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Research Article

Immunization coverage and its associated factors among children residing in project affected population's resettlement colonies in urban slum of Mumbai, Maharashtra, India

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ABSTRACT

Background: With the rapid urbanization and numerous infrastructure projects going on in cities, large number populations are affected by these development projects. Such Projects Affected People (PAP) is resettled in colonies where critical health services are often lacking. Immunization is one such preventive and promotive health services, which is often cited as one of the greatest public health achievement of 20th century and has resulted in dramatic decrease in morbidity and mortality due to vaccine preventable diseases. However, effective protection against these vaccine preventable diseases requires 90-95% immunization coverage. This study was conducted to assess the immunization coverage in PAP resettlement area of urban slum in Mumbai and associated responsible factors.
Methods: Immunization coverage was assessed with the help of the WHO's 30cluster sampling method with a sample size of 210 children in the 12-23 months age group.
Results: 90% children were completely immunized. The immunization coverage was highest for BCG (98.1%) and least for measles (90%). The most common reason for noncompliance was child's illness at the time of scheduled vaccine dose.
Conclusions: The Universal Immunization Programme (UIP) goal of 85% immunization coverage can be achieved by community based awareness activities, supplemented by patient friendly immunization services at the health centre.

Keywords: Primary immunization, PAP, Universal immunization program, WHO's 30 cluster sampling

INTRODUCTION

With rapid urbanization and large-scale development activities going on in Indian cities, a large population is displaced, which need to be resettled. Although shelter is provided, but the Project Affected People (PAP) are often neglected, they don't have access to promotive and preventive health services such as immunization, family planning services and general health checkup. This is the cost of development; such displaced groups have to pay. Immunization is often cited as being one of the greatest public health achievements of the 20th century which has resulted in dramatic decrease in morbidity and mortality due to vaccine preventable diseases.[1]

However, effective protection against these diseases requires 90-95% immunization coverage.[2] Immunization coverage refers to information on the proportion of children who have received specific vaccines or are up to date with the recommended vaccine schedule. This information is essential for planning immunization programs, identifying the vulnerable groups that require

targeting with increased resources, assessing the acceptability of a program and predicting likely vaccine preventable disease epidemics.[2] A child is considered fully immunized if s/he has received BCG; Bacillus Calmette Guerin (BCG) vaccine, three doses of Diptheria, Pertussis, and Tetanus Vaccine (DPT), Oral Polio Vaccine (OPV), Hepatitis B and measles. Despite the Universal Immunization Program (UIP) run by GOI, being functional since 20 years, the national coverage has not crosses 50% mark.[3]

In India, only 44% of children aged 12-23 months are fully vaccinated (NFHS-3), which is marginally better than 42% during NFHS-2.[3] The coverage is also not uniform for all the vaccines like coverage is highest for Polio Vaccines followed by DPT and HBV. The vaccine coverage is likely to be lower in various pockets of susceptible populations like slums, street children, children from resettlement colonies etc.[4] It is therefore necessary to know if low vaccine coverage is a problem in specific vulnerable population groups. Thus the present study was carried to assess the primary immunization coverage in project affected people's (PAP's) resettlement colonies in urban slums of Mumbai.

Aim of the study was to assess the immunization coverage in PAP's resettlement colonies in urban slums of Mumbai and determine the various socio-demographic factors affecting the same. And the objectives of the study were to assess immunization coverage for individual vaccines among children aged 12-23 months, to identify socio demographic factors associated with non-compliance

METHODS

The present community based descriptive study was carried out in PAP's resettlement colonies in the Lallubhai compound, Mankhurd, Mumbai, Maharashtra, India. The health services in this area are mainly provided by a NGO, Doctors for You (DFY), an comprehensive various public health interventions through an health Centre in the area. Immunization services to provide immunity against 7 vaccine preventable diseases (tuberculosis, polio, diptheria, pertusis, tetanus, hepatitis B and Measles) are carried out twice a week at the health centre.

The services at the health centre are supplemented by outreach services such health and immunization camps in the area. The approximate population of this area is 56,200. The area is divided in 84 natural clusters in form of 5 and 7 stories buildings with each building having 120 and 144 families respectively. And study was conducted from July 2014 to September 2014 (3 months).The study populations comprised children aged 12-23 months. Age was confirmed by birth certificates or immunization cards or when it was not available, by asking the mothers (Using the standard Indian calendar and major holidays as reference points).

Complete immunization

Children have received BCG, three doses of OPV, DPT, HBV each and Measles.

Partial/incomplete immunization

Children who are not completely immunized but have at least received one dose of any above mentioned vaccines.

Unimmunized children

Children who have not received a single dose of any vaccine (pulse polio OPV is excluded).

The WHO's 30 cluster sampling method was used for evaluation of immunization coverage.[5] Among the 84 natural clusters (5 and 7 story buildings) 30 buildings were randomly selected. Seven children between 12-23 months of age were selected from each of 30 clusters, with the effective sample size being 210 children. After getting the list of building to be covered, the floor from which the first child has to be taken was randomly selected and every next house was studied in a sequence, until a total size of seven eligible children in the age group 12-23 months were covered.

On reaching the selected household, the mother or care giver of the eligible child was interviewed. If no child belonging to the target population was found, next household was checked. If there were twins in the target population, both were included in the study. Preformed, pretested, semi structured questionnaire was used to collect the information from mothers regarding socio demographic parameters, immunization coverage and reasons for non-compliances, if any. The immunization coverage was assessed on following aspects

- Availability of Immunization card
- BCG mark/scar
- Immunization history checked from the card or elicited carefully from the mother or caregiver.

While conducting the study Declaration Helsinki guidelines were followed. Verbal consent was obtained from the mothers or caregivers before collecting the information. *Statistical Analysis:* The information was entered in Microsoft Excel 2007 and analyzed with the help of statistical software SPSS version 16.

RESULTS

In the study female to male ratio was almost 1:1. 97.1% of children were delivered at hospital. Majority of the families belong to middle and lower class as per modified Prasad's classification, while 20% respondents choose not to disclose the income (Table 1).

Table 1: Demographic profile of study participants.

Variable		Frequency	Percent
Gender	Male	101	48.1
	Female	109	51.9
Birth order	1	78	37.1
	2	89	42.4
	≥3	43	20.5
Place of delivery	Home	6	2.9
	Hospital	204	97.1
Mother's Education	Graduate	17	8.1
	HSC	34	16.2
	SSC	24	11.4
	Primary	84	40.0
	Illiterate	51	24.3
Socio Economic Status (Modified Prasad's Classification)[15]	I	3	1.4
	II	37	17.6
	III	65	31.0
	IV	54	25.7
	V	9	4.3
	NA	42	20.0

Study finding revealed that 90% of children were completely immunized while only 1.43% children had not received any vaccination (Table 3). On assessing individual vaccines, the coverage of BCG was found to be highest (206 out of 210, 98.1%).

Table 2: Immunization coverage.

Vaccine doses	Frequency	Percent
BCG	206	98.1
1st Dose (OPV1,DPT1, HBV1)	204	97.1
2nd Dose (OPV2, DPT2, HBV2)	201	95.7
3rd dose (OPV3, DPT3, HBV3)	200	95.2
Measles	189	90.0

Table 3: immunization status of study participants.

Variable		Frequency	Percent
Immunization Card	Yes	200	95.2
	No	10	4.8
BCG Mark	Yes	196	93.3
	No	14	6.7
Immunization Status	Complete	189	90.0
	Partial	18	8.6
	Unimmunized	3	1.4

The immunization coverage for 1st, 2nd and 3rd doses of DPT, OPV and HBV was 97.1%, 95.7% and 95.2% respectively (Table 2). The coverage of measles was lowest among all the vaccines (90%). BCG mark was present in 95.14% children, who received the BCG vaccine. Immunization card was there with 95.2% beneficiaries (Table 3).

Table 4: Socio-demographic factors affecting immunization coverage.

Variable		Group frequency	Complete	Partial/Unimmunized	P Value
Sex	Male	109	98	11	1
	Female	101	91	10	
Birth order	1	78	72	6	0.546
	2	899	80	9	
	≥ 3	43	37	6	
Place of delivery	Home	6	4	2	0.112
	Hospital	204	185	19	
Mother education	Illiterate	51	44	7	0.583
	Primary	84	75	9	
	SSC	24	22	2	
	HSC & Grad	51	48	3	
Family size	≤ 5	93	83	10	0.674
	>5 to 8	87	80	7	
	>8	30	26	4	
Card	Yes	200	188	12	<0.001
	No	10	1	9	
SES	Upper (I &II)	40	38	2	0.011
	Middle (III)	65	63	2	
	Lower (IV &V)	63	55	8	
	NA	42	33	9	

The main reason for noncompliance was child's illness at the time of scheduled vaccinations followed by loss of immunization card (Table 4). On assessing various demographic factors it was low in children with birth order 3 or more, lower education of mother, lower socioeconomic condition and loss of immunization card (Table 5).

Table 5: Reasons for partial immunization or Un-immunization (n=21).

Reasons	Frequency	Percent
Child's illness	10	47.6
Loss of card	4	19.0
Being busy in other works	2	9.5
No one to accompany the mother & child	2	9.5
Gone to native place at the time scheduled dose	1	4.8
Change of house	1	4.8
Not aware about immunization	1	4.8

DISCUSSION

The present study conducted in the Project affected People's resettlement colonies showed 90% primary immunization coverage, which is more than the national average 43.5% NFHS 3 and 70% immunization coverage in the state of Maharashtra.[6] The overall coverage for different vaccines ranges from 98.1% BCG to 90% for measles, which was above the 85% target set by universal immunization programme (UIP) in India.

In the unpublished data of base line survey conducted by doctors for you (NGO) at the start of project, only 59% children from 12-23 months age group were completely immunized. The immunization coverage was found to be the highest for BCG (87.6%) followed by 78/6% for 1st dose, 76.2% for 2nd dose, 66.7% for 3rd dose and 62.4% for measles.

In a study Kadri et al in Ahemdabad slums recorded 83.3% coverage for BCG and 71.7% for measles, in this study, only 70.3% children were completely immunized.[7] Singh et al on Immunization status of India showed BCG and measles coverage of 86% and 67% respectively.[8] Similar results were found by Yadav et al in an urban slum of Jamnagar where BCG coverage was maximum (94.7%) followed by OPV (84.7%) and DPT (81.4%) and that of measles was least (75.7%).[9]

In a study on malnutrition and immunization coverage in Rafiq Nagar, Mumbai, the nearest slum to the study area by Bhavsar S et al, complete immunization coverage was just 46.4%, highest coverage was noted for BCG (90.7%) followed by 88.1% for first dose of OPV, DPT and HBV each, 77.3% for second dose and 63.9% for third dose.[10] The least immunization coverage was noted for measles (52.1%). In this study, OPV doses given during pulse polio were not included in the assessment of immunization coverage.

The most common reason for not immunizing the child as cited by respondents were illness of the child (47.6%), loss of card (19%), being busy in other work (9.5%). Unawareness about immunization programme was seen in only one respondent. A study conducted by Kar et al showed that the major causes of incomplete immunization were illness of child (30.8%), unawareness (23.1%) and migration to native place (23.1%).[11] Another similar study by Nath et al showed visit to native place (14.7%), sickness of child (11.7%) and lack of knowledge (10.4%) were main reasons for incomplete immunization.[12]

Immunization status was found to be significantly low among lower socio economic group, those who did not responded and were not having card. Although not significant but it was low if mother was illiterate or educated up to primary only, higher birth order and home delivery. A study done by Vikram et al found association between mother's education and immunization status.[13] A study in urban slums of Lucknow by Nath et al found that children born at home are less likely to complete vaccination.[12] Studies done by Bobo et al and Brenner et al revealed that birth order was inversely related to vaccination coverage.[14,15]

Recommendations

The improvement in immunization coverage from baseline complete primary immunization coverage of 59% to 90% in Project Affected People's resettlement colonies in urban slums of Mumbai can be attributed to the strategic approach of the NGO, doctors for you, towards achieving universal primary immunization coverage in children. The activities carries out were as follows-

- Survey of beneficiaries in the community and awareness about importance of immunization
- Immunization camps in the area for the identified beneficiaries supplemented by immunization on fixed days at the health centre.
- Incentives to the beneficiaries at the time of vaccination and after complete immunization.
- Making immunization card counterfoil and then following up by home visits for drop outs.
- Issuing duplicate immunization card, if original one is misplaced by any reason.

The success of these strategies is evident by high immunization coverage and low level of unawareness (1 out of 210, 0.47%). At Government health facilities, the mother or care giver is severely reprimanded on misplacing the cards, which deters such population to utilize services.

For population in transitions, losing their important records can occur many times, in such conditions, issuing a fresh immunization card will not deter the mothers from utilizing immunization services. At the same time, giving some incentives i.e. soap or tooth paste (mobilized from corporate social responsibility fund or local funds) will help in success of achieving universal immunization coverage and lowering morbidity and mortality due to vaccine preventable diseases.

CONCLUSION

The Universal Immunization Programme (UIP) goal of 85% immunization coverage can be achieved by community based awareness activities, supplemented by patient friendly immunization services at the health center, along with planned surveys, providing and partnering outreach immunization services and motivation of mothers through incentives.

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