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Community Medicine

A Cross-Sectional Review Of Immunization Status Of Under-Five Children Amongst Brick-Kiln Workers' Settlements

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ABSTRACT

Introduction: Immunization is an important public health tool. But just like any other government service, the coverage of immunization is low amongst migrant children. This study was planned on children of migrant brick-kiln workers in a rural area.

Objectives: To study coverage of immunization and find out determinants of current status.

Materials & Methods: A community-based cross-sectional study was done on 216 Under-5 children in brick-kilns located in Khadavli, District Thane, Maharashtra. Information was collected from an informant preferably mother of the Under-5 child. Data was entered in Microsoft Excel 2007 and analysed using Open-Epi.

Results & Conclusion: Immunization coverage found in this study was only 36.1%. The coverage of BCG was high but drop-out rate at every point was substantial. The reasons for delay included unawareness about follow-up and family busy at work. The significantly associated determinants were parent's education, ANC Registration and registration in Anganwadi.

KEYWORDS : Immunization, Brick-kilns

INTRODUCTION:

Health care planners have often highlighted the problem of poor accessibility of health services to the temporary population settlements i.e. marginal population. These people usually belong to low socioeconomic strata of the society. Government health care coverage in this population is usually low. They are not adequately covered by routine health care services e.g. slums in urban areas and brick kiln population in rural areas. [1]

Migrant children suffer from malnutrition and lack of immunization when their parents are in perpetual low-income uncertain jobs that necessitate frequent shifts based on availability of work. [2]

Hence, this study was planned to review the immunization coverage amongst the under-five children of migrant brick-kiln workers in Khadavli rural field practice area located in Thane district of Maharashtra.

OBJECTIVES:

1. To study the immunization coverage among the under-five children residing at the brick-kilns of Khadavli rural field practice area.
2. To study the determinants of current immunization status of under-five children from study area.

MATERIALS AND METHODS:

A community based cross-sectional study was done in the Khadavli rural field practice area in Thane district of Maharashtra state. All under-five children among the brick-kiln settlements were included except those whose parents did not consent to participate.

Sample size was calculated using the standard formula for cross-sectional study with finite population. Sampling frame was taken to be 420 on the basis of previous years' records of the Khadavli PHC. Proportion of full immunization was taken as 50% as per the National Vaccine Policy. [3] Using these figures and applying the formula the desired sample size came out to be 216.

The period of data collection was from October 2014 to April 2015. Data was collected by visiting all the 37 brick-kilns of the study area. Systematic Random Sampling was followed wherein every alternate under-five child was included as a study subject.After taking consent, the data for this study was taken by interviewing an informant (preferably mother) of the child on the basis of a semi-structured questionnaire. The questionnaire included questions regarding socio-demographic characteristics, obstetric history, immunization status and reasons for delay in immunization of the child. Data was entered in Microsoft Excel Spreadsheet 2007 and analyzed using OpenEpi.

OPERATIONAL DEFINITIONS:

Age of the child: Age of the child was calculated using date of birth as per the birth certificate or any other government document or as per the immunization card. In the event of all of these documents being unavailable, age was calculated by asking for prominent events (like festivals, change of seasons, etc) that took place close to the birth of the child.

Completely Immunized:

a) A child who is aged more than 12 completed months and who has received one dose of BCG; three doses each of DPT, HBV and OPV; and one dose of Measles (i.e. has received complete primary vaccination) before the age of 12 completed months. OR
b) A child who is aged less than 12 completed months and who has received vaccines adequate for his/her age as per the national immunization schedule or there is delay of less than 15 days in receiving vaccine as recommended by the national schedule.

Non Immunized: A child who has not received any vaccine till date.

Partially Immunized: A child who has received some but not all vaccines under primary immunization as are recommended for his/her age by the national immunization schedule.

RESULTS:

A total of 216 study subjects were included in the study. 107 (49.5%) of these were female children while rest 50.5% were males. 50 children were aged less than 12 months while others were in age group of 12–59 months. All children belonged to Hindu religion and Scheduled Tribe category. 93 children (43.1%) had birth order 1. The number of children with subsequent birth order went on decreasing- 2nd (34.3%), 3rd (14.8%) and so on.

Table 1: Age and Gender wise distribution

Age-Group	Female		Male		Total
	No.	%	No.	%	
< 12 months	28	56%	22	44%	50
12-59 months	79	47.6%	87	52.4%	166
Total	107	49.5%	109	50.5%	216

The 216 children belonged to 156 families. Almost all of these were Nuclear type of families. 69.8% of mothers and 57.6% of fathers were aged less than 30 years i.e. the population at brick-kilns were relatively young. 75 mothers (48.1%) and 64 fathers (41%) had never attended school. Amongst rest most were educated till primary school only.

All families mentioned that both the mother and father of the study subjects worked at the brick-kiln. Even then 95 out of 156 i.e. 60.9% had a monthly family income of less than Rs 3000. Only 58.3% families had a ration card.

As perceived by them, only 47 families felt that a health facility was close by their place of work i.e. brick-kilns and just 36 families mentioned that health facility was near to their native place i.e. places where they stay during the off-season. Most of the families took facility based care only for major illnesses like chronic diseases or major wounds. Minor ailments were generally managed by home based rudimentary methods.

Table 2: Utilization of MCH related Government services

Government Services	Present		Absent	
	No.	%	No.	%
Ante-Natal Registration	191	88.4%	25	11.6%
Institutional Delivery	79	36.6%	137	63.4%
Birth Certificate	95	44%	121	56%
Anganwadi Registration	153	70.8%	63	29.2%
Immunization Card	152	70.4%	64	29.6%

Table 2 summarizes the utilization of Government provided services for Mother and Child Health care. Except for Ante-natal registration the coverage is on the lower side. Staggering fact is that though 88.4% registered in Ante-natal period, still only 36.6% subjects were born of an institutional delivery. The main reasons given for non-utilization of services included unawareness, cultural beliefs and health facility too far to approach.

Table 3: Age-wise distribution of Immunization Status

Category of Immunization	< 12 months	12-59 months	Total
Completely Immunized	14 (28%)	64 (38.6%)	78 (36.1%)
Non Immunized	4 (8%)	7 (4.2%)	11 (5.1%)
Partially Immunized	32 (64%)	95 (57.2%)	127 (58.8%)
Total	50	166	216

Table 3 shows coverage of Immunization. It can be observed that complete immunization coverage is just 36.1%. Also the coverage is lower among infants as compared to their elder counterparts. Further, when asked about the scheduled next dose, informants of 88.1% children were unaware about the next follow-up to the immunization sessions.

The coverage of vaccines is shown in Table 4 for children in 12–59 months age group (n=166). This is as per the details on immunization card or history elicited from the informant. The coverage of BCG vaccine is almost 95% which drops to 91% at DPT-1 and goes on decreasing to just 52% for Measles vaccine.

Table 4: Coverage under Primary Immunization (n = 166)

Name of Vaccine	Percentage Coverage of Vaccine
BCG	94.6%
OPV-0	37.4%
HBV-0	12.7%
DPT-1/OPV-1	91%
HBV-1	90.4%
DPT-2/OPV-2	77.7%
HBV-2	75.9%
DPT-3/OPV-3	54.8%
HBV-3	51.8%
Measles-1	52.4%

The BCG – DPT-1 drop-out rate was 3.8%, the DPT-1 – DPT-3 drop-out was 39.7%, BCG-DPT3 drop-out was 42% and BCG – Measles drop-out rate was a staggering high at 44.6%. These disparities between BCG and Measles coverage and similarly between Ante-natal registration and Institutional delivery coverage highlight that the migrant brick-kiln workers and their children are missed opportunities on the part of our health care system.

Out of the 78 children who were completely immunized, 75 informants i.e. 96.1% said that this state of complete immunization can be attributed to proactive work of health workers in raising awareness.

The main reasons quoted for partial immunization were Unaware about when to follow-up (83.5%), Family too busy at work (34.6%) and Health facility too far to approach (31.5%). Few also gave reasons like child was ill, long waiting time and vaccinator absent.

Amongst the 11 children who were non-immunized, 100% of informants gave the reason that the health facility was too far. Additionally, 54.5% i.e. 6 informants all said that the health facility was too far and hence, they could never vaccinate their child till date.

Table 5 shows association between various socio-demographic characteristics with immunization status and also health seeking behaviour and immunization status.

Table 5: Association between Immunization status and various characteristics

Factor		**Complete Immuni-zation**	**Partial Immuni-zation**	**Non Immuni-zation**	**Chi-square & p-value**
Age group	< 12m	14(28%)	32(64%)	4(8%)	2.56, 0.2
	12-59m	64(38.6%)	95(57.2%)	7(4.2%)	
Gender	Female	37(34.6%)	66(61.7%)	4(3.7%)	1.2, 0.5
	Male	41(37.6%)	61(56%)	7(6.4%)	
Parent's Educatio n#	Nil	20(26%)	50(64.9%)	7(9.1%)	Exact =24.6, p<0.001
	Upto Primary	28(29.2%)	64(66.7%)	4(4.1%)	
	More than Primary	30(66.7%)	15(33.3%)	0(0%)	
Use of Health Facility	Always	67(44.7%)	78(52%)	5(3.3%)	16.79, p<0.001
	Sometime/ Never	11(16.7%)	49(74.2%)	6(9.1%)	

Higher education among mother and father

Table 5: Association between Immunization and various characteristics (continued)

Factor		Complete Immuni-zation	Partial Immuni-zation	Non Immuni-zation	Chi-square & p-value
Distance of health facility at native place	Very Close / Close by	27 (52.9%)	23 (45.1%)	1 (2%)	Exact = 16.6, p<0.001
	Moderately far	44 (37.3%)	68 (57.6%)	6 (5.1%)	
	Very far	7 (14.9%)	36 (76.6%)	4 (8.5%)	
ANC Registration	Yes	75 (39.3%)	112 (58.6%)	7(2.1%)	33.69, p<0.001
	No	3(12%)	15(60%)	7(28%)	
Place of delivery	Institutional	37 (46.8%)	41(51.9%)	1(1.3%)	8.5, p=0.013
	Home	41(29.9%)	86(62.8%)	10(7.3%)	
Anganwadi Registration	Yes	67(43.8%)	85(55.6%)	1(0.7%)	29.8, p<0.001
	No	11(17.5%)	42(66.7%)	10 (15.9%)	
Informant Awareness of Follow-up	Yes	29(72.5%)	11(27.5%)	0(0%)	28.6, p<0.001
	No	49(27.8%)	116(65.9 %)	11(6.3%)	
Place of receiving vaccination (n=205!)	Both native village & migrant site	47(74.6%)	16(25.4%)	NA	51.56, p<0.001
	Only native village	31(21.8%)	111(78.2 %)	NA	

! n = 205 as this point is not applicable for 11 subjects who were non-immunized

Table 6 shows coverage of Pulse polio immunization, booster doses and Vitamin A doses. The pulse polio coverage is a staggering high of 97.2%.

Vitamin A coverage are poor with first dose (ideally to be given with Measles-1) coverage of 36.8%. It can be seen that this is less than Measles-1 coverage of 52%.

The coverage of Measles-2, Booster-1 for DPT/OPV and Vitamin A-2nd dose are also shown in Table 6. Though all these doses are supposed to be given at around the same age still there is difference between the coverage rates especially Vitamin A having a low coverage as compared to vaccine doses.

Further it was seen that Vitamin A coverage rates went on dropping with no child receiving more than 6 doses (ideally 9 doses expected for age of 5 completed years).

All these findings point out neglect on the part of health sector towards Booster doses and Vitamin A doses.

Table 6: Coverage of Pulse Polio, Booster doses and Vitamin A

Coverage of	Eligible children	Recipients	Percentage
Pulse Polio	216	210	97.2%
Vitamin A-1st dose	185	68	36.8%
Measles-2	123	35	28.5%
Booster-1 (DPT+OPV)	123	36	29.3%
Vitamin A-2nd dose	123	27	22%

DISCUSSION:

Immunization is a key component of primary health care services. It has a major role to play in a child's health. Studies have shown that if all recommended doses of vaccines are given, it will protect 80–95 percent of the children against those diseases. [2][4]

The present study shows that only 36% of children at brick-kilns were completely immunized for their age. Also, an alarming 5% were non-immunized i.e. did not receive any vaccine till date. A similar study done in brick kiln children of peri-urban areas of Pune showed that only 20% of children were completely immunized and 5% were non-immunized.[2] The comparison with other studies on children of migrant population has been given in Table 7.

Table 7: Immunization Coverage as per similar studies

Study	Complete Immunization	Partial Immunization	Non Immunization
Present Study	36.1%	58.8%	5.1%
Vaidya et al [2]	20%	74.8%	5.2%
Biswas et al [5]	0%	77.9%	22.1%
Aparajita et al[6]	3%	72%	25%
Yadlapalli et al [7]	39.7%	54.8%	5.5%
N Pandit et al [8]	9%	-	-

All these studies have repeatedly shown that the immunization coverage among children of migrant population like brick-kiln workers has been poor. The findings of present study are quite similar to the study done by Yadlapalli et al done on migrants. [7]

This study showed that coverage of BCG vaccine was about 95% which drops to around 55% for DPT-3 and 52% for Measles. In the study done by Vaidya et al the coverage of BCG was 81% while that for DPT3 and Measles was 63% and 53% respectively. This shows that while the coverage of Measles is comparable but the BCG-DPT3 drop-out is much higher in current study as compared to previous study. [2]

The BCG-DPT3 drop-out rate of 42% and BCG-Measles drop-out rate of 44.6% reflect that these are missed opportunities on the part of health sector of study area. The drop-out rate for DPT was 39.7%. This is less than that found in study by Biswas et al in brick-kilns of Kolkata where they found a drop-out of 59% in DPT vaccine. [5]

The main reasons for delay in immunization were Unawareness about follow-up, Family too busy at work and Distantly situated health facility. In the study by Vaidya et al the major reasons were illiterate and unaware about role of immunization. The reasons that stand out from this study are Family busy at work and Distantly located health centre. This shows that there is lack of active involvement of Brick-kiln owners in the immunization program. Also it points towards lack of immunization camps at brick-kilns by the health care workers.

In this study there was no significant difference between immunization status of male and female children. Similar findings are seen in study done by Aparajita et al. [6]

Pulse Polio coverage was found to be 97.2% which is similar to 97.3% found in Kolkata by Biswas et al.[5] The proportion of children receiving at least one Vitamin A dose was 36.8% which is much lower than 84% found in Coverage Evaluation Survey in Maharashtra. [9]

The determinants that significantly affected immunization status were parent's education status, health seeking behaviour, distance of health facility at native place, Registration in Antenatal period, Registration of child in Anganwadi, Informant's awareness about follow-up dose and whether child is taken for immunization both at native place and migrant site or not. This fact shows that low immunization coverage among brick-kiln children has a multi-factorial aetiology and would require both short and long term interventions.

CONCLUSION:

This study done on 216 children showed that overall coverage of immunization among brick-kiln children was lower than state or national averages. The individual vaccine coverage showed that though many children were enrolled under UIP at point of giving BCG but a lot of them get dropped out and left out with increase in their age. However high coverage of Pulse Polio shows that these children did have some contact with health sector but such contact points could not be utilized to improve coverage of Primary Immunization.

The reasons for delay and lack of immunization and the statistically significant determinants of immunization status, point out the need for specialized efforts to improve immunization status of migrant population groups like brick-kiln workers.

RECOMMENDATIONS:

1. There is an urgent need to conduct immunization camps near or at the brick-kilns to improve immunization coverage.
2. The pulse polio and routine immunization programmes can be integrated especially for migrant and marginalized population groups.
3. "Satisfied customers are bestsellers"- children with complete immunization and their mothers/family members must be portrayed as role models by conducting awareness camps at brick-kilns.
4. There is a need to increase Anganwadi Registrations of migrant population groups which would help in better delivery of MCH services including immunization.

LIMITATIONS:

The baseline knowledge of informants might have been low and recall bias may have been present in relation to information regarding immunization.

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