



IMMUNIZATION COVERAGE IN RURAL AND URBAN FIELD PRACTICE AREAS OF A MEDICAL COLLEGE OF GUJARAT

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ABSTRACT

Background: Immunization coverage indicates functionality of health program. Partial/ non-immunization will have different reasons for so also for rural and urban areas. Objective of the study was conducted to find out proportions of fully/ partially/ not immunized children, identify/ compare reasons for partial/ non-immunization and suggest corrective measures.

Methods: Based on sample size calculated as per District Level Household Survey 3, study included 1749 and 1102 children (2 - 35 months) in urban and rural areas respectively. House to House Monitoring Format for Routine Immunization (WHO) was used with suitable modifications and data was analysed using Microsoft excel.

Results: Among 2851 children, vaccination card was available with 45.3% (urban) and 32.8% (rural). Proportions of fully immunized children (12 - 23 months) were 86.4% (urban) and 83.4% (rural) and those "not vaccinated at all" were 2.3% (urban) and 1.6% (rural). DPT/ OPV booster coverage (24 - 35 months) were 87.5% (urban) and 74% (rural) were main hurdles in completing immunization. Reasons for missing doses were sickness of child, no felt need, fear of adverse effects following immunization (AEFI), unawareness about session site etc.

Conclusions: Coverage was better than the national surveys still the causes for no/ partial vaccinations need to be addressed through specific interventions to take the coverage to cent percent.

Key Words: Immunization, Coverage, Rural, Urban

INTRODUCTION

An estimated 1.5 million unvaccinated children die each year from vaccine preventable diseases (VPDs)¹ therefore, child immunization has to be a priority area with an objective to strengthen and sustain routine immunization (RI) to reduce the incidence of VPDs. Globally over 70 per cent of infants who do not receive three doses of vaccine

against diphtheria, tetanus and pertussis, live in Africa and Asia (more than third live in India alone).¹ This is also when India has one of the largest immunization programs in the world which came in existence with Extended Program on Immunization (EPI) in 1978.² Since then the program has undergone several changes in terms of (1) its

nomenclature, (2) focusing areas and (3) inclusion of newer vaccines

There is a wide variation among states and areas within a state regarding the immunization coverage. Hence it is pertinent to document the area specific immunization coverage and also to find out the reasons for poor coverage (if any) so that the locally relevant remedial action can be suggested to the administrators. Usually information of RI is collected by implementing agency/service provider itself based on number of administered doses to the target population.³ Number of administered doses could be underestimated due to non inclusion of other sources (private sector) or overestimated due to defective reporting from field units.³ Similarly calculation of target population may be incorrect due to mobility of population or use of old census data.³ In view of this, especially conducted community based coverage surveys by independent agency like us (department from a teaching institute) can provide the data closer to realistic one. Such surveys when done on a scientifically selected sub sample of population can provide insight information useful to local health authority and policy makers. Present study aimed to study the differences in immunization coverage and the reasons behind it in rural and urban field areas of our institute. While most studies focus only on 12 - 23 months of age we have included all children below three years of age. Further we have tried to segregate the sub areas with good availability and/ or utilization of services.

The study was conducted with objectives to find out the proportion of children (2-35 months) who received particular dose (s) of vaccine (s) appropriate to their age, to find out proportion of fully/ partially/ non immunized children in 12 - 23 months of age group and to study reasons for non/ partial immunization in the same age group and to suggest corrective measures based on local findings for sustaining/ improving RI.

METHOD

A community based cross sectional study was carried out in rural and urban field practice areas of GMERS Medical College, Sola, Ahmedabad. Primary Health Centre (PHC) Rancharda in Taluka (Block) Kalol, District Gandhinagar has 19 villages (6 sub centres) with population of 45414 in 11542 Household (HHs) which has been developed as Rural health Training centre (RHTC) and

Urban Health Centre (UHC) Ognaj under Ahmedabad Municipal Corporation (AMC) is located in the north western suburbs of recently annexed areas in Ahmedabad city. It is catering to a population of 39110 (7928 HHs) including approx. 33000 populations living in slums at time of study; same has been developed as Urban Health Training Centre (UHTC).

This study was planned to assess immunization status amongst children aged 2 - 35 months, hence study subjects included all children (aged 2 - 35 months) residing in various villages of PHC Rancharda and urban slums of UHC Ognaj. As per District Level Household Survey (DLHS-3) (2007-08) proportion of fully immunized children in Gandhinagar district was 61%.⁴ Sample size calculated for rural area was 1023 (allowable error 5% at 95% level of significance). Considering non response or error/ incompleteness 10% (102), it came out as 1130. Study could cover 1102 (97.5%) children. Proportion of fully immunized children in Ahmedabad urban as per DLHS 3 was 50%.⁵ Sample size calculated for urban area was 1600 (allowable error 5% at 95% level of significance), further considering non response or error/ incompleteness 10% (160), it came out as 1760. Study could cover 1749 (99.3%) children.

House-to-House monitoring format for RI developed by WHO, was used with suitable modifications. Information was gathered by interviewing mother preferably, if not available then, the person knowing about child's immunization in the family was approached after taking verbal consent by duly informing about the purpose of study. Each village (19) in rural and each area (4) in urban was considered as study unit. Eligible children were studied in each unit based on population proportion to size (PPS). After selecting 1st HH randomly in study unit, next HHs were taken in continuity towards right side to survey till desired sample size was achieved. Ready Reckoner was used to assess the immunization status "appropriate to age" (table 1). Immunization status - fully/ partially/ not vaccinated (based on the intake of primary vaccination during infancy) was assessed among 12-23 months age children by availability of Mamta card and/ or parental recall. Children were classified in to **fully** (1 dose each of BCG & measles and 3 doses each of DPT & OPV), **not (at all) immunized** (not a single vaccine) and **partially immunized** (rest). The list of non/partial immunized children was shared with health staff to cover them in following sessions. Further, to prioritize the actions in different sub centres/areas, quality of accessibility based on DPT-

1 coverage and quality of utilization based on DPT-1 – DPT-3 dropout rates was analysed (table 2).⁶

RESULTS

Socio demographic profile of study population:

Out of total 1102 children (rural), 572 (51.9%) were males and rest were females. Most of them (96.5%) were Hindus, rest were Muslims. Scheduled castes and scheduled tribes accounted for 1.9 and 6.0 percents respectively. Out of 1749 children (urban), 921 (52.6%) were males and rest were females. Most of them (99.6%) were Hindus, rest were Muslims/others. Scheduled castes and scheduled tribes accounted for 12.8% and 0.5% respectively.

Availability of Vaccination/Mamta card: When asked for the availability of Mamta cards, only 361 (32.8%) in rural and 793 (45.3%) in urban could show it to survey team. Few parents in rural (1.6%) claimed that such cards have not been issued.

Proportion of fully/ partially/ not immunized children: This was calculated amongst 373 children in rural and 786 children in urban aged between 12 – 23 months. Over all the proportions of fully immunized children were 83.4% & 86.4% followed by 15% & 11.3% partially immunized and 1.6% & 2.3% not immunized at all in rural & urban

respectively with no significant difference in fully immunized children in rural and urban (p>0.05). Proportions of fully and partially/non immunized children based on sex, caste & religion of rural and urban area are given in table 3. However variations in the immunization status based on gender, caste and religion were statistically not significant (p>0.05).

Intake of individual immunizing agents: It was calculated for each immunizing agent appropriate to the age based on the ready reckoner (table 1) and findings are presented in table 4. Coverage was highest for BCG (96.7% & 97.6%) followed by DPT-1- OPV-1 (both 95.3% & 96.8%), DPT-2- OPV-2 (both 90.2% & 95.9%), DPT-3-OPV-3 (both 85.8% & 94.2%), measles (87.6% & 88.7%) and booster of DPT-OPV (74% & 87.9%) in rural & urban respectively. Dropout rates between 1st and 3rd doses of DPT and OPV were identical and were 10.0 and 2.6 percent in rural and urban respectively.

Access / Utilization of immunization services: Three Sub centres (Jethlaj, Santej, Vadsar) were good both in terms of accessibility and utilization while rest three (Rancharda, Nasmed, Vansajada) were having good access with poor utilization. While in urban, all the 4 areas showed good accessibility & utilization.

Table 1: Ready Reckoner used in the study

Age (completed-months)	Vaccines to be checked						
	BCG	OPV	DPT	Hep-B	Penta valent	Measles	DPT/ OPV Booster
2- 4	BCG	OPV- 0		Hep-B-0			
5-9	BCG	OPV- 1,2,3	DPT- 1,2,3	Hep-B- 1,2,3	Pentavalent 1,2,3		
10-11	BCG	OPV- 1,2,3	DPT- 1,2,3	Hep-B- 1,2,3	Pentavalent 1,2,3	Measles 1 st dose	
12-23	BCG	OPV- 1,2,3	DPT- 1,2,3	Hep-B- 1,2,3		Measles 1 st dose	
24-35	BCG	OPV- 1,2,3	DPT- 1,2,3	Hep-B- 1,2,3		Measles 1 st & 2 nd dose	DPT/ OPV Booster

Table 2: Matrix of classification criteria of units based on accessibility and utilization of immunization services

Accessibility based on DPT 1 coverage	Utilization based on dropout rate between DPT 1 & DPT 3	
	Low (< 10%)	High (> 10%)
High (> 80%)	Good access & good utilization	Good access & poor utilization
Low (< 80%)	Poor access & good utilization	poor access & poor utilization

(Source⁶: Immunization Handbook for Medical Officers Revised Edition 2009)

Table 3: Profile of fully, partial/ not immunized children (12-23 months) based on their primary immunization status

Parameter	Rural			Urban		
	Eligible beneficiaries	Immunization status		Eligible beneficiaries	Immunization status	
		Fully	Partially/ Non		Fully	Partially/ Non
Gender						
Male	184	150 (81.5)	34 (18.5)	429	377 (87.9)	52 (12.1)
Female	189	161 (85.2)	28 (14.8)	357	304 (85.2)	53 (14.8)
Caste						
SC	3	3 (100)	0 (0.0)	110	96 (87.3)	14 (12.7)
ST	18	17 (94.4)	1 (5.6)	4	3 (75.0)	1 (25.0)
Others	352	291 (82.7)	61 (17.3)	672	582 (86.6)	90 (13.4)
Religion						
Hindu	362	302 (83.4)	60 (16.6)	784	679 (86.6)	105 (13.4)
Muslims	11	9 (81.8)	2 (18.2)	2*	2* (100.0)	0
Total	373	311 (83.4)	62 (16.6)	786	681 (86.6)	105 (13.4)

* Include 1 Christian child

Figures in parenthesis indicate percent values, Chi square test was used for analysis. (p<0.05 was considered significant)

Table 4 Coverage for individual immunizing agent in rural and urban areas

Vaccine Coverage	Rural (%)	Urban (%)
Availability of Mamata card (all children aged ≥ 2 months)	32.8 (n=1102)	45.3 (n=1749)
BCG (children aged ≥ 2 months)	96.7 (n=1102)	97.6 (n=1749)
DPT1 (children aged ≥ 5 months)	95.3 (n=1008)	96.8 (n=1594)
DPT2 (children aged ≥ 5 months)	90.2 (n=1008)	95.9 (n=1594)
DPT3 (children aged ≥ 5 months)	85.8 (n=1008)	94.2 (n=1594)
Measles (children aged ≥ 10 months)	87.6 (n=822)	88.7 (n=1325)
DPT/ OPV booster (Children aged ≥ 24 months)	74 (n=346)	87.9 (n=441)
Dropout rate between 1 st & 3 rd doses of OPV & DPT	10	2.6
Full Immunization Coverage (12-23 months)	83.4 (n=373)	86.6 (n=786)

Reasons for partial/ non immunization: Most common reason for partial/ non immunization was unaware of need of immunization (33.9%) in rural and caregiver didn't go for vaccination as child was sick (68.1%) in urban. Some of respondents (16.1%) in rural could not find out the reason and 11.2% were not aware of site of immunization. While second most common reason in urban was fear of AEFI (10.1%). Less common reasons observed were "child was sick" so health worker didn't vaccinate, session time/ location of session not convenient or long waiting, unaware about next session's timing and location, presence of false beliefs and absence of a care giver to take child for session etc.

Awareness regarding timing for next vaccine and vaccine preventable diseases: When enquired about the timing for next visit for vaccination, out of 1102 respondents of rural, only 45% and of 1749 in urban, 91.7% were aware of it. When the parents/ care takers were asked about the vaccine preventable diseases (VPDs), most common disease known to them was polio (59.9% in rural & 95.3% in urban) followed by measles in

urban (92.7%), tuberculosis in urban (80.1%) and measles in rural (19.9%). Awareness about all other VPDs was very less (<10%) in urban as well as rural areas.

Table 5: Common reasons (single response) for partial/non immunized children

Reasons for partial/non vaccination	Rural % (n=62)	Urban % (n=105)
Not aware of need for immunization/ not convinced	33.9	11.2
Do not know why (no reason given)	16.1	6.2
Did not know where to go	11.2	2.1
As child was sick health worker did not vaccinate	9.7	2.9
Child was sick care-giver did not go for vaccination	8.1	68.1
Other (false belief, not at home at time of session, frequent migration to native)	8.1	0
Fear of AEFI	6.5	10.1
Did not know when to go	3.2	0

Session time/ location not convenient/ long waiting	3.2	2.1
Vaccinator absent	0	0.6

DISCUSSION

In present study, total of 2851 children (1102 rural & 1749 urban) were surveyed with 52% males and 48% females. Around 33% respondents in rural & 45% in urban could show vaccination/mamta card. Similar low availability of vaccination card was seen in NFHS3 Gujarat & DLHS 3 Gujarat.^{7,8} While in coverage evaluation survey (CES) 2009, availability was more than the previous surveys (47.1 & 53.5 in rural & urban Gujarat respectively).⁹ However, preservation of vaccination card is still very poor and needs to be emphasised as it is an important document which can affect the calculation of status of immunization of a child.

Proportions of fully immunized children were 83.4% & 86.4% and 1.6% & 2.3% as not immunized in rural & urban respectively. As per NFHS 3 Gujarat, 40.1% & 54.7% were fully immunized and 6.9% & 0.0% were non immunized in rural and urban respectively.⁷ While, as per DLHS 3 Gujarat, percentages of fully immunized were 51.3 & 66.8 and of non immunized were 7.6 & 3.6 respectively.⁸ The CES 2009 recorded complete vaccination in 60.5% rural compared to 50.0% urban infants in Gujarat while no vaccination in 2.4% & 2.9% respectively.⁹ When these percentages and those from the concerned districts^{4,5} were compared with present study, these were quite higher for full immunization and lesser for non immunization, and the difference between the urban & rural was also found quite less which may be because of improvement in service delivery in last few years and also the rural area is quite nearer to the Ahmedabad city leading to good access to the services. Similar high coverage of full immunization (84% - 93%) has been reported by other studies also.^{10, 11, 12, 13}

As per NFHS-3 Gujarat, DLHS-3 Gujarat and CES 2009 India, DPT1 - DPT3 Dropout rates were found gradually decreasing in rural (26.7% in 2005 - 06 to 15.0 in 2009) and urban (22.8% in 2005 - 06 to 9.6% in 2009).^{7,8,9} These dropout rates have been found as further decreased in our study as 10.0% & 2.6% in rural & urban areas respectively. Based on DPT1 coverage ($\geq 80\%$), all areas under study reported good access to services. While based on DPT 1 to DPT 3 dropout rates ($>$ or $< 10\%$) all urban areas and 3 out of 6 sub centres

in rural areas showed good service utilization indicating good health care infrastructure/ resources with good demand in these areas.

Variations in the immunization status based on gender, caste and religion were not significant ($p > 0.05$) in present study. A secondary analysis of NFHS-3 data following binary logistic regression also showed no independent effect of gender, caste and religion on vaccination coverage in urban areas.¹⁴ Similar finding of no significant association between gender and immunization coverage was found in other studies as well.^{15, 16}

Most common reason for partial/ non immunization was unaware of need of immunization (33.9%) in rural and caregiver didn't go for vaccination as child was sick (68.1%) in urban followed by no reason (16.1%) and not aware of site of immunization (11.2%) in rural and fear of AEFI (10.1%) in urban. "Unaware of need of immunization/ did not feel need" were also the common reasons for partial/ non immunization as per CES 2009 Gujarat and DLHS 3 India.^{17,18} Similar reasons were seen for non-immunization in a study in Lucknow where unawareness of the need of immunization (32.63%), lack of faith in immunization (21%), child being ill and hence not brought (13.68%) were found.¹⁹ Punith et al. in Bangalore also showed that major reasons for non acceptance/ discontinuation of immunization were unawareness of the need of immunization or need to return for 2nd or 3rd dose, lack of information about the place of immunization, fear of side reaction etc.¹² Overall, demand side issues (unaware of need, fear of AEFI, caregiver didn't go for vaccination due to sickness of child etc.) were found more than the supply side issues (i.e. health worker didn't vaccinate due to sickness of child, long waiting time/ inconvenient session time, absence of vaccinator etc.). In present study, supply side issues were found in 12.9% in rural and 5.6% in urban.

Regarding timing for next visit for vaccination, less than half of respondents in rural were aware of it while in urban area, the awareness was good. Most common disease known to parents/ care givers in rural was polio followed by measles. While in urban areas it was polio followed by measles and tuberculosis. Awareness about all other VPDs was very less in both urban and rural areas. Similar findings were seen in the study from semi urban area of Rajasthan²⁰, which concluded that though many were aware of the importance of vaccination in general, specific information on importance of completing the schedule

and knowledge on VPDs other than poliomyelitis were very limited. Similar finding of limited knowledge of the mothers regarding diseases prevented by vaccination and of lack of knowledge on the immunization schedule in a study in urban slums of Bijapur city ¹⁶.

CONCLUSION

Overall immunization coverage in the study was above the national average (NFHS or DLHS). Between the two, immunization status was better in urban than rural areas. As a whole, both areas indicated good service accessibility with good utilization, however, 3 out of 6 sub centres in rural areas reported poor utilization. Availability of mamta card was less than 50%. Coverage was highest for BCG followed by DPT/ OPV, measles and booster. Major reasons for partial/non vaccination were unaware of need of immunization (rural) and sickness of child and care giver didn't go for vaccination (urban). Frequent migration of families was important issue in rural area while addressing the non-immunization.

Demand/ awareness generation activities targeting causes for partial immunizations are needed to take the immunization coverage to cent percent. Specific IEC activities (mass media or group based) should be undertaken focusing on (1) need of completing immunization, (2) information about timing and location of future sessions and (3) need to preserve the mamta card.

RECOMMENDATIONS

Organizing such surveys (easy to undertake & less resource intensive) in PHCs/ UHCs once in a year, can help in finding out the problem areas. Findings of such surveys must be shared with health staff and the follow up action taken by them must be reviewed. Further based on such surveys, health staff reporting 100% achievement must be incentivised or publicly honoured.

Limitations: Due to poor availability of vaccination cards in the study, vaccination status was ascertained in most cases on the basis of parental recall.

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