Original Article

Assessment Of Primary Immunization Coverage Among The Children Aged 12 - 23 Months In Urban Area Of Bhagalpur City

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Abstract

Background: Immunization is one of the most cost-effective interventions that preventneedless suffering through sickness, disability and death. The benefits of immunization are not restricted to improvement in health and life expectancy but also have social and economic impact at both community and national levels. Immunization averts an estimated 2 to 3 million deaths every year from diphtheria, tetanus, pertussis (whooping cough) and measles, however an additional 1.5 million deaths could be avoided if global vaccination coverage improves. **Objectives:** To assess estimation of the primary immunization coverage in children agedbetween 12- 23 months. To determine the factors influencing the utilization of immunization services. **Methodology:** Community based cross sectional study. Study population: Total 450 children. Sampling technique: WHO-30 Cluster sampling. **Results:** 74.2% of the children were fully immunized, 24.9% were partially immunized and 0.9% were non immunized. The coverage of BCG, OPV3, Pentavalent3, and Measles was 98.0%, 92.9%, 92.9% and 75.5% respectively. Factors like education of parents, place of delivery, birth order of the child, place of immunization, socio- economic status and number of antenatal visits were found to influence the utilization of immunization services in children. Reasons for failure of immunization were obstacles followed by lack of information and lack of motivation. **Conclusion**: The immunization coverage in the urban area of Bhagalpur has improved markedly over the past years. Sustained improvement of the immunization coverage levels can be achieved by concentrating on the factors which are influencing utilization of immunization services.

Keywords: 12-23 months children, primary immunization status, factors influencing utilization; WHO-30 Cluster sampling

Introduction

India was one of the first countries to adopt the World Health Organization's Expanded Programme of Immunization (EPI). The program started globally in 1974 and was initiated in India in 1978. Since its inception, considerable progress has been made in terms of reduction in disease burden. Despite these achievements and tremendous advances in economic and technological spheres in recent years, theburden of vaccine-preventable diseases(VPDs) remains unacceptably high, incomparison to developed countries and also many developing countries.[1] Immunization interventions have proven to be a success across the globe and today reach out to over 100 million children per year. Immunization is one of the mostcost-effective interventions that prevent needless suffering through sickness, disabilityand death. The benefits of immunization are not restricted to improvement in health and life expectancy but also have social and economic impact at both community and national levels.[2] Immunization averts an estimated 2 to 3 million deaths every year from diphtheria, tetanus, pertussis (whooping cough) and measles, however an additional 1.5 million deaths could be avoided if global vaccination coverage improves.[3] The Global Vaccine Action Plan (GVAP) is a roadmap to prevent millions of deaths through more equitable access to vaccines. Countries are aiming to achieve vaccination coverage of at least 90 percent nationally

and 80 percent in every district by 2020. While the GVAP should accelerate control of all vaccine-preventable diseases, polio eradication is set as the first milestone. It also aims to spur research and development for the next generation of vaccines.[3] Immunization forms a critical component of primary health care and ensures nations health security. Although international agencies such as World Health Organization (WHO), United Nations International Children's Emergency Fund (UNICEF) and now Global Alliance for Vaccines and Immunizations (GAVI) provideextensive support for immunization activities, the success depends on local realities and national policies. This is particularly true for a nation like India with population more than 1 billion and more than 25 million new births every year. A successful immunization program is of particular relevance to India, as the country contributes toone fifth of global under-five mortality with a significant number of deaths attributable to VPDs.[4] Also around 9 million immunization sessions are organized each year to target these infants for routine immunization.[5] According to Coverage Evaluation Survey (CES) 2009, a nationwide survey, the national fully immunized coverage against the six vaccines included in Universal Immunization Programme (UIP) in the age-group of 12-23 month old children was 61% whereas it was 54.1% and 47.3% as reported by District Level Household and Facility Survey (DLHS-3) (2007-08) and National Family Health Survey (NFHS-III) (2005-06), respectively.[6] The urban population is highly differentiated and pockets of poor coverage still exist.[7]Urban poor, many residing in slums, comprise about one-fourth of India's 285 million urban population. 60% of the children aged 12-23 months in urban India are fully immunized. Immunization services do not reach over one third of urban poorchildren, only 43% are fully immunized. Outbreaks of VPDs are more common in urban slums owing to high population density and continuous influx of a new pool of infective agents with the immigrating population. Among the urban poor children whobegin their immunization series often half of them dropout.[8]. Intensified routine immunization campaigns in these districts will help reduce morbidity and mortality due to VPDs.[10] The need of the hour is to systematically examine all sources of data reflectinginequities in vaccination. Such an exercise would be beneficial in identifying the groups of infants at highest risk of remaining unvaccinated and also the characteristicsof infants with high as well as low vaccination coverage status.[11]

Objectives

*To assess the primary immunization coverage in children aged between 12- 23months.
*To determine the factors influencing the utilization of immunization services.
*To determine the reasons for partial or non immunization of the child.

Material and Method

The present study was carried out in the urban area of Bhagalpur city. Community based cross sectional study Study period: Feb 2020 To - Feb 2021 Study subjects**:** Children aged between 12 and 23 completed months on the dateof study.

Inclusion Criteria:

*Children aged between 12 and 23 completed months as on the day of study.
*Children who are residents of Bhagalpur city for more than 1 year.

Exclusion Criteria:

*Children below 12 months and above 23 months.
*Those mothers not willing to participate in the study.

Sampling Technique: WHO 30 Cluster sampling technique was used forthe selection of subjects. The sample size to assess immunization coverage in children aged 12-23 months was obtained by using the formula

$$n = \frac{DE \times Z^2 \times P \times (1-P)}{d^2}$$

After taking data was collected from the immediatecaretakers of children using predesigned questionnaire Immunization cards of the children and mothers were verified to assess their immunization status. In case of children without immunization card, immunization history was collected from the caretaker regarding the time

when the child was immunized and the site ofinjection. BCG scar was used to evaluate whether BCG was given. The 30 cluster sampling technique proposed by WHO was used for selectionof study subjects. Bhagalpur city has 11 urban health centers (UHC's) out of which 5 UHC's were selected randomly. 30 clusters were selected from these 5 UHC's. A list of all the slums with their population from the 5 selected UHCs was procured from Bhagalpur city. The cumulative population was calculated by adding the population of the next area to the combined total of all populations in preceding areas. The first cluster was chosen by locating the first area listed in cumulative population equals or exceeds the random number. The second cluster was chosen by adding the SI to the random number and the cluster whose population was equal or exceeds this number was selected as second cluster. Subsequently clusters were selected by addingthe sampling interval to the selected cluster population.

A house to house visit was done and data was collected from the informants (preferably mothers) using a predesigned and pretested questionnaire after obtaining their informed consent for the study. On visiting the cluster area a landmark was identified and randomly one direction was selected. The number of houses which was located along the direction was counted. The first household was randomly selected, and the eligible subject in that household sampled. After the first household, the next household, which is closest to the previous house, was visited. Each next household was studied in a sequence until a total of 15 eligible children in the age group 12-23 months will be covered. In this way all the 30 clusters was studied.

Fully immunized - The child who received one dose of BCG, three doses of Pentavalent, three doses of OPV and one dose of measles. Partially immunized - Child who received some doses of the above mentioned vaccines, but immunization is not complete. Not immunized - Child who did not receive even a single dose of any vaccine. **Age:** Age was recorded to the nearest completed months as stated by themother or care taker of the child. **Birth order:** Birth order of the study child was assessed by considering thenumber of living siblings. **Religion**: was noted as Hindu, Muslim, Christian, Others.

Children aged 12–23 months are the most commonly chosen target population.The 12-month period is chosen to represent the births in a 12-month or a one-year period (an annual birth cohort). Most surveys are conducted to represent the most recent performance of the immunization system so the youngest possible children are chosen. However, the age range cannot be too young or some of the children in the survey will not yet be eligible for vaccination and the resulting survey results will be lower than actually they are. For example, if all children under 12 months of age (ages0–11 months) are eligible then the survey might include a 2-week old child. This childwould not be eligible for diphtheria–tetanus–pertussis (DTP) vaccine, measles vaccineand the first post-birth dose of oral polio vaccine (OPV) and thus DTP, measles and OPV coverage would be underestimated.

Results

Table 1: Distribution of the children according to socio-demographicdeterminants

Variables		Frequency (n=450)	Percentage
Age in months	12-14	128	28.4
	15-17	84	18.7
	18-20	106	23.6
	21-23	132	29.3
Gender	Male	246	54.7
	Female	204	45.3
Religion	Hindu	236	52.4
	Muslim	214	47.6
Caste	OBC	310	68.9
	SC	125	27.8
	ST	15	3.3
Socioeconomic status	Class I	2	0.4

(Modified Kuppuswamy classification)	Class II	59	13.1
	Class III	178	39.6
	Class IV	203	45.1
	Class V	8	1.8
Type of family	Joint	132	29.3
	Nuclear	318	70.7

The above table shows that the majority of children belonged to age group of21-23 months (29.3%), followed by 12-14 months (28.4%), 18-20 months (23.6%), and 15-17 months (18.7%). Majority of the children 246(54.7%) were males followed by 204(45.3%)females. Majority i.e. 236 (52.4%) of the children belonged to Hindu religion followed by 214 (47.6%) children who belonged to Muslim religion Majority i.e. 310 (68.9%) of the children belonged to OBC caste followed by 125 (27.8%) of children to SC caste and 15 (3.3%) of children to ST caste. The socioeconomic classification was considered based on Modified Kuppuswamy Classification, Majority of the children belonged toclass IV i.e. 203 (45.1%), followed by class III-178 (39.6%), class II-59 (13.1%),class V-8 (1.8%) and least were in the class I-2(0.4%). Majority i.e. 318 (70.7%) of the children belonged to Nuclear type of family and 132 (29.3%) children belonged to Joint family.

Table 2. Distribution of children based on age of mother

Mother's age in years	Frequency	Percentage
16-20	27	6.0
21-25	252	56.0
26-30	139	30.9
31-35	21	4.7
36-40	11	2.4
Total	**450**	**100.0**

The above table shows that, majority i.e. 252 (56.0%) of mothers of study subjects were in the age group of 21-25 years, followed by 139 (30.9%) of mothers inthe age group of 26-30 years, 27 (6.0%) of mothers in the age group of 16-20 years , 21 (4.7%) of mothers in the age group of 31-35 years and 11 (2.4%) mothers were inthe age group of 36-40 years.

Table 3.Distribution of the mothers based on the number of antenatal visitsduring pregnancy

Number of antenatal visits	Frequency	Percentage
<4	14	3.1
≥4	436	96.9
Total	**450**	**100.0**

The above table shows that, majority i.e 436 (96.9%) mothers had four or more antenatal visits during their pregnancy while 14 (3.1%) mothers had less than four antenatal visits.

Table 4.Distribution of children based on place of delivery

Place of delivery	Frequency	Percentage

Home	16	3.6
Institutional	434	96.4
Total	**450**	**100.0**

The above table shows that, majority i.e. 434 (96.4%) of the births of thechildren were institutional deliveries and only 16 (3.6%) births were home deliveries.

Table 5 Distribution of children based on birth order of the children

Birth order	Frequency	Percentage
First	139	30.9
Second	171	38.0
Third	82	18.2
Fourth and above	58	12.9
Total	**450**	**100.0**

The above table shows that majority i.e. 171(38.0%) of the children were ofthe Second birth order, followed by First borth order 139(30.9%), Third birth order 82(18.2%) and Fourth and more birth order 58(12.9%).

Table6. Distribution of children based on primary immunization status

Primary immunization status	Frequency	Percentage
Fully immunized	334	74.2
Partially immunized	112	24.9
Non immunized	4	0.9
Total	**450**	**100.0**

The above table shows that, majority i.e. 334 (74.2%) of the children were Fully immunized, 112 (24.9%) were Partially immunized and 4 (0.9%) were Non immunized.

Table 7. Reasons for failure of immunization (n = 116)

Reasons for failure of full immunization	No	%
Lack of information	55	47.4
Lack of motivation	28	24.2
Obstacles	33	28.4
Total	**116**	**100.0**

In the above table reasons for partial immunization and non immunization are considered under the heading reasons for failure of immunization. Caretakers of children who were partially and non immunized were asked the reason for not immunizing the child. The reasons were grouped under three categories as lack of information, lack of motivation and obstacles. Multiple responses were observed from some caretakers. It was observed that majority of the caretakers quoted lack of information (47.4%), obstacles (28.4%) and lack of motivation (24.2%) as the reason for incomplete immunization. Under the category lack of motivation, 8.6% of the caretakers told they postponed immunization to a later date and 6.8% said they did not immunize the childas they had heard some rumours about immunization and therefore did not immunize the child.

Discussion

The present cross-sectional study was conducted in the urban city of Bhagalpur with the objective of assessing the primary immunization coverage in children aged 12-23 months and to study the factors affecting the utilization of immunization services and also to find out the reasons for partial or non immunizationof the children. **Religion:** In our study done on 450 children we found that 52.4% of children were Hindus and 47.6% were Muslims. In a study done by Srivastava AK et al[12] showed that 76% of the children were Hindu and 24% were Muslim. In another study conducted by Koppad R et al [13] revealed that 88% of the children were Hindu and 12% were Muslim. Odomani M et al in their study revealed that about 85.2% of children were fully immunized and 14.8% were partially immunized. Coverage was highest for BCG (100%) and lowest for measles (93.8%). Dropout rates were 6.19%, 3.83% and 3.38% for BCG to measles, DPT1 to DPT3 and OPV1 to OPV3 respectively. Caretakers of children who were partially immunized and not immunized were asked the reason for not immunizing their children. The reasons were grouped under three categories as lack of information, lack of motivation and obstacles. Majority of the respondents quoted lack of information (47.4%) as the main reason, followed by obstacles (52.4%) and lack of motivation (24.5%). In the category lack of information, 23.2% of the respondents did not immunize their children because of fear of side reactions while 8.6% were unaware of the need for immunization and 6.8% were unaware of the need to return for second or third dose and also wrong ideas about contraindications. The major obstacles that prevented the utilization of the immunization serviceswas the illness of child (14.6%) due to which the parents could not take the child for immunization. The other major obstacle was the mother being too busy (5.17%) in the household work. In the category lack of motivation, 8.6% of the parents postponed immunizing their children until another time while 6.89% had heard of rumours about immunization. A study carried out by Chaturvedi M et al[14] showed that the main reason for failure of immunization was obstacles (46%) followed by lack of motivation (22.6%), lack of information (19.4%). Common obstacles mentioned were ANM not available (22.8%), vaccines not available (11.7%), mothers busy in the household work (4.6%) and immunization site very far (4.3%). In the Lackof Motivation group the reason comprised of no faith in immunization (8% in urban and 7.6% in rural) and fear of adverse effects (5.7% in urban and 7.2%in rural). In case of 2.8% children, mothers told that health worker refused to vaccinate the child. Lack of information was another important reason for not getting their children vaccinated. About 9% mother did not know that after thefirst dose further doses were necessary for protection of the child. Study carried by Kar M et al[15] showed that the major cause for incomplete immunization was postponement of immunization due to the illness of the child whereas mother's lack of information about place, schedule and eligible age of immunization constituted the main reason for non-immunization. Kulkarni P et al[16] in their study carried out in Hyderabad revealed that the most common reason for the partial immunization of the child was the unavailability of both the parents. Sickness of siblings and lack of knowledge regarding the subsequent vaccination were the other reasons found. Kumar S et al[17] in their study showed that the most common reasons for not immunizing their children were that the respondents lacked information regarding the immunization followed by obstacles and lack of motivationrespectively.

Conclusion

The primary immunization coverage in children aged 12-23 months in urban area of Bhagalpur was found to be 74.2%. Our study showed that 334 (74.2%) were fully immunized, 112 (24.9%) were partially immunized and 04 (0.9%) were non immunized. This shows that the immunization status is still not upto the accepted levels as set by the Government of India. The coverage for BCG, Pentavalent3, OPV3 and Measles was 98.0%, 92.9, 92.9% and 75.5% respectively.

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