### **Original Research Article**

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# Immunization coverage in children of 12-23 months of age group in rural field practice areas of medical college, Visnagar, Gujarat, India: a cross sectional study

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#### **ABSTRACT**

**Background:** Immunization plays a vital role in reducing childhood morbidity and mortality and higher coverage rates are needed to maintain the expected benefits. The objective was to assess immunization coverage in children of 12-23 months of age group in rural field practice areas of medical college, Visnagar, Gujarat, India.

**Methods:** Using the purposive sampling method, a cross-sectional community-based study was conducted in rural field practice areas of Nootan medical college and research center, Visnagar during June-December 2021. All 212 children of 12-23 months age group of the areas were included after taking verbal informed consent of their parents or guardians. Vaccination status of the children was verified using the Mamta card (immunization card). In conditions where the Mamta card was not available, the mother/parents were asked about the site of vaccinations to confirm the vaccines being given. Analysis of study was done by using appropriate statistical software.

**Results:** Total 1934 households were surveyed. There were 223 children in the 12-23 months age group. Mamta card or immunization record was available with 175 (78.5%) mothers of 12-23 months age group of children. Maximum coverage was seen for BCG (95.5%) followed by pentavalent/RVV/OPV first dose (93.3%). Measles-rubella (MR) 1st dose coverage was 89.2%. Overall, 86.5% of the children in the 12-23 months age group were fully immunized while only 5 children were unimmunized. Dropout rate proportion for pentavalent 1st dose to pentavalent 3rd dose was 2.46% while for pentavalent first dose to MR was 4.39%.

**Conclusions:** Full immunization coverage in children of 12-23 months of age group in rural field practice areas of medical college, Visnagar was 86.8%.

Keywords: Immunization, Vaccination, Coverage, Immunization status, 12-23 months

#### **INTRODUCTION**

Immunization plays crucial role in reducing child morbidity and mortality and needs to be sustained with higher coverage for desired benefits. 1,2 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). 3 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.<sup>4</sup> The recent National family health survey-V (NFHS-V) data shows that immunization coverage has been steadily increasing but the average level remains far less than the desired. Still only 76.3% and 76.4% of the infants in Gujarat and India respectively are fully immunized which is less than the desired goal of achieving 85 per cent coverage.<sup>5,6</sup>

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Government of India has also launched mission Indradhanush to improve immunization coverage in India. Government of Gujarat has launched technology for community health operation (TECHO) mobile application to track unimmunized children. Wide variation among states and areas within a state regarding the immunization coverage was observed. Therefore, it was important 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.<sup>7</sup> Thus, especially conducted community based surveys by independent agencies such as us (department from medical college) can provide data that are closer to realistic ones. Performing such surveys on a scientifically selected subset of the population can provide important insight information for local health authorities and policy makers. This study was formulated against this background with an objective of assessing the immunization coverage in children of 12-23 months of age group in rural field practice areas of medical college, Visnagar, Gujarat, India.

#### **METHODS**

Using the purposive sampling method, a cross-sectional community-based study was conducted in rural field practice areas of Nootan medical college and research center, Visnagar of Mehsana district of Gujarat during June-December 2021. An effort was made to collect data for maximum number of children during the available time period and all 223 children of 12-23 months age group of the area were included after taking verbal informed consent of their parents or guardians. Performa was prepared on the basis of government immunization card (Mamta card) having information regarding birth weight, date of birth, gender of baby, birth registration, growth chart and their vaccination status. Details of source of vaccination and reasons for partial immunization/non immunization were also included in performa. As the performa was specially prepared for the study, field testing was done and necessary modifications were applied to make it standardized and uniform. Vaccination status of the children was verified using the Mamta card. In conditions where the Mamta card was not available, the mother/parents were asked about the site of vaccinations and the age of vaccination to confirm the vaccines being given. Analysis of study was done by using appropriate statistical software applying suitable statistical tests.

#### **RESULTS**

Total 1934 households and 9456 persons were surveyed. The average family size was 4.67 per household. There were a total 4742 males and 4712 females in the area surveyed. There were 226 children in the age group of 0-11 months, 223 children in the 12-23 months age group and 248 children in the 24-35 months age group. There were 231 females who had delivered in the past one year, 728 children less than 3 years and 1021 children less than

five years of age in the area surveyed. Number of adolescents (10-19 years) and women in the reproductive age group were 1626 and 2678 respectively (Table 1).

Table 1: Demographic profile of household studied in Mehsana district.

S. no.	Parameters	Number
1.	Total number of the households studied	1934
2.	Total number of persons in the households	9456
3.	Total number of males in the families	4742
4.	Total number of females in the families	4712
5.	Total number of children 0-11 months of age	226
6.	Total number of children 12-23 months of age	223
7.	Total number of children 24-35 months of age	248
8.	Total number of children under 3 years of age	728
9.	Total number of children under 5 years of age	1021
10.	Total number of women who delivered in last one year	231
11.	Total number of adolescents (10-19 years) of age	1626
12.	Total women in reproductive age (15-49 years) of age	2678
13.	Average family size	4.67

Table 2: Availability of Mamta card/immunization record for children.

Availability of Mamta card/immunization record	Age group (12-23 months) Number (%)
Yes	175 (78.5)
No	45 (20.2)
Don't know about card	3 (1.3)
Total	223 (100)

Mamta card or immunization record was available with 175 (78.5%) mothers of 12-23 months age group of children. Out of them only 3 (1.3%) mothers did not know about the card or immunization record of their children (Table 2). Maximum coverage was seen for BCG (95.5%) followed by pentavalent/RVV/OPV first dose (93.3%). MR 1st dose coverage was 89.2%. Overall, 86.5% of the children in the 12-23 months age group were fully immunized (all vaccinations given as per age), 11.2% of the children were partially immunized (at least one of the vaccines given) while only 5 children were unimmunized (Table 3).

Table 3: Vaccination status of children in 12-23 months of age (n=223).

Indicators	Number	Percentage	95 % CI		
BCG	213	95.5	91.02-99.37		
Pentavalent/OPV/RVV 1st dose	208	93.3	89.05-98.6		
Pentavalent/OPV/RVV 2nd dose	206	92.4	88.4-98.32		
Pentavalent/OPV/RVV 3rd dose	203	91.0	87.16-97.74		
f-IPV 1st dose	208	93.3	89.05-98.6		
f-IPV 2nd	203	91.0	87.16-97.74		
MR 1st dose	199	89.2	80.08-93.78		
Overall immunization status					
Fully immunized	193	86.5	78.95-93.06		
Partially immunized	25	11.2	05.17-18.2		
Unimmunized	5	2.2	0.01-6.8		

Table 4: Reasons for partial immunization/unimunization among 12-23 months of age (n=30) (multiple response were counted).

Reasons (multiple options)	Number	Percentage
Not aware where to go	6	20.0
Fear of AEFI	5	16.7
Session time not convenient	2	6.7
No one to take the child	2	6.7
No perceived need	2	6.7
Travelling away	1	3.3
No one contacted	1	3.3
Not aware about missed dose	1	3.3
Other	8	26.7

Table 5: Vaccine drop-out rate proportion (12-23 months).

Vaccines	Coverage of first antigen	Coverage of last antigen	Drop-out rate proportion
Penta1 to penta3	93.3	91.0	2.46
Penta1 to measles	93.3	89.2	4.39
Highest coverage vaccine to lowest coverage vaccine	95.5 (BCG)	89.2 (MR)	6.60

Drop-out rate proportion=  $\frac{(coverage\ of\ first\ antigen-coverage\ of\ last\ antigen)}{coverage\ of\ first\ antigen}\times 100.$ 

Reasons for partial or non-immunization were asked to parents/adults in the households where the children were not immunized. Most common reason was that they were not aware of where to go (6 responses) followed by fear of adverse events following immunization (AEFI) (5 responses). Other reasons were need for vaccination not being perceived, no one available to take the child for vaccination and session time not convenient (2 responses each). Some other reasons included the travelling away, not aware about missed dose and no one contacted (Table 4).

Dropout rate percentage for pentavalent 1st dose to pentavalent third dose was 2.46% while for pentavalent

first dose to MR first dose was 4.39%. The highest covered vaccine was BCG (95.5%) while lowest covered vaccine was measles (89.2%) and the dropout rate percentage for BCG to measles was 6.60% (Table 5).

#### DISCUSSION

Immunization card was one of the important tools for assessing immunization status and as a documentary record. Mamta card was a multi-utility card incorporating not only vaccination details but also multiple maternal as well as child health components. In our study Mamta card or immunization record was available with 84 (78.5%) mothers of 12-23 months age group of children. Similar low availability of vaccination card was seen in NFHS-V Gujarat.<sup>5</sup> In Sheth et al immunization card availability was seen 77.7% of the mothers.<sup>6</sup> However, preservation of vaccination card was still very poor and needed to be

emphasized as it was an important document which can affect the calculation of status of immunization of a child.

In our study, 86.5% of the children in the 12-23 months age group were fully immunized (all vaccinations given as per age), 11.2% of the children were partially immunized (at least one of the vaccines given) while five were unimmunized. As per NFHS-V Gujarat, 76.3% were fully immunized and 75.9% were fully immunized in rural area.<sup>5</sup> Similar high coverage of full immunization (84-93%) had been reported by other studies also.<sup>9-12</sup> This strengthened the evidence that reported data should not be taken for actual coverage and evaluation studies were more likely to reveal the actual field situation for coverage of vaccination.

In our study dropout rate percentage for pentavalent 1st dose to pentavalent third dose was 2.46% while for pentavalent first dose to MR was 4.39%. The highest covered vaccine was BCG (95.5%) while lowest covered vaccine was MR (89.2%). The dropout rate percentage was 6.60%. As per NFHS-V Gujarat, dropout rates were found gradually decreasing in rural area (14.6% in 2015-2016 to 8.91 in 2019-2020).<sup>5</sup> In our study good coverage of pentavalent indicated good service utilization by people of area studied. In our study pentavalent 1st dose to pentavalent third dose was less than 10% (2.46%) also showed good service utilization indicating good health care infrastructure/resources with good demand in the area studied.

In our study, most common reason or unimmunization and partial immunization was that they were not aware of where to go (6 responses) followed by fear of AEFI (5 responses). Other reasons were need for vaccination not being perceived, no one available to take the child for vaccination and session time not convenient (2 responses each). Some other reasons included the travelling away, not aware about missed dose and no one contacted. Similar reasons were seen for non-immunization in a study in Banglore by Punith et al where 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 were found.11 Vohra et al in Lucknow showed that major reasons for nonacceptance/ discontinuation of immunization were lack of faith in immunization (21%), child being ill and hence not brought (13.68%).<sup>13</sup> Most common reasons for partial immunization were off place (22%), not known (20%) and sick child (20%).14

However, study done in rural field practice areas of Nootan medical college and research center, Visnagar of Mehsana district of Gujarat limited us to generalize the results. There was definitely a need for well-planned, large-scale studies using standardized methodologies to estimated coverage of immunization. Multi indicator cluster survey (MICS) by 30 cluster sampling technique proposed by WHO was gold standard method for rapid assessment of coverage evaluation. When planning these

studies it was necessary to ensure that importance was given to accurate evaluation of immunization status and representation of the different regions of Gujarat.

#### **CONCLUSION**

Overall immunization coverage in the study was 86.5% which was above the national average (NFHS-V). Coverage surveys should also be done on a periodic basis to check the effectiveness of measures undertaken to improve the coverage and to reduce the dropout.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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