

Child Survival and Safe Motherhood Program in Rajasthan

S.K. Jain, Uma Chawla, Neeru Gupta¹, R.S. Gupta, S.Venkatesh and Shiv Lal

National Institute of Communicable Diseases; and ¹Division of Reproductive Health and Nutrition, Indian Council of Medical Research, India

Abstract. Objective : This study was planned to evaluate the MCH services, particularly immunization in rural areas of the poor-performing state of Rajasthan. **Methods :** A community-based, cross-sectional survey using the WHO 30 cluster technique was carried out as a field exercise by participants of 9th Field Epidemiology Training Programme (FETP) course by National Institute of Communicable Diseases (NICD) in rural areas of Alwar district of Rajasthan. **Results :** Less than one third (28.9%) of children, aged 12-23 months, were fully immunized with BCG, 3 DPT, 3 OPV and Measles vaccines; around a quarter (26.5%) had not received even a single vaccine (non immunized), and little less than half (44.5%) were found partially immunized. Around half of the eligible children were vaccinated for BCG (55.9%) and Measles (43.6%). Though nearly two-third (66.8%) were covered with first dose of DPT and OPV, but about one third of these children dropped out of third dose of DPT and OPV for various reasons. National Family Health Survey (NFHS) data also had revealed that BCG coverage was 64.3%; measles was 36.2%; and coverage by DPT 1, 2, 3 and Polio 1,2 and 3 were 64.4%, 57.0%, 46.6% and 77.5%, 71.1% and 54.4% respectively in rural areas. The main reasons for drop-out or non-immunization was "lack of information about the immunization programme" (41.3%). Though nearly all (more than 96%) of the children were immunized through Government established centers, but immunization cards/documents were made available only to 27.6% of children. **Conclusion :** The problem of low coverage and high drop-out rate of immunization could be overcome by creating awareness of the program and relevance of 2nd and 3rd doses of DPT and polio vaccines. Increasing community participation through intensive and extensive health education campaign should also be undertaken. Since most of the deliveries were done at home under the supervision of untrained midwives, training programme as well as involving them in IEC activities should be contemplated. [Indian J Pediatr 2006; 73 (1) : 43-47]
E-mail : guptan@icmr.org.in

Key words : 30 cluster; Service coverage evaluation; Survey; Rural; Rajasthan

Communicable diseases kill more than 14 million people every year, mainly in the developing world.¹ Despite the availability of safe and effective vaccines against these diseases in the last 3 to 4 decades, diseases like measles and tetanus continue to be a major cause of mortality and morbidity, especially among young children in most of the developing countries like India. Universal Measles immunization coverage is one of the activities targeted in order to reduce child mortality by two-thirds by all the 191 United Nations Member States as one of the eight UN Millennium Development Goals (MDG).² As of now, Measles, Pertussis and Tetanus are the leading causes of DALYs (Disability adjusted life years) among Childhood diseases,³ and hence constitute the main global burden

of diseases among childhood illnesses.

As per WHO estimates, in 1998, approximately 30 million cases and 8,88,000 deaths occurred worldwide due to measles, of which 85% occurred in South East Asia and Africa regions.⁴ Diphtheria also has the potential to cause outbreaks especially in those countries with very low reported levels of vaccination coverage.⁵

Following the success in eradication of small pox through vaccination, India initiated immunization programme in 1978 under the banner of Expanded Programme of Immunization (EPI), with the objective to reduce morbidity and mortality due to five child killer diseases which are vaccine preventable diseases (VPDs). Those are: Diphtheria, Pertussis, Tetanus, Polio and Tuberculosis. Additional inputs were provided under Universal Immunization Programme (UIP) by strengthening the cold chain facilities and streamlining logistics for vaccine, other essential supplies and measles vaccination. The aim of UIP is (i) to give the full course of DPT, OPV, BCG and Measles vaccines before the first birthday to all children and (ii) to give 2 doses

Correspondence and Reprint requests : Dr. Neeru Gupta, F-8/17, Krishna Nagar, Delhi-110051

of tetanus toxoid to all pregnant women throughout the country. These services were organized as a part of primary health care through the existing health infrastructure. During 1992, this programme was integrated with National Child Survival and Safe Motherhood (CSSM) programme. Following the International Conference for Population and Development (ICPD) held at Cairo, a paradigm shift was brought about and "Reproductive and Child Health Programme" was launched in October, 1997. Immunization continues to be an important component of the RCH programme.

In the past decade and half, all the districts in the country have been covered under the Universal Immunization Programme. However, providing immunization, by itself, does not guarantee a reduction in disease morbidity and mortality. The full course of vaccines must be given at the right age and the vaccines must be potent. Vaccination activity should not be an end in itself but lead to development of immunity against diseases.

The accurate measurement of vaccination coverage and maternal care, antenatally and during delivery, are essential steps in determining the successful implementation of the maternal and child health programme. This can be performed with the help of a coverage evaluation survey, in field. Keeping this in view, a community-based, cross-sectional survey, using the WHO 30 cluster technique⁶, was carried out as a field exercise by participants of 9th FETP course. The study was aimed to estimate the immunization coverage of DPT, OPV, BCG and Measles amongst children of 12–23 months and to know the reasons of immunization failure. It also aimed to estimate the immunization coverage of Tetanus toxoid and the status of antenatal care and delivery practices of mothers of infants, and then to cross check the results with routine reporting system.

MATERIALS AND METHODS

A Survey was conducted in Rural area of Alwar District, Rajasthan, among children, 12–23 months of age, and mothers of children (0–11 months of age) from 25–30 September, 2004. Sampling Technique used was Standard WHO-30 cluster sampling; Population Proportionate to Size (PPS)⁶ and Sample Size were 210 mothers and 210 children.

Total rural population of Alwar district is 25,57,653. The sampling interval determined was 85,255. The first random number selected was 73. 210 mothers, and 210 children were selected from these 30 clusters (7 per cluster for each i.e., 7 mother of children in age group 0–11 months and children of 12–23 months of age). A standard WHO pre-designed schedule available for evaluation of immunization coverage was reviewed and adapted. The schedule was pre-tested in the classroom by role-play method. 14 Participants of 9th Regional

FETP assisted by staff of Field Practice Unit (FPU), NICD branch, Alwar, constituted the survey team and it was supervised by the faculty of Epidemiology Division NICD Delhi and Field Practicing Unit, NICD, Alwar.

Briefing for the survey team was done from 20th to 24th of September 2004. The briefing session consisted of schedule's review and Role-Play in the classroom. Question by question instructions and guidelines were given to the surveyors.

Data Collection in the Field

Survey was carried out in 30 clusters of rural area of Alwar district by four teams (each team comprised of 3 or 4 trainees of the 9th Regional Field Epidemiology Training course and one paramedical staff from Field Practice Unit, NICD Alwar). Information as per pre-tested schedule was collected by interviewing either mother or caretaker of children below two years.

House-to-house visits were made in each of these clusters until seven mothers of children under one year of age and seven children in 12–23 months age groups were found. The selection of the first house was done randomly and subsequent houses were selected by going to the next nearest house.

Immunization status of children (12–23 months), source of immunization and reasons for failure to initiate or complete immunization schedule were ascertained. Wherever possible, the dates of immunization were determined by immunization cards or registers. For those who had no such documents, the months and year of immunization were recorded only if convincing "verbal history" was given. Whether immunization was done at the right age was determined from dates of immunization and birth dates. First DPT before one and a half months and Measles immunization less than 9 months were considered invalid immunizations. Question on immunization status (Tetanus-toxoid), antenatal care received, place of delivery and person who conducted the delivery were asked from seven mothers of infants (0–11 months) in each cluster.

For immunization status, definitions from Service evaluation coverage, CSSM 1992⁶, were followed. The right age for vaccination was considered as: for Measles, soon after 9 months (9 months completed); BCG—any time after birth; Polio/DPT—first dose, any time after 6 weeks of birth. Subsequent doses spaced at least one month or 28 days apart.

A fully-immunized child is the child who was vaccinated for BCG, 3 doses of OPV, 3 doses of DPT and 1 dose of measles in the eligible population (12–23 months of age). First DPT before one and a half months and Measles immunization less than 9 months were considered invalid immunizations, and such vaccinations were excluded from the computation of fully immunized children even if all doses for six VPDs were given. Partially immunized child was the one who had

Child Survival and Safe Motherhood Program in Rajasthan

not received complete immunization schedule or received one or more than one of these immunizations at wrong age. A person vaccinated at the wrong age was considered not vaccinated. A second or third DPT or Polio vaccination which was given less than one month after the preceding vaccination was considered invalid. It was checked that the vaccinations were completed before 12 months of age. Measles vaccine given before 9 months age (270 days) was considered not valid. Non-immunized were those who did not receive even a single dose of any vaccine or have been administered at a wrong age. In case of a partially immunized or a non immunized child, the responsible person in household was asked to give the most important reason why the immunizations were incomplete. The information collected was transferred to 'Master Sheets' and analysis was done manually.

RESULTS

The rural of Alwar district has been covered in the present survey covering a population of about 25.58 lakhs (information of present survey is given in Methods). Of 211 eligible children, 134 (63.5%) were males and 77 (36.5%) were females. Less than one-third (61/211, 28.9%) of children aged 12-23 months were fully immunized with BCG, 3 DPT, 3 OPV and Measles vaccines; around a quarter (56/211, 26.5%) had not received even a single vaccine (non immunized) and little less than half (94/211, 44.5%) were found partially immunized (Table 1). Around half of the eligible children were vaccinated for BCG (55.95) and Measles (43.6%). Though nearly two-third (66.8%) were covered with first dose of DPT and OPV, but about one-third of children dropped out of the third dose of DPT and OPV for various reasons (Table 1). The main reasons for drop-out or non-immunization was "lack of information about the immunization programme" (41.3%). Other obstacles like absence of vaccinator (15.2%) and a busy schedule of the mother at home (10.8%) were other major responses to vaccine non-compliance (Table 2).

Three-fourth (74%) of mothers of the infants (0-11 months) were found fully-immunized with tetanus toxoid. Nearly all (96-100%) of them had received it from Government established centers. Less than one-fourth (23.8%) of mothers (Table 5) had contacted health personnel/health center for at least three times for receiving antenatal care, and 37.6% received over 100 tablets of Iron and Folic acid (IFA) during their entire period of gestation (Table 3). Around three-fifth (127) deliveries took place at "Home". Untrained midwives conducted 60% of total deliveries at homes.

DISCUSSION

This study shows that the vaccination coverage has

TABLE 1. Immunization Status (Vaccine/dose-wise) of Children (12-23 months), Alwar District, Rajasthan-September, 2004 (n=211)

Type of Vaccine/Dose	Number (%)
Immunization Cards available	57 (27.0)
DPT-I	141 (66.8)
DPT-II	118 (55.9)
DPT-III	81 (38.4)
OPV-I	136 (64.5)
OPV-II	114 (54.0)
OPV-III	82 (38.9)
BCG	118 (55.9)
with Scar	86/118 (72.8)
No Scar	32/118 (27.1)
Measles	92 (43.6)
Drop out Rates	
DPT-I to III	60 (42.6)
OPV-I to III	54 (39.7)
Fully immunized	61 (28.9)
Partially immunized	94 (44.5)
Not immunized	56 (26.5)

TABLE 2. Reasons for Failure of Immunization Amongst Children (12-23 month) Alwar District, Rajasthan - 2004.

Reasons	Number (%)
A. Lack of Information	
Unaware of need for Immunization	84 (41.3)
Unaware of need to return for subsequent doses	15 (7.3)
Fear of side reactions	8 (4.0)
Place and time not known	5 (2.0)
Sub total	112 (55.1)
B. Lack of Motivation	
Postponed till another time	4 (1.9)
No faith in Immunization	7 (3.4)
Sub total	11 (5.4)
Obstacles	
Time of Immunization inconvenient	4 (1.9)
Vaccine not available	10 (4.9)
Mother too busy	22 (10.8)
Child ill not brought	2 (0.9)
Child ill brought but not immunized	1 (0.4)
Place too far	4 (1.9)
Vaccinator absent	31 (15.2)
Mother ill and family problems	0 (0.0)
Out of station	3 (1.4)
Measles attack	0 (0.0)
Others	3 (1.4)
Sub total	80 (39.4)
Total reasons	203 (100)

remained more or less the same as compared to the previous studies carried out in the same state/district^{7,8} (Table 4). A recent evaluation of routine immunization coverage in some districts of West Bengal and Assam carried out during the period from November 2003 and April 2003 showed variable picture. Immunization coverage was good in Pashim Medinipur (82.5%), followed by Kolkata (71.6%), Malda (65.3%), and 24 Praganas South (61.9%) districts of West Bengal. Murshidabad district of West Bengal had only 41.3%

coverage, while poorest coverage was observed in Goalpara district (27.2%) of Assam.⁹ According to NFHS-2, the proportion of children fully-vaccinated in 12 months of age was 35%; 52% being urban and 29.3% being rural children. In Rajasthan, the vaccination coverage was found to be 17%, which is much less compared to National average¹⁰.

One-third (45/134; 33.6%) of males and one-fifth (16/77; 20.8%) of females were found to be fully-immunized. Complete immunization (fully immunization status) was better among male children (33.6%) than that of females (20.8%). However, statistically this difference was not found significant for overall immunization status (fully, partial or non-immunization status) ($\chi^2=4.89$; $p>0.05$). Hence, only seemingly, immunization status of males was better than that of females.

Vaccination coverage was found to be much lower than the goal of universal immunization (Table 1). NFHS data also revealed that BCG coverage was 64.3% and measles 36.2%; coverages by DPT 1, 2, 3 and Polio 1, 2 and 3 were 64.4%, 57.0%, 46.6% and 77.5%, 71.1% and 54.4% respectively in rural areas¹⁰. The reasons for non-immunization or drop-out (Table 2) were similar as have been noted in prior studies^{7,8,9}. Though nearly all (more than 96%) of children were immunized through Government established centers, but

immunization cards/documents were available only to 27.6% of children (Table 1). According to NFHS-2 also, the public sector is the primary provider of childhood vaccinations in India. NFHS-2 also reports that immunization cards were shown by 40% urban and 30% rural children in India and only 15% children in Rajasthan¹⁰.

Nearly three quarters of mothers were fully immunized for tetanus but only quarter of them received three antenatal check-up, and 60% deliveries were conducted by untrained dais. This is a matter of concern and calls for intensive training of the midwives in these areas for effective management of labor and infant vaccination later on.

Comparison of Evaluated Coverage with Recorded Coverage

BCG was reported to be 103.43%; for 3 doses of DPT the recorded coverage was 106.69%; for 3 polio doses, it was 106.69%; for measles, 103.43% and complete immunization (BCG+3 doses of DPT+3 doses of Polio +Measles) was 103.43% as per records (2002) in Alwar district. But the evaluated coverage in the present field coverage evaluation survey (25th -30th September, 2004) was 55.9% for BCG, 38.4% for 3 doses of DPT, 38.9% for 3 polio doses, 43.6% for measles and 28.9% for full immunization (Table 1). So, the observed difference between recorded and evaluated coverage as per present survey was 74.53%.

TABLE 3. Profile of Mother Coverage in Alwar District (n = 210)

	Number (%)
A. Immunization	
Immunization card	58 (27.6)
First Dose TT	156 (74.2)
Second Dose TT (including booster)	163 (77.6)
Government Source	210 (100)
B. Antenatal care	
Mother given ANC (≥ 3 visits)	50 (23.8)
IFA tablets (≥ 100 tablets)	79 (37.6)
C. Place of Delivery	
Hospital	59 (28.0)
Home	151 (71.9)
D. Delivery conducted by	
Hospital staff (Govt. or Pvt.)	63 (30.0)
Trained Dai	20 (9.5)
Untrained Dai	127 (60.4)

CONCLUSION

There were low levels of immunization coverage for both mother and children (age 12-23 months). Only one third of eligible children and three-fourth of mothers were completely immunized for their immunization schedule. Lack of awareness of the immunization programme was the main reason behind this. Regular and focused IEC activities regarding need for immunization is required so as to elevate community belief on the need for vaccination. The problem of high drop-out rate of immunization could also be overcome by creating awareness of the programme and relevance of 2nd and 3rd doses of DPT and polio vaccines. Increasing community participation through intensive

TABLE 4. Studies on EPI Evaluation Coverage Conducted in Rajasthan in Last 2 Decades

Author	Reference no	Area of Study	Fully Immunized	Partially Immunized	Not Immunized	Drop out OPV1 and OPV3
Padam Singh and R S Yadav, 1999	7	Rajasthan (rural + Urban)	40 %	33.3%	26.7%	-
Jbhattacharjee et al., 1996	8	Alwar district (rural)	27.1%	33.9%	39%	26%
Present study (FEIP, 2004)		Alwar district (rural)	28.9%	44.5%	26.5%	39.7%

Child Survival and Safe Motherhood Program in Rajasthan

and extensive health education campaign may also be required. Since most of the deliveries were done at home and conducted by untrained midwives, a training programme as well as involving them in IEC activities should be contemplated.

Acknowledgement

This study was funded by World Health Organization and was a part of training of WHO Fellowship called "Field Epidemiology Training Programme". This course was being conducted by NICD.) (Survey Team: D.S.L. Karma, Nepal; Narain Thapa, Nepal; Tarun Paudel, Nepal; Kunal Chatterjee, Armed Forces, India; Somenath Karmakar, India; Sona Pradhan, Bhutan; Subhasis Debbarma, Tripura; Kamal Riyang, Tripura; K.P. Debnath, Tripura; K.T. Lepcha, Sikkim; Maya Sarkar, West Bengal; Tun min, Myanmar; H.G.S. Navratne, Srilanka)

REFERENCES

1. *Control of communicable Diseases Manual*, 18th edn. 2004: 21.
2. United Nations Millennium Development Goals, <http://www.un.org/millenniumgoals/>.
3. Statistical Annex. *The World Health Report 2004*. WHO, Geneva: 127.
4. Measles continues to remain major public health problem in India. *CD Alert*. National Institute of Communicable Diseases, Directorate General of Health Services. Government of India. 2000; 4(5): 1.
5. Diphtheria. *CD Alert*. National Institute of Communicable Diseases, Directorate General of Health Services. Government of India. 1999; 3(4):1.
6. EPI evaluation coverage, *Child Survival and Safe Motherhood Programme*. 1992, Ministry of Health and Family Welfare. 6-9
7. Padam Singh and Yadav RS. Immunization status of children in India. *Indian Pediatrics* 2000; 37: 1194-1199.
8. Bhattacharjee J, Gupta RS, Jain DC, Devadethan and Dutta K K. Evaluation of Pulse Polio Immunization coverage: Alwar District, Rajasthan. *Indian J Pediatrics* 1997; 64: 65-72.
9. Ray SK, Dasgupta S, Dobe M, Biswas R, Mehta P, Baishya AC. An evaluation of Routine Immunization Coverage in Some Districts of West Bengal and Assam. *Indian Journal of Public Health* 2004; 48(2): 82-85.
10. *National Family Health Survey-2, India (1998-99)*. International Institute of Population Sciences; Mumbai, 2000: 209-211.