

## Original Research Article

**Immunization coverage among children in age group of 12-24 months in a block of Darbhanga, Bihar, India****Vijay Kumar Chaudhary<sup>1</sup>, Hem Kant Jha<sup>2</sup>, Chandra Mani<sup>3\*</sup>**<sup>1</sup>*Assistant Professor, Department of Community Medicine, Darbhanga Medical College, Laheriasarai, Bihar, India*<sup>2</sup>*Associate Professor, Department of Community Medicine, Darbhanga Medical College, Laheriasarai, Bihar, India*<sup>3</sup>*Assistant Professor, Department of Community Medicine, Darbhanga Medical College, Laheriasarai, Bihar, India***Received: 12-09-2021 / Revised: 13-11-2021 / Accepted: 06-12-2021****Abstract**

Immunization coverage has improved over the past few decades, but the rate of progress is not satisfactory. Globally, this rate has witnessed an increasing trend, the rate of DPT-3 vaccine has increased to 85% in 2017 from 72% in 2000 and 21% in 1980. **Methodology:** A community-based cross-sectional study was conducted between January and March 2021 in few randomly selected villages of Bahadurpur block of Darbhanga district in Bihar, India. The study subjects are included all the children aged 12--23 months old from the Bahadurpur block of Darbhanga. In this study, Bahadurpur block of Darbhanga district was selected. List of villages under the block were listed. WHO protocol for cluster sampling was used for the current study, so 30 villages were randomly selected from the obtained list. From each village, 7 households were selected as per WHO protocol. Hence, the calculated sample size came to 210 (30 × 7). **Results:** A total of 210 children in the concerned age group of 12-23 months were included in the survey. There was a slight male preponderance with a male female ratio of 1.69:1. Mean age of the surveyed children was 16.8 months with a standard deviation of 4.5 months. Median age was 17.5 months. Immunization card was available and presented at the time of survey among majority (97.8%) of the surveyed children. The present study revealed that 82.7% of children were fully immunized by first year of life. Rest 17.3% were partially immunized and only one female child was found to be non-immunized. **Conclusion:** To increase the immunization coverage, need to continuous monitoring and supervision of immunization site.

**Keywords:** Immunization, Children in age group of 12-24 months

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**Introduction**

The Universal Immunization Program (UIP), [1] has been launched nation-wide in 1985. It has been aimed at universal coverage of target population with vaccination against six preventable killer diseases - polio, diphtheria, tuberculosis, pertussis (whooping cough), measles and tetanus. Immunization coverage has improved over the past few decades, but the rate of progress is not satisfactory. Globally, this rate has witnessed an increasing trend, the rate of DPT-3 vaccine has increased to 85% in 2017 from 72% in 2000 and 21% in 1980.[2, 3] According to the joint report of the World Health Organization and the United Nations International Children's Fund in 2017, the immunization coverage in South East Asia Region (SEAR) for DPT-3 is 88% and for measles containing vaccine is 87%. Maldives has recorded the highest immunization coverage (99%) in this region and Indonesia has the lowest (79%) while India lies in the intermediate category (88%).[4] In India, UIP is the largest nation-wide programme in the world with annual cohorts of around 26.7 million infants and 30 million pregnant women.[5]

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The immunization coverage in India varies by state and area, and by level of urbanization. The National Family Health Survey-4 (NFHS-4) 2015--2016 reports 62% of children aged 12--23 months were completely immunized in India (BCG, 3 doses of DPT, OPV, and one dose of measles each). As per this national survey, 61.3% and 63.9% children of 12--23 months age have been fully immunized in rural areas and urban areas of India, respectively. Puducherry has the highest (91.3%) and Nagaland has the lowest (35.7%) percentage in terms of immunization coverage while immunization coverage for Uttar Pradesh, Bihar, India, and Jharkhand were 51.1%, 61.7%, and 61.9%, respectively.[6] In general, the rural population has substantially lower coverage than in urban areas. Availability of health infrastructure is a major factor in providing immunization, but the presence of a community health worker in the village is not necessarily associated with increased immunization coverage. [7, 8] Vaccination is widely recognized as one of the most powerful and cost-effective public health tools. Often immunization is a child's first - sometimes only - contact with the health system. [9] According to the District Level Health Survey in Lakhisarai district [10] carried out "between" 2007- 2008, in Lakhisarai district, the immunization coverage is 36.6%. The proportion of fully immunized children was 19% in the Coverage Evaluation Survey of 2005. In October 2007, a special campaign called Muskaan Ek Abhiyan (The Smile Campaign) was launched under the National Rural Health Mission to give a fillip to the immunization program, and has shown an increase in the levels of coverage. [11, 12] Access to health services and other

infrastructure, is associated with better vaccination coverage of infants. Measuring immunization coverage and the factors responsible for low coverage are critical for developing strategies to improve delivery of and access to an important public health tool. Therefore, this study was conducted to determine immunization coverage rates and evaluate factors influencing immunization coverage among children in age group 12--23 months of age in a selected block of Darbhanga.

#### Methodology

A community-based cross-sectional study was conducted between January and March 2021 in few randomly selected villages of Bahadurpur block of Darbhanga district in Bihar, India. The study subjects are included all the children aged 12--23 months old from the Bahadurpur block of Darbhanga. Children who were not accompanied by parents or caretaker at the time of three consecutive visits and the respondents who refused to respond were excluded from the study. Ethical clearance for the proposed protocol was obtained from the Institutional Ethics Committee.

#### Sample size and sampling technique

In this study, Bahadurpur block of Darbhanga district was selected. List of villages under the block were listed. WHO protocol for cluster sampling was used for the current study, so 30 villages were randomly selected from the obtained list. From each village, 7 households were selected as per WHO protocol. Hence, the calculated sample size came to 210 (30 × 7). Each village was considered to be a cluster. For selection of households in each cluster, a landmark (temple, mosque, Govt. building) was ascertained in the center of village with the help of local field worker. A convention of sticking to the left side was followed, and the house was selected by random selection method using the first currency note number (currency method) and remaining household was obtained by adding the house order to the previous house number. Data was collected by using structured WHO coverage evaluation format.

Operational definitions were taken for this study as per WHO Guidelines.[13]

- Fully immunized:** A child who has taken all the vaccines and their required doses as per national immunization up to age of 12 months.
- Partially Immunized (Dropout):** A child who has taken some vaccines or doses as per national immunization schedule up to age of 12 months.
- Non-immunized (leftout):** A child who have not taken any vaccine up to age of 12 months.

#### Data analysis

The data was entered and analyzed using Statistical Package of Social Sciences (SPSS) ver. 20.0. Descriptive statistics like frequency and percentage were used to summarize the sociodemographic characteristics of the study participants, place for

vaccination, immunization coverage, dropout and leftout along with reason for them.

#### Results

Universal immunization of children against vaccine preventable diseases crucial in combating health indicators viz infant and child mortality. According to the immunization schedule outlined by Govt. of India based on recommendations by WHO, all primary vaccination should be administered by the age of 12 months for each and every child in all communities. A total of 210 children in the concerned age group of 12-23 months were included in the survey. There was a slight male preponderance with a male female ratio of 1.69:1. Mean age of the surveyed children was 16.8 months with a standard deviation of 4.5 months. Median age was 17.5 months. Immunization card was available and presented at the time of survey among majority (97.8%) of the surveyed children. The present study revealed that 82.7% of children were fully immunized by first year of life. Rest 17.3% were partially immunized and only one female child was found to be non-immunized. The non-immunized female child belonged to a migrant couple. Gender wise distribution of fully immunized children was done and showed that 80.9% male and 79.7% of female received all the primary doses as per the schedule within 12 months of age. Dropout rates were calculated for the subsequent doses of various vaccines and it showed that these rates for both Pentavalent-1 to Pentavalent-3 and OPV-1 to OPV-3 was 4.9%. The dropout rate for highest covered antigen dose (Pentavalent 1/ OPV1) to lowest covered antigen dose (measles) was 9.1%. Sex-wise analysis of drop-outs rate of different vaccines showed no significant differences. Most of the children (96.9%) took immunization from existing Government health facilities out of which 84.8% received the vaccines from sub-centers. The major reasons for partial immunization by first year of life were enquired into and multiple responses were obtained from guardian of each of the partially immunized child. The main reason stated by 38.9% of respondents was their unawareness about the need to return for subsequent doses (38.9%), that makes the child unavailable for the complete dosages and leave the child vulnerable for the disease. Among the 17.7% of the partially immunized children, 28.5% of the children were not brought to the centre on the concerned dates due to minor illness, another 7.3% of the respondent stated their busy routine and hence their inability to take the child to the centre to get vaccinated. Around 6.2% of the children were postponed till another time during to medical reasons or due to unavailability of vaccines. Other reasons stated has been given in the following table. Almost 95.8% children aged between 12 to 23 months received first dose of Vitamin-A, of which 92.4% received first dose along with measles vaccine. The coverage was found to be more or less same in both sexes.

**Table 1: Causes of partial or non-immunization and percentage**

Causes of partial or non-immunization	Percentage
Unaware of need to return for subsequent dosage	38.9%
Unawareness about the place and time of immunization	3.1%
Fear of adverse reaction	3.1%
Wrong notions or misconceptions	4.7%
Difficult to access	3.1%
Inconvenient timing	4.7%
Mother too busy or illness	7.3%
Child illness	28.2%
Child was brought to the center but denied due to medical reason or vaccine not available	6.2%

#### Discussion

97.8% of the surveyed children in the district of Bahadurpur had their immunization cards. This figure is much higher than the corresponding figures in India (37.5%) as observed in NFHS-3.[14] The present study revealed that 82.7% of children (80.9% male and 79.7% of female) were fully immunized. According to the documents of NFHS-1, NFHS-2 and NFHS-3, fully immunized children in India

were 35.5%, 42% and 43.5% only. [14] In the present study no difference was found between immunization coverage rates of male and female children ( $p > 0.05$ ). In Madhya Pradesh, proportion of fully immunized children was 60.8% and immunization coverage rates in male and female children were 63.7% and 57.1% respectively. [15]

The factors contributing towards incomplete immunization include the fact that information on requirement for full immunization is not communicated to the client's receiver in an understandable (local language). Improving mother's knowledge regarding immunization presents potential opportunities to increase the coverage. There is a need to conduct in-depth interviews, observation of sessions and interactions in maternal child health centre to assess whether mothers and caretakers are properly motivated to bring children to maternal child health. A study was done to assess the immunization coverage in an urban slum area of Mumbai and determine various sociodemographic variables. A total of 210 children were selected from study population using 30 WHO cluster sampling technique. It showed that reason for less immunization coverage is lack of information (21.13%), lack of motivation (13.40%) and Obstacles (65.46%). Among other reasons, noncompliance was given as child's illness at the time of scheduled vaccination followed by lack of knowledge regarding importance of immunization. Low education status of mother, high birth order, and place of delivery were found to be associated with low vaccination coverage. Another similar study showed that visit to native place (14.7%), carelessness (lack of time) (11.7%), sickness of child (11.7%), and lack of knowledge (10.4%) were reasons for incomplete immunization. [16] The administration of invalid doses indicates that vaccinators in both the fixed and outreach facilities do not screen children adequately before administering vaccines. This could be investigated by physical observations of EPI sessions, as well as conducting in-depth interviews of mother and follow-up to ensure adherence to immunization schedules. There were various studies done on reason of such immunization coverage in different places shows the significant association between immunization status of the children and mother's education status, birth order, and place of delivery. To ensure regular EPI session involvement of Community may be an appropriate means to remedy this situation. A study on Immunization Coverage in Gujarat compared the results from the Rural and Urban Field Practice areas of a Medical College and showed that unawareness as well as the fear of adverse effects following immunization (AEFI) as the main reason for missed out cases and dropouts. On one side Health practitioners mostly accept that low demand for, or refusal of immunization, replicates public ignorance or misrepresentation that needs to be changed through education. So far expectations of unawareness and rumours overlook the effect of local knowledge and cultural perspectives on leading people to demand. On the other side, recording and reporting EPI performance are important documentary activities that are vital to performance of the EPI program. Among others, these include issuing mothers with cards, and documenting the EPI register for children of under one year in each immunizing facility. Child Health Cards can help health workers and caretakers to follow up child health issues. A system of tracking down eligible children for routine vaccination will be necessary, as missed opportunities and refusals are crucial in routine programme and future campaigns. All stakeholders should come to a common conclusion regarding formulation and development of alternative strategies, and proper implementation to increase the immunization coverage.

#### Conclusion

Immunization coverage rate is poor than the national coverage rate therefore need to address this issues from provider side as well as user side. Cause for no and partial immunization need to be resolved through different scientific strategies. To increase the immunization coverage, need to continuous monitoring and supervision of immunization site.

**Conflict of Interest: Nil**

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