

# Coverage Evaluation Survey of the Universal Immunization Program in North- Eastern India.

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## ABSTRACT

**Background:** The National Family Health Survey-4 Report and the District Level Household Survey-4 Report give rather low coverage rates of the Universal Immunization Program for the whole country, the state of Manipur and Imphal East District of Manipur. The aforementioned surveys have been conducted four-five years back. Meanwhile special initiatives have been taken up by the Ministry of Health and Family Welfare, Government of India to enhance the immunization coverage and by now, some changes in the program performance are expected. Aims & objectives: The current study was conducted to evaluate the primary vaccination coverage among children aged 12-23 months and TT coverage among mothers of eligible children while pregnant. The study also aimed to explore the main reasons for children not fully immunized. **Methods:** A cross-sectional study was conducted in Imphal East District, Manipur during 01 May-30 June 2017 among mothers having 12-23 months old children. 210 eligible study-women were selected by using WHO cluster sampling technique. Data on their background characteristics, immunization status of both their children and of themselves during last pregnancy and vaccination-related details were collected by a team of trained surveyors by using a pre-tested interview schedule. **Results:** The full immunization rate among children was found to be 91.9% and among women the full Tetanus Toxoid coverage during pregnancy was found to be 98%. There was no significant association between the immunization status and important background characteristics like distance from nearest health facility, gender of child, place of residence, type of community, place of delivery, order of birth, family income, mother's occupation or educational status. **Conclusion:** The main reason for not getting fully immunized was lack of information. The main sources of immunization-related information were the ASHAs, health workers and radio.

**Keywords:** Coverage evaluation, Fully immunized, North-eastern India, Universal Immunization Program.

## INTRODUCTION

Globally, 2-3 million deaths occur every year due to Vaccine Preventable Diseases (VPDs). Approximately 1.5 million of these deaths are among children aged below five years.<sup>[1]</sup> Immunization is one of the most cost-effective public health strategies to reduce morbidity and mortality associated with VPDs. The Universal Immunization Program (UIP) which followed the Expanded Program on Immunization in 1985 caters to about 2.7 crore children annually in India.<sup>[2]</sup> The vaccines used under this program are BCG, Oral Polio Vaccine (OPV), Diphtheria Pertussis Tetanus (DPT) Toxoid, Measles Vaccine, Pentavalent Vaccine comprising of DPT,

Hemophilus influenzae B (HiB) Vaccine and Hepatitis B (Hep-B) Vaccine, Tetanus Toxoid (TT) for pregnant women and Japanese Encephalitis (JE) Vaccine in selected endemic districts of the country. Rotavirus Vaccine (RVV) and Injectable Polio Vaccine (IPV) are newer additions to the list.

The evaluated coverage as given in the National Family Health Survey-4 (NFHS-4) Report (2015-16) published by the Indian Institute of Population Sciences under the aegis of the Ministry of Health and Family Welfare (MoHFW), Government of India shows the full immunization rate as 62% for the country and 65.9% for the state of Manipur.<sup>[3]</sup> The District Level Household Survey-4 (DLHS-4) Report (2013-14) further shows a figure of 54.1% for Imphal East District, which is a part and parcel of the state capital of Manipur.<sup>[4]</sup> All the figures show that, immunization coverage is not as high as desired. To give further impetus to the program, MoHFW, Govt. of India, hence after, launched special schemes like Mission Indradhanush in selected low-performing districts of the country. Hence, some improvement is expected by now. Further there is a time-lapse of 4-5

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years since the last DLHS was conducted during which some changes might have taken place. To ascertain the current status, it was felt necessary to take up a coverage evaluation study.

### **Aims and Objectives**

The current study was conducted to evaluate the primary vaccination coverage among children aged 12-23 months and TT coverage among mothers of eligible children in their last pregnancy. The study also aimed to explore the main reasons for children not fully immunized.

### **MATERIALS AND METHODS**

A cross-sectional, community-based study was conducted in the Imphal East District of Manipur during the period 01 May – 30 June 2017. The study population consisted of mothers who had children aged 12-23 months with the exclusion criteria of refusal to participate in the study or who could not be met at the time of survey. The WHO 30 X 7 cluster sampling technique was adopted to get 210 eligible mothers. 30 clusters were first selected methodically based on the population sizes of villages and wards according to Census 2011 Report. A minimum of seven eligible mothers were further selected systematically from each of the identified clusters.

A team of trained MBBS internee doctors collected data by using a pre-tested, semi-open Interview Schedule. It had sections on socio-demographic profile, immunization status of both the child and mother and vaccination-related details. Vaccination/immunization status was ascertained from Immunization card, if available, or detailed history and BCG scar, in case immunization card was not available. As Rotavirus Vaccine and IPV were recently introduced in the state, the operational definition used for “fully immunized” was made as “a child aged 12-23 months who had received one dose of BCG, three doses of DPT or Pentavalent vaccine, three doses of OPV, one dose of Measles, one dose of JE and three doses of Hepatitis B vaccine or Pentavalent vaccine”. Prior to the interview, informed verbal consent was obtained from the eligible women. Anonymity of respondents and confidentiality of collected data were maintained. Also, ethical approval from the Institutional Ethics Committee, JN Institute of Medical Sciences was obtained.

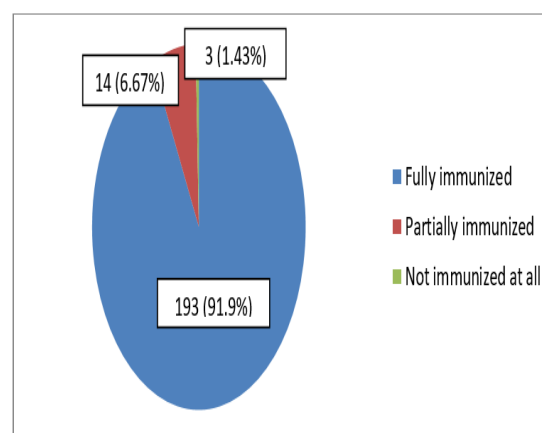
For quality maintenance of data, the investigators revisited all the identified clusters and re-affirmed the immunization status in at least 50% of the study women.

Data analysis was done by using both descriptive and analytical statistics. Wherever indicated, chi-square test and Fisher’s exact test were applied to detect statistically significant differences. A p-value

of less than 0.05 was taken as significant. SPSSv20 was used for the analysis.

### **RESULTS**

To get the targeted sample of minimum 210, a total of 213 households having eligible children had to be approached, three mothers refusing to participate as they had pre-engaged works. Thus, the participation rate was 98.59%. The mean age (SD) of the study-children was found to be 17.75 ( $\pm$ 3.391) months. The sex distribution of the 210 children was 99 males (47.1%) and 111 females (52.9%). Slightly more than half (116; 55.2%) of the study participants were from the rural area, the remaining 94 (44.6%) participants being from the municipal wards.



**Figure 1: Pie diagram showing immunization status (primary) among children aged 11-23 months.**

A total number of 193 study-children were found to be fully immunized giving a full immunization rate of 91.9%. Only 14 children (6.67%) were found to be partially immunized and only three children (1.43%) was found to be not immunized at all [Figure 1]

The vaccination coverage for the various individual vaccines were OPV-0 (37%), Hepatitis B-birth dose (37%), BCG (95%), DPT-1 to DPT-3 (99%), OPV-1 to OPV-3 (99%), Hep B-1 to Hep B-2 (99%), Hep B-3 (96%), Measles-1 (96%) and JE-1 (95%). [Table 1]

**Table 1: Distribution of children by vaccination status (n=210).**

Vaccines	No. of children vaccinated (%)
OPV-0	78 (37.1)
Hepatitis B (birth dose)	78 (37.1)
BCG	200 (95.2)
DPT/Penta-1, 2 & 3	207 (98.6)
OPV-1, 2 & 3	207 (98.6)
Hep B/Penta-1	207 (98.6)
Hep B/Penta-3	202 (96.2)
Measles-1	202 (96.2)
JE-1	200 (95.2)

As seen obviously from Table 1, the drop-out rates of BCG to Measles and DPT-1 to DPT-3 were zero,

whereas the drop-out rate of Hep B-1 to Hep B-3 was found to be 2.41%.

Among the mothers, 206 (98%) received TT-2/B in their last pregnancy, only one (0.48%) received only TT-1 and three (1.43%) did not receive TT at all. [Table 2]

**Table 2: Distribution of mothers by TT vaccination status while pregnant (n=210).**

Vaccines	No. of mothers vaccinated (%)
TT-2/B	206 (98.1)
TT-1 only	01 (0.48)
No TT	03 (1.43)

**Table 3: Immunization status of children by background characteristics.**

Background characteristics	No. fully immunized (%)	No. not fully immunized (%)	p-value
Distance from nearest health facility			0.896*
• < 1 Km (n=108)	99 (91.7)	09 (8.3)	
• 1-5 Km (n=102)	94 (92.2)	08 (7.8)	
Gender of child			0.617*
• Male (n=99)	90 (90.9)	09 (8.1)	
• Female (n=111)	103 (92.8)	08 (7.2)	
Type of residence			0.309*
• Urban (n=116)	109 (94.0)	07 (6.0)	
• Rural (n=94)	84 (89.4)	10 (10.6)	
Type of community			0.84**
• Meitei/Meetei (n=153)	140 (91.5)	13 (8.5)	
• Muslim (n=36)	33 (91.7)	3 (8.3)	
• Others (n=21)	20 (95.2)	1 (4.8)	
Place of delivery			0.109*
• Institutional (n=195)	181 (92.8)	14 (7.2)	
• Domiciliary (n=15)	12 (80.0)	3 (20.0)	
Order of birth			0.412*
• First (n=154)	147 (95.5)	7 (4.5)	
• Second (n=17)	12 (70.6)	5 (29.4)	
• Third or more (n=39)	34 (87.2)	5 (12.8)	
Occupation of mother			0.58**
• Unemployed (n=187)	172 (92.0)	15 (8.0)	
• Employed (n=23)	21 (91.3)	02 (8.7)	
Educational level of mother			0.769*
• ≤ Middle class (n=52)	47 (90.4)	5 (9.6)	
• ≥ Matriculate (n=158)	146 (92.4)	12 (7.6)	
Monthly family income (Rs.)			0.289*
• ≤ 6185 (n=42)	37 (88.1)	05 (11.9)	
• ≥ 6186 (n=168)	156 (92.9)	12 (7.1)	

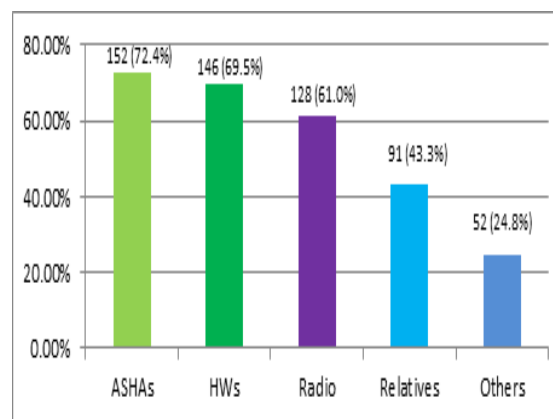
\*X2 test, \*\* Fisher's exact test.

[Table 3] shows the immunization status of study-children by selected background characteristics. There was no statistically significant difference in

the immunization status because of differences in distance from nearest health facility, gender of child, type of residence, type of community, place of delivery, order of birth, family income, mother's occupation or educational status.

The main reason, for the 17 children not fully immunized, was parents not being aware of immunization sessions (53%). Other reasons cited were feeling that immunization was not important, vaccination session site too far from home, ANM saying that vaccine was out of stock at the session site and child being ill off and on.

The main sources for information on immunization as reported by the mothers are depicted in [Figure 2].



**Figure 2: Study-women by main sources of information on immunization**

The study-women got immunization-related information from multiple sources. The main sources were Accredited Social Health Activists (by 72% women), Health Workers (by 70% women), Radio (by 61% women) and relatives (by 43% women).

## DISCUSSION

The current study finding of the full immunization rate being 91.9% in Imphal East District was much higher than the figure of 54.1% reported in DLHS-4 Report for the same study area.<sup>[4]</sup> The gap in the study timings between the two surveys and also new initiatives like Mission Indradhanush taken up recently by the Ministry of Health and Family welfare, Govt. of India to improve the coverage may explain for the quantum jump in the coverage. The same figure of 91.9% is again much better than the 65.9% full immunization rate for state of Manipur as reported in NFHS-4.<sup>[3]</sup> Similarly, it was much beyond the figures of 61% and 61.2% for the country as reported in NFHS-4 and Coverage Evaluation Survey Report (UNICEF) respectively.<sup>[3,5]</sup> The reasons already cited above may explain the difference in the findings.

The high full immunization rate as found out from the current study was comparable with the figure of 93.3% as found out by Regional Resource Center,

North-East, Ministry of Health & Family Welfare, Govt. of India from their study at Khowai District of Tripura in 2013 and also to the study finding (98%) made by Hamid S et al from their study conducted in the rural parts of North Kashmir in 2011.<sup>[6,7]</sup> The only difference with the later study was that, in their study area, health workers were the main source of immunization-related information, whereas, in the present study setting, health workers were the second best popular source of information next to ASHAs.

The fully immunized rate as found out from the present study area was slightly higher when compared to the 86.67% found out by Gupta PK et al from their study done in Pune, Maharashtra in 2013.<sup>[8]</sup> Otherwise, it is much higher compared to findings of other studies done elsewhere in different parts of the country, for example, by Assija V et al at rural Chandigarh in 2010-11 (69%), by Phukan PK et al at Assam in 2003 (62.2%), by Nath B et al at a urban slum of Lucknow in 2005 (52%), by Joshi HS et al at Bareilly, UP in 2008-09 (50%) and Masood A et al at Allahabad, UP in 2011 (31%).<sup>[9-13]</sup> The different study settings - some settings being based in slum areas and some based only in rural areas, different places in the country and different timings of the studies may be the important reasons for the disparity in the findings. Lack of information by the parents being the most important reason for not getting their children not fully immunized as found out by Phukan PK et al was also the commonest reason cited in the present study setting.

The minimal drop-out rates as found out in the current study might be because of the fact that, parents of infants were aware of the due successive doses of the vaccines. Mobilization efforts by community volunteers like Accredited Social Health Activists (ASHAs) and efforts from the healthcare providers in the district, too, could not be ruled out.

The coverage for various antigens used under UIP in the current study area was found to be above 95%, except for OPV-0 and birth dose of Hepatitis B vaccine, for which the coverage was 37% only. Taking into consideration that 185 out of the 210 study-children (88.1%) had institutional delivery, the seemingly low coverage of these two vaccines is a mismatch. The probable reasons might be that vaccines are not available round the clock in all the health facilities especially the private-run maternity clinics yet to be accredited (hence, free vaccines not supplied) or even if available, health providers not giving the birth doses because of reasons known to them only or mothers going back to home on the same day of delivery before the vaccines could be administered by the healthcare providers. The current study findings that seemingly important factors like distance from the nearest health facility, gender of child, type of residence,

type of community, place of delivery, order of birth, family income, education and occupation of mother not having any significant association with children's immunization status might be because of the very small size (only 17 in number) of "not fully immunized children" which renders inter-categorical comparison very difficult. In fact, different grades of variables like educational level of mother and family income were merged together during data analysis so that valid statistical tests could be applied.

## CONCLUSION AND RECOMMENDATIONS

The current study is one of its first kinds conducted in the state by the state itself, in addition to the surveys done by agencies of Ministry of Health & Family Welfare, Govt. of India. Another strong point of the current study was the very high participation rate by eligible study subjects (99%) which will reinforce the validity of the study findings. Having said this, the current study had some limitations, too. For example, the cluster survey method does not permit inter-cluster comparison. Hence, the urban versus rural comparison made in the current study might not be a valid one. Also, as mentioned before, the merging of different grades of variables might have masked any statistically significant association between background characteristics and immunization status.

The fully immunized rate was found to be comparatively very high in Imphal East District, Manipur (92%). Yet, as the name of the program implies, 100% should be target. It is worth mentioning that one number missed is not merely a number missed, but the life of a child kept unprotected. In half of the not fully immunized study-children, lack of information was the cited reason. Hence, awareness generation activities are recommended. While doing so, costly medium like mass media can be avoided as the very low drop-out rate found out in the area indirectly tells that parents are already aware of the need for successive doses. One-to-one communication using ASHAs and healthcare providers on issues like what vaccines are available, when and where should be the vaccination session sites will be more effective in catching up the small proportion of children (8%) not fully immunized.

It is also recommended that coverage evaluation surveys be taken up on regular intervals so as to know the program status and thereby enable to take up appropriate timely actions. Bigger surveys using more representative sampling methods are recommended so that inter-zonal comparisons can be made. This will help in planning and implementing area-specific strategies.

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