

## Original Research Article

# A cross-sectional study on determinants of immunization coverage in urban area Chidambaram, Tamil Nadu

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**Received:** 18 February 2021

**Accepted:** 17 March 2021

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## ABSTRACT

**Background:** Immunization is one of the cost effective measures preventing approximately 2 to 3 million deaths in young children every year. In spite of the progress in vaccination coverage challenges still remain for underserved and inaccessible children. It is therefore essential to evaluate the immunization coverage at periodic intervals and improve coverage in vulnerable areas.

**Methods:** A cross-sectional study was conducted among 152 children aged 12 to 42 months in urban Chidambaram from September to October 2018. We collected details regarding immunization from vaccination card or mother's recall. A pretested semi-structured proforma was used to collect sociodemographic variables. Data were collected, compiled and tabulated using Microsoft Excel and analyzed using SPSS 20.0 version.

**Results:** Complete immunization coverage was 80.3% and 19.7% were partially immunized. Lack of awareness is the major reason for failure of full immunization (63.3%). Immunization coverage was higher when parents studied up to higher secondary or graduates (mother 91.3%, father 87.5%, p value 0.01), father do skilled jobs (91.9%, p value 0.02), among first birth ordered children (88.3%, p value 0.01), children born in healthcare facility and among mothers who received antenatal care during pregnancy (80.8% each, p value 0.04).

**Conclusions:** Lack of awareness, parents' literacy and occupation, place of birth, antenatal services and number of children in the family are important determinants of immunisation coverage. Apart from strengthening of infrastructure for better delivery of mother and child health services other issues also need to be addressed for better immunization practices.

**Keywords:** Immunization, Children, Literacy, Birth order

## INTRODUCTION

Immunization remains one of the most important and cost effective public health intervention to reduce morbidity and mortality due to infectious diseases in children. It prevents approximately 2-3 million fatalities in young children every year.<sup>1</sup> The WHO expanded programme on immunization (EPI) recommends that all children receive one dose of BCG, three doses of diphtheria-pertussis-tetanus vaccine (DPT), three doses of oral polio vaccine

(OPV), three doses of hepatitis B vaccine and one dose of measles vaccine. The coverage for these major vaccine-preventable diseases has risen significantly since EPI began in 1974. Despite this progress, an estimated 1.5 million children worldwide die each year of diseases that can readily be prevented by these vaccines.<sup>2</sup>

In India, this universal immunization program (UIP) is the largest in the world with annual cohorts of around 26.7 million infants and 30 million pregnant women.<sup>3</sup> The national family health survey-4 (NFHS-4) in 2015-2016

reports 62% of children aged 12-23 months were completely immunized in India (BCG, 3 doses of DPT, OPV, Hepatitis B and one dose of measles each). As per this national survey, 61.3% and 63.9% children of 12-23 months age have been fully immunized in rural areas and urban areas of India, respectively. Puducherry has the highest (91.3%) and Nagaland has the lowest (35.7%) percentage in terms of immunization coverage.<sup>4</sup>

Several socio-economic (lack of awareness, cultural beliefs, parents education, religion, number of children in the family, socioeconomic status, lack of trust in health services) as well as other factors (poor quality of services, inadequate staffing and irregular supply of vaccines) are important determinants of immunization coverage.<sup>5</sup>

Thus the objective of this study was to assess the immunization coverage and its determinants in children aged one to three and half years in urban field practice area of Rajah Muthiah medical college, Chidambaram.

## METHODS

This community based cross-sectional study was conducted between September to October 2018 for a period of one month in urban area of Chidambaram. The study participants were all the children aged 12 to 42 months living in urban Chidambaram. Respondents whose parents refused to be a part of the study are excluded. Considering the prevalence of full immunization coverage in a study done by Duraimurugan M et al in urban area of Kanchipuram as 76% sample size was calculated to be 70 using the formula<sup>6</sup>,

$$\frac{Z^2PQ}{d^2}$$

where Z=reliability coefficient (1.96), P=Prevalence, Q=1 - P, d2=absolute precision of 10%.

House to house survey was conducted using convenient sampling technique. Details of immunization coverage was obtained from immunization card or mother's recall if the card is not available. Pretested semi-structured proforma was used to collect socio-demographic details.

## Operational definition

Infants who receive one dose of BCG, three doses of each of OPV, DPT and hepatitis B and one dose of measles vaccine before reaching one year of age is said to be fully immunized.

Infants who received any one or two doses but not all the vaccines within one year of age is said to be partially immunized.

Infants who have not received any vaccines before one year of age is said to be unimmunized.

## Statistical analysis

Data collected were coded, classified and analyzed using SPSS (statistical package for social sciences) version 20. The statistical test used to determine the attributes include descriptive statistics and chi-square test. The level of significance was fixed at 5%.

## RESULTS

Majority of the study population were males (55.9%) and belong to hindu community (80.3%). Majority (80.3%) were fully immunized and 19.7% were partially immunized. Most of the mothers had taken regular antenatal care and most of the children were born in healthcare facility (99.3% each). Most of the children (92.8%) had birth certificates. Unaware of the need of immunization (40%), unaware of need to return for subsequent doses (23.3%) and fear of side effects (16.7%) are the important reasons for failure of full immunization. Immunization coverage increased with the literacy status of parents (87.5% and 91.3% among higher secondary or graduate father and mother respectively) and was highest (91.9%) when fathers do skilled jobs which was statistically significant. The coverage is higher among first birth order (88.3%), when born in healthcare facility (80.8%) and mothers who received antenatal care (80.8%) and was significant. There was no significant association between immunization coverage and gender, religion, mother's occupation and age, family income, type and size.

**Table 1: Distribution of gender among study population.**

Sex	Frequency (N)	Percentage (%)
Male	85	55.9
Female	67	44.1
Total	152	100

**Table 2: Immunization status among the study subjects.**

Immunization status	Frequency (N)	Percentage (%)
Fully immunized	122	80.3
Partially immunized	30	19.7
Total	152	100

**Table 3: Reason for failure of full immunization.**

Reasons	Frequency (N)	Percentage (%)
<b>Unaware of the need of immunization</b>	12	40
<b>Unaware of the need to return for 2<sup>nd</sup> or 3<sup>rd</sup> dose</b>	7	23.3
<b>Fear of side effects</b>	5	16.7
<b>Postponing until another time</b>	2	6.7
<b>Child was ill</b>	3	10
<b>Others</b>	1	3.3
<b>Total</b>	30	100

**Table 4: Determinants of immunization coverage.**

Determinants	Immunization status				Total		P value
	Fully immunized		Partially immunized		N	%	
	N	%	N	%			
<b>Gender</b>							
Male	70	82.5	15	17.5	85	100	0.46
Female	52	77.6	15	22.4	67	100	
<b>Religion</b>							
Hindu	98	80.3	24	19.7	122	100	0.96
Others	24	80	6	20	30	100	
<b>Father's literacy</b>							
None/primary	6	46.2	7	53.8	13	100	0.01
Secondary	53	79.1	14	20.9	67	100	
Higher secondary/graduate	63	87.5	9	12.5	72	100	
<b>Father's occupation</b>							
Unskilled	9	45	11	55	20	100	0.02
Semi-skilled	56	80	14	20	70	100	
Skilled	57	91.9	5	8.1	62	100	
<b>Mother's literacy</b>							
None/primary	6	66.7	3	33.3	9	100	0.01
Secondary	53	71.6	21	28.4	74	100	
Higher secondary/graduate	63	91.3	6	8.7	69	100	
<b>Mother's occupation</b>							
Unskilled	106	80.3	26	19.7	132	100	0.21
Semi-skilled	3	60	2	40	5	100	
Skilled	13	86.7	2	13.3	15	100	
<b>Mother's age</b>							
Below 25 years	33	73.3	12	26.7	45	100	0.68
Above 25 years	89	83.2	18	16.8	107	100	
<b>Family income</b>							
≤5000	12	75	4	25	16	100	0.44
6000-10000	53	74.6	18	25.4	71	100	
>10000	57	87.7	8	12.3	65	100	
<b>Family type</b>							
Nuclear	69	77.5	20	22.5	89	100	0.17
Non-nuclear	53	84.1	10	15.9	63	100	
<b>Family size</b>							
≤5	90	81.1	21	18.9	111	100	0.66
>5	32	78	9	22	41	100	
<b>Birth order</b>							
1 <sup>st</sup>	68	88.3	9	11.7	77	100	0.012
2 <sup>nd</sup> /higher	54	72	21	28	75	100	
<b>Place of birth</b>							
Home	0	0	1	100	1	100	0.043
Health care facility	122	80.8	29	19.2	151	100	
<b>Antenatal care</b>							
No	0	0	1	100	1	100	0.043
Yes	122	80.8	29	19.2	151	100	

## DISCUSSION

Immunization plays an important role in preventing illness and improving health of the children. Full immunization coverage in our study was 80.3% which is similar to the study conducted by Murhekar et al in Tamil Nadu, where it was 78.8% and 79.4% as per the study by Joy et al in Kochi, Kerala whereas it was only 50% in rural Uttar Pradesh in a study done by Ahmad et al.<sup>7-9</sup> In the present study the main reason for failure of full immunization was unaware of need of immunization (40%) and need to return for subsequent doses (23.3%). Similar results were given by Nath et al in urban slums of Lucknow.<sup>10</sup>

Girl-to-boy coverage ratio of less than 1 was found in most states of India and has not changed despite improved vaccination practices.<sup>11</sup> There was no association between gender and immunization coverage in this study which is contrast to findings given by Devasenapathy et al where girl to boy complete immunization coverage was 0.78.<sup>12</sup>

Immunization coverage increased with mother's literacy which is concordant with the findings shown by Johri et al.<sup>13</sup> Illiteracy of the mother was significantly associated with partial immunization similar to the results were given by Nath et al.<sup>10</sup> There was no association between religion and immunization coverage in contrast to the study done by Devasenapathy et al where muslim households had lower complete immunisation.<sup>12</sup>

Similar to the findings of Kulkarni et al hospital based child births and antenatal care are associated with good immunization practices.<sup>14</sup> A study in Kenya found that a child who was delivered in a health facility was 2.26 times more likely to receive full immunization compared to one delivered at home or by a traditional birth attendant.<sup>15</sup>

## CONCLUSION

Complete immunization in the study area was 80.3%. In order to achieve 100% immunisation coverage vulnerable and inaccessible households should be targeted by effective outreach interventions. Lack of awareness and sociocultural beliefs were important determinants of immunization coverage. These social barriers need to overcome by improving parents literacy and ongoing motivation by professionally designed behavioural change communication interventions.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

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**Cite this article as:** Priya DPL, Kalyani P, Bala BS. A cross-sectional study on determinants of immunization coverage in urban area Chidambaram, Tamil Nadu. *Int J Community Med Public Health* 2021;8:2309-13.