

Comparative Study in Full Vaccination of Children Aged 12-23 Months in Karnataka: NFHS-4 and NFHS-5

M. S. Kampli¹, C. N. Noolvi²

^{1,2}Data Assistant,
Population Research Centre, JSS Institute of Economic Research, Dharwad, Karnataka

Corresponding Author: M S Kampli

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ABSTRACT

Immunization effectively protects children from severe diseases. It protects individuals and the community by reducing disease spread. Vaccines activate the immune system to combat specific diseases. Objectives: To evaluate the vaccination status of children aged 12-23 months across Karnataka districts and regions. Method: Secondary data published in the National Family Health Survey-4 (NFHS) and NFHS-5 were analyzed.

Result: The NFHS-5 report indicates a 34.3 relative percent improvement in fully vaccinated children compared to previous survey, with no districts showing a decline. Vaccination rates range from 100% in Ramnagar to 71.1% in Bijapur. The highest relative percent change improvement was seen in Chikkamagaluru (120.9%), Shimoga (111.2%), and Mysore (108.1%). Highest vaccination rates are in Ramnagar (100%), Tumkur (97.7%), and Mysore (97.2%), while the lowest are in Bijapur (71.1%), Bellary (71.5%), and Gadag (74.3%). Regionally, Mysore leads with 92.4%, while Gulbarga lags at 78.2%.

Conclusion: Coverage of full vaccination compared to the previous survey has improved. Around 58 per cent of the districts are above the state average in the recent survey. Every child receives all doses of vaccination required tracking, which might be weaker in some districts. Mysore region achieved the top, and Gulbarga region achieved less according to the regional-wise. In less covered regions, there may be a higher proportion of families belonging to lower wealth quintiles. Poverty directly affects access to healthcare.

Keywords: Vaccination, NFHS

INTRODUCTION

Vaccination protects children from serious illness and complications of vaccine-preventable diseases, which can include amputation of an arm or leg, paralysis of limbs, hearing loss, convulsions, brain damage, and death. Vaccine-preventable diseases, such as measles, mumps, and whooping cough, are still a threat. While routine Immunization has played a

significant role in preventing childhood deaths and disability, thousands of children in India continue to die from vaccine preventable diseases each year MoHFW(1). Globally, vaccine preventable diseases account for nearly 20% of all deaths occurring annually among children under five years of age, and immunization has a vital role to play in achieving the goals specified in the Millennium Declaration(2).

Immunization process will become more successful if the child receives full course of recommended immunization doses(3). A child in the developing world is ten times more likely to die of a vaccine preventable disease than a child in the industrialized world. Globally, approximately 132 million babies need to fully immunize each year. In order to meet this need, immunization systems must have adequate resources, trained and motivated staff, and ample vaccine and syringe supplies(4). According to World Health Organization (WHO), Immunization currently averts an estimated 2 to 3 million deaths every year but an estimated 18.7 million infants worldwide are still missing out on basic vaccines(5).

India's immunization programme is the largest in the world, with annual cohorts of around 26.7 million infants and 30 million pregnant women(1). Despite steady progress, routine childhood vaccination coverage has been slow to rise. An estimated 38% of children failed to receive all basic vaccines in the first year of life in 2016(6–8). The factors limiting vaccination coverage include large mobile and isolated populations that are difficult to reach, and low demand from underinformed and misinformed populations who fear side effects and are influenced by anti-vaccination messages(9–11). In 1985, the Universal Immunization Programme (UIP) was launched to protect all infants (0-12 months) against six serious but preventable diseases, namely, tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles. The objective of the programme was to fully vaccinate at least 85% of all infants of age of one year. In subsequent years, the goal of UIP was raised to ensure 100% coverage of all eligible children with one dose of BCG, three doses of DPT and OPV, and one dose of the measles vaccine. This programme was integrated with the Child Health (RCH) Programme in 1997. In addition to the ongoing routine immunization programme, the Pulse Polio Immunization (PPI) campaign was initiated in 1995 to eradicate poliomyelitis from the country(12). Immunization is the process whereby a

person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease(13). To promote child survival and prevent infant mortality, NHM/NRHM envisages newborn care, breastfeeding initiation, infant food supplementation at the right time and a complete package of routine immunization for children. In India, though immunization services are offered free in public health facilities, only 76.4 per cent of the children are fully immunized as per NFHS-5. An attempt is made to analyze the available data in the field of child immunization which can serve as a baseline to monitor the progress in the states.

Objective

1. To assess the different districts of primary vaccination coverage of children aged 12-23 months in Karnataka.
2. To assess the vaccination status in different regions of Karnataka.

METHODS

The NFHS has been undertaken by the Ministry of Health and Family Welfare, Government of India, with the main objective to provide reproductive and child health-related database at district level in India. The data from these surveys have been useful in setting the benchmarks and examining the progress the country has made after the implementation of RCH programme. In addition, the evidence generated by these surveys has also been useful for the monitoring and evaluation of ongoing programmes and planning of suitable strategies by the central and state governments(14). The NFHS rounds are conducted at intervals that are not regular. While NFHS-1 was conducted in 1992-1993 and NFHS-2 in 1998-1999, the NFHS-3 was conducted in 2005-2006 and the NFHS-4 was conducted after an interval of 10 years in 2015-2016 and NFHS-5 during 2019-2020, and has designated the International Institute

for Population Sciences (IIPS) as the nodal agency to carry out the survey. This fact sheet provides information on key indicators and trends for Karnataka.

Sample selection:

In rural areas, NFHS-5 sample was selected through a two-stage process. First, primary sampling units (PSUs) mainly villages, were chosen using the probability proportional to size (PPS) method. In urban areas, a similar PPS approach was applied to select households from lists within urban localities, ensuring that the demographic characteristics of each area were adequately represented.

Data Collection

NFHS-4 fieldwork for Karnataka was conducted in 2015-gathered information from 23,842 households, 26,291 women, and 3,743 men. Fact sheets for each district of Karnataka are also available separately(15). Whereas, the field work of NFHS-5 in Karnataka was conducted during July 2019 to December 2019 after gathering information from 26,574 households. From these households, 30,455 women aged 15-49 years & 4,516 Men(14).

Data on individual vaccination in NFHS-4 & 5 was either recorded from vaccination cards

or from mother`s recall. Further, data were recorded for all living children in the five years prior to the survey. The accuracy of data in case of unavailability of vaccination cards must be viewed with caution as mother`s recall is influenced by many factors, especially elapsed time in case of vaccinations given 3-5 years ago. The term “Received full vaccination” is used in the survey to denote Children aged 12-23 months, who received, BCG, 3-injection of DPT, 3 doses of Polio (excluding polio zero) and Measles.

RESULT

Proportion of fully immunized children

Children age 12-23 months fully vaccinated in India were around 76.4%(14). NFHS-5 reports that, the proportion of fully vaccinated children in Karnataka is 84.1 percent, an increase from 62.6 percent reported in NFHS-4. This represents a 34.3 relative percent improvement compared to previous survey. However, in the state, two-fifth of the districts experienced a decline in the percentage of fully vaccinated children compared to the state rate. None of the districts showed a decline when compared to the previous survey.

Districts	NFHS-4	NFHS-5	% change
Bagalkot	75.9	78.6	3.6
Belgaum	63.4	81.4	28.4
Bijapur	58.1	71.1	22.4
Dharwad	54.9	87.6	59.6
Gadag	46.7	74.3	59.1
Haveri	69.3	95.7	38.1
Uttar kannada	67.7	93.6	38.3
Bangalore	62.1	78.2	25.9
Bangalore Rural	64.1	92.7	44.6
Chitradurga	48.7	94.6	94.3
Ckikkballapur	63.7	76.6	20.3
Davangeri	75.2	79.4	5.6
Kolar	76.4	86.3	13.0
Ramnagar	58.8	100	70.1
Shimoga	45.5	96.1	111.2
Tumkur	64.8	97.7	50.8
Bellary	71.1	71.5	0.6
Bidar	59.6	74.8	25.5
Gulbarga	58.6	75.3	28.5
Koppal	72.8	84.8	16.5

Raichur	65.4	80.2	22.6
Yadgir	61.3	82.6	34.7
Chamarajnagar	59.5	93.3	56.8
Chikkmanglur	41.2	91	120.9
Dakshin kannada	77.3	86.8	12.3
Hassan	68.1	96.8	42.1
Kodagu	68.2	90.6	32.8
Monday	61	93.9	53.9
Mysore	46.7	97.2	108.1
Udupi	64.6	89.9	39.2
Karnataka	62.6	84.1	34.3

Table 1 presents the proportion of children who received complete vaccinations in different districts of Karnataka. NFHS-5 reports that, the percentage of fully vaccinated children ranges from 100.0% in Ramnagar to 71.1% in Bijapur district. In comparison, NFHS-4 indicates that this percentage is 77.3% in Dakshin Kannada and 41.2% in Chikkamagaluru. A study conducted in Kanchipuram district by Duraimurugan Murugesan et al. found that 76% of children were fully vaccinated(16). The highest vaccination coverage was recorded in the districts of Ramnagar (100%), Tumkur (97.7%), and Mysore (97.2%). In contrast, the lowest vaccination rates were observed in Bijapur (71.1%), Bellary (71.5%), and Gadag (74.3%). Notably, the districts with the highest relative percent change compared to NFHS-4 are Chikkamagaluru (120.9%), Shimoga (111.2%), and Mysore (108.1%). Whereas, least in Bellary (0.6%), Bagalkot (3.6%) and Davengeri (5.6%). This may be due to insufficient awareness about the benefits of full immunization, possible side effects, and

the recommended vaccination schedule can incomplete coverage. Moreover, long distances to vaccination centres can discourage parents particularly those with multiple children or limited transportation from ensuring timely immunization.

Proportion of Full Vaccination: Regional wise

The distribution of the full vaccination by region wise illustrated in the Table 2. Coverage of full Vaccination according to region wise is more in Mysore region (92.4%) and less in Gulbarga (78.2%) region as per NFHS-5. Compare to previous survey relative percent change of full vaccine improved in Mysore (52.0%), Bangalore (43.3%) followed by Belgaum (33.6%) region. Comparison with NFHS-4 shows that overall coverage has improved for all vaccines. In both Kalaburagi and Belagavi, especially in rural areas, there may be often a higher proportion of families belonging to lower wealth quintiles. Poverty directly affects access to healthcare.

Division	NFHS-4	NFHS-5	% change
Belgaum	62.3	83.2	33.6
Bangalore	62.1	89.1	43.3
Gulbarga	64.8	78.2	20.7
Mysore	60.8	92.4	52.0

DISCUSSION

The comparative analysis of NFHS-4 and NFHS-5 provides valuable insights into the full vaccination status of children aged 12-23 months in Karnataka. These surveys highlight the evolving trends in vaccination

coverage and indicate a relative improvement in vaccination rates over time. However, persistent challenges remain, with certain districts continuing to experience gaps in full vaccination coverage.

Socio-economic factors

In Karnataka, low vaccination coverage driven by poverty, low parental education, and residence in remote or undeserved areas. Children from Scheduled Caste, Scheduled Tribe, and migrant families face added barriers from social exclusion, relocation, and weak health services access. Cultural beliefs, vaccine hesitance, gender bias, poor awareness, and indirect costs such travel and lost wages further delay or prevent timely vaccination.

Government Initiative

The Intensified Mission Indradhanush (IMI), launched in 2017, aims to achieve 90% full immunization for children under two years and pregnant women by targeting underserved areas through focused monthly campaigns. Successive phases-IMI 2.0, 3.0, and 4.0 have sustained progress, addressed COVID-19 setbacks, and worked to close remaining coverage gaps nationwide.

CONCLUSION

The current study reveals that about one-third of districts have vaccination rates that are lower than the state average. This lower rate may be caused by insufficient coverage for one or more vaccines. The districts of Chikkamagaluru and Shimoga have seen an increase in full vaccination rates, with Mysore following closely behind. However, none of the districts shows a decline when compared to NFHS-4. Bellary, Bagalkot, and Davangere demonstrate a smaller percentage change when compared to the last survey. Districts in North Karnataka face developmental challenges that affect the health and vaccination rates of underprivileged groups. It is important to improve detailed planning at the local level, make sure there is enough vaccine supply, and set up vaccination camps in the community. It is important to raise awareness about vaccinations among mothers and family members in areas where vaccination rates are low. To make sure that every child gets all the necessary vaccinations according to the complete schedule, we need effective

systems to track and follow up. However, these systems may not be present in some regions. In addition, challenges may involve having limited access to healthcare services, not enough transportation options, and a low level of understanding about health. Additionally, cultural beliefs and a long-standing skepticism about the healthcare system can make it more difficult to increase vaccination rates. Recognizing these obstacles enables policymakers and healthcare providers to adjust their approaches to meet the specific needs of these communities. Collaborating with local leaders and trusted organizations can improve communication about the importance of vaccinations.

Declaration by Authors

Ethical Approval: The information utilized consists of publicly accessible reports, which do not contain any datasets at the individual level; therefore, no distinct ethical approval was necessary.

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