

ASSESSMENT OF PRIMARY IMMUNIZATION COVERAGE IN CHILDREN BETWEEN 12-23 MONTHS IN BHADRAVATI TALUK, SHIMOGA DISTRICT

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ABSTRACT

Background: Immunization prevents approximately 4 lakh under-five deaths from vaccine preventable diseases in India. Immunization is a proven cost-effective and relatively inexpensive public health intervention for improving child survival. Under the national immunization program infants are immunized against 7 vaccine preventable disease namely diphtheria, pertussis, tetanus, polio, hepatitis B, tuberculosis and measles. In India, inequity in the coverage of immunization persists within and between states, emphasizing the continuing need of coverage assessment surveys with a focus on quality of the health service.

Aims & Objective: (1) To assess the primary immunization coverage of children aged 12-23 months; and (2) To know the reasons for partially or not immunizing the child.

Materials and Methods: This was a cross sectional study. The method was adapted from WHO 30 cluster sampling, a two stage sampling technique involving a random selection of clusters based on probability proportional to size and then a random selection of households in the selected clusters. Mothers of the children were interviewed using a pretested and semi- structured questionnaire.

Results: Out Of the 210 surveyed children, 104 (49.5%) were males and 106 (50.5%) were females. Coverage was highest for BCG (100%) followed by DPT1 (99.5%), DPT3 (95.7%) and lowest for Measles (93.8%). As far as the dropout rate is concerned, it was 3.83% for both DPT1 to DPT3, 3.38% for OPV1 to OPV3, 4.83% for HEP1 to HEP3 and 6.19% for both BCG to measles and 5.74% for DPT1 to Measles. Amongst the various reasons main reasons for dropout or non-immunization of children were the lack of awareness about the need for immunization in 38.70% and unawareness of the need to return for 2nd or 3rd doses in 25.58%.

Conclusion: Improvement should focus on reducing the dropout rate from DPT1/OPV1/HepB1 to DPT3/OPV3/HepB3 and improving coverage of measles and also Vitamin A.

Key Words: Immunization Coverage; Cluster Sampling; Dropout Rates

Introduction

Immunization is a proven cost-effective and relatively inexpensive public health intervention for improving child survival. Under the National Immunization Program, infants are immunized against seven vaccine preventable diseases namely tuberculosis, diphtheria, pertusis, poliomyelitis, measles, tetanus and hepatitis B. Immunization averts between 2 and 3 million deaths each year globally.^[1] In India, immunization services are offered free in public health facilities but the coverage still remains low. According to the National Family Health Survey (NFHS-3), only 44% of the children between 12 to 23 months age are fully immunized.^[2] According to DLHS-3, 76.7% children were fully immunized in Karnataka.^[3] Year 2012-13 was declared as "Year of Intensification of Routine Immunization" in India. Each year full immunization prevents approximately 4 lakh under-five deaths from vaccine preventable diseases in India. This means that most of these child deaths could have been prevented by immunization. In India, inequity in the coverage of immunization persists within and between states. These disparities in coverage of immunization between different states, rural-urban, poor-rich, gender and other related differences need to be addressed to

reach every child.^[4] This emphasizes the continuing need of coverage assessment surveys with a focus on quality of the health services. To enhance the coverage of routine immunization, it is crucial that shortcomings in the quality of routine vaccination services are addressed, and quality of immunization services is monitored.^[5]

Objective of the Study: (1) To assess the primary immunization coverage of children aged 12-23 months; and (2) to know the reasons for partially or not immunizing the child.

Materials and Methods

The present study was a cross sectional study that involved administering a pretested and semi-structured questionnaire, after an informed consent, to mothers whose children are in the age group of 12 - 23 months. This study was undertaken in Bhadravathi Taluk, Shimoga District. Bhadravathi is an industrial town and a taluk headquarter in Shimoga District of Karnataka state, India. It is situated at a distance of about 255 km from the state capital Bengaluru and at about 20 km from the district headquarters, Shimoga. Bhadravathi Taluk has a total area of 675.08 square km and has a total population of 378759 as of 31st March 2012.

All the 266 villages in rural area and 78 wards in urban areas of Bhadravati were considered as clusters (344 sampling units), 30 clusters were selected by population proportional to size sampling, and then a random selection of households was done in the selected clusters. In each of the cluster, by visiting house to house, seven mothers whose children are in the age group of 12-23 months were interviewed, thus making a total of 210 mothers, to get information regarding immunization status of their children.

The sample size was estimated based on the desired confidence interval of 95% and the desired level of precision of the estimates as $\pm 10\%$. A routine coverage of 76% was taken for Bhadravati. The following formula was used:

$$N = [DE \times 1.96^2 p (1-p)] / d^2 \Rightarrow N = [2 \times 1.96^2 \times 76 (100-76)] / 10^2 \Rightarrow N = 140$$

Where, expected routine coverage, $p = 76\%$; desired width of the confidence interval = $\pm 10\%$; design Effect (DEFF) = 2.0; the desired confidence interval = 95%.

The total sample size (minimum) was 140 and raised by 50% to 210 to take care of situations where some clusters may be inaccessible. Full Immunization means a child who has received doses of the "standard seven" antigens: BCG, diphtheria -pertussis-tetanus (DPT: three doses), polio (three doses), Hepatitis-B (three doses) and measles vaccines (one dose). Partial Immunization means a child, who missed any one or more of the above doses, and no immunization means child who has not received even a single dose of vaccine.

The data gathered was analyzed using by using SPSS version 20, we calculated rates of immunization coverage and proportions for immunization status of children for each of the vaccines under the UIP. We used appropriate statistical test of significance. A p value of less than 0.05 was considered as significant.

Results

Out of 210 children covered during the study, immunization cards were available for 168 (80%) children. For the remaining children, immunization status was ascertained by mother's recall. 179 (85.2%) children were fully immunized. This rate was 90.15% in rural areas and 76.9% in urban areas. The rest of the children were partially immunized (14.8%). Totally unimmunized children were not found in the study. The percentage of partially immunized were 9.85% in rural areas and 23.1% in urban areas, this difference is statistically significant ($X^2 = 6.819$, $p = 0.009$) as shown in table-1.

Table-1: Immunization status of children between 12 to 23 months

Vaccination	Rural (n=132)	Urban (n=78)	Total (n=210)
Fully immunized	119 (90.15%)	60 (76.9%)	179 (85.2%)
Partially immunized	13 (9.85%)	18 (23.1%)	31 (14.8%)
Not immunized at all	Unimmunized children were not found in this study		
Total	132 (100%)	78 (100%)	210 (100)

Table-2: Immunization status of children between 12 to 23 months of age (considering vaccination card as well as history)

Vaccination	Rural (n=132)	Urban (n=78)	Total (n=210)
BCG	132 (100%)	78 (100%)	210 (100%)
DPT - 1	132 (100%)	77 (98.7%)	209 (99.5%)
DPT - 2	132 (100%)	76 (97.4%)	208 (99%)
DPT - 3	129 (99.7%)	72 (92.3%)	201 (95.7%)
Polio - 1	132 (100%)	75 (96.2%)	207 (98.6%)
Polio - 2	132 (100%)	76 (97.4%)	208 (99%)
Polio - 3	129 (99.7%)	71 (91%)	200 (95.2%)
HEP - 1	130 (98.5%)	77 (98.7%)	207 (98.6%)
HEP - 2	130 (98.5%)	73 (93.6%)	203 (96.7%)
HEP - 3	126 (95.5%)	71 (91%)	197 (93.8%)
Measles	125 (94.7%)	72 (92.3%)	197 (93.8%)
Vitamin A - 1	124 (93.9%)	57 (73%)	181 (86.2%)

Table-3: Dropout rates of children between 12 to 23 months of age

Dropout Rates	Rural (%)	Urban (%)	Total (%)
DPT - 1 to DPT - 3	2.28	6.49	3.83
OPV - 1 to OPV - 3	2.28	7.79	3.38
HEP - 1 to HEP - 3	3.08	7.79	4.83
BCG to Measles	5.30	7.69	6.19
DPT - 1 to Measles	5.30	6.49	5.74

Table-4: Various reasons reported by mothers for not immunizing the child

Reasons for not immunizing the child	Rural (n=13)	Urban (n=18)	Total (n=31)
Unaware of the need for immunization	5 (38.46%)	6 (33.33%)	12 (38.70%)
Unaware of the need to return for 2 nd or 3 rd doses	2 (15.38%)	5 (27.78%)	7 (25.58%)
Fear of side effects	1 (7.70%)	4 (22.22%)	5 (16.13%)
Family problems including mother's illness.	2 (15.38%)	2 (11.11%)	4 (12.90%)
Child was ill	3 (23.08%)	1 (5.56%)	3 (9.67%)
Total	13 (100%)	18 (100%)	31 (100%)

Among the individual vaccines, coverage was highest for BCG (100%) and lowest for measles (93.8%). A consistent decline in coverage rates from the first to third dose was observed for DPT, OPV and Hepatitis-B, both in rural and urban areas as shown in table-2. Only 181 (86.2%) children had received Vitamin A supplements at the time of measles vaccination. The overall dropout rates for DPT, OPV and Hepatitis-B from the first dose to third dose were 3.83%, 3.38% and 4.83% respectively. These rates were 2.28%, 2.28% and 3.08% respectively for rural and 6.49%, 7.79% and 7.79% respectively for urban areas. The overall dropout rates for measles compared with BCG and DPT - 1 were 6.19% and 5.74% respectively. These rates were 5.3% in rural and 7.69% and 6.49% respectively in urban areas. Overall dropout rates were more in urban areas compared to the rural areas as shown in table-3 below.

Table-4 shows the various reasons reported by the mother for not immunizing the child. Most frequently reported

reason in both rural (38.46%) and urban areas (33.33%) was unawareness for the need of immunization. 15.38% of rural and 27.78% of urban mothers were unaware of the need to return to the 2nd or 3rd doses. Other reasons reported were the family problems including illness of the mother in 12.9%, illness of the child in 9.67% and fear of side effects in 16.13% of the cases.

Discussion

In a study conducted during Aug 2008 to Jan 2009 by Joshi HS et al^[6], only about 50% of children were fully immunized while 27.5% were partially immunized and 22.5% were not immunized at all. Coverage was highest for BCG (62.5%) and lowest for measles (39.2%). Dropout rates were 37.5%, 19.7% and 18.2% for BCG to measles, DPT1 to DPT3 and OPV1 to OPV3 respectively. In the present study the immunization coverage is very much improved with fully immunized were 85.2% and the dropout rates are less compared to the above study. This difference could be because of the better functionality of the UIP services in this area. In the same study, the various reasons for not immunizing the child were lack of awareness of need of immunization.

A study by Mahyavanshi DK et al^[7], reported that 70.47% children were fully immunized and the coverage was highest for BCG (95.71%), followed by OPV3 (82.85%), and lowest for measles (75.23%). The dropout rates were 21.39%, 10.21% and 9.37% for BCG to measles, DPT1 to DPT3 and OPV1 to OPV3 respectively. Most common reasons for not immunizing the child were ignorance (64%) and lack of information regarding the time, place and schedule (21%). These results are comparable to the present study.

Immunization coverage assessment studies by Sheth J K et al^[8], Vikram A et al^[9] and Kadri A M et al^[10], have shown similar results where more than 60% of the children were fully immunized. There was a consistent decline in the coverage rate from BCG to measles. The major reasons for not immunizing the child were lack of awareness of the need of immunization and lack of availability of services in rural areas. The results of our study are more improved with lower dropout rates than the results of the above mentioned studies.

According to DLHS-3, 76.7% (82.3% in Shimoga district) of children in the age group of 12 – 23 months were fully immunized in Karnataka state. We have tried to compare the findings of the present study with NFHS-3, Karnataka and DLHS-3, Shimoga District. Comparison with NFHS-3 Karnataka and DLHS-3 Shimoga district shows that overall

the coverage has improved for all vaccines and no unimmunized children were found in our study.

Table-5: Comparison of results of the present study to NFHS-3 and DLHS-3

Immunization Status	Present Study Bhadravathi Taluk	NFHS-3 Karnataka	DLHS-3 Shimoga dist.
Fully immunized	85.2%	55%	82.3%
BCG	100%	87.8%	98%
DPT 3 doses	95.7%	74%	91%
OPV 3 doses	95.2%	73.8%	90.8%
HEP-B 3 doses	93.8%	--	--
Measles	93.8%	72%	90.8%

Conclusion

In the present study, there was a consistent decline in the coverage rate from BCG to measles. Coverage for fully immunized children was primarily low due to measles. Important reasons for not immunizing the child were lack of awareness of the need for immunization, family problems including illness of the mother and child.

The district health authority should monitor the outreach immunization activities by frequent field visits and also ensure accountability of staff at various levels for services they provide by effective supervision and monitoring system. They should plan extensive IEC activities generating awareness among the community about the importance of immunization, inviting opinions and suggestions from them and enhancing community participation.

Efforts should be made to educate the mothers about the importance of timely immunization, in the prevention of vaccine preventable childhood diseases, information regarding possible side effects of the vaccines and how to deal with them, by organizing information, education and communication (IEC) activities. It should also be ensured that all mothers should take active participation in these IEC activities especially during the period between DPT3 and Measles vaccination to reduce the dropout rates.

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