

## Evaluation of Primary immunization coverage in an urban area of Bareilly city using Cluster Sampling Technique

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**Abstract :** Infectious diseases are major cause of morbidity and mortality in children. One of the most cost effective and easy methods for the child survival is immunization. Objective of present study was to find out the various reasons for partial or non immunization of child and to assess the factors associated with immunization. The present cross sectional study was carried out in urban slums of Bareilly city from April 2010 to Aug. 2010 using 30 by 7 cluster sampling technique. A total of seven children aged 12-23 months were interviewed from each cluster on pre tested, predesigned schedule, thus giving us the sample size of 210. Chi square test was applied for statistical analysis. Two third children (61.9%) were found to be fully immunized. Immunization coverage was high for BCG (92.86%) and lowest for measles (62.38%). Most common reason (50%) for partial and non immunization of children was found to be ignorance on the part of parents. Religion, education of both mother and father was found to be significantly associated with immunization status. The need of the hour is to make routine immunization a “felt need” of the community. Increasing the knowledge and understanding of the caretakers of the young children about the essentiality and benefits of routine immunization would be a strong step forward in achieving the goals.

**Key words:** Immunization coverage, urban slums, clusters sampling.

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**INTRODUCTION:** The goal of immunizing children against chief diseases responsible for child mortality and morbidity is indeed a noble one. However it is not an easy task to achieve. In a developing country like India, the sheer logistics of the numbers of the target population that stretches across geographically diverse regions make universal immunization of children a herculean task<sup>1</sup>. Infectious diseases are major cause of morbidity and mortality in children. One of the most cost effective and easy methods for the child survival is immunization<sup>2</sup>.

In 1985, the UIP was started in India with the aim of achieving at least 85% coverage of primary immunization of infant's i.e. with three doses of DPT and OPV, one dose of BCG and one dose of measles by the year 1990<sup>3</sup>. Despite all the efforts put by the governmental and nongovernmental institutes for 100% immunization coverage, there are still pockets of low coverage areas. Urban slums

constitute one of the high risk areas for the vaccine preventable diseases<sup>4,5</sup>.

The current scenario depicts that immunization coverage has been steadily increasing but the average level remains far less than desired. Still only 44% of infants in India are fully immunized (NFHS-III), which is much less than desired goal of achieving 85% coverage<sup>6</sup>. So what could be the possible hindrance that hampers progress? The importance of knowledge/ awareness about routine immunization as a factor for its success is brought about by previous studies that “not aware of the needs of vaccination” is the main reason for children not being fully immunized<sup>7</sup>. The present study was conducted with the objective of assessing the immunization coverage in the slums of Bareilly, to find out the various reasons for partial or non immunization of child and to assess the factors associated with immunization.

**MATERIAL AND METHODS:** The present cross sectional study was carried out in urban slums of Bareilly city from April 2010 to Aug. 2010. Bareilly is the city with population of approx. 720335 residing in the area of 10.645 sq. Km. More than 40 % of city population lives in slums characterized by poor sanitation, poverty, overcrowding, congested living and a lack of personal hygiene.

The study population comprised of the people living in these slums located within the area under the Bareilly Municipal Corporation. The study sample includes 30 clusters from all 85 slums selected through 30 by 7 cluster sampling method as proposed by WHO<sup>8</sup>. A total of seven children aged 12-23 months were interviewed from each cluster on pre tested, predesigned schedule, thus giving us the sample size of 210.

Socio-economic status was assessed according to Modified Kuppuswamy classification<sup>9</sup>. Among the reasons for partial and non immunization of children lack of information include factors like lack of knowledge about place, schedule and eligible age of immunization. Obstacles include timing of immunization clashed busy hours of household work, illness of child etc. Lack of motivation was mainly due to uncertainty regarding the benefits of immunization. Fear of side effect includes fear of fever following immunization, abscess formation and excessive cry of child.

Selection of study clusters: A list of all the slums with their population under Bareilly Municipal Corporation was procured. A cluster interval of 10324 was obtained by dividing the total population by 30 (no. of clusters). A random number less than the cluster interval were generated with the help of currency note. The cluster, which represents the number, was picked up as the first cluster and subsequent clusters were selected by adding the cluster interval to the selected cluster population. Thus in this way we select 30 clusters. First household was selected randomly and each next household was studied in a sequence until a total of 7 eligible children in the age group 12-23 months were covered.

Proof of immunization: The child was considered as immunized or not based on immunization card. For those without an immunization card, information from the mother or any other responsible and reliable person in the family stating that the child has been immunized was considered. If the mother could not remember regarding the vaccination or in presence of any other confounding factors the child was considered as not immunized with the vaccine under consideration. Child is considered fully immunized if it receives BCG (1), DPT (3), OPV (3), and measles (1); as unimmunized if receive none of these vaccines and partially immunized if some doses given but immunization not complete<sup>10</sup>.

Statistical analysis: Data thus generated was analyzed by using SPSS soft ware and simple proportions were calculated and statistical tests of significance were applied where ever necessary. P value less than .05 were considered significant.

**RESULTS:** The demographic profile of the study population is shown in Table 1.

Table 1: Demographic characteristic

Characteristic		NO.	%
1)Religion	Hindu	160	76.19
	Muslim	50	23.81
2)Caste	General	51	24.85
	OBC	110	52.38
	SC/ST	49	23.34
3)Education Mother	Illiterate	113	53.81
	Literate	97	46.2
4)Education Father	Illiterate	71	33.81
	Literate	139	66.19
5)Type of family	Nuclear	145	69.05
	Joint	65	30.96
6)Occupation Mother	House wife	184	87.62
	Working	26	12.38
7)Occupation Father	Working	208	99.05
	Not working	2	0.96
8)Sex of child	Male	99	47.15
	Female	111	52.86

9)Immunization card	Present	167	79.53
	Absent	43	20.48
10)Socio-economic status	Class I	3	1.43
	Class II	22	10.48
	Class III	57	27.15
	Class IV	124	59.05
	Class V	4	1.91
Total		210	100

A total of 210 children aged 12-23 months were included in the study. It was found that nearly two third (61.9%) children were fully immunized against all the six vaccine preventable diseases. When compare between two genders, the proportion of fully immunized children was higher in male (68.69%) than in females (55.86%), however the difference was statistically not significant ( $\chi^2$  5.696,  $p>.05$ ) (Table2).

Table 2 : Immunization coverage of children aged 12-23 months using cluster sampling technique

Status	Total	Male NO. (%)	Female NO. (%)	p-value
1)Completely Immunized	130 (61.9)	68 (68.69)	62 (55.86)	Df= 2 $\chi^2=5.696$ $P>.05$
2)Partially immunized	60 (31.43)	28 (28.28)	38 (34.23)	
3) Unimmunized	14 (6.67)	3 (3.03)	11 (9.90)	
Total	210	99	111	

Among individual vaccines, coverage was highest for BCG (92.86%) and lowest for measles (62.38%). Coverage for DPT3 and OPV3 was the same (65.72%). A consistent decline in coverage rate from the first to third dose was observed in DPT and OPV. Dropout rate for both DPT and OPV from first to third dose was 19.76%. The dropout rate for measles compare with BCG and DPT1 were 32.82% and 23.83% respectively (Table3). Dropout rate was higher for female as compare to male. Except for BCG, coverage for all the vaccine was high for male as compare to females. All the differences were significant except for OPV2 & DPT2.

Table 3: Coverage level of different UIP vaccine

Individual vaccine	Total NO. (%)	Male NO. (%)	Female NO. (%)	p-value
BCG	195 (92.86)	96 (96.97)	99 (89.19)	$P<.05$
OPV1	172 (81.91)	88 (88.89)	84 (75.68)	$P<.05$
OPV2	157 (74.77)	80 (80.81)	77 (69.37)	$P>.05$
OPV3	138 (65.72)	73 (73.74)	65 (58.56)	$P<.05$
DPT1	172 (81.91)	88 (88.89)	84 (75.68)	$P<.05$
DPT2	157 (74.77)	80 (80.81)	77 (69.37)	$P>.05$
DPT3	138 (65.72)	73 (73.74)	65 (58.56)	$P<.05$
Measles	131 (62.38)	69 (69.70)	62 (55.86)	$P<.01$
Dropout rates (%)				
OPV (I to III)	19.76	17.04	22.62	
DPT (I to III)	19.76	17.04	22.62	
BCG to Measles	32.82	28.13	37.37	
DPT1 to Measles	23.83	21.59	3.48	
Total	210	99	111	

The main reasons (Table4) for both partial immunization and un-immunization were found to be ignorance (50%) and fear of side effect (28.78% and 42.85% respectively).

Table 4: Reasons for partial and non immunization

Reasons	NO.	%
Reasons for Partial Immunization (66)		
Lack of information	5	7.58
Lack of motivation	6	9.09
Obstacle	1	1.52
Ignorance	33	50
Inconvenience	2	3.03
Fear of side effect	19	28.78
Reasons for Non Immunization (14)		
Lack of information	1	7.14
Ignorance	7	50
Fear of side effect	6	42.85

Religion, education of the mother and education status of the father was found to be significantly affecting the immunization status of the child.

Association of different factors with immunization status is shown in table 5.

Table 5: Immunization coverage according to socio-demographic factors

Characteristics		Fully Immunized NO. (%)	Partially Immunized NO. (%)	Unimmunized NO. (%)	Total	p-value
1) Religion	Hindu	108 (67.5)	45 (21.43)	7 (3.34)	160	P< .01
	Muslim	22 (44.0)	21 (42.0)	7(14.0)	50	
2)Type of family	Nuclear	86 (59.34)	48 (33.11)	11 (7.59)	145	p>.05
	Joint	44 (67.69)	18 (27.70)	3 (4.62)	65	
3)Socio-economic status	Class I	3 (100)	0 (0.00)	0 (0.00)	3	p>.05
	Class II	12 (54.55)	9 (40.91)	1 (4.55)	22	
	Class III	42 (73.69)	12 (15.79)	3 (5.27)	57	
	Class IV	71 (57.26)	44 (35.49)	9 (7.26)	124	
	Class V	2 (50.0)	1(25.0)	1(25.0)	4	
4)Education Mother	Illiterate	57 (50.45)	44 (38.94)	12(10.62)	113	p<.001
	Literate	73 (75.25)	22 (22.68)	2(2.06)	97	
5)Education Father	Illiterate	36 (50.71)	24 (33.81)	11 (15.50)	71	p<.001
	Literate	94(67.63)	42 (30.22)	3(2.16)	139	
Total		130	66	14	210	

**DISCUSSION:** The present study was conducted to assess the immunization coverage, to find out the various reasons for partial or non immunization of child and to assess the factors associated with immunization status in urban slums of Bareilly city using 30 cluster sampling technique. The WHO 30-cluster sample survey for estimating immunization coverage among infants has been found to be very useful by public health administrators in developing countries, because it is rapid, operationally convenient and cost effective<sup>11</sup>.

In present study percentage of fully immunized was 61.9% being more for male (68.69%) than female (55.86%). Above rates were higher than the study conducted by Chaturvedi.M<sup>12</sup> in urban area of Agra (49.7%), Sharma.et.al<sup>13</sup> in Surat (25.1%), Sing and Yadav<sup>14</sup> in BIMARU states (48%), NFHSII<sup>15</sup> (42%) and Rapid house hold survey- RCHII<sup>16</sup> (42%), which could be due to regional variation and the survey technique

adopted. However higher coverage of full immunization (73.33%, 84.09%, 93.25%) has been reported by various other studies.<sup>2, 10, 17</sup> Sharma et al<sup>13</sup> reported 51.7% partial immunization and 23.1% non immunization which is much higher than the present study (31.43%) where as Punith K et al<sup>10</sup> Chopra H<sup>17</sup>, Chaturvedi M et al<sup>12</sup> and Yadav RJ<sup>18</sup> has reported the low percentage (14.09, 5.25, 29.7 and 27.7% respectively) of partially immunized children as compare to our study. Yadav S<sup>2</sup> reported 6% non immunized children, which is in consonance with present study. It was observed 92.86%, 65.72%, 65.72% and 62.38% children were immunized against BCG, OPV3, DPT3 and measles in our study, these rates were much higher than the study conducted by Sharma et al<sup>13</sup> in Surat (75.1, 48.6, 47.9 and 29.9% respectively). However Chhabra P et al<sup>19</sup> in their study in Delhi reported low level of BCG coverage (82.7%), higher level of OPV3, DPT3 (70.7% both) and similar level of measles

coverage as compare to present study. Dropout rates in study conducted by Sharma et. al. in Surat were found to be much higher as compare to our study<sup>13</sup>. Ignorance was found to be the main reason for partial and non immunization of children's (50%). Similar views have been expressed by Yadav S et al<sup>2</sup> (80.36%), Ughade et.al.<sup>20</sup> (57%) and Ray et.al.<sup>21</sup> in there study. Fear of side effect which was found as a second most common reason for partial (28.78%) and non immunization (42.85%) of children in our study, Chaturvedi M<sup>12</sup> in his study also mention fear of side effect as one of the reason for partial and non immunization of children. Higher literacy level of both mother and father was found to be significantly associated with better immunization status of the child. The close association between parental educations has also been documented by other studies<sup>18, 19, 22</sup>. Fully immunized children were found to be more among Hindu (67.5%) as compare to Muslim (44%). Similar findings were shown by Yadav RJ<sup>18</sup> in his study. No significant association was found between immunization status of child and type of family in our study and also in the study conducted by Chhabra P et al<sup>19</sup> in urbanized villages of east Delhi.

Routine immunization of all children has been long recognized and credited as one of the cost effective interventions possible by the health sector. The need of the hour is to make it a "felt need" of the community. Increasing the knowledge and understanding of the caretakers of the young children about the essentiality and benefits of routine immunization would be a strong step forward in achieving this goal. Observation from the present study point towards a pressing need to accelerate efforts in improving the immunization coverage in the area. For improving the situation, efforts should be made to have information, education and communication activities targeted to educate the mother and also the pulse polio days should be utilized as a good opportunity for the advocacy of routine immunization to the target audience.

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