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RESEARCH ARTICLE

Measles outbreak in a vaccinated or never vaccinated children aged 1-5 years in Khyber Pakhtunkhwa (KPK), Pakistan (Lower dir, Upper Dir and Bajawar): Chains of transmission of virus and role of vaccine failure

Dharma D. Subedi

Department of General Practice and Emergency Medicine, Karnali Academy of Health Sciences, Jumla, Nepal

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ABSTRACT

This study aimed to estimate the level of failures of measles vaccine or the children were never vaccinated against the measles in KPK (Lower Dir, Upper Dip, and Bajawar) aged 1–5 years. The outbreak of the measles among the children in lower Dir is very high. We carried out in all three districts which covered 467 children mostly aged 1–5 years in KPK during the month of March–July, 2014. Compared to the past year with 2014 (n = 467), the prevalence of the measles cases were very high (n = 1400) in 2013. Spread of measles virus is highest in the month of March–May 80% (375 of 467). The highest numbers of the measles cases 74% (347 of 467) were reported. In temperate areas, cases typically occur at the end of winter and the beginning of spring. The prevalence of measles in male and female children was nearly equal. Finally, we have observed that those children who were suffering from measles were mostly unvaccinated aged <3 years having acute malnutrition, Vitamin A deficiency, and parasitic infestation.

Keywords: Measeles, Temperate areas, Vaccinated, Unvaccinated

INTRODUCTION

The compulsory immunization program is very essential to improve the childhood immunization status in KPK, Pakistan. This study aimed to estimate the level of failures of measles vaccine or the children were never vaccinated against the measles in KPK (Lower Dir, Upper Dip, and Bajawar) aged 1–5 years. The outbreak of the measles among the children in lower Dir is very high.

MATERIALS AND METHODS

We used the data from the children 467 cases from March 2014 to July 2014, who were admitted in the measles ward in DHQ, Timergara with a history of a fever and widespread skin rash associated with a cough or conjunctivitis (red eyes and watery eyes) or nasal discharge (runny nose). We carried out in all three districts (L. Dip, U. Dir, and Bajawar) which covered 467 children mostly aged 1–5 years in KPK during the month of March–July, 2014.

RESULTS

There were total 467 cases of measles reported in the measles ward in DHQ, Timergara in the month of March–July, 2014. All children admitted to the measles ward had a history of a fever and widespread skin rash associated with a cough or conjunctivitis (red eyes and watery eyes) or nasal discharge (runny nose) virus. Only 30% (328 of 467) of children aged 1–5 years have received the full course of vaccination. Children of the poor and illiterate mothers have also not received full immunization. On the other hand, in low vaccination coverage (below 50%), incidence of measles viruses in the population is high, with intense virus transmission. Measles is endemic, with

***Corresponding Author:**
Dharma D. Subedi,
E-mail: dharmasubedi92@gmail.com

closely-spaced spikes (every 1–2 years). Hence, as compared to the past year with 2014 (n = 467), the prevalence of the measles cases were very high (n = 1400) in 2013. Spread of measles virus is highest in the month of March–May 80% (375 of 467). The highest numbers of the measles cases 74% (347 of 467) were reported in Timergara and Balambat (Lower Dir) which belongs to the sub-tropical zone. Hence, in temperate areas, cases typically occur at the end of winter and the beginning of spring. Classically, the disease spreads from high population density to low population density areas. In the meantime, we have in Timergara and Balambat (Lower Dir) has a very high prevalence of measles cases 74%. On the other hand, in rural settings in Bajawar and Upper Dir where the transmission of measles virus is lower 26% only, epidemic outbreaks are generally localized, more widely spaced, and smaller in scale than in urban settings as in Lower Dir, Timergara, and Balambat.

DISCUSSION

Measles is an extremely contagious acute viral infection, characterized by a fever and skin rash with signs of respiratory infection.[1,2] It mainly affects those children who are not vaccinated with measles vaccine, malnourished, and living in poor socioeconomic status. There is no specific treatment for measles. Measles is a highly contagious and deadly disease, but can be easily prevented with a vaccine. Measles immunization is one of the most cost-effective medical interventions in public health. However, it is estimated that approximately millions of children are dying every year from measles[3,4] that are preventable by measles vaccine recommended for children by the World Health Organization.

The introduction of an effective inexpensive vaccine in the 1960s helped reduce the scope of the disease on a global level.[4] However, measles is still a major public health problem in countries where low vaccination coverage (in Africa and Asia, mainly) has allowed the disease to persist and give rise to large-scale outbreaks [Figure 1].

In 2010, 181 countries together reported more than 254,000 cases of measles.

The highest numbers of the measles cases 74% (347 of 467) were reported in Timergara and Balambat (Lower Dir) which belongs to the sub-tropical zone. Hence, in temperate areas, cases typically occur at the end of winter and the beginning of spring. Classically, the disease spreads from high population density to low population density areas. In the meantime, we have in Timergara and Balambat (Lower Dir) has a very high prevalence of measles cases 74%. On the other hand, in rural settings in Bajawar and Upper Dir where the transmission of measles virus is lower only 26%, epidemic outbreaks are generally localized, more widely spaced, and smaller in scale than in urban settings as in Lower Dir, Timergara, and Balambat. Measles cases being seen across the country are due to the number of people who are not being vaccinated or failure of efficacy of measles vaccine due to false technique or not maintained cold chain system.[5] Most of the children in the lower Dir, Upper Dir, and Bajawar were not vaccinated (70%)

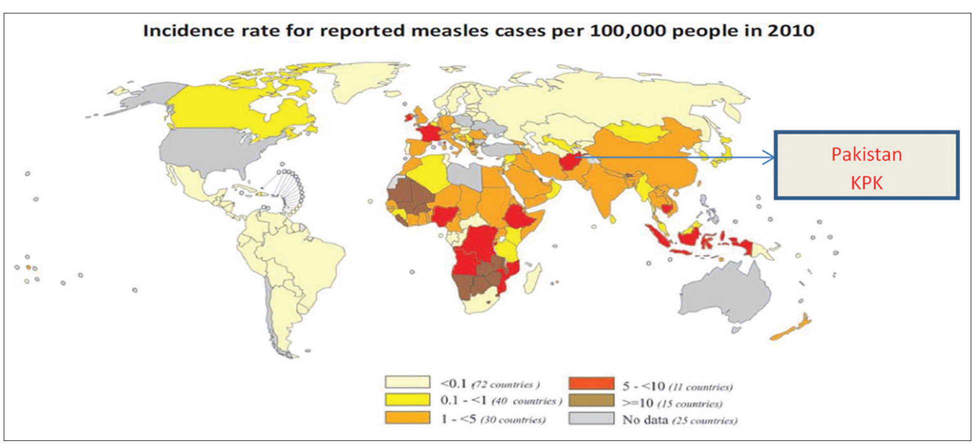

Figure 1: Spread of measles virus is highest in the month of March–May 80% (375 of 467)

and only 30% were vaccinated against the measles virus.

In low vaccination coverage (below 50%), incidence of measles viruses in the population is high, with intense virus transmission. Measles is endemic, with closely-spaced spikes (every 1–2 years). Hence, as compared to the past year in 2013 (n = 1400), the prevalence of the measles cases were very high whereas prevalence of measles in 2014 was (n = 467).

When vaccination coverage increases and stays at a high level, there is a decline in the incidence and more widely-spaced outbreaks. Only maintaining very high vaccination coverage[6] (over 95%) can prevent outbreaks. According to our data analysis, the most of the children who suffered from measles were unvaccinated or they did not have any record of vaccination in their childhood. It is estimated that in an unvaccinated population, nearly all children will develop measles before adolescence. While the age of occurrence is determined by the probability of contact with an individual that has measles, children under 5 years – and more specifically, under 3 years – are usually affected most. When vaccination is administered, a small percentage of those vaccinated fail to develop immunity (vaccine efficacy 80–95%). Those individuals will not be protected by the vaccine and will be at risk of developing the disease if infected.

Vaccination helps control measles and changes the epidemiology of the disease. The vaccine protects individuals from infection; it reduces the number of susceptible individuals. When more than 90% of the population are immunized, transmission is reduced and the risk of exposure to the virus is low for the whole population. This is known as community, or herd, immunity; non-immunized people are protected by the size of the immunized group around them. High vaccination coverage will help to reduce the measles incidence and mortality rate; reduce the group of susceptible individuals; increase the proportion of immunized people among the cases; alter the age distribution of cases; and increase the time between outbreaks.

A total of 467 cases of measles were identified over a period of 4 month; maximum incidence of measles was observed for children between 1 and 5 years of age. The most of the children presented in the measles ward with underweight and having 1st, 2nd, and 3rd degree of malnutrition. The maximum numbers (n = 452) 96% of children were having malnutrition of different degrees. The most of the children reported with corne[7,8] al opacities and the lesions responded well to oral Vitamin A therapy.[7,9,3,10,4] Malnutrition and infection are the two major public health problems in developing countries. In South East Asia, there is a very high incidence of protein energy malnutrition[11] that is seen in preschool children. The condition is particularly serious during the post-weaning period and is often associated with infection. Much has been written about the synergistic interaction and infection in turn adversely affects the nutritional status. Although this relationship is well documented with respect to bacterial infections, it is not clear whether nutrition can influence the incidence or course of viral diseases. Measles is one of the most common viral infections that occur during childhood. The interactions between measles and nutritional status acquire considerable importance in situations where as a result of inadequate food intake, chronic malnutrition is widespread among children.[12,13,2]

CONCLUSION

The majority of the measles cases 82% were admitted to the measles ward through the emergency ward. Most of them were belonging to the orange and red triage groups. In the meantime, we can easily find that the most of the measles children who were admitted in the measles ward were serious, so they first presented to the emergency ward. Utmost of the children were not vaccinated 70% and only 30% were vaccinated against the measles virus. The prevalence of measles in male and female children was nearly equal. Finally, we have observed that those children who were suffering from measles were mostly unvaccinated aged <3 years having acute malnutrition, Vitamin A deficiency, and parasitic infestation.

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