



IMMUNIZATION COVERAGE AND ITS DETERMINANTS AMONG CHILDREN AGED 12-23 MONTHS IN URBAN SLUMS OF GUWAHATI CITY- A CROSS SECTIONAL STUDY

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KEYWORDS :

INTRODUCTION:

Immunization is a process by which a person becomes protected against a disease through vaccination. This term is often used interchangeably with vaccination or inoculation.¹ In 1976, Dr Edward Jenner created the world's first successful vaccine against small pox. Subsequently, vaccine against typhoid, rabies, diphtheria, influenza, yellow fever, pertussis, polio, hepatitis B, measles, mumps, rubella were discovered. In 1974 the Expanded Programme on Immunization (EPI, now the Essential Programme on Immunization) is established by WHO to develop immunization programmes throughout the world. The first diseases targeted by the EPI are diphtheria, measles, polio, tetanus, tuberculosis and whooping cough.²

Expanded Programme on Immunization was launched in 1978. It was renamed as Universal Immunization Programme (UIP) in 1985 when its reach was expanded beyond urban areas. In 1992, it became part of Child Survival and Safe Motherhood Programme (CSSM) and in 1997 it was included in the ambit of National Reproductive and Child Health Programme (RCH). Since the launch of National Rural Health Mission (NRHM) in 2005, Universal Immunization Programme has always been an integral part of it. Universal Immunization Programme (UIP) is one of the largest public health programmes targeting close of 2.67 crore newborns and 2.9 crore pregnant women annually. It is one of the most cost-effective public health interventions and largely responsible for reduction of vaccine preventable under-5 mortality rate. Under UIP, immunization is providing free of cost against 12 vaccine preventable diseases: Nationally against 9 diseases - Diphtheria, Pertussis, Tetanus, Polio, Measles, Rubella, severe form of Childhood Tuberculosis, Hepatitis B and Meningitis & Pneumonia caused by Hemophilus Influenza type B; Sub-nationally against 3 diseases - Rotavirus diarrhoea, Pneumococcal Pneumonia and Japanese Encephalitis; of which Rotavirus vaccine and Pneumococcal Conjugate vaccine are in process of expansion while JE vaccine is provided only in endemic districts. A child is said to be fully immunized if child receives all due vaccine as per national immunization schedule within 1st year age of child.³

In Assam, as per NFHS-5 (2019-20) survey, among children aged 12-23 months, the percentage who received specific vaccines was 92.6% for BCG, 69.3% for polio (3 doses), 79.7% for DPT (3 doses) and 77.3% for Measles and percentage of fully immunized children (age 12-23 months) was 63.2%.⁴ SDG Target 3.8 is defined as "Achieve universal health coverage, including financial risk protection, access to quality essential

health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all".⁵ India with all of its states are far from achievement of the universal coverage. So, this study is conducted with the aim to assess the immunisation coverage of children aged 12 to 23 months and to identify its determinants.

MATERIALS AND METHODOLOGY:

This is a community-based cross-sectional study conducted between 15th April to 15th July, 2023 for a period of three months in the urban slums of Guwahati City. There are 217 slum pockets in Guwahati city out of which 99 slums are notified with a population of 87,457 and 15,701 household as per Census of India (2011). Children within 12-23 months of age living in the selected slum area whose parents/caregivers gave informed consent were included in the study. Using the formula, $n = 4pq/l^2$, where, p= Prevalence of children aged 12 to 23 months based on information from either vaccination card or mother recall, q = 100-p and l= allowable (relative) error the sample size calculated was 202.45 where prevalence of children aged 12 to 23 months based on information from either vaccination card or mother recall was 66.4 % as per NFHS 5(Assam Data) and allowable error taken is 10%. The sample size is rounded off to 225.

A multistage random sampling technique was applied for selecting households. Out of 99 notified slums, 15 slum areas were selected randomly. For all the selected slums a landmark was fixed in the centre of the slum and the first household to the left of the landmark was visited and a convention of sticking to left was followed till 15 mothers of children aged 12 to 23 months from all the selected slums were interviewed to achieve a target of 225. The mothers of children aged 12 to 23 months age were interviewed using a pretested semi-structured schedule.

Data was entered and analysed using Microsoft office Excel and represented using appropriate tables. Chi square test was applied and p value less than 0.05 was considered as statistically significant.

RESULTS:

The above figure represents the status of immunization where 70.2% of the study population was fully immunized, 29.8% was partially immunized. All the children included in the study were either fully or partially immunized, but none of them were found to be unimmunized.

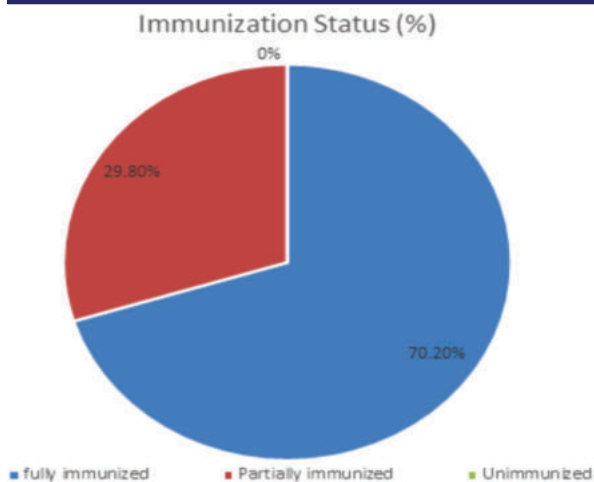


Fig 1: Immunization status of the study population:

Table 1: Socio-demographic Profile Of Study Population As Per Their Immunization Status:

Variables		N (%)	Partially Immunized (Percent age)	Fully immunized (Percent age)	p-value
Gender	Male	125 (55.6)	39 (31.2%)	86 (68.8%)	>0.05
	Female	100 (44.4)	28 (28%)	72 (72%)	
Religion	Hindu	185 (82.2)	42 (22.7%)	143 (77.3%)	<0.05
	Muslim	37 (16.4)	22 (59.5%)	15 (40.5%)	
	Christianity	3 (1.3)	3 (100%)	0	
Caste	General	91 (40.4)	31 (34.1%)	60 (65.9%)	>0.05
	OBC	53 (23.6)	11 (20.8%)	42 (79.2%)	
	SC	73 (32.4)	20 (27.4%)	53 (72.6%)	
	ST	8 (3.6)	5 (62.5%)	3 (37.5%)	
Birth Place	Govt hospital	142 (63.1)	51 (35.9%)	91 (64.1%)	<0.05
	Private hospital	65 (28.9)	6 (9.2%)	59 (90.8%)	
	Home delivery	18 (8)	10 (55.6%)	8 (44.4%)	
Age of mother (years)	≤25	104 (46.2)	32 (30.8%)	72 (69.2%)	>0.05
	>25	121 (53.8)	35 (28.9%)	86 (71.1%)	
Father's educational status	Literate	201 (89.3)	49 (24.4%)	152 (75.6%)	<0.05
	Illiterate	24 (10.7)	18 (75%)	6 (25%)	
Mother's educational status	Literate	202 (89.8)	54 (26.7%)	148 (73.3%)	<0.05
	Illiterate	23 (10.2)	13 (56.5%)	10 (43.5%)	
Type of Family	Joint	103 (45.8)	26 (25.2%)	77 (74.8%)	>0.05
	Nuclear	122 (54.2)	41 (33.6%)	81 (66.4%)	
Total no of family members	≤5	144 (64)	40 (27.8%)	104 (46.2%)	>0.05
	>5	81 (36)	27 (33.3%)	54 (66.7%)	

Total income (as per Kuppusswamy Scale)	≤9307	54 (24)	19 (35.2%)	35 (64.8%)	<0.05
	9308-27882	147 (65.3)	46 (31.3%)	101 (68.7%)	
	27883-46474	24 (10.7)	2 (8.3%)	22 (91.7%)	
Birth order	≤2	193 (85.8)	51 (26.4%)	142 (73.6%)	<0.05
	>2	32 (14.2)	16 (50%)	16 (50%)	

Among the children aged 12- 23 months, 55.6% were male and 45.4% were female. Majority of them belonged to the Hindu (82.2%) religion followed by Muslims (16.4%). Majority (63.1%) of them were born in government hospital whereas 8% had home delivery. Higher Literacy rate among parents was found with majority of the family having income in the range of Rs 9308-Rs 27882 (65.3%).

Table 2: Percentage Of Immunization Coverage Of All The Vaccines Under National Immunization Schedule (NIS):

Vaccine	Frequency (N=225)	Percentage (%)
BCG	225	100
OPV 0	218	96.8
HEP B	218	96.8
OPV1	223	99.1
PEV1(Pentavalent 1)	223	99.1
ROTA1	223	99.1
PCV1	195	86.6
IPV1	218	96.8
OPV2	215	95.5
PEV2 (Pentavalent 2)	213	94.6
ROTA2	215	95.5
OPV3	213	94.6
PEV3 (Pentavalent 3)	213	94.6
ROTA3	213	94.6
PCV2	187	83.1
IPV2	210	93.3
MR1	190	84.4
JE1	188	83.5
PCV Booster	167	74.2

According to table 2, immunization coverage of BCG vaccine was 100% and minimum (74.2%) coverage was of PCV.

Table 3: Factors Responsible For Partial Immunization

Factors	N=67	Percent age
Lack of awareness of vaccination schedule	23	34.3
Inconvenient immunization time	6	8.9
Immunization was postponed due to child's illness	8	11.9
Fear of Side effects	11	16.4
Unavailability of vaccine	18	26.9
Migrated from different place	1	1.6

The main reason for not taking vaccine was lack of awareness regarding their scheduled dose (34.3%) followed by unavailability of vaccines (26.9%). Other reasons were illness of their children at the time of immunization (11.9%), fear of side effects (16.4) and migration (1.6%).

DISCUSSION:

The present study shows that 70.2% of the study population is fully immunized and 20.8% is partially immunized. The immunization coverage in our study is higher than the data provided by NFHS-5 where the fully immunized children was 63.2%. None of the children were unimmunized which is a good indication that people are aware about the need of vaccination and there is an increased vaccine acceptance in public. A study done in the urban slum of Bhubaneswar by

Ipsa Mohapatra *et al*, 72% were fully immunized.⁶

Our study suggests that there is a significant association of immunization with religion, birth place, birth order, parent's educational status and their income. A study done by Suresh Sharma using three rounds of NFHS data found that immunization status varied with mother's educational status and their socioeconomic status and full immunization among children to religions other than Hinduism was lower.⁷ A study conducted by PS Rakesh *et al* observed that mother's education status was associated with improved vaccination status of the child.⁸ In a study, done by Sanjay Pandey *et al* it was observed that immunization was associated with mother's literacy, place of birth and availability of immunization card.⁹ It can be said that education and better socioeconomic status have a role to play in increased coverage as they understand the importance of vaccination so there is higher acceptance rate. Also, they have better access to health information and healthcare services.

The immunization coverage for BCG (100%), OPV 0 (96.8%), Hep B (96.8%), OPV1 (99.1%), PEV1 (99.1%), ROTA1 (99.1%), PCV1 (86.6%), fIPV 1(96.8%), OPV2 (95.5%), PEV2(94.6%), ROTA2 (95.5%), OPV3 (94.6%), PEV3 (94.6%), ROTA3 (94.6%), PCV2 (83.1%), fIPV 2 (93.3%) whereas only 84.4% are vaccinated with measles vaccine and 83.5% with JE showing a higher dropout after 9 months. The coverage of PCV was found to be 74.2% citing the reason of unavailability at vaccination centres as it is comparatively a newer vaccine. As per a study in Vellore by Mark Rohit Francis *et al*., BCG coverage was found to be 97% and measles to be 75%.¹⁰ In a study by C.M. Singh *et al* in Bihar, the vaccination coverage for BCG was 99.21% whereas measles coverage was 92.52%.¹¹ Both the study shows a drop in vaccination coverage from BCG to measles.

In our study, the reasons for not taking vaccine were lack of awareness regarding their scheduled dose (34.3%), unavailability of vaccines (26.9%), illness at the time of immunization (11.9%), Inconvenient immunization time (8.95%), fear of side effects (16.4) and only 1.6% was migratory population. The consolidated Intensified Mission Indradhanush report states the reason for non-vaccination are lack of awareness (45%), apprehension about adverse events (24%), vaccine resistance i.e, reluctance to receive the vaccine for reasons other than fear of adverse events (11%), child travelling (8%), and programme related gaps in 4% of the respondents.¹² A study conducted by Devendra *et al*. in tertiary care hospital of North India stated that the reasons for partial immunization and non-immunization were lack of knowledge about immunization (30.3%), apprehension about side effects of vaccination (28.8%), and lack of knowledge about subsequent doses (22.09%). Other reasons were vaccine causes sterility, vaccine was not available and vaccinator was not available.¹³ According to a study conducted by Priya P K *et al*. in slum areas of Maharashtra, showed poor coverage due to lack of response in spite of repeated counselling. Majority of the response for non/partial vaccination was due to illiteracy or worry about loss of a day's wage.¹⁴

CONCLUSION:

The study shows poor immunization coverage in slum areas of Guwahati city. In our study, it was found that immunisation coverage is influenced by the literacy status of parents and their financial status. Improving literacy can have a positive impact on immunization coverage by increasing knowledge and understanding of the importance of vaccines and healthcare. When individuals are more literate, they are better equipped to access information, comprehend health-related messages, and make informed decisions about vaccination for themselves and their families. Regular monitoring and evaluation of immunization programs are essential to assess

progress, identify gaps, and adjust strategies accordingly.

By implementing these strategies and maintaining a long-term commitment to immunization coverage, we can achieve higher vaccination rates, reduce the burden of preventable diseases, and build a healthier, more resilient global community. The effort to improve immunization coverage is a shared responsibility that demands collective action and dedication from all stakeholders involved. Together, we can ensure that vaccines reach every corner of the world, protecting lives and fostering a brighter future for generations to come.

Conflict Of Interest: nil

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