Record-Based Immunization Coverage Assessment in Rural North India

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Citation

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Abstract

A cross section survey was done in a rural area of north India to estimate the immunization coverage rate in the study area on the basis of records of anganwadi workers (AWW) and health workers (HW). Immunization registers of six subcentres and 36 anganwadi workers were scrutinized (population 40616) to enlist eligible children aged 12-23 months on the day of survey. Information about receipt of various vaccines by these children was noted. In 10% cases home visits were also done to check the quality of data of immunization registers. Of the 747 eligible children 708 (94.8%) were fully immunized. Main reasons for incomplete immunization was parental indifferences or migration of the child/family. In 10% cross checking resurvey majority of the records were found to be correct. Quality of record keeping was reasonably good. Record based estimation of immunization coverage rate was found to be feasible.

KEY MESSAGE

Record based immunization coverage assessment is a feasible and cheaper alternative for this purpose in Indian health care set up.

INTRODUCTION

Immunization coverage surveys help us in evaluation of the performance of our immunization programmes. The standard methodology for such surveys is to use a 30-cluster sampling technique devised by W.H.O[1] Usually, these surveys are specially commissioned and are conducted by outside agencies (other than the providers). This involves expenditure on manpower and field work. Hence, such surveys are not frequently conducted. Apart from these occasional surveys, the state level authorities (Directorates of Health and Family Welfare) also regularly report on immunization coverage in their states. Such reports are made on the basis of the data on consumption of doses of various vaccines, as against the expected number of required doses to be given to children. This methodology does not yield true coverage rates, eg often coverage rates of more than 100% have been reported which is logically and mathematically wrong[2]

The present study proposes to demonstrate the feasibility of using a third method of ascertaining the immunization coverage of infants on the basis of inspection of records of health workers. This new technique will provide health supervisors and medical officers with an additional tool of record based armchair supervision. Utility and feasibility of record based estimation of perinatal mortality rate has also been demonstrated earlier by the authors in rural Haryana, north India [3,4,5]

OBJECTIVES

to estimate the immunization coverage rate in the study area on the basis of records of anganwadi workers (AWW) and health workers (HW).

MATERIAL AND METHODS

Rural areas of India are divided into community development blocks (CDBs). There are more than 500 districts in India, with more than 5,000 blocks to which the government provides health care. Every CDB (average population 1,00,000) has one community health center (CHC), three or four smaller primary health centers (PHC) and 20-30 subcenters. At present, there are more than 142655 SCs, 23109 PHCs and 3222 CHCs in India (6). Each PHC has five or six sub centers under it, each serving about 5,000 people. Each sub center is staffed by a male and female health worker (HWM and HWF) with a 10^{th} grade education. The HWF is responsible for providing maternal and child health (MCH) services to the population covered by the sub center, including immunization services, ante - intra - and post-natal care. Each subcenter covers one to eight villages, depending on village size (average village

population is 700 to 800). Every four or five health workers are supervised by one health assistant male or female. In addition to the health workers, every village has one anganwadi worker per 1000 population who helps in providing child care services to 0-6 years old children and pregnant/lactating women. Nutrition, immunization and non formal education are the main services provided by her.

Health workers and anganwadi workers routinely enlist all children born in their allocated areas since they are the beneficiaries to whom they provide services. The information on the dates of birth of these children and the date when various doses of different vaccines are given are duly recorded by them in their registers. We scrutinized these immunization registers of HW/AWW to get our data.

A social worker was recruited for the study. She was trained in survey techniques and record analysis. The sample size calculation was done at 95% level of confidence and 5% degree of precision with minimum estimated immunization coverage rate of 80% ($t^2 = 4$, d= 0.05, P =0.80, Q=0.20). This yielded a sample size of 256. It was enhanced to 300 to make an allowance for incomplete data and non-availability of records. Taking into consideration the available manpower, time, and resources and assuming a less than 50% availability of the records of the estimated 25-30 eligible children in each anganwadi, it was proposed to select 30 anganwadis for the study.

To obtain the requisite number of anganwadi centers, first, six subcentres (expected population 6x5000=30000) were selected purposively from the study area. Selection of the anganwadis was done from these subcentre areas in order to obtain comparative data for the same area/children from HW/AWW registers.

The medical officer in charge and child development project officer of the area were contacted to obtain their concurrence for the study. Immunization registers of the anganwadi workers and health workers were scrutinized for retrieving the requisite information for the study. This was noted on a survey schedule designed and pretested for the study. First, the names of the eligible children from AWW registers were recorded on the survey schedule.

Only those children were considered eligible for this study who would have been aged between 12-23 months on the day of the survey i.e. the day when record scrutiny was done. This survey was conducted during 2004-2005. So, if the social worker examined the register on say October 1, 2004, she noted down the names of children who were born between October 2, 2002 and October 1, 2003. This yielded a list of children who would have been 12 months –23 months old on the day of survey (October 1, 2004). Completed months were counted to calculate the age i.e. a 6 month 23 days old child was counted as six month old.

Entries for DPT/ polio, measles, BCG immunization of these children were copied from the AWW registers. Thereafter, registers of the health workers of the corresponding village/subcentre were scrutinized. One by one, names of the children enlisted from AWW registers were located in HW registers. Entries from HW registers were also copied for the listed children on the survey schedule. Thus, an attempt was made to record the information about a child from the two sources (first from anganwadi worker register and then from health worker register) together on the schedule in order to get a comparative picture.

As a routine; for each child when a vaccine is administered, AWW/HW either put the date of the vaccine administration or put a tick mark (√). in the respective column of the immunization register. For this study, a child was recorded as completely immunized if as per the records of either the AWW or the HW he/she had received BCG+measles+DPT/Polio-3 doses i.e. either the date or √ was entered against the name of the child in the immunization register in the respective column. The rest of the children were classified accordingly. In case, the respective column for a particular vaccine was found to be blank in both AWW as well as HW records, the concerned child was considered as unimmunized for that dose of vaccine. Reasons for incomplete immunization were noted if recorded in the register. Home visits were made to contact about 10% of the completely immunized and all the partially immunized or unimmunized children in order to verify the quality of records and to get details on reasons for missing the dose of vaccine. Enquiries from health workers, anganwadi workers and helpers were also made, particularly, regarding incompletely immunized and unimmunized children.

Consent of workers and respondents was taken for their participation in the study. The study was cleared by the institute ethics committee before the data collection. The data was analysis manually.

RESULTS

There were 36 anganwadis in the area covered by 6 subcentres selected for the study. Total population of the

area was 40616. Overall 777 (1.9%) eligible children were enlisted in the study area (423 male; 324 female). Of them, 30 were recorded as dead (still birth, early neonatal death or infant death).

As per the records analysed in the study 708 of the 747 eligible children (94.8%) were fully immunized i.e. had received requisite doses of all the primary schedule vaccines (BCG, OPV, DPT, Measles). In 39 (5.2%) children immunization was incomplete.

On enquiry, the main reason for incomplete immunization of the study children was temporary or permanent out migration of the children/ family (left the village, went to parents' home, divorce, child adopted by relatives). There were 24 such cases. In remaining 15 cases incomplete immunization was due to parental indifference. These cases were migrant laborers living on the outskirts of native villages in temporary hutments.

Table-1 shows the coverage rates for individual vaccines as per the records of HW/AWW. The rates vary as per the criteria used for estimation of coverage. If only AWW records are considered the minimum coverage estimated would be for measles vaccine i.e. 72.6%. This rose to 94.8% if child was considered to have received the vaccine as per records of either HW or AWW i.e. when both records were considered.

Figure 1

Table 1: Recording of Receipt of Various Vaccines by AWW/HW (n=747)

	Recorded by			Vaccine wise coverage based on records of		
Vaccine*	Both (a)	Only AWW (b)	Only HW (c)	Either HW/AWW (a+b+c)	HW only (a + c)	AWW only (a + b)
BCG	671	37	30	98.8% (738)	93.8% (701)	94.8% (708)
DPT/ Polio-3	647	37	45	97.6% (729)	92.6% (692)	91.6% (684)
Measles	492	50	166	94.8% (708)	88.1% (658)	72.6% (548)

(figures in parentheses reflect no. of cases)
*Information was not recorded by either of the workers(i.e. uncovered children) in 9 cases for BCG, 18 cases for DPT/Polio-3 and 39 cases for measles.

In the 10% resurvey, 83 randomly selected houses were visited. Records were available in 42 (50%) of these cases. Of these, the information on immunization cards tallied with that of immunization registers in 30 cases. In rest 12 cases, date of birth did not match in three case and immunization dates did not tally in 9 cases. Mothers' information tallied with that in HW records in all except two cases – in one case date of birth was different and in the other case the mother told that measles was not given while records revealed that it had been given. In addition, one unregistered child was also detected in the survey i.e. his name did not exist in HW records. However, he was fully immunized.

DISCUSSION

For evaluation of immunization coverage the 30-cluster technique of WHO is the gold standard, since this involves actual contact with the children concerned during house to house survey. Verification of immunization cards is also done by the survey team. Such surveys attempt to provide a realistic picture of the immunization coverage. These focus on children aged 12-23 months i.e after they had had the opportunity of receiving primary immunization before 12 months of age (7-9). The main constraint of this technique is the logistics involved – the time, manpower and money for the fieldwork. Such surveys are to be specially commissioned. The coverage rate here is calculated by the formula.

Figure 2

$$\text{Coverage (\%)} = \frac{\text{No.of eligible children found to be fully immunized}}{\text{No. of eligible children surveyed and contacted (usually 30x7=210)}} \times 100$$

So, mathematically this coverage is never reported as more than 100%. It only reports on what proportion of the 12-23 months old children surveyed (denominator) are fully immunized (numerator).

However, the official statistics of various state health directorates quite often report more than 100% ‘immunization coverage'. The formula commonly used for such reports is ‘

Figure 3

$$\text{Coverage (\%)} = \frac{\text{No. of doses of a particular vaccine consumed in the state (as per the record and feedback from health centres of all the districts)}}{\text{Estimated requirement (no. of doses) of that vaccine (no. of infants x no. of doses required) for the whole state}} \times 100$$

Here, the no. of required doses are calculated on the basis of expected no. of infants in that state. This number is estimated on the basis of reported birth rate. Numbers of infants are then multiplied by no. of doses required per child for a particular vaccine. This gives the estimated no. of doses of a vaccine required for a state. For example, if the estimated no. of children (0-1 yr) in a state (based on the reported birth rate) is 100000 per year, for primary immunization of DPT 100000 x 3= 300000 doses are

required. If as per the records actually 330000 doses were consumed in that year the ‘coverage' will be reported as 110%.

Figure 4

$$\text{Coverage Rate \%} = \frac{330000}{100000 \times 3} \times 100 = 110\%$$

Clearly, such reporting of more than 100% coverage is illogical and erroneous i.e. in fact, use of the term ‘coverage' for such reporting is anomalous since it does not estimate how many children were covered or actually immunized. Neither there is any direct contact with children nor does it focus on individual child related data. Rather, it only estimates the extent to which the planned ‘target' of no. of doses to be administered was achieved. Moreover, this technique does not yield any information as to whether a particular child had received all the required doses of all the vaccines (i.e. was she/he fully immunized). Thus, in the above mentioned formula used for reporting coverage rate at state level the numerator is not a part of denominator. Neither the numerator nor the denominator refers to children. Rather both refer to no. of doses of a vaccine. So, clearly this indicator does not refer to coverage of children by vaccines. It provides only vaccine wise ‘target' achievement. Unlike 30-cluster technique, here, the focus is not on fully immunized children. Moreover, this method does not refer to 12 months –23 months old children. Rather, it reports on annual basis, target achievement regarding doses of vaccines to be given to estimated no. of infants (0 -1 year).

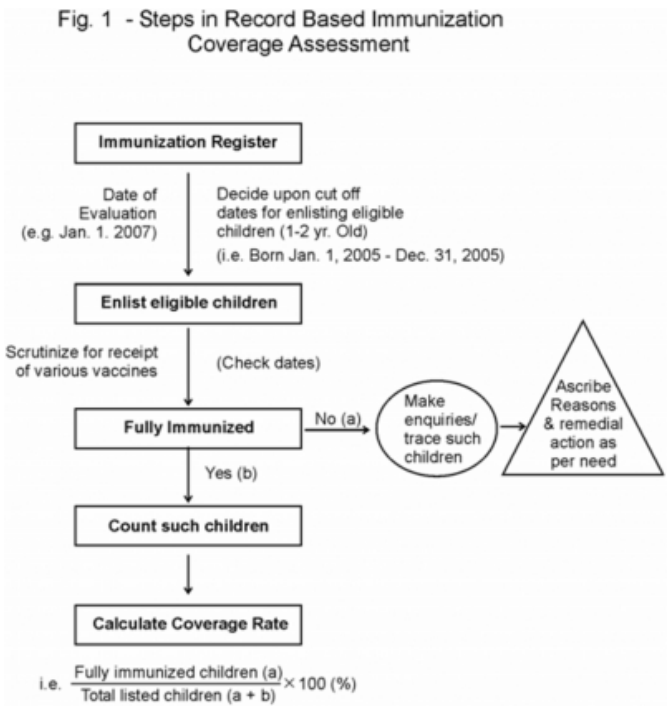
Mercifully, some states in India have now changed the terminology used in their reports on immunization services (10). They are not using the term ‘coverage' anymore. Rather, they are presenting it as ‘achievement' of doses of vaccines administered under immunization program and the rates are reported in percentage against the targets. The reported range, of course, still extends beyond 100%. For reporting vaccine dose target achievement such reporting may be acceptable but certainly not for reporting immunization coverage rates.

Still, the question here is – what purpose is served by such reporting of more than 100% achievement of targets, e.g., a reported ‘immunization coverage' of 142% achievement may just reflect that the target set at the outset was not accurate. Probably, a low target of doses of a vaccine to be given was set, thereby leading to ‘spurious' overestimation of ‘achievement' i.e. >100%. Such analysis, in fact, only serves the purpose of a ‘process' evaluation i.e. vaccination dose delivery. On the other hand, the 30-cluster technique data reports on the desired ‘end product' i.e. proportion of ‘completely immunized' children in a given population. However, as indicated above, it is a costly affair and is not feasible for routine ongoing monitoring.

Our study demonstrates the feasibility of a third technique as an alternative methodology for assessment of immunization services i.e. record based armchair evaluation of immunization coverage of an area e.g – a PHC, utilizing existing records. It does not involve heavy input in terms of fieldwork.

Essentially, this technique involves scrutiny of immunization registers of health workers or anganwadi workers. The focus is on study of immunization records of children who would have been 12-23 month old children on the day of the scrutiny (Fig. 1). For example, if this scrutiny is done on January 1,2007, we need to focus on studying records of all children born between January 1, 2005 – December 31, 2005. This will yield immunization coverage data of children who would be 12-23 month old as on January 1, 2007 i.e. no. of children with full immunization out of total children whose records were scrutinized from the registers. On an average, this will involve a workload of scrutiny of ~ 70 pages of registers in a PHC or ~ 10 pages of registers of a health workers for a subcentre i.e. half an hour job for a subcentre at the most.

Figure 5



Such an approach will also help in familiarizing the medical officers with the health records of his/ her health workers. This will provide a tool for concurrent evaluation of a crucial RCH activity viz. immunization. This will also help to improve the quality of record keeping at health centers. Quite often medical officers confine themselves to clinical care mainly. Health care management remains a neglected part in their routine. Our approach will help in demonstrating to them as to how health records can be utilized to enhance the quality of services provided by them.

Our study also revealed that record keeping of the HW/AWW was reasonably good. As against the expected availability of records of 300 children from 30 AWW we could get records of 777 children from 36 AWW. Moreover, reasonably satisfactory quality of record keeping is also corroborated by the results obtained by us during our field-based verification of 10% of records.

From north India, earlier Lal et al had reported in their study of health records at subcentre level that immunization registers were used by all subcentre studied by them and that the record was quite impressive and complete (11) . HW used this register to ascertain immunization status of children. However, they reported that except for immunization register wealth of data generated by HW was not utilized for planning, work schedule or community needs assessment. They observed that HW perceived collection of information as an end in itself. Follow up action was seldom undertaken.

Lot of valuable information is in fact, contained in health workers records /registers. Quite often, this data is grossly underutilized despite the usual exhortation by the administrators for ‘bottom up' approach of planning by health workers. Our approach for record based assessment of immunization coverage may also help in use of locally generated data at local level itself i.e. by health workers and medical officers at subcentre/village and PHC level.

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