

Original Research Article

Assessment of under-five immunization coverage among the population of slum areas in Mangalore taluk, India

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ABSTRACT

Background: Immunization coverage is better in urban than rural areas. However, we anticipate and argue that within the urban areas disparities and inequities persist in immunization coverage and that the socioeconomically disadvantaged, particularly those who reside in slum areas are more vulnerable and may contribute to the lower uptake of immunization. The objectives of the study were to assess the under-five immunization coverage amongst the households in slums of Mangalore taluk and to identify determinants of full immunization uptake among under 5 in the slums population and to know the reasons for non-immunization or partial immunization of children.

Methods: Community Based Cross sectional study was conducted in the notified slum areas of Mangalore during August-November 2015. Information was collected from the parents regarding vaccination of their children and sociodemographic variables using a semi-structured interview schedule.

Results: 88 (57.7%) of under 5 children were fully immunized, 62 (41.3%) were partially immunized in the slum areas of Mangalore, Karnataka, India. Mean age of the children in our study was found to be 35.15 months. Immunization coverage was found to be associated with the presence of immunization card, occupation of mother, knowledge about universal immunization programme (UIP), knowledge about protection offered by vaccines.

Conclusions: Unfortunately, the immunization coverage was found to be very bad in the slum areas of Mangalore city, Karnataka, India. There is an urgent need to ensure that regular health education sessions are conducted. Secondly, slum areas should be the target of RCH programme with special focus on immunization related activities e.g. ensuring that all households with children should have immunization cards, as the slum areas remain the neglected section of the society due to various reasons.

Keywords: Coverage, Immunization, Slum, Under-five

INTRODUCTION

Immunization has been one of the most important, cost-effective public health interventions. India, along with the whole world, stands committed to the welfare of children, as reflected in the theme of World Health Day 2005- Make every mother and child count.² The most important indicators mentioned in the Millennium Development Goals (MDGs) are the under-5 mortality rate (U5MR),

infant mortality rate (IMR) and proportion of 1-year-old children immunized against measles (P1MV). About one-quarter, or 25%, of under-5 mortality is due to vaccine preventable diseases.³ In May 1974, the World Health Organization (WHO) officially launched a global immunization programme, known as Expanded Program on Immunization (EPI) to protect all children of the world against six vaccine-preventable diseases, namely-diphtheria, tuberculosis, whooping cough, tetanus, polio,

measles by the year 2000. EPI was launched in Indian in 1978.⁴ Later in the year 1985, the Universal Immunization Program (UIP) was introduced in India with the objective to cover at least 85% of all infants by 1990.⁵ Further, a national socio-demographic goal was set up in National Population Policy (NPP) 2000 to achieve universal immunization of children against all vaccine-preventable diseases by 2010.⁶ India's population crossed 1 billion mark on 11th May 2000, and is projected to reach 1.53 billion by the year 2050. It's the urban area which has grown at a very rapid pace.⁷ Most of this growth is due to migration, leading to mushrooming of slums. With the rapid growth of big cities, an impending threat of outbreak of vaccine preventable diseases always exists due to the high population density, continuous influx of a new pool of infective agents with the immigrating population and the reported poor coverage of primary immunization in the urban slums.^{8,9} In view of this, it was necessary to understand the immunization coverage and its determinants in the notified slum areas of Mangalore, Karnataka, India.

METHODS

The community based cross sectional study design was conducted in the notified slums of Mangalore during August- November 2015. The target population of the study was the mothers who were having children below the age of five in slums of Mangalore Taluk.

The Sample size was calculated as follows:

Estimation of sample size:

$$n = \frac{z^2 PQ}{(E)^2}$$

Where, n is the projected number of targeted study population (children under 5 years of old).

Z is the Z score, which is standard =1.96.

P = 0.435 (Proportion of children completely immunized 43.5% from NFHS-III).

Q=1-P, E=Maximum error to be tolerated=20% of p=0.435.

$n = (1.96^2 * 0.435 * 0.565) / 0.007569$.

n= 125 approx.

With 20% nonresponse rate, the sample size came out to be 150.

Sampling Method

First of all, main slums area in Mangalore taluk were listed. Then one slum area was randomly selected. There were 8 notified and 13 non-notified slum areas in Mangalore. Then all the mothers having less than 5 years children were interviewed. Then another slum was again

taken randomly till we got the exact sample size. In total, we covered 3 out of 8 notified slum areas.

Inclusion

- Only those mothers having less than 5 years' child were included for the study purpose.
- Those who consented to be a part of the study.

Written informed consent was taken from the person being interviewed. The primary respondent was the mother. In the absence of mother, the father was considered as the respondent. In case of absence of both of them, the adult in the household who remained with the child for most of the time or had taken the child for immunization on at least one occasion was interviewed. If a mother was having more than one under 5 year children only one, the older one's information was taken to minimize the repetition.

Following criteria for full, partial and no immunization will be used

- Full immunization- a child who has received three doses of DPT, Hep B and OPV each and one dose of BCG and Measles each.
- Partial Immunization- A child who missed any one of above doses.
- No Immunization- A child who did not receive even a single dose of any vaccine.

To ascertain this information, the respondents were asked to produce immunization card if they had any. In the case of unavailability of the card, the information regarding the administration of vaccines was recorded on the basis of the respondent's recall.

The collected data was entered in microsoft excel 2010 and analyzed using SPSS 23 quantitative variables like age and others were presented as mean and standard deviation.

Qualitative variables like socio-demographics were presented in frequency and percentages. Chi square test of significance was applied to test the association between various variables and status of immunization coverage. Bivariate logistic regression was done followed by multiple logistic regression to make a model for finding out predictors for the outcome i.e. Immunization status.

RESULTS

In the notified slums of Mangalore, it was found that out of total 150 under 5 children, 58.7%(88) were fully immunized 41.3% (62) were partially immunized. Mean age of the children was found to be 35.15 months.

Most of the respondents were belonging to Hindu religion 94.7% (142). In all the cases except for one the respondent was the mother of the child. Maximum respondent's (58.4%) monthly family income came in the bracket of 5000-10000. Decision maker in the house regarding immunization of the children was most commonly the father 55.3% (83) of the child followed by joint decision of the father and mother 26% (39) respectively.

Knowledge on vaccine related information

87.3% of the respondents were having the knowledge about the universal immunization programme. And Majority of them had got the information regarding the UIP from the Asha workers. But unfortunately, only 14% of the respondents were aware about the number of vaccines given in the UIP correctly.

Immunization status of Children

The children of all the respondents were either fully immunized or partially immunized. Immunization cards were present with 83.3% that the respondents. Those who did not have immunization card mainly said they were unaware of the immunization card.

26.7% of the respondents had given their children some vaccines not mentioned in the immunization card of the Government i.e. optional vaccines. 82% of the respondents had ensured that their children got pulse polio doses during the Pulse Polio Round conducted in 2015. People were being sensitized regularly regarding immunization in the group meetings conducted by the Asha workers or health care providers. The knowledge regarding the vaccines appeared to be satisfactory amongst the respondents. 75.3% of them said they were aware of the diseases which are prevented by the vaccines given in the UIP. Further 63.3 % said that if the vaccines were not given there can be fatal consequences. Coverage in terms of individual vaccines came out to be BCG 100%, DPT 1 97.3%, DPT 2 94.7%, DPT 3 86%, OPV 1 97.3 %, OPV 2 95.3%, OPV 3 89.3 %, Measles 75.3% reflecting high instances of late dropouts.

Reasons for partial immunization

Out of 62 children who were partially immunized, it was found that that in case of 27 (43.5%) children, the respondents lacked information regarding the immunization followed by obstacles and lack of motivation respectively (Table 1).

According to the bivariate analysis it was found that the children who were likely to be fully immunized were those whose mothers were housewives and their mothers had knowledge about the prevention of many diseases by vaccination and had the immunization card of the child in the house along. Further those who attended the health

education meetings organized by the health department or Asha worker/anganwadi worker were more likely to get their child immunized.

Table 1: Reasons of partial immunization in the study population.

Reasons for partial immunization in the study population	Frequency (n=62)	%
Lack of Information	27	43.5
Unaware for need of immunization	4	6.5
Unaware of need to returns for 2 nd and 3 rd dose	15	24.2
Place or time of immunization unknown	0	0.0
Fear of side reaction	5	8.1
Wrong ideas about contraindications	3	4.8
Lack of Motivation	16	25.8
Postponed until another time	14	22.6
Cultural / religious reasons	0	0.0
Rumors	2	3.2
Obstacles	19	30.6
Place of immunization too far	2	3.2
Time of immunization inconvenient	14	22.6
Vaccination absent	0	0.0
Vaccination not available	0	0.0
Family problems including illness of mother	2	3.2
Child ill brought but not given immunization	1	1.6
Long waiting time	0	0.0

Presence of Immunization card, occupation of mother, knowledge of diseases can be prevented by vaccination and attendance in the health meetings were entered into a logistic regression model in an enter manner. This analysis revealed that occupation of mother (OR=2.29; 95% CI: 1.0-5.0) was the significant variable in the final model. Even though the other 2 variables i.e. knowledge about prevention of diseases by vaccination and presence of immunization card were statistically significant, the adjusted OR did not provide an unequivocal confirmation (Table 3).

DISCUSSION

This study describes immunization coverage and risk factors for partial immunization for children aged 12-60 months in notified slums of Mangalore city. In the present study it was found that 58.7% of the children were fully immunized slightly higher than the immunization coverage reported by NFHS III 54.7%.

Table 2: Socio-demographic factors association with immunization status.

		Immunization status					
		Fully immunized N=88		Partially immunized N=62		χ^2	p value
		No.	%	No.	%		
Sex of the child	Male	45	51.1%	35	56.5%	0.413	0.521
	Female	43	48.9%	27	43.5%		
Religion	Hindu	85	96.6%	57	91.9%	0.276*	
	Others	3	3.4%	5	8.1%		
Education of mother	Educated	12	13.6%	16	25.8%	1.000*	
	Not educated	76	86.4%	46	74.2%		
Education of father	Educated	19	21.6%	21	33.9%	2.805	0.094
	Not educated	69	78.4%	41	66.1%		
Occupation of mother	Housewife	68	77.3%	38	61.3%	4.482	0.034
	Employed	20	22.7%	24	38.7%		
Occupation of father	Unskilled	39	44.3%	25	40.3%	0.237	0.626
	Others	49	55.7%	37	59.7%		
Decision maker	Husband	47	53.4%	36	58.1%	0.330	0.954
	Wife	8	9.1%	5	8.1%		
	Mother/father in law	9	10.2%	6	9.7%		
	Both	24	27.3%	15	24.2%		
Know about UIP	Yes	82	93.2%	49	79.0%	6.583	0.010
	No	6	6.8%	13	21.0%		
Immunization card	Yes	81	92.0%	44	71.0%	11.635	0.001
	No	7	8.0%	18	29.0%		
Attended the health education meetings	Yes	57	64.8%	28	45.2%	5.697	0.001
	No	31	35.2%	34	54.8%		
Place of delivery	Health institution	81	92.0%	57	91.9%		
	Home	7	8.0%	5	8.1%		
Knowledge of disease being prevented by vaccination	Yes	77	87.5%	36	58.1%	16.960	<0.001
	No	11	12.5%	26	41.9%		
Fatal consequences if not vaccinated	Yes	58	65.9%	37	59.7%	0.608	0.435
	No	30	34.1%	25	40.3%		

Table 3. Predictors of immunization status using multiple logistic regression analysis.

	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for exp (B)	
							Lower	Upper
Occupation of mother	0.870	0.401	4.706	1	0.030	2.386	1.088	5.235
Knowledge of diseases being prevented by vaccination	-1.133	0.461	6.044	1	0.014	0.322	0.131	0.795
Immunization card	-1.182	0.532	4.936	1	0.026	0.307	0.108	0.870
Attended the health education meetings	-.498	0.388	1.648	1	0.199	0.608	0.284	1.300
Constant	3.256	0.855	14.515	1	0.000	25.935		

The study also revealed that place of delivery did not have an independent effect on the children being partially immunized. This might be because institutional deliveries may lead to administration of initial vaccines. But to ensure the subsequent vaccines are given, it requires continuous motivation.

Knowledge on vaccine related information

87.3% of the respondents were having the knowledge about the universal immunization programme. And Majority of them had got the information regarding the UIP from the ASHA workers. The findings were similar

to those found by Angadi et al. which said that health personnel and Anganwadi workers were the principal sources of information regarding the immunization.¹⁰ Other Studies also reported similar findings.¹¹ This shows the importance of field workers to ensure that people in the catchment area receive the requisite health services.

Immunization status of Children and reasons of Partial Immunization

The children of all the respondents were either fully immunized or partially immunized. Immunization cards were present with 83.3% of the respondents. Presence of Immunization card was found to be associated with full immunization status. (Table 2) Yadav et al also reported the similar findings in the urban slums of Jamanagar city.¹²

It was observed the sex of the child did not have any bearing with Immunization status. Angadi et al, Kadri et al also observed the similar trend.^{10,13}

In the present study, it was found that immunization status was not associated with factors such as education of mother and socio-economic status of the family. This was in contrast to the findings of study done by Bholanath et al., that found that maternal education and socioeconomic status were significant independent predictors of immunization status.¹⁴ But Angadi et al reported the similar findings.¹⁰

The knowledge regarding the vaccines appeared to be satisfactory amongst the respondents. 75.3% of them said they were aware of the diseases which were prevented by the vaccines given in the UIP. This is in contrast to the findings of other studies; Angadi et al, Manjunath et al.^{10,15} This may be because of regular health education programmes attended by mothers which were organized by anganwadi workers/Asha workers. Attending the health education meetings was found to be associated with Immunization status of the child, though it was not a significant independent predictor for immunization status (Table 2,3).

Coverage in terms of individual vaccines came out to be BCG 100%, DPT 1 97.3%, DPT2 94.7%, DPT 3 86%, OPV 1 97.3 %, OPV 2 95.3%, OPV 3 89.3 %, Measles 75.3% reflecting high instances of late dropouts. Similar findings of late drop outs were observed by Santosh et al. Bholanath et al.^{14,16} Further the main reason behind partial immunization was found to be lack of information regarding when to return for 2nd and 3rd vaccination followed by lack of motivation and inconvenient time of immunization respectively (Table 1). This was in contrast to the findings of Kadri et al, Punith et al and Kar et al.^{13,17,18}

Occupation of the mother came out to be significant independent predictor for immunization status. Mothers who were only housewives were more likely to get their

children immunized in the slum areas. The reason may be because of their regular attendance in the health education meetings organized by health worker/Asha workers. Further the women who were working were usually in some unskilled jobs as daily wage labourer and hence might be finding it difficult to get the immunization done on some fixed date. Ray SS et.al had contrasting findings. In his study he found that father's occupation was associated with the immunization status of the child.¹⁹

CONCLUSION

Unfortunately, the immunization coverage was found to be very bad in the slum areas of Mangalore city, Karnataka, India. There is an urgent need to ensure that regular health education sessions are conducted. Secondly, slum areas should be the target of RCH programme with special focus on immunization related activities e.g. ensuring that all households with children should have immunization cards, as the slum areas remain the neglected section of the society due to various reasons. Further, Inradhanush sessions need to be conducted in vulnerable areas like slum areas, construction sites and the areas with more of migrant population.

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

REFERENCES

1. International Institute of Population Sciences (IIPS) and Macro International (2007) National Family Health Survey (NFHS-3), 2005-6. India: Volume I. IIPS, Mumbai.
2. World Health Report, 2005. Available at: <http://www.who.int/whr/2005/en/index.html>.
3. Kalaivani K, Mathiyazhagan T, Patro BC. Editorial. News Lett Nat Inst Health Fam Welfare 2006;8:1-2. Accessed 10 July 2016.
4. Park K. Principles of epidemiology and epidemiologic methods. In: Text Book of Preventive and Social Medicine; 2005:103.
5. Chapter VI. Annual report. Ministry of Health and family Welfare: New Delhi; 1992-93:2. Available from: <http://mohfw.nic.in/reports/Annual%20Report%201992-93/chap-VI.pdf>.
6. National Population policy 2000, Ministry of Health and Family Welfare. Government of India; New Delhi: 2000.
7. Dutta SS. A mess of our own making. Times of India. Available from: <http://timesofindia.indiatimes.com/articleshow/1193470.cms>. Accessed 10 July 2016.
8. Lodha R, Dash N, Kapil A, Kabra SK. Diphtheria in urban slums in North India. Lancet. 2000;355:204.

9. Loening WE, Coovadia HM. Age specific occurrence rates of measles in urban, peri-urban and rural environment: Implications for time of vaccination. *Lancet*. 1983;2:324-6.
10. Angadi MM, Jose AP, Udgiri R, Masali KA, Sorganavi V. A study of knowledge, attitude and practices on Immunization of urban children in urban slums of Bijapur city, Karnataka, India. *J Clin Diagn Res*. 2013;7(12):2803-6.
11. Nath B, Singh JV, Awasthi S, Bhushan V, Kumar V, Singh SK. A study on immunization of children in a city of North India- A 30 cluster survey. *Online J Health Allied Sci*. 2008;7(1):2.
12. Yadav S, Mangal S, Padhiyar N, Mehta JP, Yadav BS. Evaluation of immunization coverage in urban slums of Jamnagar city. *Indian J Community Med*. 2006;31:300-1.
13. Kadri AM, Singh A, Jain S, Mahajan RG, Trivedi A. Study on immunization coverage in urban slums of Ahmedabad city. *Health and Population: Perspective and issues*. 2010; 33(1): 50-4.
14. 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.
15. Manjunath U, Pareek RP. Maternal knowledge and perceptions about the routine immunization programme- A study in a semi-urban area in Rajasthan. *Indian J Med Sci*. 2003; 57:158-63.
16. Prusty SK, Panda B, Chauhan AS, Das JK. Factors affecting immunization coverage in Urban slums of Odisha, India: implication on urban health policy. *Health care in low resource settings* 2013;1:e18.
17. Punith K, Lalitha K, Suman G, Pradeep BS, Jayanth Kumar K. Evaluation of primary immunization coverage of infants under universal immunization programme in an urban area of Bangalore city using cluster sampling and lot quality assurance sampling techniques. *Indian J Community Med*. 2008;33:151-5.
18. 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 Community Medicine*. 2001;26:151-4.
19. Ray SS, Patra L, Giri AK. Coverage evaluation of primary immunization and the associated determinants in an urban slum of Eastern India. *Indian J Res Rep Med Sci*. 2013;3(2):35-7.

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