

Assessment of Immunization Coverage in Children Aged 1 Year To 2 Years From Rural, Urban and Tribal Areas After Launching Mission Indradhanush

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Abstract

Original Research Article

Vaccination has saved more lives worldwide than any other medical products or procedures. To accelerate immunization coverage, Mission Indradhanush was launched by Ministry of Health and Family Welfare in 2014. Under Mission Indradhanush, the immunization programme was strengthened and also newer vaccines like pentavalent, rotavirus and f-IPV vaccines were sequentially introduced. Mission Indradhanush was intensified in 2017 to further accelerate full immunization coverage. The present study was done for a period of 2 months in 2 urban areas, 2 rural areas and 2 tribal areas of East Godavari district of Andhra Pradesh with the objective to know the immunization coverage in children aged 1-2 years after launching Mission Indradhanush with the aim to evaluate the primary immunization coverage, coverage of newer vaccines after launching MI, assess the knowledge of mothers on routine vaccination with a special focus on newer vaccines and the reasons for delay or dropouts in vaccination. In the present study, the overall coverage of primary immunization was 94.8%. Overall immunization coverage is less in urban areas compared to rural and tribal areas. Literacy of mother, parity and place of delivery had significant association with complete immunization coverage. The main reason for high dropout rate of newer vaccines was non-availability of vaccine. This study showed that Mission Indradhanush was successful in accelerating the overall primary immunization coverage in this area to a significant extent.

Keywords: Immunization, Mission Indradhanush, Newer vaccines, pentavalent vaccines, Tribal areas.

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INTRODUCTION

Vaccination is one of the milestone achievements in the field of public health. Estimated 2.5 million children are saved from vaccine preventable diseases [1].

India's Universal immunization programme started in the year 1985 is among the largest in the world and is available for all children in the country free of cost [2]. Almost 10 million of 27 million children born in India every year are either not vaccinated or partially vaccinated [3].

The current scenario depicts that immunization coverage in India has been steadily increasing but the average level remains far less than desired [4]. The recent NFHS-4 survey data has shown that out of the targeted annual cohort of 26 million infants in India,

only 62% received all due vaccines which is much less than the desired goal of achieving 85% coverage[5].

The Sustainable Development goal commitment warrants universal immunization coverage by 2030[7]. To accelerate the immunization coverage to 90% by 2020 and to meet the sustainable development goal for under five mortality of 25 by the year 2030, Mission Indradhanush was envisaged by GOI. This programme was launched in the year 2014 with the aim to vaccinate all pregnant women against tetanus and ensure that all children are fully vaccinated against seven vaccine preventable diseases by the age of two years. Immunization programme was strengthened and newer vaccines like f-IPV, Rotavirus and pentavalent were introduced in a phased manner. After completion of first two phases of Mission Indradhanush, full immunization coverage increased by 6.7% in one year as compared to 1% increase in the past

[8]. Mission Indradhanush was intensified in 2017 to further accelerate full immunization coverage.

There are very few studies available on primary immunization coverage after launching Mission Indradhanush and studies on knowledge and coverage of newer vaccines is negligible. This study aimed to evaluate the primary immunization coverage and also the coverage of newer vaccines after launching MI. The study also tried to assess the knowledge of mothers on routine vaccination with a special focus on newer vaccines and the reasons for delay or dropouts in vaccination.

MATERIALS AND METHODS

This study was conducted in Urban Health Centre Jagganaikpur and Immunization clinic of Government general hospital, Kakinada; Subcenters of Kotnanduru and Vetlapalem Primary Health Centres (Rural PHC); Subcentres of Pedageddada and Maredumalli Primary Health Centers (Tribal PHC). Study was conducted over duration of 2 months - from 1st August 2018 to 30th September 2018. This is a community based cross-sectional study and the study population included were children aged 1-2 years brought to Sub-centre or Urban Health Centre for immunization. A total number of 108 children from urban areas, 203 children from rural areas and 109 children from tribal areas were included in the study. A predesigned proforma was used to collect the information. The sociodemographic characteristics like maternal age, parity, literacy status, type of family was noted. The details of immunization of enrolled children were recorded from the information given by mothers

or immunization cards or from registers maintained by the ANMs.

The reasons for delay or dropouts in vaccination were noted. Awareness of mothers on newer vaccines like rotavirus vaccine, IPV vaccine and pentavalent vaccine was noted by using the predesigned questionnaire.

Mission Indradhanush definition for immunization was used to categorize the children as completely immunized or partially immunized or not immunized.

Complete Immunization: Any child who has received one dose each of BCG and measles, three doses each of pentavalent vaccine and Polio (excluding 0 dose OPV) by 2 years of age.

The collected data was tabulated and analyzed by using SPSS 24.0 version. Simple proportions were calculated and statistical tests of significance were applied wherever required. P value <0.05 is considered as statistically significant. Ethical clearance was taken from IEC.

OBSERVATIONS AND RESULTS

87% children in urban areas, 100% children in rural areas and 92.7% children in tribal areas were completely immunized. This difference in immunization coverage in urban, rural and tribal areas is statistically significant with p value of 0.000003. The overall coverage of primary immunization in urban, rural and tribal areas is 94.8% and a total of 22 children (5.2%) were partially immunized.

Table-1: Immunization status of urban, rural and tribal children

	Total	Completely Immunized	Partially Immunized	P Value
Urban	108	94 (87%)	14 (13%)	0.000003
Rural	203	203 (100%)	0	
Tribal	109	101 (92.7%)	8 (7.3%)	
Total	420	398 (94.8%)	22 (5.2%)	

Table-2: Immunization status vs Demographic features

		Total	Completely Immunized	Partially Immunized	P Value
Gender	Male	232	220 (94.8%)	12 (5.2%)	0.7641
	Female	188	177 (94.1%)	11 (5.9%)	
Literacy	Literate	350	337 (96.3%)	13 (3.7%)	0.0017
	Illiterate	70	61 (87.1%)	9 (12.9%)	
Parity	Primi	217	211 (97.2%)	6 (2.8%)	0.0187
	Multi	203	187 (92.1%)	16 (7.9%)	
Type of Family	Nuclear	176	163 (92.6%)	13 (7.4%)	0.0933
	Joint	244	235 (96.3%)	9 (3.7%)	
Place of Delivery	Government Hospital	342	329 (96.2)	13 (3.8)	0.0056
	Private Hospital	78	69 (88.5)	9 (11.5)	

There is no statistically significant difference in the immunization coverage of children in nuclear and joint families and there is no gender difference in immunization coverage. Significant difference was observed in relation to literacy rate of mother, parity and place of delivery.

The coverage of BCG and zero dose OPV vaccines was 100% in urban, rural and tribal areas. The overall coverage of 3 doses of OPV, 3 doses of pentavalent and measles vaccine was 96.1%, 96.7% and 97.8% respectively.

Three doses of OPV were given to 87% children in urban, 100% children in rural and 98.2% children in tribal areas. 91% children in urban, 100% children in rural and 97.2% children in tribal areas received all the 3 doses of pentavalent vaccine (table 3).

91% children in urban, 100% children in rural and 100% children in tribal areas received measles vaccine. 60.2% children in urban areas, 77.8% children in rural areas and 62.4% children in tribal areas received 2 doses of IPV. 3 doses of Rotavirus vaccine were given to 68.5% children in urban, 72.4% children in rural and 72.2% children in tribal areas.

Table-3: Coverage of individual vaccines

	Urban (n = 108)	Rural (n = 203)	Tribal (n = 109)
BCG	108 (100%)	203 (100%)	109 (100%)
Zero Dose OPV	108 (100%)	203 (100%)	109 (100%)
3 Doses OPV	94 (87%)	203 (100%)	107 (98.2%)
3 Doses Pentavalent	98 (91%)	203 (100%)	106 (97.2%)
Measles	107 (99.1%)	203 (100%)	101 (92.7%)
2 Doses IPV	65 (60.2%)	158 (77.8%)	68 (62.4%)
3 Doses Rotavirus Vaccine	74 (68.5%)	147 (72.4%)	82(72.2%)

The dropout rate of rotavirus vaccine was 19.6%, 19.2% and 18.8% in urban, rural and tribal areas respectively. The dropout rate of IPV was 30.1%, 14.1% and 26.1% in urban, rural and tribal areas respectively.

Though all the children in urban, rural and tribal areas received zero doses OPV, 408 (97.2%) children were given the vaccine within 14 days of birth while 12 (2.8%) children were given vaccine after 14 days of birth. An interval of 4 weeks between two doses of Rotavirus vaccine was not maintained in 6 children in urban and 3 children in rural areas. 87% children in urban, 84% in rural and 80.7% in tribal areas received measles vaccine between 9 – 12 months of age while 4.5% of all the children received measles vaccine before the age of 9 months. 6.9% children received measles vaccine after 12 months of age. The interval between 2 doses of IPV was less than 8 weeks in 35 children in urban, 4 children in rural and 10 children in tribal areas while there was more than 12 weeks interval between two doses in 11 children in urban, 14 children in rural and 1 child in tribal areas. The interval between 1st & 2nd dose and 2nd & 3rd dose of pentavalent vaccine was < 4 weeks in 10 children and 9 children whereas the interval was more than 8 weeks in 35 and 29 children respectively. Pentavalent vaccine was given before 6 weeks of age in 10 children.

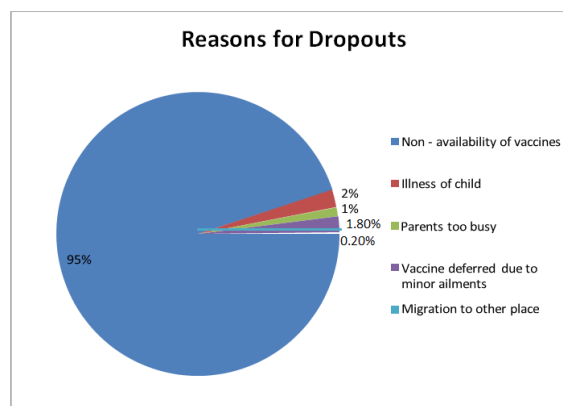


Fig-1: Reasons for dropouts or delay in vaccination

The reasons for dropouts or delay in vaccination were non-availability of vaccine particularly rotavirus and IPV (95%), illness of the child (2%), mother or father too busy (1%), vaccine deferred by the health worker due to minor ailments of the child (1.8%) and children could not be vaccinated due to migration to other places (0.2%). (Figure 1)

30% of the mothers were aware of the diseases prevented by newer vaccines like pentavalent, rotavirus vaccine and IPV (unprompted) but when prompted 64% of the mothers could answer the diseases prevented by the vaccines. 98% of the mothers were aware of the number of oral vaccines given where as 35% of the mothers were aware that rotavirus vaccine prevents diarrhea.

DISCUSSION

The primary immunization coverage in the present study was 94.8% which is better than national immunization coverage (62%) according to NFHS 2015-2016 survey [5].

According to surveys of Health Management Information Systems (HIMS) and Government of India (GOI) statement in December 2016, 87.13% children were completely immunized [10]. Datta A *et al.* [11] from Tripura and Goyal S *et al.* [12] from Haryana reported complete immunization in 90.9% and 73.1% of children respectively in their studies.

In this study, complete immunization coverage was 100% in children from rural areas while only 87% of children from urban areas were completely immunized. Studies done in urban areas by Dalal A *et al.* [13] (90.6%) and Punith K *et al.* [14] (84%) also reported similar results, while A.M. Khadri *et al.* [4] reported complete immunization in 70.3% of urban children.

Studies on immunization coverage in tribal area are limited. In the present study, primary immunization coverage in tribal children was 92.7%.

A study of immunization coverage in tribal area of Andhra Pradesh under ICMR–STS project [15] have reported 85% coverage in children aged 12-23 months.

Immunization coverage in tribal areas has improved a lot during the last 4 years from 85% to 92.7% (85% in 2014 ICMR–STS project [15] vs 92.7% in the present study).

Zafer A *et al.* [16] from Udaipur have reported complete immunization in 21.42% tribal children while study by Varma *et al.* [17] from tribal area of Andhra Pradesh have reported complete immunization in 63.3% children.

In the present study, the immunization coverage of children of literate mothers was significantly higher than children of illiterate mothers which was comparable to the study by Dalal *et al.* [13] and Devasenapathy N *et al.* [18].

Maternal literacy is important in immunization because literate mothers will have better understanding of the need to immunize, when to start immunization, vaccination schedule and the benefits of immunization.

In the present study, the immunization coverage was significantly higher in children born at government hospitals than in children born at private hospitals. This could be due to better follow up of babies born at government hospitals by ASHAs/ANMs till complete immunization.

Complete immunization was better in children of primi mothers than in children of multipara mothers in the present study which is in contrast to the studies by Goyal S *et al.* [12] and Devasenapathy N *et al.* [18] which showed better immunization in children of multipara mothers. This improvement in immunization coverage of children of primi mothers may be due to implementation of PMMVYK (Pradhan Mantri Mathru Vandana Yojana Karyakram) which gives incentives to primi mothers after completion of 3 doses of pentavalent vaccine.

The coverage of BCG and zero doses OPV was 100% in urban, rural and tribal areas as majority of the deliveries were institutional. This shows the importance of institutional deliveries in the promotion of complete immunization of BCG and OPV.

The overall coverage of 3 doses of pentavalent vaccine in this study was 96.7%. Studies prior to launching of Mission Indradhanush have reported coverage of DPT-3 in 65.7% children by Varsha C *et al.* [19]. Goyal S *et al.* [12] in their study done after the launch of Mission Indradhanush have shown increased coverage of pentavalent vaccine (95.9%). This improvement could be due to intensification of routine immunization and catch up immunization of partially and unimmunized children by activities under Mission Indradhanush.

The coverage of 3 doses of pentavalent vaccine was 91% in urban areas as compared to 100% in rural areas in the present study. The low coverage in urban areas may be due to a smaller number of ASHA workers in urban health centres and more nuclear families in urban slums with both parents working. Hence there is a need to concentrate on pockets of low immunization in urban areas under Mission Indradhanush.

In the present study, 1st dose of pentavalent vaccine was given in 10 children before 6 weeks of age. The interval between any 2 doses of pentavalent vaccine was < 4 weeks in 10 children. The immunogenicity of vaccine is questionable if given before 6 weeks of age and if the interval between 2 doses is < 4 weeks.

The interval between 1st & 2nd doses and 2nd & 3rd doses of Pentavalent vaccine was > 8weeks in 8% and 7% children respectively.

The main reason for this delay in vaccination was non-availability of vaccine at the time of vaccination session. But complete immunization coverage of 99-100% was achieved due to catch up of partially immunized children as part of Mission Indradhanush activity. Delay in vaccination was more evident in rural areas and tribal areas away from district headquarters due to delay in procuring vaccine.

Newer vaccines like Rotavirus vaccine and fractional IPV were introduced in UIP in a phased manner throughout the country. Rotavirus and IPV vaccines were started in 2017 in this region.

In the present study, coverage of 3 doses of Rotavirus vaccine was 68.5% in urban, 72.4% in rural and 72.2% in tribal area. A significant number of children did not receive even a single dose of rotavirus vaccine (14.8% in urban, 10.4% in rural and 7.4% in tribal areas).

In the present study, complete immunization for IPV (2 doses) in urban, rural and tribal areas was 60.25%, 77.8% and 62.4% respectively and the difference in IPV coverage among different areas was statistically significant.

Coverage of both Rotavirus and IPV vaccines was low in urban areas which again emphasize the need to concentrate in these pockets under Mission Indradhanush activity rounds.

Dropout rates for both rotavirus and IPV were significantly high compared to pentavalent and OPV vaccines. The reason for this high dropout is non-availability of Rotavirus and IPV vaccines for a long period and also lack of knowledge regarding the importance of completing the dosage schedule of specific vaccines.

In rural areas, the health workers (ASHAs and ANMs) track the immunization status of children in their respective areas and see that all the eligible children complete vaccination schedule. Human resources in urban health centres (ASHAs & ANMs) are inadequate to cover all the eligible children in urban areas. Hence the responsibility of complete immunization of children lies on parents. Health workers should impart knowledge to mothers regarding importance of completing the schedule. In urban areas, health workers should inform the mother if any vaccine is not available at scheduled time and emphasize the need to come back for missed doses or vaccinate the child if vaccine is available in other centres.

One of the vaccine post introduction evaluation indicators in the field is to assess the community acceptance of newer vaccines and how far the family/mother is able to name the vaccine and diseases it prevents [20].

The present study had shown awareness of diseases prevented by newer vaccines like Pentavalent/Rotavirus and IPV vaccines in only 30% mothers when unprompted while 64% of mothers could answer when prompted. A study by Selvaraj K *et al.* [21] has also shown similar results.

Even though 98% mothers knew that 2 types of oral vaccines were being given, only 35% of mothers were aware that rotavirus vaccine prevents diarrhea. Hence the mothers should be given information about the available vaccines at every health visit and emphasize the vaccine schedule. In the present study, the low level of awareness on newer vaccines did not affect the coverage of primary immunization. However, this lack of knowledge may affect the coverage of newer vaccines unless there is, intensive monitoring of programmes and wide accessibility of vaccines. Hence there is a need to create awareness in the community regarding the diseases prevented by these vaccines, dosage schedule and the necessity of timely administration of individual vaccines through IEC activities and mass media at immunization sessions.

Identification of pockets of low coverage through regular surveys and implementation of Mission Indradhanush in these areas will go a long way in achieving the SDG (Sustainable Development Goals) of immunization coverage of 100% by 2030.

CONCLUSION

The overall coverage of primary immunization in urban, rural and tribal areas in the present study is high (94.8%) probably due to intensification of routine immunization and catch up immunization of partially and unimmunized children by activities under MI (Mission Indradhanush). The reason for drop outs or delay in vaccination in this study is mostly non-availability of vaccine particularly rotavirus and IPV. Lack of knowledge regarding newer vaccines in our study did not affect the coverage of primary immunization. However, this lack of knowledge may affect the coverage of newer vaccines unless there is good monitoring on wide availability of newer vaccines.

Some lacunae like less coverage in urban areas, lack of awareness on newer vaccines and their schedule can be overcome by IEC activities through mass media and by giving one to one information at every immunization visit.

Further research in the form of periodic surveys and extra immunization rounds in these areas helps in achieving complete immunization especially in low coverage pockets like urban slums.

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