)	22(13.3)	4(6.1)	12(18.2)
	Lower class (276)	10(3.6)	62(22.5)	20(7.2)	38(13.8)	0(0.0)	14(5.1)
	x^2	2.45	18.09	21.63	14.09	12.01	13.03
	p-value	0.12	0.00	0.00	0.00	0.00	0.00
Birth Order of the child	≤IInd (232)	16(6.9)	76(32.8)	36(15.5)	56(24.1)	4(3.4)	26(11.2)
	>IInd (110)	0(0.0)	18(16.4)	2(1.8)	4(3.6)	0(0.0)	0(0.0)
	x^2	7.96	10.06	14.19	21.68	0.72	13.34
	p-value	0.01	0.00	0.00	0.00	0.39	0.00
Education	High school complete (188)	0(0.0)	36(19.1)	0(0.0)	6(3.2)	0(0.0)	0(0.0)
	>High school (108)	16(14.8)	58(53.7)	38(35.2)	54(50.0)	4(3.7)	26(24.1)
	x^2	36.37	61.24	92.63	115.2	NA	60.97
	p-value	0.00	0.00	0.00	0.00	NA	0.00

* ClassI, II, III =Upper class; Class IV,V = Lower class

A significantly higher proportion of children from urban locality, general caste, upper socioeconomic class, birth order of less than 2 and having parents with higher education were immunized with optional vaccines than their respective counterparts. (Table 3)

Table 3:
Association of socio-demographic Characteristics of the respondent's with the use of Optional Vaccines Part-2.

Socio demographic Characteristics		Vaccines				
		IPV	MMR	Hib	Hep B	Rota
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Sex	Male (170)	4(2.4)	34(20.0)	18(10.6)	22(12.9)	2(1.2)
	Female (172)	8(4.7)	30(17.4)	20(11.6)	20(11.6)	8(4.7)
	x^2	1.33	0.37	0.09	0.14	2.52
	p-value	0.25	0.54	0.76	0.71	0.11
Locality	Urban (200)	12(6.0)	50(25.0)	38(19.0)	42(21.0)	10(5.0)
	Rural (142)	0(0.0)	14(9.9)	0(0.0)	0(0.0)	0(0.0)
	x^2	7.12	12.52	30.35	33.99	5.66
	p-value	0.01	0.00	0.00	0.00	0.02
Religion	Hindu (294)	12(4.1)	60(20.4)	36(12.2)	40(13.6)	10(3.4)
	Muslim (48)	0(0.0)	4(8.3)	2(4.2)	2(4.2)	0(0.0)
	x^2	1.00	3.96	2.73	3.41	0.69
	p-value	0.32	0.04	0.09	0.06	0.40
Caste	General (174)	12(6.9)	50(28.7)	34(19.5)	38(21.8)	10(5.7)
	OBC/SC/ST (168)	0(0.0)	14(8.3)	4(2.4)	4(2.4)	0(0.0)
	x^2	12.01	23.39	25.48	30.04	8.02
	p-value	0.00	0.00	0.00	0.00	0.01
Socio-Economic Status*	Upper class (66)	6(9.1)	16(24.2)	18(27.3)	18(27.3)	4(6.1)
	Lower class (276)	6(2.2)	48(17.4)	20(7.2)	24(8.7)	6(2.2)
	x^2	7.53	1.64	21.63	17.06	2.84
	p-value	0.01	0.20	0.00	0.00	0.09
Birth Order	≤IInd (232)	12(5.2)	50(21.6)	36(15.5)	40(17.2)	10(4.3)
	>IInd (110)	0(0.0)	14(12.7)	2(1.8)	2(1.8)	0(0.0)
	x^2	4.47	3.82	14.18	16.48	3.48
	p-value	0.04	0.05	0.00	0.00	0.06
Birth spacing	<3yrs (160)	2(1.2)	24(15.0)	6(3.8)	10(6.2)	2(1.2)
	≥3yrs (70)	8(11.4)	26(37.1)	20(28.6)	20(28.6)	6(8.6)
	x^2	9.81	14.03	29.92	21.39	7.78
	p-value	0.00	0.00	0.00	0.00	0.01
Education	High school complete (188)	0(0.0)	26(13.8)	0(0.0)	0(0.0)	0(0.0)
	>High school (108)	12(11.1)	38(35.2)	38(35.2)	42(38.2)	10(9.3)
	x^2	26.95	32.80	92.61	103.72	22.32
	p-value	0.00	0.00	0.00	0.00	0.00

* Class I, II, III =Upper class; Class IV,V = Lower class

Lack of awareness was found to be the most common cause of non-administration of optional vaccines followed by the cost of the vaccines. (Table 4)

Table 4:
Reasons for Non-administration of Optional Vaccines

	IPV (330)		MMR (278)		Hib (304)		Hep B (300)		Hep A (342)		Varicella (342)		Rota (332)	
Reasons	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Lack of awareness	313	94.8	233	83.8	288	94.7	263	87.7	303	88.6	309	90.3	311	93.7
Cost	6	1.8	25	9.0	9	2.9	8	2.7	35	10.2	11	3.2	21	6.3
Side Effects	4	1.2	2	0.7	2	0.7	14	4.7	4	1.2	18	5.3	0	0.0
Non-Availability	5	1.5	0	0.0	3	1.0	13	4.3	0	0	2	0.6	0	0.0
Religion Taboo	2	0.6	0	0.0	2	0.7	2	0.7	0	0	2	0.6	0	0.0
Time shortage	0	0.0	18	6.5	0	0.0	0	0.0	0	0	0	0	0	0.0

Discussion:

With the recent advances in the field of vaccine development and the emergence of new infections, it is expected that the National Immunization schedule will soon need to be revised. The effectiveness and safety of the newer vaccines have been studied in different settings. The availability of these vaccines in the market and the prescription by the doctors as well as the promotion by the drug companies warrants the proper knowledge about the vaccines among the people for informed decision making.

The combined MMR vaccine has shown to yield results similar to administering individual measles, mumps and rubella vaccines at different sites and lead to significant reduction in the incidence of the three target diseases. [7] Fortunately, the knowledge and use of MMR vaccine was found to be highest in the present study.

Hepatitis B infection is one of the most prevalent diseases in the world [8]. India is moderately endemic for Hepatitis B infection with a carrier rate of 4.71%.[9] The need for universal immunization of infants with Hepatitis B vaccine is quite well established. The inclusion of HBV in the UIP schedule has been started in some states but it has failed to reach to community at large in the country[10]The rates of knowledge and vaccination were found to be poor in our settings also.

Hib is a common cause of meningitis and pneumonitis in children less than 5 years old in India. However**,** the Indian Academy of Pediatrics has not recommended Hib vaccine for all infants, but has suggested that it be optional to be decided by the pediatricians and the parents. In the present study only 11% of the respondents had any knowledge of Hib and had vaccinated their child against it in the present study. .

The results of our study indicate the need for increasing the knowledge about the Rotavirus vaccine, which is intended to prevent the infection and its toll- deaths, hospitalization and medical visits. [11,12]. The use of IPV vaccine in the pre-eradication phase is especially prolific. However, very few respondents had any knowledge about the vaccine and consequently very few got it administered in our study.

Chicken Pox and Hepatitis A are mild diseases with low mortality in childhood and most of the children are infected by the age of 15 years. [13] Natural infections provide lifelong immunity. Since the available vaccine is highly effective but costly, therefore the parents might be given the option of vaccinating the child. [6] The knowledge of the vaccines was negligible in our study and none were vaccinated.

The prescription of newer vaccines was mainly carried out at the private facilities in the urban areas and suggests that affordability in urban areas is not an impediment to vaccination. However the prescription at the government health facilities is still low, probably because of the want for a national policy. The incorporation of the selected newer vaccines would lead to universality of the vaccination schedule as well as availability of the vaccines to all the sections of the society. The low dropout for vaccines requiring multiple doses was laudable and indicates towards the completeness of information and concern as well. The delay in the age of vaccination is not a matter of much concern since the dissemination of knowledge regarding the newer vaccines is not extensive presently.

The association of lower birth order, at least three years of spacing between children, general caste, urban background and education of the respondents with the better knowledge and use of the vaccines was similar to the findings of other studies done to determine the predictors of the UIP vaccines. [14] This indicates that the efforts made for the dissemination of the information regarding the UIP vaccines would be fruitful for the newer vaccines as well and no new efforts are required.

Non vaccination of the children was primarily due to lack of awareness about the vaccines. This finding is different as compared to the reasons for non-administration of the UIP vaccines[14]. This could well be understood since the dissemination of information regarding the newer vaccines is very restricted and the parents have access to very limited information through limited means. This affects their decision making regarding either administration or non-administration of the vaccines. Government, along with concerned professional organizations need to take an initiative in this direction.

Limitations

Since this study was carried out in a hospital setting hence it was difficult to predict the actual newer vaccine coverage in the community. A community based study would provide us a better estimate of the coverage and the factors associated with it. Also since even one dose of the vaccines requiring multiple doses was counted as being immunized, we obtained an overestimate of the coverage, yet it was quite low.

Conclusions

With the availability of convincing evidence regarding the efficacy, effectiveness and acceptability of the various vaccines in different settings, it is time for looking into the issues of procurement, funding and strategic implementation of the newer vaccines for the control of emerging childhood illnesses.

Key Message:
'What is Already Known': The effectiveness of newer vaccines in different settings?
'What this Study Adds': The baseline data regarding the awareness and use about the newer

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