

ORIGINAL ARTICLE

**Immunization status of children upto 3 years in rural block, Muzaffarnagar**

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<a href="#">Abstract</a>	<a href="#">Introduction</a>	<a href="#">Methodology</a>	<a href="#">Results</a>	<a href="#">Conclusion</a>	<a href="#">References</a>	<a href="#">Citation</a>	<a href="#">Tables / Figures</a>
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**Abstract**

**Background:** The year 2012-2013 was declared as ‘Year of intensification of Routine Immunization (IRI) in India. As per CES, DLHS and AHS, Full Immunization for the children of age group of 12-23 months of Uttar Pradesh is 30.2 (DLHS 2007), 40.9 (CES 2009) and 45.3 (AHS 2010-2011). Studies have been done to assess the primary immunization status i.e. BCG, OPV3, DTP3 and Measles. Data on the Booster doses and the additional vaccine is insufficient. **Objectives:** To assess the status of full Immunization, Complete Immunization and the status of Immunization with regard to different vaccine and reasons for partial and No Immunization. Design & Methodology: A community based cross sectional study was done (Aug to December 31th 2014) in the field practice area of rural health and training centre (RHTC) of Muzaffarnagar Medical College, Muzaffarnagar. 50% of the villages i.e. 3 villages (Bilaspur, Shernagar and Dhandhera) selected by simple random sampling technique and the age group selected were up to three years of age. The data was analyzed using MS excel sheet and the software used was software Epi-info version 7.1.3. Results and **Conclusion:** The Full Immunization in the age group of children between 12-23 months was 65% with antigen coverage maximum for BCG (93%) and lowest for Measles (68%). Reason for partial and unimmunized children were majority due to non-availability of vaccine at the centre followed by fear of AEFI. Complete Immunization in the age group between 24-36 months was 46% with MCV 2 coverage being the lowest (34%). Full Immunization in the age group of 24-36 months is significantly more than 12-23 months age group. Tendency is to have less and less immunization as the age of the child grows (P<0.05).

**Key Words**

Full Immunization; Complete Immunization; Measles Containing Vaccine (MCV)

**Introduction**

The year 2012-2013 was acknowledged as ‘Year of intensification of Routine Immunization (IRI) in India. There was augmented focus on improving coverage in identified 239 poor performing districts in India. The government intends to focus attention and priority on conducting immunization week in these states and districts, conducting more regular review and monitoring and supervisions, improving cold chain status, and improving IEC efforts for increasing coverage for all the antigens. (1) As per the Coverage Evaluation Survey (CES-2009), 61% of children in the

country are Fully Immunized with all vaccines. The comparative national figures for the District Level Household Survey (DLHS) 3(2007-08) and CES (2009) are summarized in the table below: (2)

Status	Evaluated Coverage (%)	
	DLHS (2007-08)	CES (2009)
Full Immunization	53.5	61
BCG	86.7	86.9
OPV3	65.6	70.4
DTP3	63.4	71.5
Measles	69.1	74.1
No Immunization	4.6	7.6

These figures vary widely across the regions, and states. As per CES, DLHS and AHS, Full Immunization for the children of age group of 12-23 months of Uttar Pradesh is 30.2 (DLHS 2007), 40.9 (CES 2009)

and 45.3 (AHS 2010-2011). Two Studies have been done to evaluate the primary immunization status i.e. BCG, OPV3, DTP3 and Measles. (3,4,5,6) Data on the Booster doses and the additional vaccine is insufficient.

### Aims & Objectives

1. To know the Immunization status.
2. To evaluate the reasons for partial and No Immunization

### Material and Methods

The present study is a community based, cross-sectional epidemiological study and conducted in the field practice area of RHTC, Department of Community Medicine Muzaffarnagar Medical College Muzaffarnagar. RHTC caters 6 villages, out of which 50% of the villages i.e. 3 villages (Bilaspur, Shernagar and Dhandhera) selected by simple random sampling technique. The age group selected for the study was up to three years. Informants preferably mothers/head of the family were interviewed using a semi-structured and pre-tested questionnaire by house -to -house visit. Data collection carried for 5 months from August 2014 to December 2014. On considering the Full Immunization in Uttar Pradesh as 40.9 (CES 2009), with 95% confidence interval; at 5% level of significance and 10% allowable error using the formula  $n=4pq/l^2$ , the minimum sample size required was calculated to be 577. Considering 10% for the non-respondent, the sample size is 634 (577+57=634). Special care was taken to see that the doses of OPV administered during the Pulse Polio Program (PPI) are not taken into account as quite often parents associate the doses administered during PPI with the regular OPV doses. The status was determined by history obtained from parents (preferably mothers), confirmed, wherever feasible, by immunization cards. Full Immunization was defined as receipt of BCG; DPT 1,2 and 3; HepB 1,2 and 3; OPV 1,2 and 3 and Measles before 01 year of age. A child will be Complete Immunized only when he receives Measles 2nd dose; DPT Booster-1 and OPV Booster before two year of age in addition to vaccines pertinent to Full Immunization (Complete Immunization: Full Immunization plus Measles 2nd dose, DPT-1 booster and OPV booster). No Immunization was defined as failure to receive any vaccine listed above; all children who fell between complete and no immunization were considered to have partial immunization. Prior consent obtained

from the mother/head of the family and approval from the Institutional Ethical Committee taken well in advance. For statistical evaluation, Chi-square test was applied

### Results

We had agreement of 600 subjects out of 634, as mothers of 34 children refused to participate in the study. Out of 600 students, 276 (46%) children were in the age group of 12-23 months, 90 (15%) were in the age group of 24-36 months and 234 (39%) children were in the age group between births to eleven months as can be seen in [Figure 1](#).

Status of Immunization in different age group

1. Immunization status of children in the age group (12-23 month)

The immunization status of children in the age group of 12-23 months is depicted in [Table 1](#). Out of 276 children in the age group 12-23 months, 179 (65%) children found to be full immunized, 91 (33%) children found to be partially Immunized and 6 (2%) of children with No Immunization

[Table 2](#) shows antigen wise coverage in the age group of 12-23 months. The coverage decreases from BCG (93%) to Measles 1st dose (68%). Drop out between DPT1 and DPT 3 is 19% and drop out between DPT1 and Measles first dose is 22%.

[Figure 2](#) reflects the reason for partial & unimmunized children in 12-23 months age group

2. Status of vaccination of BCG, OPV Birth dose, and Hepatitis B birth dose (0-11 month):

OPV (70%) and Hepatitis B birth dose (65%) coverage is significantly less when compared to BCG (92%). This could be because of increase window period for BCG vaccination as compared to OPV and Hepatitis B birth dose. [Figure 3](#)

3. Status of Immunization in the age group of 24-36 months

Complete Immunization when analyzed in the age group of 24-36 months came out to be 46% which is quite less when compared to FI in the same age group. One of the significant factors is low coverage of MCV 2 (34%).

Awareness of family pertinent to timing of visit for next due vaccine becomes quite important and this came out to be more in the age group of 0-11 months (51%)

[Table 3](#) shows the immunization status of children belonging to different age groups. As can be easily appreciated by this table Full Immunization in the age group of 24-36 months is significantly more than

12-23 months age group. Tendency is to have less and less immunization as the age of the child grows. This difference is statistically significant

## Discussion

Largely, the immunization coverage (taking all vaccines together) in India, notwithstanding showing improvement remains far from satisfactory. When equated with CES (2009), a slight improvement, from 61% to 65%, was notable. But the figures from U.P. remained awfully low, improving from 40.9% (CES 2009) to only 45.3% (AHS 210-11). Other studies carried out in different parts of U.P. and contiguous states of North India witnessed complete immunization rates of 30%, 44% and 33.3% respectively. (7,8,9) Interestingly, the studies made in and around Delhi show higher rates, varying from 69% to over 71%, though one of them gave a figure as low as 25%. (10,11,12) The rates for partial immunization and no immunization in our study are 33% and 2% respectively, while the comparable rates in all these studies varied between 15% and 48%, and between 8.5 and 34% respectively. (8-12) The vast alteration between different coverage rates in these studies can be elucidated by differences in setting (rural, urban or urban slums; different parts of the country) and of course the facilities available in different parts of North India. One large study, consisting of about 19000 children, carried out in 90 districts strewn in different parts of India, is worth mention, which gave rates of coverage in the districts lying in U.P. as 51%, 32% and 16% of the complete, partial and no immunization respectively. (13) We could find only one study which strained to look outside and take into account the booster doses of DPT/DT and OPV, as we have tried to do in the present study; in a study comprising children <7 years, they found that, 77.2% children received primary vaccination, while the rates for the 1st booster and the 2nd booster doses (of OPV, DPT) were 73.1% and 58.4% respectively. (14) Likewise taking a general view according to the children age, we also tried to go deeper and studied the coverage of the individual vaccines and different vaccination events, including the doses of the same vaccine, in an effort to know as to which vaccines or vaccination events are the most desired or deserted ones. Several facts emerge from [table 2](#). Firstly, there is a sizable loatheness for the vaccination events falling at a later age and this lessening trend is upheld even for the subsequent doses of the same vaccine,

so much so that the rates for OPV-1 (89%) and DPT-1 (90%) are much better than those for OPV-3 (76%) and DPT-3 (71%) respectively. A look at [table 2](#) makes it profusely clear that there appears to be an inverse association between the age of the child and the vaccine acceptability; lesser the age, better is the coverage and lower is the default rate. However, the consequence is not so simple; exception being the BCG and to a lesser extent the OPV-0, which, though are the earliest vaccines to be given, are taken only by 93% and 70% children respectively, which indicate that apart from the age of the child, parents also tend to show preference or loatheness for different vaccines; and this is another noteworthy finding. While the most preferred immunizations is BCG (93%), the most dodged vaccination event is the Measles 2<sup>nd</sup> dose (34%). The NFHS III report also shows a decline in coverage for each succeeding dose of DPT/OPV, and between the third dose of DPT/OPV and measles vaccine, suggesting that coverage rates declined as children grew older. (15) The present study not only shows slightly different rates for OPV and DPT doses meant for the same session but also between OPV-0 and BCG (both given at birth). This selective pattern was also observed by some other workers, all these studies, like the present study, show the measles vaccine as the least preferred. (8,12,14)

While doing the present study, an attempt was also made to find, through interviewing parents, the reasons for not getting their children immunized (as per schedule or not at all). The reasons are listed in [figure 3](#). The most commonly observed reason for partial or no immunization was non-availability of vaccine at the centre followed by fear of AEFI and other reasons. ([Figure 4](#))

## Conclusion

Interpretations from the present study imitate towards a pressing need to fast-track efforts in improving the immunization coverage in the area. Efforts should specially be to ensure we have all the vaccine at the session site and also target at children delivered at home, migratory population and less educated mothers

## Authors Contribution

Though the notion and strategy were mainly by the first author, all authors have contributed adequately in the intellectual content, understanding of data and preparation of the manuscript.

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**Tables**

**TABLE 1 STATUS OF FULL IMMUNIZATION IN 12-23 MONTHSAGE GROUP (N=276)**

	Numbers	Percentage
Full Immunization	179	65
Partial Immunization	91	33
No Immunization	6	2

**TABLE 2 ANTIGEN WISE COVERAGE IN THE AGE GROUP (12-23 MONTHS)**

Antigen	Numbers	Percentage
BCG	257	93
OPV1	246	89
DPT1	248	90
HepB1	248	90
OPV2	235	85
DPT2	232	84
HepB2	218	79
OPV3	210	76
DPT3	196	71
HepB3	196	71
MCV1	188	68

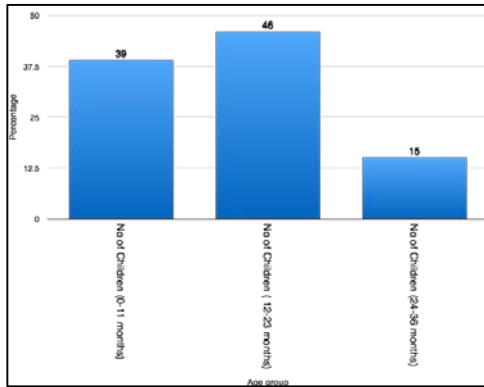
**TABLE 3 IMMUNIZATION STATUS OF CHILDREN FROM DIFFERENT AGE GROUP**

Age group	No. of children	Full Immunization	Partial Immunization	No Immunization
12-23 months	276	179	91	6
24-36 months	90	76	9	5
Total	366	255	100	11

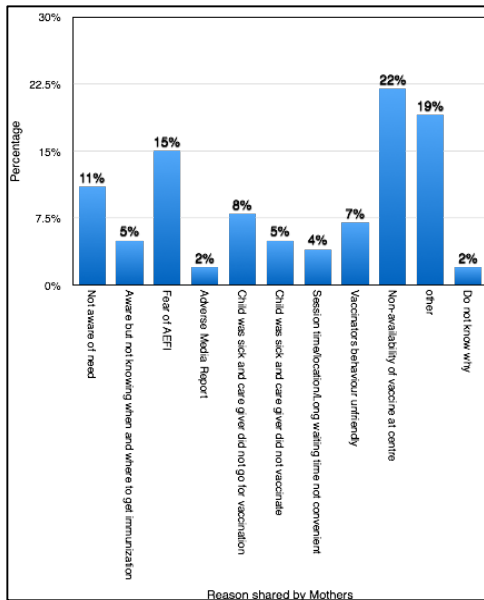
The chi-square statistic is 19.4277. At df=2 the p-value is .00006. The result is significant at p < .05

**Figures**

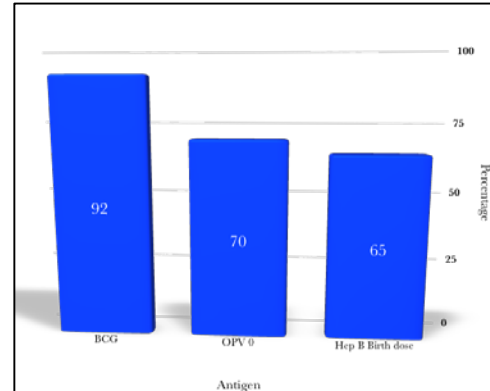
**FIGURE 1 AGE GROUP DEVISION BETWEEN 0-36 MONTHS CHILDREN**



**FIGURE 2 REASON FOR PARTIAL AND UNIMMUNIZED CHILDREN IN THE AGE GROUP OF 12-23 MONTHS**



**FIGURE 3 STATUS OF VACCINATION FO BCG/OPV HEP B BIRTH DOSE AND HEP B BIRTH DOSE IN AGE GROUP OF 0-11 MONTHS [N=234]**



**FIGURE 4 % FAMILY KNOW THE TIMING OF VISIT FOR NEXT VACCINE DUE IN AGE GROUP**

