

Challenges for Measles Elimination in Nepal

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Abstract

In Nepal, immunization against measles in the public health sector was introduced in the fiscal year 1981/82. The coverage rate of the measles immunization has been gradually increasing to a level of around 80% in a national scale. However, there are many districts which are lagging behind to achieve the 80% target. Similarly, there remains a large pool of unimmunized infants in the country every year, which explains frequent outbreaks of measles every now and then. Besides there are other factors that challenge the goal of eliminating measles from Nepal. The challenges cover not only programmatic aspects but also issues like need to reach a very high immunization coverage for achieving herd immunity, vaccine efficacy and appropriate case management.

Keywords: Measles; Nepal; Immunization; vaccine coverage.

Introduction

Measles is an infectious disease, which contributes significantly to the morbidity and mortality in children all over the world.¹ After the introduction of measles vaccine, the morbidity and mortality rates associated with measles have been reduced to a significant level. However, it remains a significant public health problem in Nepal, despite the efforts to reach the global objective of eliminating measles death morbidity by year 2000.⁸

Measles vaccine was incorporated into the Expanded Program on Immunization (EPI) in 1974 by the World Health Organization (WHO).⁴ However, Nepal introduced the measles vaccine in the public health sector only in 1982 incorporating it in the national immunization program.⁵

In Nepal measles vaccination was started in the fiscal year 1981/82. Initially only few districts of the country were included for this activity. The service was gradually expanded to other districts and by fiscal year 1987/88 all the 75 districts of the country were covered with the measles immunization service to the infants. This study attempts to analyse the status in the country basically for the last 5 years and look into possibility of measles elimination in Nepal.

Aim of the study

The aim of the study is to review the progress in measles immunization and elucidate on the impending challenges for its elimination in Nepal.

Methods and Materials

The data for this article are received from various articles and reports published by various authors and organizations and so constitute secondary in nature.

Prevalence of Measles in Nepal

In 1989, it was estimated that some 4,83,318 measles cases might have occurred in the country in case of absence of immunization. In 1985/86 it was estimated that about 81,988 deaths attributable to measles might have occurred in the country of which 14.6% were prevented by measles vaccine.⁵ In 1991, it was once again, estimated that some 13,576 deaths were attributable to measles, of which some 53.55% were prevented by measles vaccination.

Findings

The coverage rate is considered as an indicator of the program performance in relation to immunization services. First we will see the coverage status in relation to measles immunization in the country over the years. Table I shows the reported coverage rate for measles vaccination over the last 18 years.

Table I: Coverage rates of measles vaccination, Nepal.

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<i>Fiscal Year</i>	<i>Coverage rate</i>	<i>Remarks</i>
1981/82	2	Introduction of measles vaccine in 3 districts
1982/83	11	
1983/84	24	
1984/85	24	
1985/86	37	
1986/87	63	
1987/88	37	
1988/89	58	All 75 districts included measles immunization
1989/90	57	
1990/91	68	
1991/92	64	
1992/93	64	
1993/94	61	
1994/95	78.2	
1995/96	87	
1996/97	87.8	
1997/98	88.6	
1998/99	80.5	
1999/2000	76.9	

It is seen from the table I that the reported coverage for measles vaccine has gradually increased over the last decade. By fiscal year 1995/96 the global target to reach the 80% coverage level in a national scale has been met. However, it somewhat plateaued for 3 years and then started declining.

Another indicator of protection of measles through immunization is measles case reports. Measles case reports from the health management information system (HMIS) show fluctuation of measles cases in the country

without any distinctive pattern.

Table II: Reported Measles Cases

<i>Year</i>	<i>Reported number of measles cases</i>	<i>Remarks</i>
1993/94	1401	
1994/95	4810	
1995/96	8513	
1996/97	12677	
1997/98	5771	
1998/99	6878	
1999/2000	9397	

Source: HMIS. (Annual reports of DHS)

As the table shows the number of measles cases are fluctuating over the years with a reported morbidity rate of 8.7 to 19 per 1000 children. Though the overall coverage of measles immunization is around 80% in the country, not all the districts have high level of coverage. It is very important to have uniform high level coverage to reduce morbidity and mortality.

Table III: Number of Districts with High and Low Coverage Rates

<i>Year</i>	<i>Districts with less than 50% coverage</i>	<i>Districts with coverage between 51-79%</i>	<i>District with coverage of 80% and above</i>
1994/95 (2051/52)	4	43	28
1995/96 (2052/53)	3	28	44
1996/97 (2053/54)	-	25	50
1997/98 (2054/55)	1	23	51
1998/99 (2055/56)	2	40	33
1999/2000 (056/57)	1	46	28

This table shows that some districts are lagging behind with measles immunization coverage as low as or less than 50% though the number of districts with coverage above 51% is gradually increasing. However, the number of districts with coverage of 80% or above decreasing gradually, indicating that considerable number of

districts are still below the cut off line of 80%.

A map of Nepal has been presented here to show the coverage rates for the districts for the fiscal year 1999/2000.

Map 1: Districts with measles vaccine coverage rates (1999/2000)

Surveillance of measles cases

There is no unified system to collect data on measles cases in Nepal. Few attempts were done in the past to collect information through the establishment of sentinel sites. Later attempt was done by inclusion of measles in the Early Warning and Reporting System (EWARS). Further, reporting of measles was included in the health management information system (HMIS). However, their use by the program as such seems to be minimal because of very late reporting. A few case reports on measles outbreaks have been published in the last few years as follows:^{2,6}

- a. Measles outbreak in Nuwakot 1992/93
- b. Measles outbreak in Lalitpur 1992
- c. Measles outbreak in Dhankuta 1993

Outbreak of any infection, including measles can be explained by the adequate number of unprotected children (unvaccinated children in case of vaccine preventable diseases) in the community. In Nepal also a significant number of infants are left without measles vaccine. The following table shows how many children are left without immunization against measles:

Table IV: Pool of Children who did not receive measles vaccine

<i>Year</i>	<i>Target number</i>	<i>Reported number of vaccinated children</i>	<i>Number of children who did not get measles vaccine</i>
1994/95	612034	478861	133,173
1995/96	628445	543701	84,744
1996/97	645325	566567	78,758
1997/98	662670	587402	75,268
1998/99	680498	547902	132,596
1999/2000	698824	537471	161,353

As seen from this table and the coverage rate for the few districts shown in the map a significant number of infants remains unvaccinated which can explain the measles outbreak every now and then.

With the outbreak of measles, significant number of deaths are also reported.^{2,6} Though there is no system to report deaths due to measles, it is assumed that the number of deaths might be quite high as shown in the table below:

Table V: Estimated number of expected deaths from measles due to unvaccinated pool of children

<i>Year</i>	<i>Target number</i>	<i>Number of unvaccinated children</i>	<i>Expected cases of measles among unvaccinated*</i>	<i>Expected minimum number of death due to measles*</i>

1994/95	612,034	133,173	119,856	2397
1995/96	628,445	84,744	76,270	1525
1996/97	645,325	78,758	70,882	1418
1997/98	662,670	75,268	67,741	1355
1998/99	680,498	132,596	119,336	2387
1999/2000	698,824	161,353	145,218	2904

*calculated by using the attack rate of 0.9% among unvaccinated children and a case fatality rate of 2%

This table shows that a considerable number of children are at risk of contracting measles, followed by measles related death each year. With increasing number of unvaccinated children, the number of measles morbidity as well as measles-attributable deaths are expected to be increasing each year due to cumulative effect.

Discussion

An editorial in the Lancet (1944) mentioned that measles caused an estimated 45 million cases and killed more than one million children in developing countries each year.⁹ In 1996 world health Organization (WHO/GPVI) estimated that measles accounted for 9.5% of the estimated 12.2 million deaths annually among children less than 5 years of age.⁸

Measles was reported to kill some two of each 10,000 cases in the US but two per 100 cases in the developing world.⁵ A study carried out in 1981 showed that the case fatality rate due to measles in Nepal was 4.0% in the hills and 2.2% in the Terai.⁵ At that time, it was estimated that some 70,000 deaths of the children was due to measles. Similarly, the median age of measles infection was between 4-5 years. Another study showed that by 28 months of age, there was 50% prevalence for naturally acquired measles immunity. Both these findings indicate that Nepal is particularly prone to the outbreaks of measles.

Immunization coverage survey carried out in 1998 showed that only about 67% of the infants are "fully immunized".¹⁰ This very finding indicates that the "last vaccine" in the immunization schedule of the infants might be the one that is very often forgotten. That means a pool of unvaccinated children remains quite high than seen in the reported coverage. Similarly, the "window" for immunizing infants with measles vaccine is rather small (just 3 months), which in itself might be a limitation for the parents to realize the importance of immunization from a program point of view. Similarly, missed opportunities are also frequently reported problem for the coverage.¹¹ A community-based study had shown that the coverage in rural area might be low and among the unimmunized children the incidence of measles was quite high.³

It is estimated that the attack rate for measles is 0.9 to 1.0 in the unvaccinated children. The case fatality rate for measles is estimated around 2%. Taking these figures into account, the number of estimated measles cases and measles-attributable death is worked out. As we see from the tables IV and V, there is a large pool of unvaccinated children in Nepal, which is accumulating each year. On this basis it can be easily forecasted that measles outbreak can occur any time especially in the districts, where the immunization coverage is below 80% with the herd immunity being very low. It has been reported in the literature that in order to achieve 100% protection against measles in the UK, the uptake of immunization must be about 95% whereas for India, the immunization uptake should be 99%.¹² Nepal being identical with India in terms of epidemiological aspects of measles, 99% coverage seems to be necessary. However, this should also be weighted with factors like high rate of malnutrition and the vaccine potency/efficacy.

The case fatality due to measles in Nepal is further exacerbated by the widespread malnutrition and vitamin A deficiency. Some two third children are estimated to be malnourished in the country, so the seriousness of the problem speaks of itself. Besides, the skill in case management of measles and availability of necessary services at the grass root level are rather weak. These factors are very crucial for reducing the mortality from measles, which is very important from the program point of view.

This, in turn, raises a serious question regarding measles in Nepal after almost two decades of the initiation of measles vaccination. The available data on the coverage put some hope but still, the reports of outbreaks and the number of unvaccinated children gives plenty of room to realize that strengthening of immunization program should be a priority. For this high level commitment and effective IEC from the central level is a must. Besides, it also relies on health workers' and parents' cooperation to immunize sufficient number of infants at the grass root level. And it seems appropriate to acknowledge that we have to go a long way for the elimination of measles.

World Health Organization has proposed to eliminate measles from the face of the earth. This refers to the interruption of transmission in a sizeable geographical area.⁸ It is mentioned that the global eradication of measles is technically plausible with currently available vaccines because it is very unlikely that non-human reservoirs could sustain measles transmission. However, for eradication of measles, more than one dose vaccine is recommended as a strategy.⁹ As WHO categorizes countries in three "phases" of elimination and Nepal falls into the lowest rank, some innovative strategy need to be developed and implemented.

There is no doubt that high level of immunization coverage is the most important factor in preventing measles. However, there are other factors, which need clear outlook and appropriate strategy for measles elimination from a program point of view. These factors definitely need serious consideration and appropriate action to address them. In absence of appropriate strategies for high coverage the goal for measles elimination might be a dream only.

Challenges in relation to Measles Elimination

As WHO has targeted measles to be one of the diseases that can be eliminated/eradicated, Nepal is expected to face certain challenges in the reduction of measles morbidity and mortality. The following factors might be important in the context of measles elimination, particularly for Nepal.

1. Increasing measles immunization coverage to a level of at least 95%.
2. Rescheduling or two-dose policy in measles immunization.
3. Addressing missed opportunity adequately.
4. Cold chain maintenance for securing vaccine potency/efficacy.
5. Safe Injection Practices in immunization.
6. Better case management of measles cases.
7. Active surveillance of measles cases.
8. Clear guidelines on "Outbreak Response Immunization": vaccination during outbreak of measles.

All these factors need appropriate response for embarking to achieve the goal.

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