

An evaluation of primary immunization coverage among 12-23 months old children in an urban area of Western Maharashtra: A community-based study

G M Jatti¹, S T Bandichhode², V A Nandimath¹, S B Jadhav³

From Departments of ¹Community Medicine and ²Paediatric, Dr. V. M. Government Medical College, Solapur; ³Department of Community Medicine, Government Medical College, Miraj, Maharashtra, India

Correspondence to: G M Jatti, Department of Community Medicine, Dr. V.M. Government Medical College, Solapur- 413 003. Maharashtra. India. Phone: +91-8237005707. E-mail: drgmjatti707@gmail.com

Received – 20 October 2016

Initial Review – 30 October 2016

Published Online – 29 December 2016

ABSTRACT

Introduction: Immunization is a process whereby a person is made immune to infectious diseases. In 1985, Universal Immunization Programme started in India with the aim of achieving at least 85% coverage of primary immunization. A child is considered fully immunized if he/she received one dose each of Bacille Calmette-Guérin and measles and three doses of oral polio vaccine, hepatitis B virus, and DPT before the age of 1 year. **Objectives:** To determine primary immunization coverage among 12-23 months old children and the factors affecting primary immunization coverage. **Materials and Methods:** A cross-sectional community-based study conducted from March 2011 to June 2011 in Miraj city of Maharashtra. The WHO 30 by 7 cluster sampling technique was used to collect data from 210 study subjects. **Results:** Among 210 (100%) children, 127 (60.5%) children were fully immunized while remaining 83 (39.5%) were partially immunized or unimmunized. Negligence of parents toward immunization was the main reason for incomplete immunization status of children. **Conclusion:** Health education activities for parents, especially in mothers, emphasizing the importance and need of immunization of children at right time could be arranged in communities. Equitable, participatory and intersectoral approach is need of hour for health care of children.

Key words: Drop outs, Health education, Immunization coverage, Universal Immunization Programme, WHO 30X7

Globally, 3 million children die each year of vaccine-preventable diseases with disproportionate number of these children residing in developing countries [1]. Recent estimates shows 34 million children are not completely immunized with almost 98% of them residing in developing countries [1]. Since Independence, many steps were taken by WHO and UNICEF to immunize children, such as expanded programme of immunization in late 1970s as well as Universal Immunization Programme (UIP) in 1985-86. However, a large number of children continue to be deprived from complete immunization [2]. Various social, cultural and economic factors inhibit women from accessing public health-care facilities [3]. These factors affect health of women, general well-being and development of entire family; particularly children. The aim of UIP is to avert morbidity and mortality due to the six childhood diseases and to fully vaccinate at least 85% of all infants at the age of 1 year [3].

According to the National Family Health Survey-III survey the percentage of full immunization, although only 43.5% at national level is 58.9% in Maharashtra [4]. In past 50 years, India's population has increased 2.5 times while urban population has grown 5 times [5,6]. Furthermore, population of Miraj has grown 7.8 times as per census data. With rapid growth of big cities, an impending threat of outbreak of vaccine-preventable

diseases exists due to high population density, continuous influx of new pool of infectious agents with immigrating population and poor coverage of primary immunization in an urban slum. Thus, it is necessary to understand the utilization of immunization services by community and their determinants. Hence, this study was undertaken to find the level of immunization in an urban area and factors affecting it such as socioeconomic status, education of parents, awareness regarding immunization, and place of delivery.

MATERIALS AND METHODS

This is a community-based descriptive cross-sectional study conducted between 01 March 2011 and 30 June 2011 in an urban area of Miraj city under the Municipal Corporation of Sangli. The study questionnaire was formed using a household coverage survey obtained from "A module to Evaluate Vaccination Coverage, National Immunization Programme, Ministry of Health and Family Welfare, Government of India, New Delhi, 1989" [7]. The sampling size of 210 was determined according to the WHO 30/7 cluster sampling method. 30 clusters from the study area were identified and from each cluster 7 study subjects were taken into the study according to inclusion and exclusion criteria. The inclusion criteria consisted of children in the age group of 12 to 23 months and residing in the study area for at least 6 months and above.

After reaching the selected cluster of 30, we went center of the ward (cluster) and then selected the first house according to the following random selection procedure. We numbered the paths leading from the center. Then, we used a currency note and look at the last digit of the serial number and the path selected accordingly. Next count or closely estimate the number of houses from the center of the ward to the boundary along that path. Then, we selected a random number between 1 and the total number of houses. This represented the first house from which the survey started. First house and the direction, in which investigator has gone, was chosen randomly.

Immunization status of the children was checked through immunization card or asked to mother or other care taker. Children who received one dose of Bacille Calmette-Guérin (BCG), three doses of oral polio vaccine (OPV), hepatitis B virus, and DPT each and one dose of measles were considered to have received full immunization. Children (12-23 months old) who missed anyone or more of above doses were considered as partially immunized and children who did not receive even a single dose of vaccine were categorized as unimmunized. Reasons for non-immunization or incomplete immunization were asked in detail by putting direct ended questions.

Data entered in MS excel sheet. Chi-square test was used for data analysis. Variables (such as gender, education of parents, immunization history, and reasons for incomplete immunization) were collected.

RESULTS

Out of 210 children, 127 (60.5%) children were fully immunized, 76 (36.20%) were partially immunized and 7 (3.30%) were unimmunized. The majority of children, i.e., 185 (88.09%) were from lower socioeconomic class while 25 (11.91%) children belonged to upper socioeconomic class as per the Prasad's classification (Table 1). Among 7 unimmunized children, unawareness (85.7%) and busyness of parent (14.28%) were the reasons behind it. Among 76 partially immunized children, business of the parents (33.5%), illness of child (30.26%), forgetfulness (19.73%), and carelessness (13.16%) were the reasons.

In this study, immunization coverage was 60.5% which was less than the desired goal of achieving 85% coverage. Among 210 children, 202 received BCG and out of 202 children, only 56 received Measles. Dropout rate of BCG to Measles was 27.72%. Similarly, dropout rate of DPT-1 to measles was 26.26% while DPT-I to DPT-III was 16.66% that for OPV-1 to OPV-3 was 16.24% (Table 2). We observed that there was a significant association between literacy of parents and immunization status of children (Table 3), while there was highly significant association between place of delivery and immunization status of children (Table 4).

DISCUSSION

In this study, 127 (60.50%) children aged 12-23 months were fully immunized, 76 (36.19%) were partially immunized, and 07 (3.31%)

Table 1: Distribution of children according to socioeconomic class of the family (as per BG Prasad SES classification)

Socioeconomic class	Number of children (%)
Class I	03 (1.40)
Class II	22 (10.50)
Class III	41 (19.50)
Class IV	141 (67.10)
Class V	03 (1.40)
Total	210 (100)

SES: Socioeconomic status

Table 2: Distribution of vaccination coverage of each vaccine

Vaccine	Vaccine coverage	n (%)
BCG	BCG	201 (95.71)
1 st Dose	DPT ₁	197 (93.80)
	OPV ₁	196 (93.33)
	HBV ₁	192 (91.43)
2 nd Dose	DPT ₂	192 (91.43)
	OPV ₂	192 (91.43)
	HBV ₂	188 (89.52)
3 rd Dose	DPT ₃	165 (78.57)
	OPV ₃	165 (78.57)
	HBV ₃	155 (73.81)
Measles	Measles	147 (70.00)
Full vaccination		127 (60.5)
Dropout rates		
DPT I (198) to DPT III		33 (16.66)
OPV I (197) to OPV III		32 (16.24)
BCG (202) to measles		56 (27.72)
DPT I (198) to measles		52 (26.26)

OPV: Oral polio vaccine, BCG: Bacille Calmette-Guérin

Table 3: Association of parent's literacy and immunization status of children

Parent's literacy	Immunization status		
	Fully immunized	Partially immunized	Not immunized
Illiterate	07	16	04
Primary	02	03	01
Secondary	96	46	02
Higher secondary	22	11	00
Total	127	76	07

$\chi^2=28.9$, d.f.=6, $p<0.001$, highly significant

Table 4: Association of place of delivery and immunization status of children

Place of delivery	Immunization status		
	Fully immunized	Partially immunized	Not immunized
Hospital	126	65	00
Home	01	11	07
Total	127	76	07

$\chi^2=83.61$, d.f.=02, $p=0.0001$, highly significant, $\chi^2=16.0129$, d.f.=01, $p=0.000063$, highly significant. *The association between immunization status (fully immunized and partially immunized) and place of delivery was checked and it was found highly significant

were not immunized at all. A study by Kadri et al. [8] in urban slums of Ahmadabad city showed that 70.3% children fully immunized and only 29.7% partially immunized in their study. In a study by Nath et al. [9] in urban slums of Lucknow district, 44.1% children were fully immunized. In our study, ignorance of parents regarding immunization (40.96%) was the main reason behind partial or non-immunization of their children. Other reasons were sickness of child (27.71%), visit to another village (16.87%), and busy household work of mother (14.46%). In a study by Nath et al. [9], 17.2% children were partially immunized due to unavailability of parents followed by visit of parents to other village in 14.7%, ignorance (11.7%), sickness of elder siblings (11.7%), and lack of knowledge regarding subsequent vaccination (10.4%).

A study conducted by Kar et al. [10] in South Delhi, illness of the child was the major cause of partial immunization in 30.8% of children, while 23.1% had lack of knowledge of immunization schedule. Shah et al. [11] observed that the reasons for partial or non-immunization were lack of awareness among parents regarding the need of the vaccine (39%) followed by fear (20.4%), vaccination not being a priority (16.7%), sick child (14.8%), no time for it in 13% cases. Tapare et al. [12] in urban areas of Miraj, Maharashtra showed vaccination coverage of 87.5% while this study showed it as 60.5%. Area covered in study conducted by Tapare et al. [12] was limited to an urban field practice area of department of community medicine as compared to our study which included whole urban area of Miraj city. This could be the reason for high vaccination coverage in the previous study [12].

There was gradual increase in the dropouts from BCG to measles (26.86%) and DPT to measles vaccination (25.37%). The main reason for dropout or non-immunization of the children may be ignorance and illiteracy among parents. Furthermore, it could be due to the long time interval between DPT to measles. Similar observations regarding immunization dropouts were seen by Kadri et al., [8] Shah et al., [11] and Singh et al. [13]. There was significant association between immunization status of the children and their parent's literacy. Sharma et al. [14] also showed a significant association between immunization status of children and education of mother, while Pakhare et al. [15] observed significant association between immunization status and education of both mother and father. Likelihood of partial immunization was found to be more in home delivered children; similar findings were reported by other studies [16-20].

Our study has few limitations such as memory recall of mother or caretaker may cause bias in results and secondly, although this is a community-based study, studies with larger sample size may draw more valid conclusions.

CONCLUSION

The goal of achieving universal immunization especially, in the disadvantaged vulnerable urban population needs a coordinated effort and a multi-pronged strategy to deal with ignorance, awareness and dropout. In this study, all home delivered children are unimmunized which could be prevented.

REFERENCES

1. Das Mishra T, Kurani H, Singhal P, Shrivastav PS. Simultaneous quantitation of HIV-protease inhibitors ritonavir, lopinavir and indinavir in human plasma by UPLC-ESI-MS-MS. *J Chromatogr Sci.* 2012;50(7):625-35.
2. Som S, Pal M, Chakrabarty S, Bharati P. Socioeconomic impact on child immunisation in the districts of West Bengal, India. *Singapore Med J.* 2010;51(5):406-12.
3. Patra N. Universal immunization programme in india: The determinants of childhood immunization. Available at SSRN: <https://ssrn.com/abstract=881224> or <http://dx.doi.org/10.2139/ssrn.881224>.
4. LLPS. National Family Health Survey-3 (NFHS-III) 2005-2006. Mumbai: Ministry of Health and Family Welfare, Government of India, International Institute for Population Sciences; 2007.
5. Lodha R, Dash NR, Kapil A, Kabra SK. Diphtheria in urban slums in north India. *Lancet.* 2000;355(9199):204.
6. Loening WE, Coovadia HM. Age-specific occurrence rates of measles in urban, peri-urban, and rural environments: Implications for time of vaccination. *Lancet.* 1983;2(8345):324-6.
7. National Institute of Health and Family Welfare. Evaluate Vaccination Coverage, National Immunization Programme. New Delhi: Ministry of Health and Family Welfare, Government of India; 1989.
8. Kadri AM, Singh A, Jain S, Mahajan RG, Trivedi A. Study on immunization coverage in urban slums of Ahmedabad City. *Health Popul Perspect Issues.* 2010;33(1):50-4.
9. 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(11):598-606.
10. Kar M, Reddaiah VP, Kant S. Primary immunization status of children in urban slum areas of South Delhi-m the challenge of reaching poor. *Indian J Community Med.* 2001;26(3):151-4.
11. Shah UP, Sheth JK. Assessment of immunization coverage in east zone (EZ) of Ahmedabad Municipal Corporation (AMC). *NHL J Med Sci.* 2013;2(2):44-7.
12. Tapare VS, Borle PS. Assessment of vaccination performance by lot quality technique in an urban community of Miraj. *Inidan J Community Med.* 2006;31(3):181-2.
13. Singh B, Vashisht BM, Panda M, Khanna P. Study to find out the coverage evaluation and drop-out rates of different vaccines in an urban area of Rohtak city in Haryana. *Int J Basic Appl Med Sci.* 2013;3(2):223-9.
14. Sharma B, Mahajan H, Velhal GD. Immunization coverage: Role of sociodemographic variables. *Adv Prev Med.* 2013;2013:607935.
15. Pakhare AP, Pawar R, Lokhande GS, Datta SS. Does seasonal migration for sugarcane harvesting influence routine immunization coverage? A cross-sectional study from rural Maharashtra. *Indian J Public Health.* 2014;58:116-20.
16. Kusuma YS, Kumari R, Pandav CS, Gupta SK. Migration and immunization: Determinants of childhood immunization uptake among socioeconomically disadvantaged migrants in Delhi, India. *Trop Med Int Health.* 2010;15(11):1326-32.
17. Antai D. Migration and child immunization in Nigeria: Individual-and community-level contexts. *BMC Public Health.* 2010;10:116.
18. Antai D. Inequitable childhood immunization uptake in Nigeria: A multilevel analysis of individual and contextual determinants. *BMC Infect Dis.* 2009;9:181.
19. Lee SH. Demand for immunization, parental selection, and child survival: Evidence from rural India. *Rev Econ Househ.* 2005;3:171-96.
20. Kogan MD, Alexander GR, Jack BW, Allen MC. The association between adequacy of prenatal care utilization and subsequent pediatric care utilization in the United States. *Pediatrics.* 1998;102:25-30.

Funding: None; Conflict of Interest: None Stated.

How to cite this article: Jatti GM, Bandichhode ST, Nandimath VA, Jadhav SB. An evaluation of primary immunization 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.