Missed Opportunities for Immunization in Hospitalized Children in the 1-5 Year Age Group

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ABSTRACT

Introduction: The coverage of vaccination in India is far from complete despite the commitment for universal coverage and one of the barriers for the same is Missed Opportunities for Immunization (MOI). Thus, there is a need to evaluate the factors for MOI and remedies to improve the same.

Material and Methods: A cross sectional observational study was conducted at a tertiary care hospital on 585 hospitalized children in the 1-5 year age group to determine the magnitude and causes for MOI. The qualitative data was represented in the form of frequency and percentage tables with the help of SPSS 17.

Results: In our study, the magnitude of MOI was found to be 29.9 %. MOI was found more among males (57.3%) than females (42.7%). Of the 585 subjects enrolled, 48.7% were Hindus, 46% were Muslims and 5.3% belonged to other religions. 91.1% of the study subjects hailing from an Urban area were completely immunized versus 8.9% from Rural areas. Higher percentage of MOI was found in children who were home delivered versus institutional deliveries. BCG vaccine had a 100% coverage. Despite having contact with a health care facility, 19.5% of the subjects weren't immunized and the most common reason for this was presence of minor illnesses like at that contact time. The average lag period of MOI in our study was 67.3 weeks. Measles vaccine had the highest lag period of 85.2 weeks. A statistically significant association ($p<0.05$) with MOI were seen with gender, area of residence, place of delivery and antenatal immunization status.

Conclusion: In our setting, MOI were lower in girl children, institutional deliveries and children residing in an urban area. Multi-centric data, health education and recommendations would help improve the overall immunization coverage in the Indian subcontinent.

Keywords: Immunization, Missed Opportunities for Immunization.

INTRODUCTION

Immunization is the most cost effective method to reduce childhood mortality and morbidity. At the global and regional levels, actions are taken regularly like vaccination campaigns, training workshops and round table discussions to improve the overall coverage of immunization. It has been recently estimated that more than 98% of the incompletely immunized children are from developing countries.[1] The coverage of vaccination in India is far from complete despite the commitment for universal coverage. The risk factors associated with the delay in immunization include family size, number of children<5 yrs, birth order, sex, religion, maternal and paternal education etc.[1]

An opportunity for immunization is missed when a person who is eligible for immunization and has no contraindication to immunization, visits a health service and does not receive the needed vaccines.[2] The global magnitude of MOI is 0 to 99%.[2] Missed opportunities for immunization can occur during visits for immunization wherein the health worker does not use appropriate contraindications to immunizations (Table-1) or when they do not routinely screen children for their immunization status and offer the recommended vaccines.[3] Minimizing the missed opportunities for immunization is the easiest and best measure to improve vaccine coverage, thereby protecting the child against contracting an infectious disease. Thus this study was undertaken to determine the magnitude and factors responsible for missed opportunities of immunization at our institution and remedies to improve the same.

MATERIAL AND METHODS

A cross sectional observational study was conducted at a tertiary care center in a metropolitan city after obtaining approval from the Institutional Ethics Committee. By appropriate statistical methods sample size calculated was 576. However 585 patients over an 18 months (April 2013 to October 2014) period who fulfilled the inclusion criteria (availability of a primary care taker, availability of an immunization card or verbal recall of the primary care taker as a proof of immunization) and who signed a written consent were enrolled in the study. Patients admitted in the intensive care unit and under-vaccinated children without a prior health visit were excluded from our study. The primary care taker of the hospitalized child was interviewed within 24 hours of admission to avoid bias caused by immunization related interventions. We collected data pertaining to details of demographic profile, previous immunization details including dates of vaccines taken, previous health care facility visits, prior contraindication, if any, to previous vaccination, missed opportunities for vaccination and dissipation of immunization related health education to the primary caregivers. Universal Immunization Programme (UIP) (Table-2) was followed and the data with dates of immunization and age at administration of vaccine was noted.[3] Lag period was calculated for individual subjects as the number of weeks between the actual age of administration of the vaccine versus the recommended cut off age (Table-3).[3] Those children who were not immunized at the time of interview were referred to our immunization clinic and immunized.

STATISTICAL ANALYSIS

SPSS Version 17 was used for analysis. Predictiveness for MOI

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were analyzed by logistic regression analysis. Results were graphically represented where ever deemed necessary.

RESULTS

There were 1,384 patients admitted in the pediatric ward during the 18 months study period. Of the 750 children who were in the age group of 1-5 years, 585 children who fulfilled the inclusion criteria were enrolled in the study. 166 (28.4%) children were in the age group of 1 to 2 yrs, 158 children (27%) were between 2 to 3 yrs, 109 children (18.6%) between 3 to 4 yrs and 152 children (26%) were between 4 to 5 yrs. There were 218 boys and 192 girls enrolled in our study.

410 children (70.1%) were completely immunized and 175 children (29.9%) had MOI. 285 children were Hindus, 269 were Muslims and 31 belonged to other religions. MOI in Hindu children was 34.7%, in Muslims was 27.1% and in other religions was 9.7%.

52 (8.9%) children were from rural areas as compared to 533 (91.1%) children who were from an urban area. 25 of the 52 children (48.1%) from rural areas had MOI as compared to 150 of the 533 children (28.1%) from the urban areas.

The mother was the primary care taker in 62.9% children and MOI was 33.4% where the mother was the primary care taker, (22.5%) when the father was the primary care taker and (30.8%) when other relatives were the primary care takers.

The percentage of MOI in our study was seen in 34.9% in boys when compared to 23.2% in girls. 61.4% of Children who were delivered at home had MOI versus 27.4% who had institutional deliveries.

A 100% BCG vaccine coverage was noticed. The least coverage was for the Measles vaccine (78.8%). Vaccine coverage in our study is depicted in (Table-4). Under immunization in siblings was observed in 58.5% of the MOI patients.

19.5% of the MOI subjects had contact with a health care facility either in the private or public sector. Despite this the most common reason for MOI was a minor illness at the time of contact (false contraindication for immunization). 46 primary care takers believed that the vaccines had side effects.

Of the 175 MOI children 40 primary care takers were illiterate (57.1%), 96 had attended primary school (31.5%), 35 (17.9%) had attended secondary school and 4 (26.7%) were graduates. The average lag period for MOI in our study was 67.3 weeks and the Measles vaccine had average lag period of 85.2 weeks (minimum-4wks and maximum-230 wks).

A significant association of MOI ($p<0.05$) was observed with children who were home delivered, mostly from rural areas (Table-5). From the logistic regression analysis, independent predictor variables for MOI in our study contributing to lesser chances of MOI were female gender, children born at an institution and hailing from urban areas.

DISCUSSION

The study was conducted to determine the contribution of MOI which was one of the hindrances to achieve 100% immunization coverage. The incidence of MOI in our study was 29.9%. Our

1.	Immunize children who are malnourished or mildly ill.
2.	Immunize pregnant women with Tetanus Toxoid.
3.	For children who have an illness requiring hospitalization the decision whether or not to immunize should be made by the treating doctor
4.	Human Immune Deficiency Virus (HIV) infection is not a contraindication to immunization
5.	BCG is contraindicated in children with symptomatic HIV infection
6.	A prior serious adverse event to a vaccine is a contraindication to immunization with the same

Table-1: Summary of Indications and Contraindications to EPI Vaccines[3]

At birth	BCG and OPV0
6 weeks	DPT1, OPV 1 and HEP B1
10 weeks	DPT2, OPV2 and HEP B2
14 weeks	DPT3, OPV3 and HEP B3
9 months	Measles

Table-2: Recommended Immunization Schedule to Provide Protection at the Earliest Age as per EPI.[3]

2 months	BCG and OPV0
3 months	DPT1, OPV 1 and HEP B1
5 months	DPT2, OPV2 and HEP B2
7 months	DPT3, OPV3 and HEP B3
10 months	Measles

Table-3: Cut off age for missed immunization used in the study were defined as follows.[3]

Vaccine	Completely immunised as per schedule			
	Yes		No	
	N	%	N	%
BCG, OPV	585	100	0	0
DPT1/OPV1/HBV2	562	96.1	23	3.9
DPT2/OPV2/HBV2	539	92.1	46	7.9
DPT3/OPV3/HBV3	499	85.3	86	14.7
Measles	461	78.8	124	21.2

Table-4: Vaccine wise distribution of immunisation status

Factors		Completely immunized	Missed opportunity	Percentage of MOI	chi-square tests	p value
Gender	Male (335)	218	117	34.9%	9.338	0.002
	Female (250)	192	58	23.2%		
Place of delivery	Institutional (541)	393	148	27%	22.45	<0.05
	Home (44)	17	27	61.4%		
Antenatal Immunization status	Immunized (565)	402	163	28.7%	8.940	0.002
	Unimmunized (20)	8	12	60%		
Area of residence	Urban (533)	383	150	34.64%	9.890	0.003
	Rural (52)	27	25	48.1%		

Table-5: Association of the factors and MOI status of the study group (N=585) and (MOI=175).

study documented a lower MOI compared to other studies.[4-6] This can be attributed to the fact that our study was conducted in hospitalized sick patients receiving curative care versus other studies which included patients who received preventive and curative care.

Our study also focused on the factors which contributed to MOI. Girls were found to have lesser MOI than boys in our study. This can be explained on the basis that our study was conducted at a tertiary care center in a metropolis draining urban locality where there is minimal gender discrimination. However, study by Wadgave et al found males to be more completely immunized than females.[7] No gender bias was observed by Jagrati et al.[8]

Other observations from our study were a lower incidence of MOI when parents were the primary caretaker. 61.4% of children who were home delivered had MOI versus 27.4% who were institutional deliveries. This could be attributed due to lack of sensitization and contact with health care workers in non-institutional deliveries.[8] Hutchins et al also had a similar experience in their study.[9]

In our study the highest lag period was found for Measles vaccine, a finding similar to that observed by Desphande et al.[11] This could be attributed not only to the lack of awareness as well as the long duration between the 3rd dose of DPT/OPV/HepB and the Measles vaccine.

In our study 62.2% of the children were taken to a public sector institution for immunization. It was found that though the children with MOI had contact with a health care system many of them weren't immunized at the time of contact and the reasons for not immunizing at the time of contact with the health care system were minor illnesses (like fever, cough, cold, diarrhea) (66.7%), serious illness (25.4%) and non-availability of vaccines (7.9%). However in the earlier studies, the reasons for MOI despite having a contact with the health care system were found to be having minor illnesses at the time of contact, vaccine shortage, failure to administer multiple immunizations simultaneously, ineffective communication by health care providers and misconceptions associated with immunization.[2,8,9,10,12]

Our study pointed out the factors contributing to MOI at our institution, which were home deliveries, lack of antenatal care and children from rural areas. Thus the MOI can be tackled by taking a detailed immunization history which can reduce its incidence. Appropriate policies should not only be formulated but also be implemented to ensure dissipation of basic health education to all citizens ensuring availability and affordability. Further research needs to be carried out to determine the specific age groups, geographic areas and immunization services which needs to be targeted to decrease the overall incidence of missed opportunities for immunization. The gaps in the knowledge, attitude and practices of health workers across all sectors of societies should be assessed and addressed because at some public sectors practice of not immunizing the children during minor illness is still prevalent.

Existing immunization programs need to be strengthened using the media and other channels of communication like door to door vaccination campaigns, role plays, propaganda by famous personalities using social media in a positive way etc. Inservice education and training is essential and immunization updates should be provided on a regular basis to all health workers.

CONCLUSION

Thus a combined effort from the clinicians and the community is required to decrease MOI and improve the vaccination coverage to reduce the child mortality and morbidity.

REFERENCES

1. Frenkel LD, Nielsen K. Immunization issues for the 21st century. Ann Allergy Asthma Immunol. 2003;90(6 Suppl 3):45-52.
2. Deivanayagam N, Nedunchelian K, Mala N, Ashok TP, Rathnam SR, Ahmed SS. Missed opportunities for immunization in children under 2 years attending an urban teaching hospital. Indian Pediatr. 1995;32:51-7.
3. Mbori-Ngacha D.A, Sang R K A, Onyango F.E, Mutie D.M, Wilson M.C. KEPI Immunization Manual for Medical Students and Physicians. 1st Edition:chapter 4,Page 49-52.
4. Jonathan G. Lim, M.D. Immunization Coverage and Missed Immunizations Among 1-5 Year Old Patients Seen At Chong Hua Hospital. PIDSP Journal. 2003;7:33-37.
5. Loevinsohn BP. Missed opportunities for immunization during visits for curative care: practical reasons for their occurrence. Am J Trop Med Hyg. 1989;41:255-8.
6. MamtaMuranjan, Chhaya Mehta and AbhijitPakhare. An Observational, Health Service Based Survey for Missed Opportunities for Immunization. Indian Pediatr. 2011;48:633-636.
7. Wadgave HV, Pore PD. Missed opportunities of immunization in under-fives in adopted area of Urban Health Centre. Ann Trop Med Public Health. 2012;5:436-40.
8. Jagrati V Jani, Caroline De Schacht, Ilesh V Jani, Gunnar Bjune. Risk factors for incomplete vaccination and missed opportunity for immunization in rural Mozambique. BMC Public Health 2008;8:161.
9. Hutchins SS, Jansen HA, Robertson SE, Evans P, Kim-Farley RJ. Studies of Missed opportunities for immunization in developing and industrialized countries. Bull World Health Organ. 1993;71:549-60.
10. Rahman M, Obaida-Nasrin S. Factors affecting acceptance of complete immunization coverage of children under 5 years in Rural Bangladesh. Salud publica Mex. 2010;52:134-140.
11. Deshpande R, Nimbalkar S, Banker N, Kapoor A. Prevalence for missed opportunities in rural areas of Gujarat, India. Indian J Pediatr. 2001;68:609-12.
12. Agarwal S, Bhanot A, Goindi G. Understanding andaddressing childhood immunization coverage in urbanslums. Indian Pediatr. 2005;42:653-63.

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