

Original Research Article

Immunization coverage and factors associated with immunization status in an urban area of Imphal East district: a cross-sectional study

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ABSTRACT

Background: Despite many initiatives undertaken by the government of India, many children remain unvaccinated or under vaccinated, and vaccine preventable diseases are still a leading cause of morbidity and mortality. The present study was done to assess the immunization coverage of children aged 6 to 23 months in an urban area of Imphal East district and to determine the factors associated with immunization gap. We also determined the association of immunization status with some socio-demographic variables.

Methods: A cross-sectional study was carried out in all the thirteen villages under urban primary health centre (UPHC), Kshetrigao among mothers or primary caregiver of children aged 6-23 months. Data were collected using semi-structured questionnaires by face to face interview.

Results: The total number of respondents was 206. The prevalence of fully immunized, immunized up to date, partial and non immunized were found to be 73%, 59%, 37%, and 3% respectively. Child being sick was the main reason for incomplete immunization. Mother belonging to older age group were found to have significantly higher immunized up to date children than younger mother ($p=0.02$).

Conclusions: The prevalence of immunized up to date children was low. Effective strategy of raising awareness among communities regarding routine vaccination and clarifying their misconceptions related to vaccines is the need of the hour.

Keywords: Below two years children, Immunization, Imphal, Reasons for incomplete immunization

INTRODUCTION

Immunization is an essential part of primary health care and a basic human right. According to World health organisation (WHO) reports, childhood vaccines prevent 2-3 million untimely deaths in children per year, with an additional 1.5 million deaths likely to be avoided with increased vaccination coverage.¹

Childhood immunisation is central component of Sustainable Development Goal (SDG) target 3.2, which focuses on avoiding preventable deaths in new-borns and children under age of 5, and SDG target 3.8, which seeks

to achieve equitable access to vital medicines and vaccines.²

Owing to low childhood vaccination coverage, India's Ministry of Health and Family Welfare, Government launched Mission Indradhanush in December 2014, to target underserved, vulnerable, resistant and inaccessible populations.³ This contributed to an increase of 6.7% in full immunization coverage (7.9% in rural areas and 3.1% in urban areas) after the first two phases. In October 2017, the prime minister of India launched Intensified Mission Indradhanush (IMI) with an aim to vaccinate all children under 2 years of age.⁴ According to National

Family Health Survey (NFHS-5), children aged 12-23 months who were fully vaccinated was found out to be 76.4% for India and 68.8% for Manipur.⁵

Government of India had prepared a road map for achieving 90% full immunization coverage across the country in 2019.⁶ Unfortunately, many children remain unvaccinated or under vaccinated, and vaccine preventable diseases are still a leading cause of morbidity and mortality, especially in low- and middle-income countries.⁷

In order to increase child immunization coverage, the underlying causes and reasons not to immunize their children should be known. There are limited studies done to explore the obstacles faced by the mothers preventing them to access the immunization program in Manipur. So, this study was conducted to assess the immunization coverage of children aged 6 to 23 months in an urban area of Imphal East district and to determine the factors associated with immunization gap. We also determined the association of immunization status with some socio-demographic variables.

METHODS

A community based cross-sectional study was conducted in Kshetrigao, Imphal East district, Manipur. All the thirteen villages under UPHC, Kshetrigao, were included in the study. Kshetrigao has a total population of 14,298 and consisting predominantly of Muslim community. The study population consisted of mothers or primary caregivers of children aged 6-23 months. As per survey conducted by department of community medicine, JNIMS, Imphal, the total number of eligible children in the target population was 251. Those who were residing in the study area for more than one year and gave consent were included in the study. Those who were seriously ill and those who could not be contacted even after third visit were excluded from the study.

The study was carried out from September 2023 to October 2023. All the children aged 6-23 months from all the thirteen villages were included in the study. Universal sampling was done for selecting the mothers or primary caregivers of the children aged 6-23 months.

A pre-tested semi-structured questionnaires consisting of the following domains-socio-demographic profile, health service utilization, ante-natal and birth history of the child, immunization history of the child and factors influencing the immunization status was used.

Operational definition

Immunized up to date were defined as those children who received all the recommended doses of vaccines for their age as per the national immunization schedule at the time of the study.

Partially immunized were defined as those children who defaulted at least one or more doses of recommended vaccines for their age.

Non-immunized: A child who did not receive any vaccine till date.

Partially and non immunized children were merged to express incomplete immunization.

Fully immunized/ primary immunization: A child aged 12-23 months who had received one dose of BCG, three doses of pentavalent vaccine, three doses of OPV and one dose of MR and JE.

House to house visit was done and mothers/primary caregiver of children 6 to 23 months were identified. The purpose of the study was clearly explained and informed verbal consent was taken from the study participants before collecting data. Data were collected using semi-structured questionnaires by face to face interview. In case there were more than one eligible participant in a household, all the participants were interviewed. All the collected data were in the custody of the investigators in password protected computers.

Data analysis

Data were entered in MS excel and analysed in IBM SPSS version 22-Chicago, Illinois, USA. Descriptive statistics like mean, proportion, standard deviation was used to summarize the findings and analytical statistics i.e., Chi square test was used to find association between immunization status and socio-demographic variables. A p value of <0.05 was taken as significant.

Ethical approval

Ethical approval was obtained from institutional ethics committee (IEC), JNIMS. Informed consent was taken from the study participants and purpose of the study was clearly explained prior to the interview. Strict confidentiality of the information was maintained.

RESULTS

The total number of respondents was 206. There were ten houses found to be locked or not available on repeated visit. Three children were found to be severely ill while two mothers refused to give consent. The mean (S.D) age of the child was 15.94 (6.12) months. The mean (S.D) age of the mother was 26.85±(5.02) years and Range from 15 to 40 years. Majority (66%) of the child were aged 12-23 months. Male and female proportion was almost similar. Almost half of them (40%) belong to first birth order. Maximum of the mother (81%) belonged to 18-30 years. Majority (85%) of them were homemaker and less than half of them had attended primary school. While majority (39%) of the father had attended secondary school and were self-employed (43%). Proportion of nuclear and

joint family was almost similar. Majority (82%) of the families belong to middle class according to modified BG Prasad classification.

Table 1 shows that regarding the health service accessibility, majority (88%) was aware regarding their nearest Health Facility (UHTC Kshetrigao). The 82% of them reported visit by ASHA/ANM in the last six months. Around 94% were aware about Anganwadi centre nearby and reported receiving benefits from them. Almost all of the mother went for ante-natal check up and around 92% of them received adequate ante-natal check up. Only 2% of them did not received Inj. TT. Around 84% had institutional delivery and remaining 16% delivered at home. Out of which NVD by non- skill birth attendant accounted for 13%.

Regarding the health seeking behaviour, 94% of the child reported sickness in the last six months. Fever, ARI and diarrhoea were the most reported illness. Majority of them reported seeking treatment from private health

facility (33%) followed by government health facility (29%). The respondent stated easy access (65%) and belief or trust in that system (49%) as reason for choosing the health facility.

Table 2 shows the immunization history of the child. Majority (97%) of them were found to be immunized with majority getting immunized at government health facility. Immunization card were available in 70% of the cases. The prevalence of immunized up to date, partial immunized and non immunized were found to be 59%, 37% and 3% respectively. Prevalence of fully immunized children aged 12-23 months were found to be 73%.

Figure 1 shows that BCG, OPV-1 and pentavalent-1 were the most commonly received vaccine (96%) while MR-1 and JE-1 were the least received vaccine (73%) among children aged 12-23 months.

Table 1: Accessibility and utilization of health service, (n=206).

Variables	N	Percentage (%)
Nearest health facility		
Jawaharlal Nehru Institute of Medical Sciences, Imphal	25	12.1
Urban Health Training Centre, Kshetrigao	180	87.4
Lamjingba Hospital (private hospital)	1	0.5
Asha/ANM visit in last 6 months		
Yes	169	82
No	37	18
Anganwadi center nearby		
Yes	193	93.7
No	13	6.3
Benefit from Anganwadi center		
Yes (Rice, Dal)	163	79.1
No	43	20.9
ANC checkup during pregnancy		
Yes	203	98.5
No	3	1.5
Number of ANC visit		
<4 times	17	8.3
≥4 times	189	91.7
Received two Td doses/booster dose		
Yes	202	98.1
No	2	1.9
Place of delivery		
Home	34	16.5
Government health facility	122	59.2
Private health facility	50	24.3
Mode of delivery		
NVD with non-skilled birth attendant	26	12.6
NVD with skilled birth attendant	101	49
Caesarian section	79	38.3
Child sick in the last six months		
Yes	194	94.2
No	12	5.8

Continued.

Variables	N	Percentage (%)
Place where medical treatment were sought for the recent illness (n=194)		
Private health facility	67	32.5
Government health facility	59	28.6
Pharmacy	56	27.2
Home remedy	9	4.5
Traditional healers	3	1.5
Reason for selecting particular health care (n=194):*		
Easy access or convenient	126	64.9
Belief or trust in that system	96	49.4
Referred by family and friend	16	8.2

*Multiple options allowed.

Table 2: Immunization history of the child, (n=206).

Variables	N	Percentage (%)
Ever taken child for immunization		
Yes	199	96.6
No	7	3.4
Immunization card available		
Yes	140	70.4
No	59	29.6
Place of immunization (n=199)		
Govt. health facility	198	99.5
Private health facility	1	0.5
Up to date immunized children	122	59.2
Partial immunized children	77	37.4
Non immunized children	7	3.4
Fully immunized children (n=136)	99	72.8

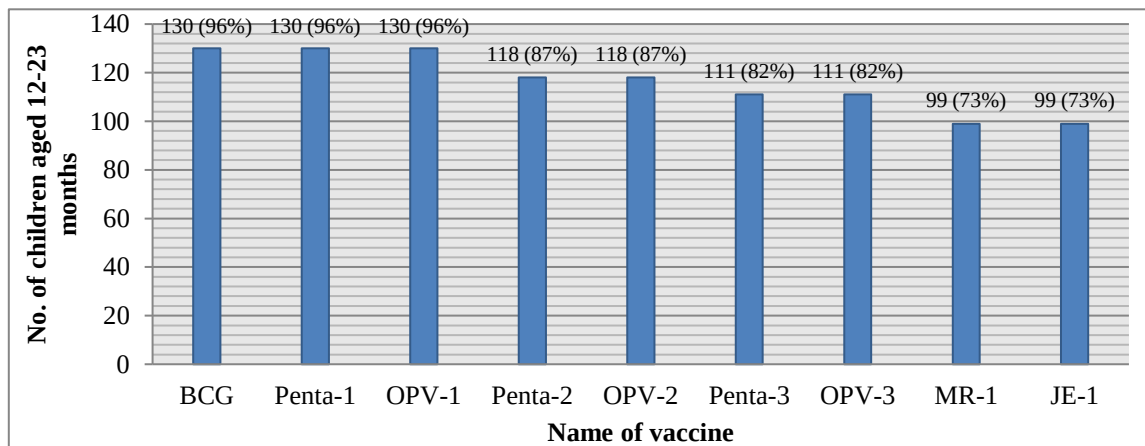


Figure 1: Comparing the individual vaccine coverage of children aged 12-23 months, (n=136).

Table 3: Reasons for immunization uptake or gaps in immunization of the child.

Reasons	N	Percentage (%)
For up to date immunized children (n=122)		
My child will get sick if not immunized	119	97.5
Health care providers told me that it is important	44	36.0
Message from mass media	8	6.5
For partial immunized children (n=77)		
Child got sick	49	63.6
Family problem	13	16.8

Continued.

Reasons	N	Percentage (%)
Inconvenient timing	13	16.8
Long waiting time	5	6.4
Vaccine was not available	4	5.2
Place of immunization too far	3	3.9
Due to law-and-order situation	2	2.6
Fear of side effects	1	1.2
For non immunized children (n=7)		
Child was sick	6	
Refusal by in-law	1	

Table 4: Association between socio-demographic variables and immunization status.

Variables	Immunization status, N (%)		P value
	Upto-date	Incomplete immunized	
Sex			
Male	61 (57.5)	45 (42.5)	0.614
Female	61(61)	39 (39)	
Age of the child (months)			
6-<12	38 (54.3)	32 (45.7)	0.301
12-23	84 (61.8)	52 (38.2)	
Birth order of the child			
1	52 (62.7)	31 (37.3)	0.804, Df=3
2	37 (56.9)	28 (43.1)	
3	23 (57.5)	17 (42.5)	
≥4	10 (55.6)	8 (44.4)	
Age of the mother (in years)			
<18-30	92 (55.4)	74 (44.6)	0.02
31-40	30 (75)	10 (25)	
Mother’s educational level			
Illiterate	10 (55.6)	8 (44.4)	0.53, Df=3
Primary	47 (56)	37 (44)	
Secondary	36 (58.1)	26 (41.9)	
Graduate and above	29 (69)	13 (31)	
Mother’s occupational status			
Unemployed	100 (57.1)	75 (42.9)	0.149
Employed	22 (70.9)	9 (29.1)	
Father’s educational status			
Illiterate	7 (63.6)	4 (36.4)	0.41, Df=3
Primary	32 (53.3)	28 (46.7)	
Secondary	46 (57.5)	34 (42.5)	
Graduate and above	37 (67.3)	18 (32.7)	
Father’s occupational status			
Government employee	15 (71.4)	6 (28.6)	0.492
Private employee	22 (62.9)	13 (37.1)	
Self employed	52 (59.1)	36 (40.9)	
Daily wage worker	33 (53.2)	29 (46.8)	
Type of family			
Nuclear	64 (63.4)	37 (36.6)	0.235
Joint	58 (55.2)	47 (44.8)	
Socio-economic status			
Upper class (≥8480)	10 (58.8)	7 (41.2)	0.401
Upper middle class (4240-8479)	28 (60.9)	18 (39.1)	
Middle class (2544-4239)	44 (67.7)	21 (32.3)	
Lower middle class (1272-2543)	30 (51.7)	28 (48.3)	
Lower class (<1272)	10 (50)	10 (50)	

Table 3 shows the reasons for immunization uptake or gaps. Almost all (98%) of the mother stated that my child will get sick if not immunized. Also, on asking the reason for partial immunization, majority (64%) of them said that the child got sick. On enquiring the mother regarding not immunizing the child, six of them cited the child was sick while one of them cited refusal by in laws.

Table 4 shows the association between socio-demographic variables and immunization status. Mother belonging to older age group i.e. 31-40 years were found to have higher immunized up to date children than younger mother and it was found to be statistically significant ($p=0.02$). More educated mother (graduate and above) and employed mother have more immunized up to date children but it was not statistically significant. Similarly, sex, age of child, birth order of the child, paternal education and occupation, type of family and socio-economic status were not found to be statistically significant with immunization status.

DISCUSSION

The present study was conducted among the mothers of children aged six months to less than two years residing in Kshetrigao. The prevalence of up to date immunized and fully immunized children were found to be 59% and 73% respectively. According to NFHS-5, children aged 12-23 months who were fully vaccinated was reported to be 76% for India and 69% for Manipur.⁵ In our present study, the low rate of up to date immunization might be attributed to the ongoing conflict in Manipur which has disturbed the routine immunization sessions.

The highest individual vaccination coverage was observed for BCG, OPV-1 and pentavalent-1 while lowest were seen for MR-1 and JE-1. Similar finding were also seen in rural Barak valley.⁸ The gradual drop in vaccination coverage from BCG to MR-1 could be due to forgetfulness of the mother or lack of understanding for the need for further vaccination and loss of motivation.

Child being sick was cited as the most common reason for partial immunization as well as non immunization. Similar findings were reported by Gill et al in Mumbai and Masood et al conducted in Sindh.^{9,10}

A study done in India identified low awareness of the benefits of vaccination, safety concerns, especially related to mild adverse events following immunization and mistrust in government and health service quality as the important individual-level influences.¹¹ In our study, only one mother reported fear of side effect as reason for partial immunization whereas in a study by Roy et al fear of side effects of immunisation, specifically post immunisation symptoms that often lead to mild pain or fever in the child, was found as the main reason for incomplete immunisation followed by a lack of faith in immunisation.⁸ Also, in a study conducted by Kumar fear of adverse events following vaccination, session not held,

family not aware of the need of immunization, vaccine not available at session site, etc were some of the major factors limiting the vaccine coverage.¹²

In our study, 17% of the mother cited family problem for partial immunization while one mother cited refusal by in laws as reason for not immunizing the child. This highlights the importance of family support in getting the child immunized.

In our study, older Mother i.e. 31-40 years were found to have higher immunized up to date children than younger mother and it was found to be statistically significant. Older mothers are likely to have more experience and more knowledgeable about children's health which might explain the finding. Similar findings were reported by in a study conducted in Haryana.¹⁰ The importance of maternal education in children's health is universally recognised. Children of more educated mothers were more likely to be fully immunized.¹³⁻¹⁵ However in our study, maternal education was not statistically associated with immunization status. Paternal education and occupation were not found to be associated with immunization status. Similar findings were reported in Nagaland by Kim.¹³ This was in contrast to a study conducted in Punjab where father's education was found to be significantly associated with immunization status.¹⁶

Our study found no association between sex, age and birth order of the child with immunization status. Similar findings were reported in other studies.^{17,18} However, a study conducted in Eastern India found female gender as statistically significant predictors for incomplete immunization.¹⁹ This might be attributed due to gender discrimination and preference for male child which is comparatively lesser in North-East India compared with mainland India. In another study, higher birth order was also found to be associated with incomplete vaccination.¹⁶ As the number of children increases, the attention of the mother is more frequently split between them if she has a large family.

In this study, parent's socioeconomic status was not associated with immunization status. Similar finding was seen in other studies.^{13,18} However immunization status was found to be significantly low among lower socioeconomic group in urban slum of Mumbai.⁸

Our study found children belonging to nuclear family to be more up to date immunized compared to those belonging to joint family though it was not found to be significant. Gawade et al found significantly lesser immunized children in nuclear family compared to joint family.²⁰

The limitation of our study is that in cases where the MCP card were not available, information based on maternal recall method might be prone to recall bias and might overestimate immunization coverage. The strength of our study lies in that we covered all the children aged

six months to less than two years residing in the study area and we could also assess the immunization status for the early part of childhood.

CONCLUSION

The prevalence of immunized up to date children was found to be 59%. Child being sick was cited as the most common cause for incomplete immunization. Older mothers were found to have significantly immunized up to date children than younger mothers. There is a need to sensitize the mother about the importance of timely immunization. Mothers should also be made aware that vaccine can be safely given during mild illnesses. Effective strategy of raising awareness among communities regarding routine vaccination and clarifying their misconceptions related to vaccines is the need of the hour. Timely reminders to parents through health worker home visits or mobile-phone reminders may help improve uptake of vaccination.

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