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Original Research Article

A study on predictors of complete immunization in children aged 12-23 months in slums of Kanpur Nagar, India

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ABSTRACT

Background: Kanpur is one of the major industrial hub of Uttar Pradesh. Migration of people in the search of jobs led to formation of slums in many part of city which is 20% of total population of the city. A large number of below poverty line (BPL) population (about 60%) also live-in slums. Little data is known about immunization status of children residing in these slums. With this background this study is planned to predict various demographic factors affecting immunization status and to study various factors responsible for partial/non immunization of children.
Methods: Cross sectional observational study. 30 cluster sampling technique was used to select 30 clusters from 380 identified slums of Kanpur Nagar.
Results: More children were completely immunized with increase in educational level of mothers. (χ^2= 16.62, df=2, p=0.000) ; mothers having institutional delivery (χ^2 =31.8, df=1, ,p=0.000; belonged to general category (χ^2=25.3, df=2, p=0.000) and Hindu by religion. (χ^2=7.34, df=1, p=.006). No significant difference was seen in immunization coverage with respect to gender (χ^2 =2.7, df=1, p=.09). Obstacles (45.2%) were the most common reason for partial immunization whereas lack of information (52.63 %) was most common reason cited in case of non-immunized children.
Conclusions: Educational status of the parents particularly mothers and the economic status of the family have great bearing on the immunization coverage of under 5 children. So female empowerment measures may prove helpful in improvement of the immunization status.

Keywords: 30 cluster technique, Complete immunization, Slums

INTRODUCTION

Childhood is a significant stage of life and deprivation during this period can have a long-term adverse impact on the wellbeing of children. Immunization is one of the most effective and cost-effective ways to protect children's lives and futures and prevents 2-3 million death globally every year. An additional 1.5 million deaths could be avoided, however, if global vaccination coverage improves.[1] Vaccine Preventable Diseases (VPD) like diarrhoea, pneumonia and measles were among the leading causes of under-five deaths in India resulting in about one-fourth of all under-five deaths between 2000 and 2015.[2]

Percentage of world's population living in urban areas is continuously increasing and by 2050 this proportion is expected to increase to 66%, adding approximately 2.5 billion new urban dwellers, of whom 90% will be in Asia and Africa. This trend towards urbanization is closely linked with an increasing population living in urban poor communities and slum environments.[3]

Immunization services are more critical for survival of under privileged children living in slums not only because of poor utilization of health services owing to migration from one place to other, high population density, poor environmental conditions and continuous influx of infectious agents due to immigrating population. Slum dwellers constitute about one-third of Indian population, and most children in these slums still remain incompletely immunized.[4] Uttar Pradesh, the most populous Indian State, with nearly 11 million urban poor, houses the largest number of urban poor in a single state. Not only does the state have a heavy burden of poverty, it also ranks low in terms of other social indicators among the states in the country. United Nation Development Programme's (UNDP) Urban Poverty Report has pegged the number of slum dwellers in Uttar Pradesh at 44 lakh.[5]

Kanpur is one of the major industrial hub of Uttar Pradesh. Migration of people in the search of jobs led to formation of slums in many part of city which is 20% of total population of the city. A large number of below poverty line (BPL) population (about 60%) also live-in slums6. Little data is known about immunization status of children residing in these slums. With this background the study is planned to have estimates of vaccination status and to assess various factors responsible for partial/non immunization of children. Objectives were to study the various epidemiological predictors of complete immunization in the slums of Kanpur Nagar and to study various reason accountable for incomplete immunization.

METHODS

The present cross sectional study was carried out in slums of Kanpur Nagar (Uttar Pradesh) during September – November 2013. Immunization coverage was assessed using 30 cluster sampling technique. The 30 by 7 cluster survey is a two-stage cluster sampling technique. In the first stage, 30 of these clusters are sampled with probability proportional to the size (PPS) of the population in the cluster. Sampling with probability proportional to size allows the larger clusters to have a greater chance of being selected. The study sample includes 30 clusters selected from 380 identified urban slums of Kanpur Nagar. A total of 210 mothers of children aged 12-23 months were interviewed on pretested and predesigned questionnaire. The immunization status of the child was assessed by vaccination card, BCG scar and mother's recall where vaccination card was not available.

Immunization status of study subjects was categorized into two categories-complete and incomplete immunization. Complete immunization includes those children who received all the vaccines given under Universal Immunization Programme (UIP) till the age of one year. Study subjects who received some vaccines or no vaccine till first year of life were included in incomplete immunization category.

Among the reasons enquired for incomplete immunization in case of partially and un-immunized, lack of information include factors like lack of knowledge about place, schedule and eligible age of immunization etc. Obstacles include timing of immunization clashed busy in 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. In case of a partially/non-immunized child the most important single reason for not immunizing was considered. Collected data was entered in MS EXCEL sheet and analyzed using SPSS VERSION 22. Chi square test was used as a test of significance and p value less than 0.05 was considered significant.

RESULTS

In the present study out of 210 children, 51.43% were males and 48.57% were females. 47.62% mothers were delivered at home while 52.38% had institutional delivery. 50% children belonged to birth order ≤2 while rest were having higher birth order. Among all the study subjects 110 (52.3%) were fully immunized, 62 (29.5%) received partial vaccination. 38 (18.1%) children were not immunized at all (Table 1).

Table 1: Demographic profile of study subjects.

Demographic profile	N	%
Gender		
Males	108	51.43
Females	102	48.57
Place of delivery		47.62
Home delivery	100	52.38
Institutional delivery	110	
Birth order		
1	47	22.38
2	58	27.62
3	70	33.33
>3	35	16.67

Various demographic variables like gender, place of delivery, birth order, caste, religion, type of family they are residing, education status of mother were studied to see their association with immunization status of the child. No significant difference was seen in immunization coverage with respect to gender (χ^2=2.7, df=1, p=.09) and type of family they are residing (χ^2=2.3, df=2, p=0.3) More children were completely immunized with increase in educational level of mothers. (χ^2=16.62, df=2, p=0.000) Immunization was significantly higher among children of mothers having institutional delivery (χ^2=31.8, df=1, p=0.000); belonged to general category (χ^2=25.3, df=2, p=0.000) and Hindu by religion. (χ^2=7.34, df=1, p=0.006) (Table 2).

Table 2: Demographic predictors of complete immunization.

Variables	Complete immunization	Incomplete immunization	Total	Test of significance
Gender				
Male	48	60	108	
Female	34	68	102	(χ^2=2.7, df=1, p=0.09)
Place of delivery				
Home delivery	32	68	100	
Institutional delivery	78	32	210	(χ^2=31.8, df=1, p=0.000)
Birth order				
Up to 2	64	41	105	(χ^2=42.3, df=1, p=0.000)
More than 2	18	87	105	
Mothers education				
Illiterate	2	13	15	
Up to High school	97	86	183	(χ^2=16.62, df=2, p=0.000)
Above High school	11	1	12	
Mother's occupation				
Unemployed	48	74	122	
Unskilled worker	24	48	72	(χ^2=6.04, df=3, p=0.1)
Semi skilled worker	8	6	14	
Skilled worker	2	0	26	
Family type				
Nuclear	50	86	136	(χ^2=2.3, df=2, p=0.3)
Joint	10	8	18	
Extended	22	34	56	
Religion				
Hindu	102	80	182	(χ^2=7.34, df=1, p=0.006)
Non hindu	8	20	28	
Caste				
General	35	5	40	
OBC	48	54	102	
SC/ST	27	41	68	

Table 3: Attitude of mothers towards immunization.

Question	N	%
Favours immunization	174	-82.90
Awareness of mothers regarding next date for immunization	78	-37.10
Immunization is necessary even when child is healthy	94	-44.80
Will follow immunization schedule	59	-28.10
Recommend immunization to others	88	-42
Mother is involved in decision making	96	-45.70

More than 1/3rd (82.9%) mothers were in favour of immunization. But only 37.1% were aware about next date of immunization. 44.8% believe that immunization in necessary even when child is healthy. 45.7% mothers said they are decision maker with respect to immunization of the child (Table 3).

Table 4: Various reasons accountable for incomplete immunization.

Reason	Partially immunized (n=62) N (%)	Not immunized (n=38) N (%)
Lack of information	22 (35.48)	20 (52.63)
Obstacle	28 (45.16)	8 (21.05)
Lack of motivation	12 (19.36)	10 (26.32)
Total	62 (100)	38 (100)

Various reasons accountable for incomplete immunization were studied. Obstacles (45.2% were the most common reason for partial immunization whereas lack of information (52.63%) was most common reason cited in case of non immunized children (Table 4).

DISCUSSION

Immunization coverage in slums in India, varies considerably from state to state showing a wide range of

coverage, from 3.0% in rural migrant children in slums in Chandigarh 7 to 88.7% in Mumbai; with the lowest rates in the large central states. The highest numbers of partially immunized and non-immunized children are found in large states such as Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan.[8,9]

The proportion of fully immunized children found in the present study was low (52.30%) in comparison to similar studies done in South Delhi (69%) and Jamnagar (73%). This could be due to interstate variation in infrastructure and implementation of health programmes.[10,11]

Various demographic factors associated with complete and incomplete immunization were studied. Children of General caste and Hindu religion were significantly more immunized as compared to other caste and religion .This is in concordance with the studies of Phukan et al and Sreedhar et al while UNICEF Coverage Evaluation Survey reported higher complete vaccination coverage among Sikh infants (78.2%), followed by Christian infants (65.6%), Hindu infants (61.2%) and least in Muslim infants (55.7%).[12-14]

In our study complete immunization was higher among the children of mothers who had institutional delivery as compared to home delivery. These findings were supported by results of another study conducted in Uttar Pradesh.[15] This may be because vaccination was started at birth, and parents were educated regarding subsequent vaccinations. Therefore, institutional deliveries should be promoted to increase the coverage of immunization.

The present study shows that immunization coverage went on improving with increase in the level of education of parent. Similar association was also observed by other studies conducted in North India.[15,16] This fact highlights the role of female education for the utilization of child health services.

In current study, complete immunization was significantly higher among children having birth order less than 2 as compared to higher birth order. This could be explained by the fact that they belonged more likely to lower socioeconomic class, had less educated or illiterate and working mothers. They had less awareness and motivation for utilization of all preventive health services.

In our study 83% mothers favour immunization while 45% believe that immunization is beneficial to the child but only 52% children are fully immunized .These figures indicate gap in knowledge, attitude and practice. Migration, odd working hour, loss of immunization cards may be key factors for not completing immunization schedule on time.

In our study, obstacles (45.16%) are the main reason for partial immunization of study subjects The findings of our study are different from the other studies where Postponement of vaccination due to illness of the child (30.8%) and unavailability of both the parents (17.2%) was the commonest reason mentioned.[10,14]

The main reason for non -immunization was lack of information (52.63%). Some studies found ignorance as the major cause of non immunization in their studies. Kulkarni et al8 cited migration to native village (14%) as a most important reason for non immunization.[8,15,16]

CONCLUSION

Educational status of the parents particularly mothers and the economic status of the family have great bearing on the immunization coverage of under 5 children .Since mothers are main decision makers with respect to child health so female empowerment measures i.e. enhancing literacy level and providing job opportunity to the females may prove helpful in improvement of the immunization status. Immunization camps should be arranged by considering the work schedule of the community and the distance from houses of beneficiaries.

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