

# Coverage Evaluation of BCG, MR, and New vaccines (Fipv, Fractional Dose Inactivated Polio Vaccine) Under Universal Immunization Program and Optional Vaccines In Rural India

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**Abstract - Context:** Immunization coverage survey appraises how many children were immunized correctly and the reason for dropouts. Information obtained from an immunization coverage survey can be used at all levels of the health system.

## Aims:

1. To assess the coverage of BCG, MR, and New vaccines (Fipv, Fractional dose Inactivated polio vaccine) optional vaccines, in the study area.
2. To find out reasons for drop out, if any

**Settings and Design:** Community-based, cross-sectional study.

**Methods and Material:** WHO's standard EPI 30 cluster sampling technique is used for assessing the vaccine coverage. In the present study, 30 villages around the Rural Health Training Centre were selected.

**Statistical analysis used:** analysis was done using SPSS version 24 Univariate analysis with chi-square test, and students t-test was done to find factors associated with vaccination status.

**Results:** Only a single dose of IPV and MR vaccine was taken by 84% and 80% of children, respectively. Lack of motivation due to rumors or no faith in immunization was found to be the most common reason for vaccines, i.e., 44.9% for IPV and 46.5% for MMR.

**Conclusions:** Supplementary immunization activities can help achieve the goal of 95% coverage for the Measles-Rubella vaccine to reach elimination.

**Keywords:** Vaccine coverage; Univerasal Immunisation Programme; Fractional dose Inactivated polio vaccine

## I. INTRODUCTION

Immunization saves millions of lives every year and is widely recognized as one of the world's most successful and cost-effective health interventions. It is a major public health intervention for the protection of children from preventable life-threatening conditions. Immunization coverage surveys provide information on the proportion of children that have been covered even if the number of children requiring immunization is not known. An advantage of a coverage survey is that it tells how many people were immunized correctly, as well as how many were immunized by other providers. Information obtained from an immunization coverage survey can be used at all levels of the health system. It helps evaluate the performance, find ways to improve the immunization activities, and estimate reductions in morbidity and mortality from vaccine-preventable diseases. The evaluation of reasons for immunization failure will provide useful information about why the mothers did not bring their children for immunization.

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## Objectives

1. To assess the coverage of BCG, MR, and New vaccines (Fipv, Fractional dose Inactivated polio vaccine) under Universal Immunization Program and optional vaccines, in the study area.
2. To find out reasons for drop out if any



## Subjects and Methods: Methodology

**Research design:** Community-based, cross-sectional study.

### Outcome to measure

1. Vaccination coverage (New vaccine, optional vaccine, and UIP routine vaccines)
2. The reason for drop out, if any.

### Data analysis and sample size

Estimates of percentages, means, and odds ratios will be computed using statistical software Microsoft office Excel and Software for Statistics and Data Sciences (STATA). Association between immunization status and background variables such as gender, birth order, religion, type of family, the socioeconomic status will be measured using the Z test, univariate and binomial logistic regression.

- Sample size was calculated by using the formula:
  - $n = \frac{(Z\alpha/2)^2 pq/d^2 = (1.96)^2 \times (0.5)^2}{(0.1)^2} = 96$
- After applying doubling effect,  $n = 192$   
By adding 10%,  $n = 192 + 19$ ,  $n = 211$ ,  $n \approx 210$

Similarly, another 210 was the sample size considered separately for coverage of both optional vaccines and MR Campaign.

Total sample size =  $210 + 210 = 420$

- **New Vaccines** under UIP (i.e., fIPV and MR vaccine)
- **Optional vaccine:** Pneumococcal conjugate vaccine, Rotavirus vaccine, Seasonal influenza vaccine (Flu Vaccine), Varicella vaccine, Typhoid vaccine, Meningococcal vaccine, Hepatitis A, and Rabies vaccine is recommended as pre-exposure prophylaxis.
- **Vaccines under UIP:** 1. BCG (Bacillus Calmette Guerin) 2. DPT (Diphtheria, Pertussis, and Tetanus Toxoid) 3. OPV (Oral Polio Vaccine) 4. Measles 5. Hepatitis B 6. TT (Tetanus Toxoid)
- Data collection tool- pre-tested questionnaire.

### Study subjects

Children aged **between 19-30 months** for coverage of the new (fIPV & MR) vaccines and **2 & 1/2-15 years**<sup>1</sup> for optional vaccine and MR Campaign coverage.

WHO's standard EPI 30 cluster sampling technique is used for assessing the vaccine coverage. In the present study, 30 villages around the Rural Health Training Centre were selected. Villages are selected based on the convenience of distance. After selecting the first house randomly from that street, subsequent nearby houses to be visited until the sample size is attained. The first available seven children aged between **2 & 1/2-15 years**, and the first available seven children in the age group of **19-30 months** (a total of 14 children in each village), to be included in the study from each village mothers and child health cards from the subcenters will be used to obtain vaccination data. Children were classified into 'vaccinated' or 'not vaccinated' based on the vaccination card.

### Ethics approval

Required ethics principles followed by taking consent from the participants, adopting the principles of the Declaration of Helsinki<sup>ii</sup>. Confidentiality of the data is ensured at all levels. No invasive tests are carried out in the survey.

## RESULTS

The mean age of study participants was 21.44 months (SD=2.4months)(table 1). It ranged from 16 to 31 months, and 89% were less than 2 years of age. The majority (62.4%) of them were males. In our study area, BCG coverage was 100%. But for IPV and MMR, the majority was partially vaccinated. Only a single dose of IPV and MR vaccine was taken by 84% and 80% of children, respectively (Table 2). Among those partially immunized, reason was elicited for both IPV and MMR separately. Lack of motivation due to rumors or no faith in immunization was found to be the most common reason for vaccines, i.e., 44.9% for IPV and 46.5% for MMR. The second most common reason was obstacles like a far place of vaccination, unavailability of vaccines, ill child, etc., which was noted among 42.8% children for MR vaccine and 32.4% for IPV vaccine. Lack of information regarding vaccines was comparatively less among our sample. 22.7% of partially immunized for IPV and 10.7% of those partially immunized for MR mentioned unawareness regarding subsequent doses to be a reason for their vaccination status. Gender was found to be having a statistically significant association with IPV vaccination status. The majority of female children were vaccinated for IPV compared to males (p value=0.001). A similarly higher proportion of vaccination was found among female children for MR vaccine as well, but it was not statistically significant. There was no significant difference in the mean age of partially and completely immunized children for both IPV and MR.

**Table 1.**

Socio-demographic variables	Categories	Frequency(n)	Percentage
Age	<2years	379	89%
	>2years	47	11%
Gender	Male	266	62.4%
	Female	160	37.6%
Age of Mother	<25years	256	60%
	>25years	170	40%
Education Status of Mother	illiterate	149	45%
	Literate	277	65%
Occupational status of Father	Unemployed	175	41%
	Employed	251	59%
Poverty Status	APL		
	BPL		

**Table 2.**

Immunization Coverage	Categories	Frequency(n)	Percentage
BCG	Immunized	426	100%
IPV	Completely Immunized	357	83.8%
	Partially Immunized	69	16.2%
MR	Completely Immunized	341	80%
	Partially Immunized	85	20%
Total Immunization status	Completely Immunized	400	93.9%
	Partially Immunized	26	6.1%

**Discussion:**

During the covid Pandemic, the study was undertaken for a vaccine coverage survey. The Universal vaccination program was uninterrupted. Nevertheless, the impact of airborne infection was felt in rural areas and continuity of logistic supply. The main reason for partial and unimmunized subjects was the non-availability of fractional dose Inactivated Polio Vaccine. In the Measles-Rubella vaccine,

Child being ill was the main reason among the partially and unimmunized subjects. There is a need to ensure a regular supply of fIPV to bring down the dropout rates. Supplementary immunization activities can help achieve the goal of 95% coverage for the Measles-Rubella vaccine to reach elimination. Mass media can highlight the significance of vaccination and allay fear and apprehension among the general public.

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