

Immunization status of the children age (1 to 5 years) and factors associated with incomplete and no immunization in a Tertiary-care Hospital

Running title: Immunization status of the children age (1 to 5 years) and factors associated with incomplete and no immunization in a Tertiary-care Hospital

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ABSTRACT

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MATERIAL AND METHODS:150 children aged (1 to 5 year) without any immunodeficiency or in immunocompromised state, whose parents gave informed consent were enrolled in this study. Parents were individually administered a structured questionnaire. Data was analyzed by using statistical package for social science software and p value <0.05 was considered significant.

RESULTS: In our study, Out of the 150 children, 99 (66%) were fully immunized, 51 (34%) were incomplete immunized and none of the children failed to receive a single vaccine. 1.3% and 7.3% of the children didn't get OPV2 and OPV3 vaccines respectively. 0.7% , 1.3% and 7.3% of the children didn't get pentavalent1, pentavalent 2 and pentavalent 3. 12.7% of children didn't have 1st and 2nd dose of PCV and 18% didn't have 3rd dose of PCV. IPV1 and IPV2 doses were not received by 10% and 20.7% of the children respectively. Rota 1 and Rota 2 vaccines were not received by 10% and 20.7% of the children respectively. 17.3% and 20.7% didn't get Measles/Rubella 1 and Measles/Rubella 2 doses respectively. DPT booster 1 and 2 were not received by 20.7% and 14% of the children respectively. In this study, among males (73.3%) had completed their immunization as compared to females (61.1%) p value(0.122). Significantly more children had completed their immunization who had educated parents either father or mother. Among nuclear families, 67.2% had complete immunization as compared to joint families (65.1%). Urban children (83.6%) had more immunization as compared to rural (53.9%) with significant p value (<0.001). Among socioeconomic status,as the economic status improved rate of immunization improved. Causes of incompletely immunization were lack of knowledge about importance of immunization(18);(p < 0.001),sick at time of immunization (20) (p<0.001) side effect of immunization(9), parents forgot about immunization(17); (p <0.001), date of next immunization was not told to 10 children(p< 0.001), Immunization center was far away from home for 6 children(p value 0.001).

Conclusion: To improve immunization coverage, there is need to strengthen the education, communication and information skill of health workers. Policymakers should establish a need-based program like nearness of immunization centers, awareness among parents about benefits of vaccination. By improving immunization coverage , we can decrease the morbidities and mortality associated with vaccine preventable diseases.

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Key words: Immunization, Children, Education,vaccine,Diseases

Introduction: Childhood immunization is a highly effective and protective measure for preventing vaccine preventable diseases. Childhood immunization remains one of the highest impact public health interventions, reducing infectious diseases-related morbidity and mortality of children at a low cost.(1) According to the National Family Health Survey (NFHS) 5, children aged 12-23 months fully vaccinated based on information from either vaccination card or mother's recall were 76.4% (57.5% in urban areas and 38.6% in rural areas)which is much less than the desired goal of achieving 90% coverage.(2),(3) Recent estimates suggest that approximately 34 million children are not completely immunized, with almost 98% of them residing in developing countries.(4) Approximately 3 million children die each year in the developing countries, because of vaccine preventable diseases.(5)The World Health Organization (WHO) launched the Expanded Programme on Immunization (EPI) in 1974 and was implemented by the Government of India in 1978 with aim to prevent six vaccine preventable childhood diseases.(6) It was renamed as Universal Immunization Programme in

1985 and in 2005 it become the integral part of National Rural Health Mission. The goal of UIP was to ensure 100% coverage of all children with one dose of BCG, three doses of DPT and OPV, and one dose of the measles vaccine.(6) In 2014, Family Welfare launched Mission Indradhanush to target underserved, vulnerable, resistant, and inaccessible populations.(7) In October 2017, the prime minister of India launched Intensified Mission Indradhanush (IMI)—an ambitious plan to accelerate progress. It aimed to reach 90% full immunization coverage in districts and urban areas with persistently low levels.(8) Immunization is a multi-sectoral activity, and influenced by various factors like demographic, socioeconomic, awareness , religion, cost of immunization program, health care services and political structures of that area.(9) A number of studies have explored the reasons for non-immunization (10-12) but very few studies have been carried out on children admitted to a tertiary-care hospital. (13) Hence, this study is to assess the status of immunization and to analyze the various factors responsible for the non compliance to the immunization among patients in the tertiary care center.

Materials and Methods: This was hospital based prospective cross sectional descriptive study, conducted in Government Medical College and Hospital Patiala, Punjab. 150 children aged (1 to 5 years) without any immunodeficiency or in immunocompromised state, whose parents gave informed consent were enrolled in this study. Parents were individually administered a structured questionnaire consisting of personal and demographic Information, self prepared questionnaire to check compliance. Data was analyzed by using statistical package for social science software and p value <0.05 was considered significant to see the association between factors and non adherence.

Complete immunization: Children received BCG, three doses of Pentavalent, three doses of pneumococcal conjugate(PCV) vaccine, three doses of oral polio vaccine (excluding OPV-0), two doses of Inactivated polio vaccine, two DPT booster doses, two doses of Rota virus and two doses of measles/rubella.

Partial/Incomplete Immunization: Those children, who missed any dose of above vaccines.

Unimmunised Children: Children didn't not received any vaccine.

Results: In our study, Out of the 150 children, 99 (66%) were fully immunized, 51 (34%) were incomplete immunized and none of the children failed to receive a single vaccine. 1.3% and 7.3% of the children didn't get OPV2 and OPV3 vaccines respectively. 0.7% , 1.3% and 7.3% of the children didn't get pentavalent1, pentavalent 2 and pentavalent 3. 12.7% of children didn't have 1st and 2nd dose of PCV and 18% didn't have 3rd dose of PCV. IPV1 and IPV2 doses were not received by 10% and 20.7% of the children respectively. Rota 1 and Rota 2 vaccines were not received by 10% and 20.7% of the children respectively. 17.3% and 20.7% didn't get

Measles/Rubella 1 and Measles/Rubella 2 doses respectively. DPT booster 1 and 2 were not received by 20.7% and 14% of the children respectively.

In this study, among males (73.3%) had completed their immunization as compared to females (61.1%) with p value of 0.122. 80.4% of patients, whose mothers passed primary education, had complete immunization. 84.4% of patients, whose fathers passed primary education, had complete immunization with p value of 0.008 and 0.002 respectively. Among nuclear families, 67.2% had complete immunization as compared to joint families (65.1%) with p value of 0.787. Urban children (83.6%) had more immunization as compared to rural (53.9%) with significant p value (<0.001). Among socioeconomic status, 43% of lower socioeconomic children, 73.6% of lower middle, 80% of upper lower and all of upper middle had complete immunization as compared to 56.9% of lower socioeconomic children, 27% of lower middle, 20% of upper lower had incomplete immunization with p value <0.001.

Among all 18 patients, those had lack of knowledge about importance of immunization, were incomplete immunized with significant p value of < 0.001. In our study 9 patients had side effect of immunization and all of those were incomplete immunized but 141 patients didn't have any side effects, 25% among them were incompletely immunized, that was statistically significant (p <0.001). 17 patients or their parents forgot about immunization and all of them were incompletely immunized with p value <0.001. Date of next immunization was not told to 10 children and they were incomplete immunized with p value < 0.001. Immunization center was far away from home for 6 children, so they were incomplete immunized with p value 0.001. 2 children parents thought immunization was not required and 3 children parents thought immunization could cause disease against which their child got vaccinated, so they were incomplete immunized with p value 0.114 and 0.038 respectively.

Table 1: Coverage of individual vaccines

	Yes		No	
	Number	(Percentage)	Number	(Percentage)
BCG	150	(100)	0	(0)
OPV1	150	(100)	0	(0)
OPV2	148	(98.7)	2	(1.3)
OPV3	139	(92.7)	11	(7.3)
Pentavalent 1	149	(98.3)	1	(0.7)

Pentavalent 2	148	(98.7)	2 (1.3)
Pentavalent 3	139	(92.7)	11 (7.3)
PCV1	131	(87.3)	19 (12.7)
PCV2	131	(87.3)	19 (12.7)
PCV3	123	(82)	27 (18)
IPV1	135	(90)	15 (10)
IPV2	128	(85.3)	31 (20.7)
ROTA1	143	(95.3)	7 (4.7)
ROTA2	141	(94)	9 (6)
Measles/Rubella1	120	(80)	26 (17.3)
Measles/Rubella 2	98	(65.3)	31 (20.7)
DPT Booster1	89	(59.3)	31 (20.7)
DPT Booster 2	24	(16)	21 (14)

Table 2: Association of socio-demographic factors with immunization status of children

	Complete	Incomplete	P value
	Number (Percentage)	Number (Percentage)	
Sex			
Female (n=90)	55 (61.1)	35 (38.9)	0.122
Male (n=60)	44 (73.3)	16 (26.7)	
Education of Mother			
≤ primary (n=99)	58 (58.6%)	41 (41.4)	0.008
> primary (n=51)	41 (80.4%)	10 (19.6)	
Education of Father			

≤ primary (n=105)	61 (58.1)	44 (41.9)	0.002
> primary (n=45)	38 (84.4)	7 (15.6)	
Family			
Nuclear (n=67)	45 (67.2)	22 (32.8)	0.787
Joint(n=83)	54 (65.1)	29 (34.9)	
Locality			
Rural (n=89)	48 (53.9)	41 (46.1)	<0.001
Urban (n=61)	51 (83.6)	10 (16.4)	
Socio Economic Status			
Lower (n=51)	22 (43.1)	29 (56.9)	<0.001
Lower Middle (n=63)	46 (73)	17 (27)	
Upper Lower (n=25)	20 (80)	5 (20)	
Upper Middle(n=11)	11 (100)	0 (0.0)	

Table 3: Reasons for incomplete immunization

	Reason for Incomplete immunization		P value
	Number	Percentage	
lack of knowledge about importance of immunization			
Yes (n=18)	18	100.0	<0.001

No (n=132)	33	25.0	
Side effect of immunization			
Yes (n=9)	9	100.0	<0.001
No (n=141)	42	29.8	
Child was sick at the time of schedule immunization visit			
Yes (n=20)	20	100.0	<0.001
No (n=130)	31	23.8	
Reaction during first dose			
Yes (n=1)	1	100.0	0.340
No (n=149)	50	33.6	
Forget about immunization			
Yes (n=17)	17	100.0	<0.001
No (n=133)	34	25.6	
Date of next immunization not told			
Yes (n=10)	10	100.0	<0.001
No (n=140)	41	29.3	
Away from home			
Yes (n=6)	6	100.0	0.001
No (n=144)	45	31.2	
Not required			
Yes (n=2)	2	100.0	0.114
No (n=148)	49	33.1	
Can cause disease against which child get vaccinated			
Yes (n=3)	3	100.0	0.038
No (n=147)	48	32.7	

Discussion: Immunization is one of the important health measures to decrease vaccine preventable diseases and to reduce under 5 mortality. So it's important to do regular surveillance on immunization coverage so as to sustain immunization coverage.(14) In this study, we enrolled 150 children and looked at coverage of immunization and factors associated with incomplete immunization and sorted out the common reasons for incomplete immunization so as to address the concerns. Out of the 150 children, 99 (66%) were fully immunized, 51 (34%) were incomplete immunized and none of the children failed to receive a single vaccine. National Health Family Survey 5 (2019–2021) showed 76.4% of the children were fully immunised.(15)The study conducted by Adokiya MN, Bagueune B in 2016, revealed 89.5% of the children were fully immunized, 9.5% partially immunized and 1.0% received no vaccine.(16) In our study, 73.3% of male had complete immunization as compared to female population(61.1%) with p value of 0.12, that was statistically not significant. Similar association was also found in the studies conducted by Naveen C Khargekar and Verma SK.(17,18) Our study revealed urban children (83.6%) were more immunized as compared to rural (53.9%) with significant p value (<0.001). National Health Family Survey 5 (NFHS- 5) 2019-2021 for India showed 76.8% immunization for rural and 75.5% for urban.(15) 80.4% of the children , whose mothers passed primary education, had complete immunization. 84.4% of the children , whose fathers passed primary education, had complete immunization with p value of 0.008 and 0.002 respectively. It showed the importance of parent's education and its association with their children immunization. Kumar D et al in 2010 and Mathew JL et al in 2012 did the study and revealed the similar results. (19,20)

In our study, BCG and OPV1 vaccination coverage was 100%. 1.3% and 7.3% of the children didn't get OPV2 and OPV3 vaccines respectively. 0.7% , 1.3% and 7.3% of the children didn't get pentavalent1, pentavalent 2 and pentavalent 3. 12.7% of children didn't have 1st and 2nd dose of PCV and 18% didn't have 3rd dose of PCV. IPV1 and IPV2 doses were not received by 10% and 20.7% of the children respectively. Rota 1 and Rota 2 vaccines were not received by 10% and 20.7% of the children respectively. 17.3% and 20.7% didn't get Measles/Rubella1 and Measles/Rubella 2 doses respectively. In this study the coverage of BCG, OPV1, DPT1and measles were 100%, 100%, 99.3%and 80% respectively. Similar results were found by Yadav et al. in an urban slum of Jamnagar where coverage of BCG was maximum (94.75%) followed by

OPV (84.7%) and DPT (81.4%) and that of measles was the least (75.7%) (21). Although DPT and polio vaccinations are given at the same time as part of the routine immunization programme, the coverage rates for Polio is more than DPT, it might be because of the Pulse Polio Programme (22).

The most common reasons for not immunizing the child in this study were illness of the child (39.2%), unawareness of the need for immunization (35.3%) and forget about vaccination (33.3%). A study conducted by Kar et al. (23) showed that the major causes for incomplete immunization were illness of child (30.8%), unawareness (23.1%), and migration to native place (23.1%). Another similar study by Nath et al. (24) showed that visit to native place (14.7%), carelessness (11.7%), sickness of child (11.7%), and lack of knowledge (10.4%) were reasons for incomplete immunization. The most common reasons for partial or non-immunization were: inadequate knowledge about immunization or subsequent dose (n=140, 52.4%); belief that vaccine has side-effects (n=77, 28.8%); lack of faith in immunization (n=58, 21.7%) in a study by Kumar D and Aggarwal A(13).

Conclusion: In our study, Out of the 150 children, 99 (66%) were fully immunized, 51 (34%) were incomplete immunized and none of the children failed to receive a single vaccine. Socioeconomic status, education of parents and locality played an important role and associated with full immunization and statistically significant. The most common reasons for not vaccinating the child in our study were illness of the child (39.2%), unawareness of the need for immunization (35.3%) and forget about vaccination (33.3%). So to improve immunization coverage, there is need to strengthen the education, communication and information skill regarding immunization of health workers such as ANM, ASHA and Anganwadi workers, as these workers are the primary source of information for mothers. To achieve full immunization coverage, policymakers should establish a need- based program like nearness of immunization centers, awareness among parents about benefits of vaccination. By improving immunization coverage, we can decrease the morbidities and mortality associated with vaccine preventable

diseases.

Reference

1. Obasoha PE, Mustapha MA, Makada A, Obasohan DN. Evaluating the reasons for partial and non-immunization of children in Wushishi local government area, Niger state, Nigeria: methodological comparison Afr J Reprod Health 2018; 22:113:
2. International Institute for Population Sciences. National family health survey-5 (2020-2021). Mumbai: International Institute for Population Sciences, 2007. (<http://www.nfhsindia.org/pdf/IN.pdf>, accessed on 24 May 2009).
3. Ministry of Health & Family Welfare, Government of India. (2018). Roadmap for Achieving 90% Full Immunization Coverage in India – A Guidance Document for the States. p. 1.
4. Frenkel LD, Nielsen K. Immunization issues for the 21st century. Ann Allergy Asthma Immunol 2003;90(Suppl 3):45-52.
5. Kane, M. Lasher, H. (2002) “The case for childhood immunization”. Occasional paper, No.5. Children’s Vaccine Program at Path. Seattle, WA.
6. Park K. Principles of epidemiology and epidemiologic methods. Text book of preventive and social medicine. Jabalpur: Banarasidas Bhanot Publishers, 2005. 103 p.
7. Ministry of Health and Family Welfare (MOHFW). Mission Indradhanush, operational guidelines. Delhi, India: MOHFW;2014.
8. Ministry of Health and Family Welfare (MOHFW). Intensified Mission Indradhanush, operational guidelines. MOFHW, 2017. <https://mohfw.gov.in/sites/default/files/Mission%20Indradhanush%20Guidelines.pdf>
9. Singh S et al. Ensuring childhood vaccination among slums dwellers under the National Immunization Program in India - challenges and opportunities. Prev. Med. 2018; 112: 54–60
10. Khokhar A, Chitkara A, Talwar R, Sachdev TR, Rastogi SK. A study of reasons for partial immunization and non-immunization among children aged 12-23 months from an urban community of Delhi. Indian J Prev Soc Med 2005;36:83-6.
11. Nath B, Singh JV, Awasthi S, Bhushan V, Kumar V, Singh SK. A study on determinants of immunization coverage among 12-23 months old children in urban slums of Lucknow district, India. Indian J Med Sci 2007;61:598-606.

12. Mathew JL, Babber H, Yadav S. Reasons for non- immunization of children in an urban, low income group in North India. *Trop Doct* 2002;32:135-8.
13. Kumar D, Aggarwal A, Gomber S. Immunization status of children admitted to a tertiary-care hospital of north India: reasons for partial immunization or non-immunization. *J Health Popul Nutr.* 2010 Jun;28(3):300-4. doi: 10.3329/jhpn.v28i3.5560. PMID: 20635642; PMCID: PMC2980896.
14. Lahariya, C. A brief history of vaccines and vaccination in India. *Ind J Medi Resea.* 2014;139(4):491.
15. James, K. & Singh, Shri Kant & Lhungdim, Hemkhotang & Shekhar, Chander & Dwivedi, Laxmi & Pedgaonkar, Sarang & Arnold, Fred. (2022). National Family Health Survey (NFHS-5), 2019-21, India Report.
16. Adokiya MN, Baguune B, Ndago JA. Evaluation of immunization coverage and its associated factors among children 12–23 months of age in Techiman municipality, Ghana, 2016. *Arch Public Health.* 2017;75(1):28.
17. Khargekar NC, Khargekar VC, Shingade PP. Immunization status of children under 5 years in a Tribal Area, Parol, Thane District. *Natl J Community Med* 2015;6:522- 7.
18. Verma SK, Yadav A, Dabi DR. A hospital based study of assessment of missed opportunities of immunization in children aged less than two years. *J Pediatr Neonatal Care* 2017;6:00261.
19. Kumar D, Aggarwal A, Gomber S. Immunization status of children admitted to a tertiary-care hospital of north India: reasons for partial immunization or non-immunization. *J Health Populat Nutrit.* 2010;28(3):300.
20. Mathew JL. Inequity in childhood immunization in India: a systematic review. *Ind Pediat.* 2012;49(3):203-23.
21. Yadav RJ, Singh P. Immunization status of children and mothers in the state of Madhya Pradesh. *Indian J Commun Med* 2004;29:147-8.
22. R. Basu and J. Tiwari, *Status of Child Immunization in Madhya Pradesh*, Population Research Centre, PRC Division, MOHFW, Government of India, <http://prcs-mohfw.nic.in/showprcdetail.asp?id=135>.
23. Kar M, Reddaiah VP, Kant S. Primary immunization status of children in slums areas of South Delhi: the challenge of reaching urban poor. *Indian J Commun Med* 2001;26:151-4.

24.Nath B, Singh JV, Awasthi S, Bhushan V, Kumar V, Singh SK. A study on determinants of immunization coverage among 12-23 months old children in urban slums of Lucknow district, India. *Indian J Med Sci* 2007;61:598-606.

Acknowledgement form

This is to declare that all of us are authors of the following manuscript titled “Immunization status of the children age (1 to 5 years) and factors associated with incomplete and no immunization in a Tertiary-care Hospital” and we hereby agree to the following:

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