

A Study on Immunisation Coverage among Children in Hosakote, Mysuru

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ABSTRACT

Introduction: Immunisation coverage is a vital strategy adopted by most programs on child survival globally. A robust immunisation coverage program goes a long way in controlling the Vaccine Preventable Disease (VPDs). It is very important to analyse the factors which are detrimental in achieving 100% immunisation among children.

Aim: To find the extent of immunisation coverage and to identify the factors for failure of immunisation among children in the rural field practice area of Mysore Medical College and Research Institute, Mysuru.

Materials and Methods: A cross-sectional was carried out from November 2019 to January 2020 on children between 0-2 years of age using the World Health Organisation (WHO) thirty clusters sampling method. The sample size was estimated to be 210. Identification of clusters was done as per the WHO manual on 30x7 cluster survey. Interview was conducted using a structured interview format in selected households with study subjects. Data was entered in Microsoft Excel sheet and analysed using

chi-square test. Statistical Package for Social Sciences (SPSS) software version 23.0 was used for analysis of data.

Results: Among the study participants, 131 (86%) were fully immunised and 29 (14%) were partially immunised (those who did not receive all the due vaccines till two years of age). Religion, educational status of parents and the presence or absence of immunisation card had significant (p -values=0.01, <0.05, <0.05 respectively) association with the immunisation status. The main reasons for partial immunisation were: parents being unaware of the need for returning for subsequent doses 13 (44.8%), fear of side-effects 12 (41.3%), and vaccine not being available 7 (24.1%). Coverage of all individual vaccines among the children (0-2 years) were mostly above 199 (95%).

Conclusion: This study observed higher immunisation coverage as compared to that of the national immunisation coverage of 62%. In spite of efforts to increase the immunisation coverage in the country there are regional differences in the extent of this coverage which points to the need for better strategies to tackle this problem.

Keywords: Fully immunised, Vaccine preventable diseases, World health organisation 30 cluster sampling

INTRODUCTION

Immunisation is a public health success story, saving millions of lives every year. It is also one of the best health investments money can buy. Unfortunately, despite all the progress to date in this regard, far too many children including about 20 million infants each year do not have sufficient access to these vaccines [1].

In India, the Universal Immunisation Programme (UIP) targeting six Vaccine Preventable Diseases (VPDs) (Tuberculosis, Diphtheria, Pertussis, Tetanus, Poliomyelitis and Measles) was launched in 1985. Although UIP has partially succeeded in reducing the burden of VPDs, coverage of primary vaccinations in the country continues to be low, with only 62 percent children fully vaccinated as per the National Family Health Survey-4 (NFHS-4) [2]. As per NFHS-4 the coverage of childhood vaccination in the State of Karnataka in India is 62.6 % for children aged 12-23 months [3].

One of the key indicators of childhood vaccine coverage is the proportion of children given 3 doses of DPT vaccine. By this parameter, India accounted for the single largest number of partially vaccinated children in the world in year 2013 [4]. Worldwide around 21.8 million children did not receive three doses of DPT in the year 2013, among them 6.9 million children were from India alone [5].

Immunisation coverage refers to the proportion of children who have received specific vaccines or who are compliant with the recommended vaccine schedule. This data on immunisation coverage is very important for planning strategies, identifying vulnerable groups or areas that require increased resources, for interventions, for assessing the acceptability of the programme and for predicting the vaccine-preventable disease epidemics [6].

The current goal as per the Global Vaccine Action Plan is to reach at least 90% of the population nationally, and at least 80% in every district [7]. Therefore, this cross-sectional study was conducted to estimate the Immunisation coverage and to determine the factors associated with incomplete immunisation among children aged 0-24 months of age in Hosakote Primary Health Care which is the rural field practice area of Mysore Medical College and Research Institute, Mysuru.

MATERIALS AND METHODS

The present community based cross-sectional study was conducted from November 2019 to January 2020, at Hosakote Rural Health Training Centre (RHTC), the rural field practice area of Department of Community Medicine, Mysore Medical College and Research Institute, Mysuru (MMC&RI). Ethical clearance was obtained from the Institutional Ethics Committee of MMC&RI (vide letter dated 22.10.2019).

Inclusion criteria: Children aged 0-2 years residing in the area under all 5 sub-centres of Hosakote RHTC (Hosakote, Tumnerale, Moodali, Immavu, Hulimavu) were included in the study after obtaining the informed consent from parents/caregivers.

Exclusion criteria: Children whose parents/caregivers did not gave the informed consent.

The standard WHO 30x7 cluster survey method, which is a cluster sampling technique, was used to evaluate the immunisation coverage. Children aged 0-2 years on the day of survey were included in the survey. The determination of sample size was done as per the WHO "The Expanded Program on Immunisation (EPI) coverage survey" [8]. The number of children to be surveyed in each

of the 30 clusters was 7 and hence 210 children were included in the study. The study was conducted in five subcentres that come under Hosakote Rural Health Centre. A list of all the wards under the subcentres was taken and 30 wards were selected randomly, which were considered as clusters.

The first house was selected randomly from the geographic centre of each cluster. Then in the chosen direction, all the houses were visited, till 10 eligible children from that cluster were obtained for the study. When there was more than one child in a house aged between 0-2 years, only the youngest eligible child was included for the study.

A semi-structured questionnaire was used to collect socio-demographic details, immunisation status and reasons for partial immunisation using the interview technique. The parent/caregiver of the child was interviewed and the information which they provided was cross checked with the immunisation card of the child. A child was regarded to be fully immunised if he/she had received one dose of Bacille Calmette Guerin (BCG) vaccine, 3 doses of Diphtheria Pertusis Tetanus (DPT) vaccine, 3 doses of Oral Polio Vaccine (OPV) and 1 dose of measles vaccine and to be partially immunised if one or more of the above doses were missed and to be un-immunised if none of the above doses were received [9]. Drop out was calculated as percentage point difference between the vaccines of the maximum and the minimum antigen received, expressed as a percentage of the maximum dose, as:

For full immunisation dropouts- (BCG-Measles) X 100/BCG

STATISTICAL ANALYSIS

The collected data was numerically coded and entered in Microsoft Excel 2007, and then analysed using Statistical Package for Social Sciences (SPSS) Software (Trial version 23.0). Chi-square test of significance was applied to test the association between various variables.

Characteristics	Frequency (N)	Percentage (%)
Age		
0-6 months	106	50.5
7-12 months	57	27.1
13-24 months	47	22.4
Gender		
Male	114	54.3
Female	96	45.7
Religion		
Hindu	199	94.8
Christian	5	2.4
Muslim	6	2.8
Place of birth		
Government hospital	155	73.8
Private hospital	55	26.2
Interviewed person		
Mother	197	93.8
Father	9	4.3
Grandmother	4	1.9
Walking distance to nearest health facility		
<2 km	29	13.8
>2 km	181	86.2
Having immunisation card		
Yes	206	98.1
No	4	1.9
Immunisation card updated or not		
Yes	191	92.7
No	15	7.3

[Table/Fig-1]: Socio-demographic distribution of study subjects.

RESULTS

Among 210 children [Table/Fig-1], 206 (98.1%) had their immunisation cards available with their caretakers. A total of 181 children (86%) were fully immunised and 29 (14%) were partially immunised [Table/Fig-2]. Main reason for partial immunisation was caregivers not being aware of the need for returning for subsequent doses as presented in [Table/Fig-3].

Characteristics	Fully immunised N=181	Partially immunised N=29	p-value (Chi-square test)
Gender			
Male	103 (56.9%)	11 (37.9%)	0.07
Female	78 (43.1%)	18 (62.1%)	
Religion			
Hindu	174 (96.1%)	25 (86.2%)	0.01
Christian	2 (1.10%)	3 (10.4%)	
Muslim	5 (2.8%)	1 (3.4%)	
Education of father			
Illiterate	34 (18.8%)	16 (55.2%)	<0.05
Primary school	18 (9.9%)	12 (41.4%)	
Middle school	75 (46.9%)	1 (3.4%)	
High school	40 (22.1%)	0	
Graduate	14 (7.7%)	0	
Education of mother			
Illiterate	53 (29.3%)	20 (68.9%)	<0.05
Primary school	18 (9.9%)	8 (27.6%)	
Middle school	85 (46.9%)	1 (3.5%)	
High school	20 (11%)	0	
Graduate	5 (2.9%)	0	
Place of birth			
Government hospital	134 (74%)	21 (72.4%)	0.823
Private hospital	47 (25.9%)	8 (27.6%)	
Birth order of index child			
1	88 (48.6%)	15 (51.7%)	0.963
2	59 (32.5%)	10 (34.5%)	
3	25 (13.8%)	3 (10.4%)	
>4	9 (4.9%)	1 (3.4%)	
Having immunisation card			
Yes	181 (100%)	25 (86.2%)	<0.05
No	0	4 (100%)	

[Table/Fig-2]: Showing the association of socio-demographic factors with immunisation status of children. p-value <0.05 considered significant

Reasons for partial immunisation	N (%)
Unaware of the need for returning for subsequent dose	13 (44.8)
Fear of side effects	12 (41.3)
Vaccine not available	7 (24.1)
Child brought ill and vaccine not given	6 (20.6)
Parent too busy	3 (10.3)

[Table/Fig-3]: Reasons for partial immunisation (N=29). The numbers are not mutually exclusive

In [Table/Fig-2], the variables which were found to have significant association with full immunisation status of children were religion of the child (p-value=0.01), father and mother's education status (p-value <0.05) and the availability of immunisation card (p-value <0.05).

Coverage of individual vaccines among children 0-24 months was mostly above 199 (95%) except Pentavalent 3rd dose and IPV 2nd dose which had coverage of 196 (93.3%), 195 (93%) and 190 (90.5%), respectively as per [Table/Fig-4].

Vaccine	N (%)
BCG	205 (97.6)
OPV zero dose	206 (98)
Hep B Zero dose	206 (98)
Pentavalent 1 st dose	204 (97.1)
IPV 1 st dose	204 (97.1)
OPV 1 st dose	202 (96.2)
Pentavalent 2 nd dose	200 (95.2)
OPV 2 nd dose	200 (95.2)
Pentavalent 3 rd dose	196 (93.3)
OPV 3 rd dose	195 (93)
IPV 2 nd dose	190 (90.5)
Measles 1 st dose	202 (96.2)
DPT booster	204 (97.1)
MR booster	204 (97)
OPV booster	204 (97.2)

[Table/Fig-4]: Coverage of different vaccines among children.

BCG: Bacillus calmette guerin; OPV: Oral polio vaccine; Hep B: Hepatitis B; IPV: Injectable polio vaccine; DPT: Diphtheria pertusis tetanus; MR: Measles rubella

Rotavirus vaccine was made available in Karnataka after September 2019. So, in this study only 69 (32%) children were eligible for rotavirus vaccine as they were all born after this period according to the information available from their immunisation cards. Among them, 61 (88.4%) and 53 (76.8%) children received Rotavirus 1st and 2nd dose, respectively. The dropout rate for BCG to Measles in this study was 0.49%.

DISCUSSION

In spite of significant progress in immunisation services globally, several factors have hindered the achievement of 100% coverage in India. Hence, this study tried to assess the immunisation coverage and factors associated with poor vaccination, among children aged 0-2 years in Hosakote PHC of Mysore district.

This study revealed that 86 percent of children in 0-2 years age group were fully immunised which is much higher than the NFHS-4 data of Mysore district (52.1%) and Karnataka (62.6%) [2,3]. Studies by Koppad R et al., Kizhatil A et al., Gupta PK et al., observed similar patterns of immunisation coverage when compared to this study [10-12], whereas a few other studies have quoted low coverage, as highlighted in the [Table/Fig-5] [9-15]. The higher coverage in this study can be attributed to the success of Mission Indradhanush and the active campaigns conducted by the Accredited Social Health Activist (ASHA) workers in the community for creating awareness among parents/caregivers regarding the importance of vaccinations [13].

The dropout rate was 0.49% during January 2020 in the present study. Higher dropout rate was seen in other studies in India as quoted in the [Table/Fig-5], which could possibly be due to lack of awareness among the caregivers or due to regional variation in the immunisation coverage [16,17].

Limitation(s)

The study was restricted to one PHC of Mysuru district. So, the result cannot be generalised to the whole population because of the probable variations in the socio-demographic characteristics.

CONCLUSION(S)

This study shows that the immunisation coverage among the children of Hosakote PHC area is quite high (86%) as compared to state average (62.6%). The most important reason for partial immunisation was the lack of awareness among the caregivers about the need of returning for subsequent doses and fear of side effects. These hurdles can be overcome by undertaking Information, Education and Communication (IEC) activities focusing on these issues in the affected populations.

Author name/ Study Year	Geographical location	Full immunisation (%)	Partial immunisation (%)	Dropout rate	Most common reason for partial immunisation
Goyal S et al., (2015-2016) [9]	Rohtak, Haryana	73.15%	23.85%	13.88%	Lack of awareness regarding need for immunisation
Koppad R et al., (2016) [10]	Shimoga, Karnataka	98%	2%	-	-
Kizhatil A et al., (2017) [11]	Ernakulam, Kerala	82%	18%	3.7%	Lack of awareness about immunisation,
Gupta PK et al., (2013) [12]	Pune, Maharashtra	83.6%	11.9%	11.1%	Time of immunisation was inconvenient
Malkar VR et al., (2010) [14]	Beed, Maharashtra	78.5%	20.48%	-	-
Pandey LN et al., (2013-2015) [15]	Jaipur, Rajasthan.	76.19%	22.86%	-	Child ill- not brought to the centre, fear of side effects.
Agrawal K et al., (2015) [16]	Dhule, Maharashtra	58.6%	37.1%	22.95%	Lack of awareness to return for subsequent vaccine doses
Jatti GM et al., (2011) [17]	Miraj City, Maharashtra	60.5%	39.5%	22.72%	Negligence of parents toward immunisation
Munda NK et al., (2014-2015) [18]	Ormanjhi, Jharkhand	57.8%	33%	-	Lack of awareness of immunisation, No faith in immunisation
Srivastava AK and Shankar G, (2016) [19]	Bagalkot, Karnataka	83%	16%	-	Lack of awareness of the schedule
Present study	Mysuru, Karnataka	86%	14%	0.49%	Lack of awareness to return for subsequent vaccine doses

[Table/Fig-5]: Summary of other similar studies [9-12, 14-19].

REFERENCES

- Immunisation [Internet]. World Health Organization. 2020 [cited 24 July 2020]. Available from: <https://www.who.int/topics/immunisation/en/>
- National Family Health Survey-4 (NFHS-4), 2015- 16, Ministry of Health and Family Welfare, Government of India, International Institute for Population Sciences, Mumbai. Available at: rchiips.org/NFHS/NFHS-4Reports/India.pdf. Accessed on 24 July 2020.
- National Family Health Survey-4 (NFHS-4), Karnataka, 2015-16, Ministry of Health and Family Welfare, Government of India, International Institute for Population Sciences, Mumbai. Available from: http://rchiips.org/nfhs/pdf/NFHS4/KA_FactSheet.pdf. [cited 24 July 2020].
- Lahariya C. A brief history of vaccines & vaccination in India. *Indian J Med Res.* 2014;139(4):491-511.
- Devasenapathy N, Ghosh JS, Sharma S, Allen E, Shankar AH, Zodpey S. Determinants of childhood immunisation coverage in urban poor settlements of Delhi, India: a cross-sectional study. *BMJ Open.* 2016;6(8):e013015.
- Joy TM, George S, Paul N, Renjini BA, Rakesh PS, Sreedevi A. Assessment of vaccine coverage and associated factors among children in urban agglomerations of Kochi, Kerala, India. *J Family Med Prim Care.* 2019;8(1):91-96.
- Global Vaccine Action Plan [Internet]. [cited 2020 Nov 23]. Available from: <https://www.who.int/teams/immunisation-vaccines-and-biologicals/strategies/global-vaccine-action-plan>.
- The module for mid-level for managers: The EPI coverage survey WHO/IV B/08.07. 2008. [Last accessed on 2016 Jan 15]. Available from: <http://www.who.int/immunisation/documents/mlm/en/index.html>.

- [9] Goyal S, Kumar V, Garg R. Evaluation of primary immunisation coverage among children in a rural block of district Rohtak, Haryana, India. *Int J Community Med Public Health*. 2017;4(5):1612-19.
- [10] Koppad R, Kumar SA, Chandrashekar SV, Dhananjay KS. A cross sectional study on primary immunisation coverage of children between the age group of 12-36 months under the national immunisation programme in rural field practice area of Shimoga institute of medical sciences, Shimoga, Karnataka, India. *Int J Community Med Public Health*. 2017;3(5):1310-14.
- [11] Kizhatil A, Reshma, Hariharan H, John A, Thomas A, Padmanabhan G. Assessment of immunisation coverage and associated factors among children in Paravur Taluk of Ernakulam district, Kerala. *Int J Community Med Public Health*. 2019;6(8):3594.
- [12] Gupta PK, Pore P, Patil U. Evaluation of immunisation coverage in the rural area of Pune, Maharashtra, using the 30 cluster sampling technique. *J Fam Med Family Care*. 2013;2(1):50-54.
- [13] Coverage Report: Intensified Mission Indradhanush 2.0 [Internet]. [cited 2020 Dec 2]. Available from: https://imi2.nhp.gov.in/report/coverage?District_ID=247.
- [14] Malkar VR, Khadilakar H, Lakde RN, Joge US, Choudhari SG. Assessment of Sociodemographic factors affecting immunisation status of children in age group of 12-23 months in a rural area. *Indian Medical Gazette*. 2013;164-69.
- [15] Pandey LN, Paliwal A, Sharma BN, Choudhary RC, Bhardwaj SL. Evaluation of immunisation coverage in the rural area of Jaipur, Rajasthan, using the WHO thirty cluster sampling technique. *Int J Med Sci Educ*. 2016;3(1):16-24.
- [16] Agrawal K, Nagaonkar S, Agrawal S. Coverage evaluation of vaccines using 30x7 cluster survey in rural area of Dhule, Maharashtra. *Int J Community Med Public Health*. 2019;6(7):2832.
- [17] Jatti GM, Bandichode ST, Nandimath VA, Jadhav SB. An evaluation of primary immunisation coverage among 12-23 months old children in an urban area of Western Maharashtra: A community based study. *Indian J Child Health*. 2017;4(1):85-87.
- [18] Munda NK, Sagar V, Vivek K, Kumar M. Study on immunisation status among children's between 2 to 6 years of age group in rural field practices area of ormanjhi of Rims, Ranchi. *IOSR-JDMS*. 2016;15(3):108-12.
- [19] Srivastava AK, Shankar G. A study of immunisation coverage and its determinants among under five children residing in urban field practice area of SN Medical College, Bagalkot, Karnataka, India. *Indian J Forensic Community Med*. 2017;4(1):49-53.

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