



**IMMUNISATION COVERAGE AND DETERMINANTS OF INCOMPLETE
CHILDHOOD IMMUNIZATION AMONG CHILDREN AGED 12-23 MONTHS
RESIDING IN SLUMS OF NORTH-WEST DISTRICT OF DELHI, INDIA (2018)**

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1.1 Abstract

Immunisation is a cornerstone of public health and one of the most effective methods to prevent childhood morbidity and mortality. Globally, routine childhood immunisation prevents an estimated 1.4 million deaths annually. Despite the implementation of India's Universal Immunisation Programme (UIP) since 1985 and further enhancements through Mission Indradhanush and Intensified Mission Indradhanush (IMI), gaps in immunisation coverage persist, particularly among urban poor communities. This study was conducted to assess immunisation coverage among children aged 12-23 months in slums of North-West Delhi and identify factors leading to incomplete immunisation. A cross-sectional analytical study was conducted between January and April 2018 using cluster sampling across 59 slum clusters. Data from 413 children were collected through structured interviews conducted by trained ASHA workers. The study found that 86.14% of the children were fully immunised, with BCG, OPV3, Pentavalent, and Measles coverage rates exceeding 85%. Despite this high overall coverage, a significant proportion of children were incompletely immunised, primarily due to socioeconomic and educational disparities. Multivariate analysis identified key determinants of incomplete immunisation: maternal illiteracy, low family income (EWS), and home births. Additionally, scheduling conflicts, lack of awareness, and forgetfulness were reported as primary reasons for missed vaccinations. The study concludes that while significant progress has been made toward achieving the IMI target of 90% coverage, further targeted interventions focusing on vulnerable groups are essential. Recommendations include enhanced community outreach, targeted education campaigns, flexible immunisation schedules, and consistent follow-ups by healthcare workers. These measures are vital for bridging the immunisation gap and ensuring equitable healthcare access in urban slum populations.

Keywords: Immunisation, Urban Slums, Mission Indradhanush, Delhi, Child Health, Vaccination, Socioeconomic Determinants

1.2 Introduction

Immunisation is recognised as the most cost-effective public health strategy available today. It is when one takes a shot—injection, actually seems like the nuisance equivalent of a doctor's office. But it's a call to the body's inner circle of defenses, the immune system, to do something it doesn't ordinarily do: recognise a harmless agent—like a killed or weakened virus, or a piece of virus that can't harm that's just been introduced, and learn how to eliminate it. If it succeeds, then next time around, when the real live virus confronts the body it was immunised against, the immune system will remember and act much more quickly than it did the first time.

In 2014, the Government of India launched Mission Indradhanush to close the immunisation gaps. The mission aimed to achieve 90% full immunisation coverage by 2019. This target was reinforced by the Intensified Mission Indradhanush (IMI) in 2017, which aimed to reach the target in certain districts, including urban slums, by December 2018. Even though these two missions had clear aims and timelines, the result of closing coverage gaps has been quite uneven. Despite a significant urban migration, public health services have not kept pace with the sharp rise in slum dwellers; therefore, children are more likely than ever to go without vaccinations.

Urban slums are typically characterised by a high density of people, poor sanitation, and limited access to healthcare, which can prevent serious illnesses. In places like Delhi that have so much wealth, the kind of urbane nearness that appears in business class, the poor seem to reside in a cohabitation of sorts with the slums. The SRS and NFHS surveys enable us to understand that people living inside and outside the slums lead very different lives in terms of health and access to healthcare. We have some baseline numbers concerning life in the slums, access to services that can prevent VPDs (vaccine-preventable diseases) like polio and measles, and simple healthcare access.

1.3 Objectives

Primary Objective: Estimate coverage of vaccinations among children aged 12-23 months in the slums of North-West Delhi.

Secondary Objective: Identify factors that are associated with the vaccination coverage.

1.4 Methods

The study employed a cross-sectional analytical design conducted from January to April 2018 in the slum clusters of North-West Delhi. Slum locations, due to their high population density and other socio-economic challenges, are zones of critical public health concern. This made the study an optimal one for surveying immunisation coverage; the children surveyed for the study were far more likely than the average child to face serious obstacles to receiving vaccines, including profound ignorance of their existence, as well as a lack of adequate health services and dire poverty. Therefore, we should pay close attention to the results of the surveys, which struck at the very heart of key government public health initiatives, including Mission Indradhanush and Intensified

Mission Indradhanush (IMI), both of which target high-risk areas that are likely to see the study's immunisation results relevant.

A survey was conducted with 413 children under two years of age. They were selected from 59 randomly chosen clusters. The scientists employed a sampling technique known as multistage cluster sampling. This method allows for the kind of capturing of variety that is very useful when dealing with the sorts of demographic and social factors that are (often invisibly) structuring our lives. The use of this method also enhances the generalizability of the results.

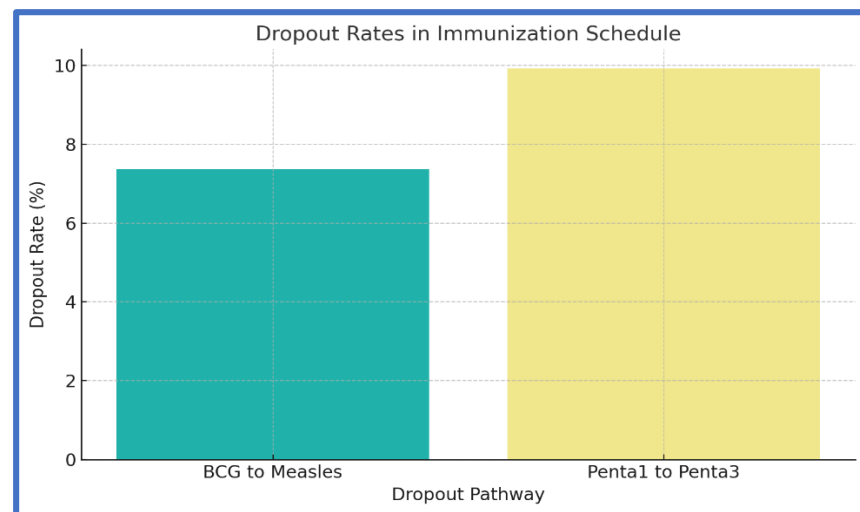
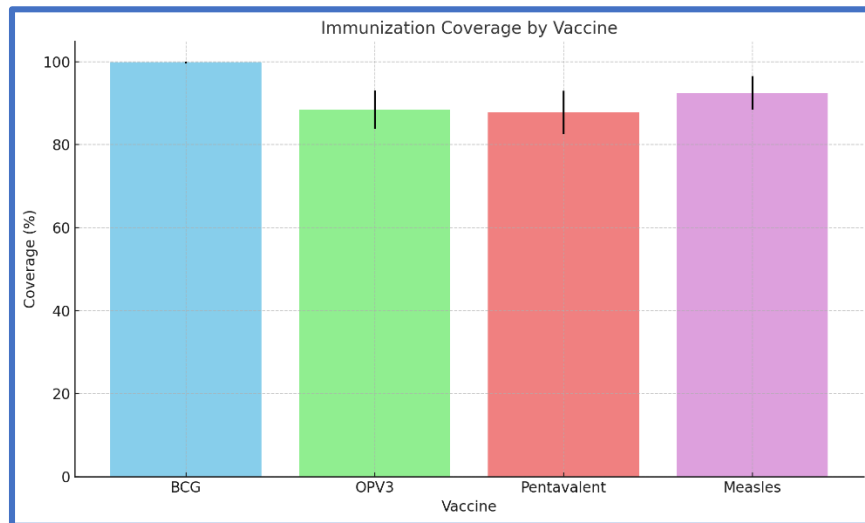
The collection of data occurred through semi-structured questionnaires administered by trained ASHA workers. ASHA workers are community health workers who are trusted by the communities they serve. They also ensured community participation in the research, which in turn led to more accurate responses from the community. The data gathered in this research included the following demographic information, which is also key to the research: vaccination history, verified via immunisation cards or maternal recall, and reasons for incomplete immunisation. I like the use of the dual verification approach (card or recall). It adds robustness because not all caregivers might preserve vaccination records.

Vaccination definitions were aligned with standard immunisation guidelines:

- ❖ Fully vaccinated: A child who had received BCG, three doses of OPV, three doses of DPT (or pentavalent), and one dose of Measles vaccine by the age of one year.
- ❖ Incomplete vaccination: A child who had missed any of the required doses.
- ❖ Unvaccinated: A child who had not received any vaccine dose by age one.

The data were analysed using Epi Info version 7.2.0.1. Weighted analyses took into account the complex sampling design. Both univariate and multivariate logistic regression models were applied to identify significant risk factors. This allowed the researchers to assess the influence of various sociodemographic variables on immunisation status while adjusting for confounders.

Vaccine	Coverage (%)	95% CI Lower	95% CI Upper
BCG	99.84	99.51	100
OPV3	88.4	83.76	93.04
Pentavalent	87.77	82.58	92.96
Measles	92.47	88.39	96.55



1.5 Results

The study had a mean child age of 17.7 months, ensuring that almost all children were past the first year, a critical milestone in immunisation schedules. Most (86.9%) of the children were from Hindu families. This reflects the demographic pattern in the area. A sizable number of mothers (16.2%) were illiterate, and almost 44% of the families studied fell under the Economically Weaker Section (EWS) of society. Despite these odds, the overall full immunisation coverage was recorded at a commendably high level (86.14%). This is especially impressive when one considers that most slum settings across the world are deep pockets of poverty. BCG: 99.84%

- ❖ OPV3: 88.4%
- ❖ Pentavalent (or DPT): 87.77%
- ❖ Measles: 92.47%

These figures highlight how the initial immunisations (such as the BCG, typically administered at birth) had more exhaustive coverage, but as one progresses along the vaccination timeline, stage by stage, a conspicuous decline in coverage for later immunisations becomes apparent. The dropout rates further clarify this trend:

- ❖ BCG to Measles: 7.37%
- ❖ Penta1 to Penta3: 9.92%

When children drop out, it indicates the presence of severe systemic problems, such as inadequate follow-up, insufficient reminder systems, poor parental engagement, and the like. While the dropout rates I observed are not alarming, they do signal some weak areas in the overall immunisation program and suggest critical areas for intervention.

Risk factors significantly associated with incomplete immunisation, as identified through adjusted odds ratios (AOR), include:

- ❖ Illiteracy among mothers (AOR: 10.3): Mothers who cannot read and write are more than 10 times as likely to have children who are not fully immunised. This fact highlights, in the most extreme way possible, the enormous difference that maternal education makes to child health.
- ❖ EWS family status (AOR: 4.0): Families in poverty face four times the risk. They struggle with accessing healthcare, transportation, or coping with the numerous demands that hinder their ability to earn a living.
- ❖ Home births (AOR: 4.3): Children who were born at home were significantly more likely to be missing vaccines. This was likely due to poor connectivity with healthcare systems from birth.

It is encouraging that immunisation cards were available for 95.23% of the children. For those children without a card, however, there seemed to be a problem with the incomplete nature of their immunisation. This ties back to the tracking system problem, making a compelling case for improved documentation.

When analysing reasons for dropouts, the study found:

- ❖ Mismatched or unavailable timing of vaccination services: 30%
- ❖ Perceived lack of need for further vaccines: 23%
- ❖ Forgot due date: 14.28%

These answers hint at structural and behavioural problems—mismatches in service delivery, lack of awareness, poor recall—that call for solutions at both the program and community levels.

1.6 Discussion

The slum regions of North-West Delhi have made significant progress; an immunisation rate of 86.14% is quite commendable and stands in contrast to much older statistics from other urban

slums across India. There is no single reason we can point to for this progress. Instead, several initiatives deserve mention for at least contributing in some part to this positive outcome. One program we should highlight is Mission Indradhanush, which targets, indeed, underserved communities and high-risk areas that our more routine outreach has thus far missed.

This research indicates that immunisation efforts are progressing, yet barriers rooted in education and socio-economic status prevent us from realising the complete vision of success. It identifies maternal illiteracy as the most imposing risk factor in this region, which fits well with findings in both national and global literatures. It supports the idea that mothers who are unable to read or otherwise access health information are much less likely to complete the full immunisation schedule. We know this: It's a point well-taken and well-supported across numerous studies. And it makes intuitive sense. If you cannot read or, for whatever reason, do not have access to basic health information, how can you be expected to understand the essentially life-saving proposition that you must have your baby vaccinated at regular intervals from birth to 2 years of age? Similarly, economic vulnerability has long been linked to poor health outcomes.

The dropout analysis exposes barriers on both the supply and demand sides. First, it suggests that health facilities might not be providing services at appropriate times for working families. Second, it indicates that, despite their healthcare training, community health workers might not be communicating effectively with families about the importance of completing the immunisation schedule. Only when awareness and perceived importance are sufficient can we expect significant changes in behaviour. Another area that needs improvement is providing personal reminders to families whose children are due for vaccination. Although more than 85% of parents probably have a dependable means of remembering a VCR appointment, this is not true for all. Finally, if hiking up to 95% card retention is just a warm-up, then achieving even half of the 95% figure presents a substantial hurdle that serves as an identity matrix for the not-yet-immunised child.

1.7 Conclusion

A compelling case emerges from this study to show the effectiveness of Mission Indradhanush along with other vaccination endeavours in Delhi's urban slums. Securing an 86.14% comprehensive immunisation rate in this distinctly vulnerable group amounts to a good deal of success, especially when you stack it against the kinds of numbers that have emerged from this sort of community in the past.

Yet, insurmountable hurdles persist, particularly for the most at-risk groups: uneducated mothers, families in extreme poverty, and children born at home. The research calls for the kind of life-and-death interventions that are a hallmark of federal and state programs aimed at reducing maternal and child mortality, which in recent years have targeted the most vulnerable communities.

- ❖ Improving education and knowledge of mothers.
- ❖ Enhancing access to services (evening hours, mobile units)

- ❖ Lowering the number of childrens who drop out of school through improved methods of keeping tabs on them and following up with them.
- ❖ Making better use of community health workers.

Reminder systems and digital cards are introduced. The implication for health policies is clear: they must go far beyond just making health services available. They must tackle, head-on, the critical factors in the funnel that determine health outcomes. These are mainly social and economic factors that cross the life course, starting well before birth and continuing long after we're supposed to be dead and buried. They include education, income, and the kinds of cultural behaviour that can either promote or suppress good health.

This research also emphasises the need for systematic health planning at the community level, involving collaboration among health workers, government programs, and local oversight personnel. If models like this are established and reinforced in other urban poor settings, the 90% target of the IMI can be reached in a way that is both sustainable and equitable.

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