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IMPACT OF SOCIO-DEMOGRAPHIC FACTORS ON AGE APPROPRIATE IMMUNIZATION OF INFANTS IN SLUMS OF AMRITSAR CITY (PUNJAB), INDIA

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ABSTRACT

Introduction: Vaccination status of slum newborn and infant is far from being satisfactory. Hence, the present study was conducted to assess the age appropriate immunization status of infants and to explore the impact of socio-demographic factors on immunization status in various slum areas of Amritsar city.

Methods: A total of 30 clusters of 7 infants each were studied to make a sample of 210 units. Age appropriate immunization status of infants and socio-demographic factors related to it were studied.

Results: Out of 210 infants, 42.9% infants were completely immunized appropriate to their age, 27.1% were partially immunized and 30% were unimmunized. On bivariate analysis, age and birth order of infants, nativity, socio-economic status, place of delivery, planning of pregnancy, literacy status of mothers and fathers were statistically significant factors influencing age appropriate immunization. But, on multivariate logistic regression analysis, only age of the child (OR= 2.8, CI= 1.4 to 5.4, p= 0.002) and nativity (OR= 2.0, CI= 1.04 to 3.9, p= 0.04) emerged as significant factors affecting age appropriate immunization.

Conclusion: Age appropriate immunization of infants in slums remains very low especially infants of more than six months of age and infants belonging to migrant families.

Keywords: Vaccination, infants, slums, sociodemographic, urban.

INTRODUCTION

Urban population in India has increased with a growth rate of 31.8% in the last decade in comparison to 12.3% in rural areas.[1] This explosive increase in urban population without the requisite economic and social infrastructure has resulted in the formation of slums. According to Census 2011, 65.4 million people are living in slums in India whereas the figure was 45 million during 2001 census.[1]The most vulnerable population in these urban slums is children; especially newborns and infants. One in every ten newborns does not live to see their fifth birthday.[2] Infectious diseases are major causes of morbidity and mortality in children. One of the most cost effective and easy methods for the child survival is immunization.[3] Expanded Programme on Immunization was started in 1978 which was later modified to Universal Immunization Programme

in 1985. The aim of UIP was to achieve at least 85% coverage of primary immunization of infants including BCG, three doses of DPT and polio and measles. Recently Hepatitis B has also been included in National Immunization Schedule.[4] Though vaccination has brought in rapid advances in recent past for prevention and eradication of disease, National Family Health Survey (NFHS) III has shown that only 40% children are completely immunized in slums leaving others vulnerable to various diseases.[5] Hence, the present study was conducted to assess the age appropriate immunization status of infants and to explore various socio-demographic factors affecting vaccination status of infants in slums of Amritsar city so that appropriate measures can be taken to improve upon it.

METHODS

A cross-sectional epidemiological study was carried out in slum areas of Amritsar city. Study period was from 1st January 2011 to 30th June 2011. Ethical clearance was taken from Ethical Committee of Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar. According to the records available in Civil Surgeon Office Amritsar, there are 108 pockets of slum areas. By adopting WHO cluster sampling technique,[6] 30 clusters of 7 units each, were taken up making a total sample of 210 study units. The infants born within one year before the interview were considered as study subjects. After taking informed consent, the mothers or care givers of infants were interviewed with the help of a predesigned, pre-tested proforma. Modified Udai-Pareek Scale[7] was used to study socio-economic status (SES). Immunization status was confirmed from Immunization card of the child or by asking mother or the care giver. Vaccines recommended under National Immunization Schedule i.e. BCG, OPV and Hepatitis B at birth, 3 doses of DPT and Hepatitis B at 6, 10 and 14 weeks and measles at 9 months were studied.[8] If the mother/ care giver could not recollect the vaccination or in the presence of any other confounding factors the child was considered as not immunized with the vaccine under consideration. The data was compiled and analyzed by using SPSS 17.0 version for windows. Various socio-demographic factors were studied for age appropriate vaccination by applying bivariate analysis. The significant factors were further evaluated by applying multivariate logistic regression analysis. Each factor was studied for age appropriate immunization by adjusting all other variables. Partially immunized infants and unimmunized infants were clubbed together for analysis. Adjusted Odds Ratios (ORs) with 95% confidence level were generated. Infants whose mother / care giver was not willing to participate or those suffering from any congenital abnormality or chronic illness were excluded from the study

Operational definitions:

1. Completely Immunized: an infant who has received all vaccinations recommended under National Immunization Schedule appropriate to his/ her age.
2. Partially Immunized: an infant who has received at least one or more of vaccinations recommended under National Immunization Schedule appropriate to his/ her age.
3. Unimmunized: an infant who has not received any vaccination recommended under National Immunization Schedule appropriate to his/ her age.

RESULTS

Table 1: Distribution of infants according to their immunization status

Immunization status as per age	Infants (n= 210) (%)
Completely immunized	90 (42.9)
Partially immunized	57 (27.1)
Unimmunized	63 (30.0)

The above table reveals that 42.9% infants were completely immunized as per their age, 27.1% were partially immunized and 30% were unimmunized at the time of study.

Table no. 2 shows that age of the child, birth order, nativity, socioeconomic status, place of delivery, planning of pregnancy, literacy status of mother and father and type of family were significant factors affecting vaccination status of infants.

Table 3 shows the odds ratios obtained from multivariate logistic regression analysis. Significant factors like age, nativity, socioeconomic status, place of delivery, planning of pregnancy and literacy status of mother and father were studied in relation to age appropriate immunization. Each of these factors was studied after adjusting all other factors. It proved that only age of the child and nativity are significant factors affecting vaccination status of the infant.

Table 2: Distribution of infants according to their immunization status in relation to various socio-demographic factors

Parameter	Immunization status as per age		OR (95% CI)†	P value
	Completely Immunized (n=90) (%)	Partially Immunized/ Unimmunized (n= 120) (%)		
Age				
0- 6mth (114)	59 (51.7)	55 (48.3)	2.2(1.3-3.9)	0.005
6-12mth (96)	31 (32.3)	65 (67.7)		
Sex				
Male (107)	52 (48.6)	55 (51.4)	1.6 (0.9-2.8)	0.08
Female (103)	38 (36.9)	65 (63.1)		
Birth order				
≤2 (136)	70 (51.5)	66 (48.5)	2.9 (1.6-5.5)	0.000
>2 (74)	20 (27.0)	54 (73.0)		
Nativity				
Native (101)	56 (55.4)	45 (44.6)	2.7 (1.6-4.8)	0.000
Migrant (109)	34 (31.2)	75 (68.8)		
Caste				
Upper (68)	35 (51.5)	33 (48.5)	1.7 (0.9-3.0)	0.08
Lower (142)	55 (38.7)	87 (61.3)		
Socio-economic Status (SES)*				
Upper (55)	31 (56.4)	24 (43.6)	2.1 (1.1-3.9)	0.01
Lower (155)	59 (38.1)	96 (61.9)		
Place of delivery				
Hospital (77)	46 (59.7)	31 (40.3)	3.0 (1.7-5.3)	0.000
Home (133)	44 (33.1)	89 (66.9)		
Planned				
Unplanned(67)	20 (29.9)	47 (70.1)	0.44 (0.2-0.8)	0.009
Planned (143)	70 (49.0)	73 (51.0)		
Literacy of mother				
Literate (85)	52 (61.2)	33 (38.8)	3.6 (2.0-6.4)	0.000
Illiterate (125)	38 (30.4)	87 (69.6)		
Literacy of father				
Literate (95)	55 (57.9)	40 (42.1)	3.1 (1.8-5.5)	0.000
Illiterate (115)	35 (30.4)	80 (69.6)		
Occupation of Mother				
Housewife (160)	69 (43.4)	91 (56.6)	1.04 (0.5- 2.0)	0.8
Working (50)	21(42.0)	29 ((58.0)		
Type of family				
Joint (105)	53 (50.5)	52 (49.5)	1.8 (1.07-3.2)	0.02
Nuclear (105)	37 (34.6)	68 (65.4)		

*MUP Scale was used. Socio-economic status groups were clubbed together for statistical analysis. Upper Middle Class was clubbed with Upper Class and Lower Middle Class was clubbed with Lower Class.
†OR (CI) = Odds Ratio (Confidence Interval)

Table 3: Socio-demographic variables correlated with full immunization according to age by using multiple logistic regression

Variable	cOR (95% CI)	aOR (95% CI)	p value
Age < 6mth	2.2(1.3-3.9)	2.8 (1.4-5.4)	0.002
Birth order **≤2**	2.9 (1.6-5.5)	1.7 (0.8- 3.9)	0.19
Native	2.9 (1.6-5.5)	2.0(1.04- 3.9)	0.04
Upper SES	2.1 (1.1-3.9)	0.8 (0.3-2.1)	0.6
Hospital delivery	3.0 (1.7-5.3)	0.5 (0.2-1.02)	0.06
Unplanned preg.	0.44 (0.2-0.8)	1.1 (0.5-2.6)	0.7
Literate mother	3.6 (2.0-6.4)	1.4 (0.6-3.3)	0.4
Literate father	3.1 (1.8-5.5)	2.1 (0.9-4.8)	0.06

cOR=Crude ODDs Ratio; aOR= Adjusted OR

DISCUSSION

The current study showed that despite the long standing commitment to universal coverage, age appropriate immunization of infants in slums was far from complete. Only 42.9% infants [Table 1] received age appropriate vaccination completely, whereas others were partially immunized or unimmunized at the time of study. The findings are comparable to NFHS III findings for slums,[5] but figures are on lower side when compared with vaccination coverage in Punjab (80%).[9]

The impact of various socio-demographic factors on age appropriate vaccination was studied (Ta-

ble 2). It was observed that percentage of infants fully immunized as per their age was higher among those of less than six months of age in comparison to infants of more than six month of age. The difference was statistically significant. The observed difference which might have occured because of drop out, was also observed in another study in slums of Chandigarh.[10]

Contrary to the general perception, there was no difference in vaccination status of boys and girls. Similar finding were observed by Malkar et al in Maharashtra.[11]

The vaccination status was inversely proportional to birth order. The infants of birth order of two or less were 2.9 times more likely to be fully immunized in comparison to infants of higher birth order. The findings are consistent with observation of another study conducted to explore socio-demographic variables related to immunization.[12] Infants belonging to native families were 2.7 times more likely to be fully immunized in comparison to migrants. Migrants in Amritsar are generally from states like UP, Bihar and West Bengal where immunization coverage is very low which requires further evaluation.[13] Higher socioeconomic status had a positive impact on odds of infants fully immunized. In upper socio-economic status families, 51.5% infants were fully immunized as per their age whereas the figure was 38.7% for infants belonging to lower socio-economic status. Similar findings were observed in slums of Bareilly.[14]

Odds of infants fully immunized were also higher among those who were delivered in a hospital. Hospital staff might have motivated them for vaccination of the child. These findings are in tune with the findings of another study conducted in Ethiopia.[15] Planning of pregnancy and literacy of mother and father also had a significant positive effect on vaccination status of infants and the findings are consistent with other studies.[12,14]Occupation of mother had no significant effect on vaccination status of infants and the same was proved by Chaudhary et al.[14] Probability of infants being fully immunized was also higher in joint families which might have provided support to the family.

Multivariate logistic regression analysis was applied to various socio-demographic factors found to be significant in bivariate analysis (Table 3). The results showed that infants below 6months of age were 2.8 times more likely to be completely vaccinated as per their age in comparison to infants of more than 6months of age (OR= 2.8, CI= 1.4 to 5.4, p= 0.002).

Similarly, infants of native families were 2 times more likely to be immunized in comparison to infants belonging to migrant families (OR= 2.0, CI= 1.04 to 3.9, p= 0.04). But all other variable turned out to be non-significant.

Keeping in view the increasing urban slum population and poor immunization coverage, consistent efforts need to be made especially for migratory population so that immunization coverage could be improved for better survival of infants.

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