

Original Research Article

A longitudinal study of immunization status and reasons for non-vaccination of children in OPD and pediatric ward of a teaching hospital

Mir Sumsam Ali Khurram*, Khaja Amer Khan

Department of Pediatrics, Deccan College of Medical Sciences, Hyderabad, Telangana State, India

Received: 05 June 2020

Revised: 02 July 2020

Accepted: 08 July 2020

*Correspondence:

Dr. Mir Sumsam Ali Khurram,

E-mail: dr.sakhurram@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The present study was to find out the immunization status of children in the age group of 0-7 years from OPD and those admitted in hospital attached to Deccan College of Medical Sciences with respect to primary immunization (BCG, OPV/DPT 1, 2, 3, measles), 1st booster dosage of OPV, DPT and also primary doses of Hepatitis-B vaccine and coverage of vitamin A with measles vaccine. The objectives of this research work were to study factors which influence the immunization status and to know reasons for partial and non-immunization and their follow up over 2 years. Also, to know proportion of vaccine preventable diseases in children under study group.

Methods: An oral questionnaire method was adopted for parent of children in the age group 0-7 years to assess their immunization status and social factors influencing immunization coverage. Systemic random sampling method was applied to select 200 children i.e. every 5th child admitted in the age group of 0-7 years was taken for analysis.

Results: The study showed that out of 200 children 115 were fully immunized, 78 were partially immunized and 7 were non-immunized, 66 children among male and 49 among females were fully immunized, & the study shows that males had better immunization than females.

Conclusions: Out of total 200 cases 57.6% were fully immunized, 38 % were partially immunized while 3.5% were unimmunized. Immunization coverage was better in urban children than rural children.

Keywords: BCG, DPT, Immunization, MMR

INTRODUCTION

The Indian population had swollen to 133.92 crores which had led to crucial changes in balance between young and old, rich and poor, urban and rural. Choices made by millions of couples, will determine how the future of this nation was shaped. The Government of India keeping this in mind had made it mandatory for all children to be immunized against 6 killer diseases. In May 1974 WHO officially launched a global immunization programme known as Expanded programme on immunization (EPI) to protect all children

of the world against 6 vaccine preventable diseases namely diphtheria, Tetanus, whooping cough, polio, tuberculosis and measles by the year 2000. In India EPI was launched in January 1978. Prior to 1978 there were no provisions made for immunizations under any of the Government programme. The success of eradication of small pox backed the WHO made the Government and other associated bodies had taken noticed about the importance of immunization and hence in the V five year plan and introduced immunizations as a priority under MCH services.¹ The five year plan (1980-85) strengthened the immunization caused by planning to get

down the Infant mortality rate (IMR) from 127 to 60. In India universal immunization programme (UIP) was launched on November 19th 1985. And the National Health Policy aimed at achieving universal immunization coverage of the eligible population by 1919. The Achievements in VII five year plan was that they brought down IMR from 146 to 80, which was mainly due to immunization.² From the year 1992-93 the UIP had been strengthened and expanded into the CSSM project an integration of UIP with expanded/intensified MCH activities in high IMR states/districts of the country. It involved sustaining the high immunization coverage level under UIP.³ To impart dynamism in the VIII plan (1992-97), the UIP which was launched in 1985, provided universal coverage of infant and pregnant women all over India with immunization against 6 identified vaccine preventable killer diseases. In the 1980's the percentage of immunization was less than 5% according to Government figures. The campaign was picked up in the early 1990's the scenario was changed rapidly in the 90's, as the government took up the issue of national immunization. In 1995-96 the immunization was almost 97.1% for BCG, 91.6% for polio, 82.6% for measles. But of late the trend has changed. With the launching of pulse polio immunization in 1995 to eradicate poliomyelitis, routine immunization suffered.⁴ India had paid a certain price for the success of pulse polio eradication programs as a result of which immunization coverage of other childhood diseases had fallen in certain areas.⁵ Poor physical access to routine immunization, weak social mobilization, inefficient maintenance of cold chains in remote areas delays in provision of injection equipment and lack of awareness among the masses were some of the major causes of this decline. Studies had been conducted in the past to access the primary doses in age group 12 to 23 months old children. In the present study children of age group 0-7 years were included to analyse the coverage of 1st booster doses of OPV and DPT. An evaluation by UNICEF (2001) showed that in India, 49% of children were fully immunized which was significantly low. The fall in immunization coverage had led to concerned of re-emergence of a few of these easily preventable killer diseases.

METHODS

Hospital based study during period of August 2017 to August 2019. The present study was a hospital-based study and had been carried out in pediatric department of Deccan College of Medical Sciences, Hyderabad, Telangana during the period of August 2017 to August 2019 for which the inclusion criteria were children aged between 0-7 years. The study protocol was approved by the ethical committee of the institute.

Source of data

Data was collected from parents of 200 children 0-7 years from OPD and those admitted in hospitals attached to

Deccan College of medical Sciences. The Patients were from all religion

Method of collection of data

A structured pretested proforma was used to fulfill the objectives. An oral questionnaire method was adopted for parents of children in the age group 0-7 years to assess their immunization status and social factors influencing immunization coverage. Collected data was put on a master chart for basic analysis.

Sampling method

Based on hospital statistics of 2017, 2018, 2019 an average number of admission of study age group (0-7 years) children were found to be 1000/years depending on this information about 1000 children were expected to get admitted during present study period.

Inclusion criteria

The 200 children in age group of 0 to 7 years from OPD and those admitted to hospital attached to Deccan College of Medical Science were included.

Exclusive criteria

Children >7 years, children with progressive neurological diseases, immuno-compromised child, children not belonging to Hyderabad were excluded.

Other criteria

Age

Calendar-based age was taken for study.

BCG scar

Parent who did not have an immunization card, we were used BCG Scar for evaluation of whether BCG was given. For DPT, measles, hepatitis-B vaccination we required the month when child was immunized, site of injection also gave an accurate data. And also vitamin A administration with measles vaccination was also asked.

Immunization status

Fully immunized: The child who had received all primary doses of BCG, DPT/OPV123, Measles and 1st booster doses of OPV/DPT as mentioned in immunization schedule.

Partially immunized: If Child had missed even a single dose as mentioned in immunization schedule.

Un-immunized: If the child had not received even a single dose of any vaccine.

In addition

Coverage of vitamin A administration with measles Vaccination was assessed. Immunization status for primary doses of hepatitis B vaccination was also assessed. A proportion of vaccine preventable disease in studied children was analyzed.

RESULTS

During study period 200 Children were admitted in hospital attached to Deccan College of medical sciences with respect to primary immunization. The study showed

that, out of 200 children 115 were fully immunized, 78 were partially immunized and 7 were non-immunized, 66 children among male and 49 among females were fully immunized and the study showed that males had better immunization than females. Table 1 show that children included in our study group comprised 107 male (53.67%) and 93 females (46.33%) Age wise distribution had an almost equal number of children in all age groups.

Table 2 shows that out of 200 children 115 were fully immunized (57.66%) 78 were partially immunized (38.83) (that was the child received at least one of the immunization UIP Vaccine) and 7 of them were non-immunized.

Table 1: Age sex distribution in study population.

Age of the child in years	Sex of the child					
	Male		Female			
	N	%	N	%	N	%
0-3	57	53.70	40	46.29	72	36
3-4	32	52	25	48	67	33.33
4-7	28	55.43	24	44.56	61	30.66
Total	107	53.67	93	46.33	00	100

Table 2: Immunization status.

S. no.	Status of immunization	Total	Percentage
1.	Fully immunized	115	57.66
2.	Partially immunized	78	38.83
3.	Non-immunized	7	3.50
		200	100.00

Table 3: Sex and immunization status.

Sex	Fully immunized		Partially immunized		Non immunized		Total	
	N	%	N	%	N	%	N	%
Male	66	62.11	37	34.78	3	3	107	53.66
Female	49	52.51	40	43.17	4	4	93	46.33
Total	115	57.66	78	38.83	7	3.5	200	100

Table 4: Individual vaccine and coverage.

Type of vaccine	No of children vaccinated	Percentage (%)
BCG	193	96.50
DPT1(OPV1)	184	92.16
DPT2(OPV2)	175	87.33
DPT3(OPV3)	161	80.33
Measles	142	71
Vitamin- A	134	67.1
DPT1st booster	116	58

Table 3 showed that out of 200 children, 115 were fully immunized (57.66%), 78 were partially immunized

(57.66%), 78 were partially immunized (38.33%) and 7 were non-immunized (3.5%). 66 children among male (62.11%) and 49 among females were fully immunized (52.51%) and the study shows that males had better immunization than females and statistically significant.

Table 4 shows that BCG coverage was 96.5% where as DPT1st booster dose coverage was 58% other vaccines coverage were 184 for DPT1 (92.16%), 175 for DPT2 (87.33%), 161 for DPT3 (80.33%), 142 for measles (71%).The study shows that there was a gradual drop out from BCG in neonatal period to DPT1st booster dose at 1^{1/2} years. Vitamin-A coverage with measles was 67.1%.

Table 5 shows that fully immunized Muslim children were constituted 97(57.87%) Hindus children were 11 (46.96%) and Christian children 7(80.76%). Among the partially immunized,

Hindus had the highest number with 45.45% compared to Muslim 39.17% and Christian were 15.38%.

Unimmunized children were more among Muslims. 2.96% were compared to Hindus 7.57% and Christians were 3.84% and the study was found to be statistically significant. Christians had the best immunization coverage and were followed in Hindus and were least among Muslims.

Table 5: Immunization status and religion.

Religion	Fully immunized		Partially immunized		Unimmunized		Total
	N	%	N	%	N	%	
Muslim	97	57.87	66	39.17	5	2.96	508
Hindu	11	46.96	11	45.45	2	7.57	66
Christian	7	80.76	1	15.38	2	3.84	26
Total	115		78				200

Table 6: Proportion of vaccine preventable disease.

Disease	Number of patients	Immunization status (For respective vaccine)	
		Immunized	Unimmunized
Measles	12	2	10
TB	12	9	3
Tetanus	3	0	3
Pertussis	6	1	5
Hepatitis-B	2	0	2

Table 7: Drop-out rates based on follow up.

Immunization status	Total number of children	Number of children vaccinated	Percentage of drop outs
Birth - BCG	200	193	3.5
BCG -DPT1	179	171	4.4
DPT1 -DPT2	153	145	5.2
DPT2 - DPT3	124	114	8.01
DPT3 - measles	82	72	11.6
Measles-DPT 1st booster	142	116	18.3
BCG - DPT3	190	158	16.7
BCG - Measles	192	141	26.4
BCG -DPT 1st booster	185	111	39.8
DPT1 -DPT 1st booster	175	110	37
Birth -DPT 1st booster	200	116	42

Table 6 shows that 5.83% of studied children had vaccine preventable diseases. Two of measles, nine children of

Tuberculosis, and one child of pertussis were immunized with respected vaccines and other children were unimmunized, and this table was also shows that Tetanus Toxoid and Hepatitis-B vaccines had better efficacy than other vaccine.

Table 7 shows that, dropout rates were 3.5% for birth to BCG, 4.4% for birth to DPT1, 5.2% for DPT1 to DPT2, 8% for DPT2 to DPT3 11.6% for DPT3 to measles, 18.3% for measles to DPT1st booster dose. Birth to DPT1st dose on the whole 42% dropped out. So, we have seen a progressive rise in the drop out levels for subsequent immunization. Over all dropout rate for DPT was 37%. Hence it was important to lay a heavy emphasis on importance of follow up visits for subsequent vaccines.

DISCUSSION

Immunization is still a major and effective tool in fighting against communicable diseases particularly in preventing childhood diseases which account for high morbidity and mortality in young preschool children. Expanded programme on immunization aims at delivering the primary immunization series to at least 90% of infants. However inadequate levels of immunization against childhood diseases was remain a significant public health problem in resource poor areas of globe. Accurate measurement of vaccination coverage was an essential step in determining expected reduction in morbidity and mortality from vaccine preventable diseases. It was one of the ways to evaluate effective operation of programme.

Sex of the child: A feature of developing countries that was particularly worrying was the adverse ratio of the number of women to that of men; Even though males outnumber females at birth women tend to outnumber

men in North America and Europe with an average ratio of 1.05. Thus the girl child was one of the most marginalized and deprived groups not only in terms of social status and access to education but also nutrition and health. In our study it was seen that males (62.1%) were better immunized than females (52.1%) which was comparable to study conducted by Yadav J et al stated that coverage levels of males (63.7%) were better than in females (57.1%).⁶ Study was conducted by Nirupam S et al revealed male (39%) had better immunization than females (30%).⁷

Place of birth: In our country most of the delivery occurs at home. Mother who delivered at home may be non-users of health services in general. Hospital staff will also play an important role in educating parents regarding the need of immunization to mother delivered in hospital. The mothers who delivered at hospital will get motivation from co-patients for better immunization. Moreover home delivered children had a 2.27 times higher risk of not completing their vaccination programmers than who born in health facility area. Present study shows that children were born at hospital (67.7%) were better immunized than those were born at home (30%) which was similar to study conducted by Chhabra et al where 58.2% of hospital born and 34.6% of home born children were fully vaccinated.⁸

Both the above studies were comparable in the fact that hospital born children were twice more likely received complete immunization than those born at home.

Religion: India is a country where there is a unity in diversity, consists of various religions, each religion have their own respectable culture and traditions. Our study shows that immunization coverage were better in Christians (80.76%) than in Muslims (57.87%) and Hindus (46.96%) comparable to study conducted by Yadav et al.

During 1999 showed 100% Christians, 61.5% Hindus, and 50.5% Muslims were fully immunized, other study conducted by same authors in BIMARU States in 2000 showed 48.8%/ Hindus, 38.7% Muslims and 73.7% of Christian were fully immunized and this was due to better literacy and socioeconomic condition of Christians. In the study by Malinikar et al showed that Hindus (69.9%) were better immunized than non-Hindus.⁹

Residence: Our study shows that urban children were better immunized (66.57%) than rural (45.2) which was comparable to study conducted by Dhadwal D et al showed 84.3% of urban and 57.5% of rural children were fully immunized.¹⁰ So immunization was better in urban area than rural probably due to easy accessibility and better health care facility, better health awareness and higher standard of living.

Immunization status: Recent immunization coverage evaluation survey had shown improvement in all India

level immunization coverage levels. National family health survey had also reported that proportion of fully immunized children had increased from 36% in 1st survey (1912) to 42% in 2nd survey (1998), but these figures vary widely across regions, states and strata's of society depending on socio economic factors and availability of health care facility. In our study 57.66% of children were fully immunized comparable to study done by Sokhey et al, where 8.6% were fully immunized were compared to recent coverage evaluation survey 2000 to 2001 (53%), our study had better immunization (57.66%) may be due to literate parents and seeing medical help for minor ailments.¹¹ When were compared to NFHS3 study where coverage was found 44% at national level and 45% at Gujrat level. Our study had better immunization, because it was a tertiary care hospital and patient represents wider section, and different strata from all localities of Davangiri district and selection of patients coming to hospital removes possibility of selection bias.

Type of vaccine received: In our study coverage for BCG was 96.5%, DPT1/ OPV1 were 92.16% DPT2/ OPV2 were 87.33%, DPT3 /OPV3 were 80.3%, and for measles was 69% comparable to study conducted by Trivedi S et al, were showed almost similar results as follows BCG was 94% DPT1/OPV1 were 91% DPT2/OPV2 were 86.8%, DPT3/OPV3 79% and measles was 69%.¹²

Table: 8 Comparison of individual vaccine coverage.

Type of vaccine	Present study	Chhabra et al ⁸	Singh et al ¹³	Bhatial et al ²
BCG	96.5%	87.2%	68.6%	93.99%
DPT1/OPV1	92.16%	81.5%	75.7%	93%
DPT2/OPV2	87.33%	76.8%	73.2%	90.5%
DPT3/OPV3	80.33%	70.7%	66.7%	85.9%
Measles	71%	65.3%	60.1%	76%

Table 8 shows that BCG coverage was 96.5%, DPT 1/OPV1 were 92.6% and DPT2/OPV2 were 97.33 whereas DPT3/OPV3 were 80.3% and for measles vaccine was 96% comparable to study conducted by Chhabra et al, Singh et al and Bhatia et al were showed similar results as follows. Our study showed 58% coverage for DPT 1st booster dose, which was much higher than figure 15% observed in surveys conducted by UNICEF. Only state of Goa had coverage over 50% while it was also neglected in better states like Maharashtra, Kerala, and Tamil Nadu. Study by Pragathi et al, showed 41.4% coverage for the same vaccine.

Reasons for partial/non-immunization

In our study top 3 reason for partial/un-immunization were ignorance of parents, lack of knowledge of and lack of motivation, comparable to study conducted by Malinikar et al where the common reasons were unwell

child, lack of knowledge of immunization schedule and migration to native village. In other study by Nirupam et al, common reasons for un-immunization were obstacles, lack of information and lack of motivation.

Vitamin A coverage with measles vaccination: Provision of high dose of vitamin A supplements every 4-6 month not only protects against blindness but also had a dramatic multiple impacts on the health of children. Overall, the reduction of child mortality attributable to vitamin A supplementation was comparable to if not greater than of any individual child vaccine. It was only 45% of children in age group of 6-59 months of age in India received at least one dose of vitamin A supplementation in 2003, comparable to our study where vitamin A coverage was 67%. It was probably due to better awareness of population regarding the benefits of vitamin A in this area. Study conducted by Singh et al, at all India level Vitamin A coverage was 59%.¹³

Drop out rate: The rate difference between the initial reference vaccine (IRV) and the final reference vaccine (RFV). Given by the formula:

$$\text{IRV/FRV Dropout rate} = \frac{\text{IRV} - \text{FRV}}{\text{IRV}} \times 100.$$

IRV-It reflects the lacunae in the health system and opportunities missed.

Table 9: Comparison of dropout rates.

	Present studies	Pragathi et al	Gaash et al	Vikas et al
BCG-DPT1	4.4%	1.3%	11.5%	1.48%
DPT1-DPT2	5.2%	5.8%	5.6%	1.2%
DPT2-DPT3	8.01%	7.8%	1.1%	10.1%
DPT3-measles	11.6%	6.9%	21.7%	6.6%
BCG-measles	26.4%	20.9%	20.94%	18.3%

Table 9 shows that drop-out rate was 4.4% for both BCG - DPT, 5.2% for DPT1 - DPT2, DPT2 -DPT3 were 8.01%, DPT3-measles were 11.6% and BCG-measles were 26.3%. Our study was comparable to studies conducted by Pragathi et al, Gaash et al and Vikas et al. In fact that dropout rate increases with subsequent vaccination. Our dropout rate (BCG-DPT 1st booster) in our study was 42% comparable to study done in urbanized villages of Delhi where it was 49% and indicates that the enthusiasm of the parents generated with the birth of the child was not maintained, which in terms suggests lack of sustained health education by the concerned health workers.

This study has several limitations. As this was a hospital based study, it does not represent the component of the society. The Studied children were sick and often coming from poor socio-economic status. Factor responsible for non-utilization of immunization service were not studied

extensively. Since study group were between 0 to 7 years, there might be chances for recall bias.

CONCLUSION

From this hospital based observational study on immunization status of children between 0 to 7 years from OPD and those admitted to hospital attached to Deccan college of medical sciences, our study had derived the following conclusions. Of the total 200 cases 57.6% were fully immunized, 38% were partially immunized, while 3.5% were un-immunized. Male were better immunized than females. Immunization coverage was better in urban children than rural ones. Christians had best immunization coverage followed by Muslims and least in Hindus. Children were delivered at hospital showed better immunization status than those born in home because of better sensitization of mother in hospital for the need of primary immunization. In our studied children only 66.1% had immunization card. BCG vaccine had better coverage with 96.5% and DPT1st booster dose with only 58% coverage. Overall dropout rate for all the vaccine was 42%. Hepatitis B coverage was less with only 24.5% of children received all 3 does. Only 67.1% of children received vitamin A Solution with measles Vaccine. 5.83% of studied children had vaccine preventable disease. Most common reasons for failure immunize identified in our study were lack of knowledge about immunization schedule, lack of motivation and ignorance of parents. 58% of parent gave >2 reasons.

Recommendations

Health workers and medical personnel should educate the parents about the importance of routine immunization along with pulse polio immunization. While going door to door for the administration of polio vaccine, routine immunization should be emphasized. Mass media communication like radio, television, postal information, poster boards etc, can be used to increase the awareness of routine immunization in general public. Immunization coverage surveys must be conducted at least once in a year by expert teams till the problem is brought under a proper control. Efforts should be made to educate mothers about immunization when they are pregnant itself. The basic objective of UIP is to reduce mortality and mortality in children, Therefore surveys should be carried out at regular intervals to assess the progress of the programme. Since, there is a high dropout rate between I-III doses of DPT and OPV and between measles and DPT booster, it indicates the need for sustained health reduction to ensure adequate coverage for all doses. It would also be nice to implement a card system, where in the mother is posted a postal card from the PHC reminding her it's time for her child's immunization.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Salhotra VS, Sharma AK. A study of universal immunization coverage during last five years in resettlement colonies of Delhi. *Indian J Comm Med.* 1999;24(3): 120-23.
2. Bhatia V, Swami HM, Rai SR, Gulati S, Verma A. Immunization status in children. *Indian J Pediatr.* 2004;71:313-5.
3. Mehra M, Dewan S, Aggarwal S, Garg S. Immunization coverage evaluation survey in rural Narela zone and city zone areas of Delhi. *Indian Pediatr.* 1990;27(4):342-6.
4. Bandyopadhy S, Banerjee K, Datta KK, Stephen J. Evaluation of pulse polio immunization in Delhi. *Indian J Pediatr.* 1996;63(2):133-7.
5. Singh MC, Badole CM, Singh MP. Immunization coverage, knowledge and practice of mothers regarding immunization in rural areas. *Indian J Pub Health.* 1992;6(3):153-5.
6. Yadav J, Sing P. Immunization status of children and mothers in the state of Madhya Pradesh. *Indian J Comm Med.* 2004;29(3):147-8.
7. Nirapam S. UIP in Sarojini Nagar Block of Lucknow district. *Indian J. comm Med.* 1991;16(2):82-4.
8. Chhabra P, Nair P, Gupta A, Sandhir M, Kanna AT. Immunization in Urbanized Villages of Delhi. *Indian J Pediatr.* 2007;74(2):131-4.
9. Kar M, Reddaiah VP, Kant S. Primary immunization status of children in slum areas of South Delhi-the Challenge of Reaching the urban poor. *Indian J Comm Med.* 2001;26(3):151-4.
10. Dhadwal D, Sood R, Gupta AK, Ahluwalia SK, Vatsayan A, Sharma R. Immunization coverage among urban and rural children in the Shimla hills. *J Comm Dis.* 1997;29(2):127-30.
11. Sokhey J, Jain DC, Harit AK, Dhariwal AC. Moderate immunization coverage levels in East Delhi. Implication for disease control programmes and introduction of new vaccines. *J Trop Pediatr.* 2001;47(4):199-203.
12. Sanguta TCR, Rajesh. Evaluation and impact of various factors affecting universal immunization programme coverage in surat. *The Inter Net J Epidemio.* 2009;6;2.
13. Singh P, Yadav RJ. Immunization status of children of India. *Indian Pdiatr.* 2000;37:1194-9.

Cite this article as: Ali Khurram MS, Khan KA. A longitudinal study of immunization status and reasons for non-vaccination of children in OPD and pediatric ward of a teaching hospital. *Int J Contemp Pediatr* 2020;7:1853-9.