

# To Determine the Measles Vaccination Status and its Correlates in Children with Measles

Measles  
Vaccination Status  
and its Correlates  
in Children

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## ABSTRACT

**Objective:** To assess the measles vaccination status of children with measles and to ascertain the reason for any omission.

**Study Design:** Descriptive / case series study

**Place and Duration of Study:** This study was conducted at the Pediatric Unit, Rehman Medical Institute, Peshawar from January 2013 to December 2013.

**Materials and Methods:** Sixty children with measles according to CDC clinical criteria were included. Data regarding the demographics and immunization status was noted after consent. The children who were vaccinated against measles were enquired about the history of contact and the ones not vaccinated, about the reason for omission.

**Results:** Out of 60 patients 36 (60 %) were male and 24 (40%) were females. 52 (86.6%) were Pakistani while 8 (13.3%) were Afghani. 31 (51.6%) were between 3-12 months, those aging between 13-24 months were 8 (13.3%) while ages 3-7 years and above 7 years were 16 (26.6%) and 4 (6%) respectively. Only 12 (20%) were vaccinated according to the EPI schedule including measles vaccine, out of these 7 gave history of contact. Twelve (20%) were not vaccinated at all against any of the infectious diseases including measles because of lack of awareness or unavailability of vaccines while 36 (60%) were vaccinated according to EPI schedule but measles vaccination was not done either due to age less than 9 months or lack of awareness about measles vaccine.

**Conclusion:** Measles outbreaks will continue unless awareness and immunization rates are increased and maintained at universal levels.

**Key Words:** Measles, Immunization, EPI

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## INTRODUCTION

Measles is a highly contagious respiratory disease caused by a virus. It can result in serious health complications, such as pneumonia and encephalitis, and even cause death. Measles kills more than 100,000 children in the world each year despite the availability of an effective vaccine. In 1980, before widespread vaccination, measles caused an estimated 2.6 million deaths each year. Approximately 158,000 people died from measles in 2011, mostly children under the age of five years.<sup>1</sup>

No specific antiviral treatment exists for measles virus. It could easily be prevented by timely immunization. The measles vaccine has been in use for over 4 decades. It is safe and cost effective. Measles vaccination resulted in a 71% drop in measles deaths between 2000

and 2011 worldwide.<sup>1</sup> The Millennium Development Goal, 4 aims to reduce, the less than 5 years child mortality rate by two-thirds between 1990 and 2015 and routine measles vaccination coverage is a key indicator of monitoring progress. All 194 WHO Member States have committed to reduce measles deaths by 95% by 2015. However, Pakistan witnessed measles outbreaks (particularly in the province of Sindh) from January 2012 to February 2013. 19,048 suspected measles cases were reported, 3982 were reported from KPK. 463 deaths of children were reported throughout the country, out of which 50 deaths occurred in KPK. There is general consensus that the most important cause of the Measles outbreak is the deterioration in, and failure of, routine EPI system in Pakistan, this failure is evident in the low immunization coverage achieved to date.<sup>2</sup>

The reasons for the current increase in the number of measles patients in KPK according to the report on measles outbreak in Pakistan by the Federal ombudsman Islamabad are (1) Post 18th Amendment situation at the provincial and federal level have a bearing on the EPI situation, (2) reported Measles 1 coverage is 79%. And Reported Measles 2 coverage is 59%, (3) poor socio economic condition, (4) congested

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population, (5) influx of IDPs /security situation /Influx from the FATA and Afghanistan, (6) earthquake and other disasters in the province and (7) polio vaccination priority ignoring measles vaccination.

The aim of this study was to assess the vaccination status of children admitted with measles to pediatric unit Rehman Medical Institute, Peshawar, and to ascertain the reason for omission of the vaccine. This may have implications for future strategies to prevent measles outbreaks, reduce morbidity and mortality as well as achieving the targets of millennium development goal 4.

## MATERIALS AND METHODS

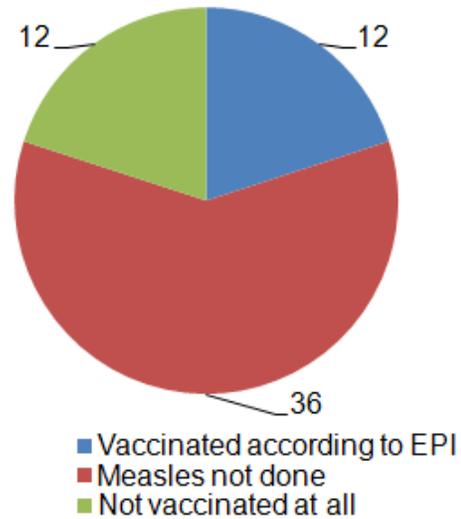
This study is a descriptive case series conducted at Pediatric unit from January till December 2013 at Rehman Medical Institute, Peshawar, which is one of the tertiary care centers in the province, receiving patients not only from all over Pakistan but also Afghanistan and Central Asia. All children with confirmed clinical diagnosis of measles were included in the study, minimum clinical criteria for measles being -generalized maculopapular rash of at least three days' duration, notable fever and cough, coryza, and conjunctivitis. A total of 60 Patients were included in the study age ranging from 3months to 18 years. Written consent was taken from the parents. Data regarding the age, sex, and origin of the children was noted along with the immunization status in general and measles vaccine in particular. The children who were vaccinated against measles were enquired about the history of contact and the ones not vaccinated, about the reason for not immunizing the child. Descriptive analysis of data was done by Microsoft Excel version 7 on personal computer.

## RESULTS

Out of 60 patients 36 (60%) were males and 24 (40%) were females. 52 (86.6%) were Pakistani while 8(13.3%) were from Afghanistan. The children were divided into four age groups for the sake of simplifying data (Table 1). Only 12 (20%) patients were vaccinated according to the EPI schedule including measles vaccine, out of these 7 (58.3%) gave history of contact with a measles patient while in 5(41.6%) history of contact could not be elicited. Thirty six (60%) patients were vaccinated according to EPI schedule but measles vaccination was not done because of the following reasons (1) <9 months of age=18 (2) lack of awareness about measles vaccine=10 (3) busy routine of the parents=6 (4) febrile illness=1 (5) unavailability of the vaccine=1. Twelve patients (20%) out of 60 were not vaccinated at all against any of the infectious diseases including measles, 5 had no access to immunization facility while 7 did not have any awareness about immunization (Fig. 1).

**Table No.1: Descriptive statistics of the patients**

Age	No.	%
3-12 months	31	51.6
13-24 months	8	13.3
3-7 years	16	26.6
>7 years	4	6.0



**Figure No. 1: Immunization status**

## DISCUSSION

Measles is a leading cause of childhood morbidity and mortality in developing countries. Furthermore, the residual effects of measles often precipitate other, often fatal illnesses among children. The incidence of illness and death in the months following a measles outbreak can be up to 10 times greater among children who contracted the disease than among those who did not. Measles is also one of the major contributors to childhood malnutrition. These problems continue to plague even developing countries with relatively high coverage.<sup>3,4</sup> Vaccination against measles is the recognized prevention measure. However the risk factors increasing the severity of the disease are (a) Malnutrition, (b) Overcrowding, and Adverse socioeconomic conditions. All these factors along with poor vaccination coverage are the main reasons for measles epidemics.<sup>5</sup> In a study in India in areas of high vaccine coverage, poor cold chain maintenance was found to be a reason for vaccine failure (6). According to Bhutta; "Poor coverage of vaccine is due to the lack of human and vaccination resources "to those who need it the most".<sup>7</sup> In endemic countries, Measles attains epidemic proportions every 2nd or 3rd year and its outbreaks. These outbreaks become deadly from public health point of view when they are occurring during natural disasters or conflicts.<sup>2</sup> Case Fatality Rate (CFR) is estimated to be 3-5% in developing countries but may reach up to 30% in complex emergencies.

Therefore effective routine measles vaccination for children, combined with mass immunization campaigns and personnel trainings are recommended in countries with high measles cases and death rates.

In this study it was observed that majority of the cases belonged to the group A i.e. aged between 3-12 months (51.6%) and group C aged between 3-7 years (26.6) which is comparable with study carried out by Dales LG et al in California in 1990 (8). Studies done in Pakistan, showed the prevalence of measles in children less than 9 months of age to be 25.4%.<sup>9</sup> All these children were non-vaccinated. International organizations such as WHO and UNICEF<sup>1</sup> recommend vaccination of infants at 6-9 months because of the high susceptibility of young infants to measles and its complications. Thus, many children are immunized while maternal antibodies are still present at sufficient levels to prevent an adequate response to the vaccine, resulting in high percentages of vaccine failure, with low levels of individual protection and herd immunity. It has been observed that children of mothers vaccinated against measles have lower concentrations of maternal antibodies and lose protection by maternal antibodies at an earlier age. Where early vaccination is indicated by the epidemiological situation (high morbidity and mortality in infancy), a second dose should be seen as essential to boost the immunity levels and catch those who did not get the primary vaccination.<sup>10</sup>

Twenty percent of the patients suffered from measles despite of being vaccinated against measles. In case of measles vaccine, it is universally recognized that 15% of vaccinated children after first dose do not develop required level of immunity for various reasons which could be genetic weaknesses of immunity system and levels of mal-nutrition etc. prevailing in a given society. It must be recognized that even with adequate resources and good public response to immunization campaigns, the control of measles epidemics is difficult. Measles is a highly contagious, rapidly spreading infection that has repeatedly demonstrated its ability to erupt even in the presence of high population immunity levels.<sup>11-13</sup> It has been suggested that a large inoculum might increase vaccine failure risk. Airborne transmission might occasionally entail a large measles inoculums.<sup>14</sup>

Around 60% of the patients in our study were vaccinated according to EPI, however measles vaccine was not done. Most of them were less than 9 months and were not due for their routine measles vaccine; Ten out of these thirty six patients, were left out merely due to lack of awareness of the parents about the measles vaccine and unfortunately few of them missed the vaccine because of the busy working schedule of the parents. Infants younger than the recommended age for vaccination are susceptible to the disease, and in developing countries they have a high risk of complications and mortality.<sup>14</sup>

Twenty percent of the patients were not vaccinated at all against any of the infectious diseases mostly due to lack of awareness and inaccessibility to the immunization facility. Nearly 30 % of the children who were not vaccinated against measles and other vaccines had an array of reasons. Literature says male and elder children have more chances to get vaccinated than female and younger children of the family.<sup>15</sup> Similarly it was observed that younger mothers tend to take their children's vaccination for granted than older mothers.<sup>16</sup> To improve this situation substantially, we need a measles vaccine that is effective in infants younger than 12 months, better accessibility of immunizations for low-income families, and more effective methods of motivating parents to have their young children immunized. Staff training, cold chain maintenance and active surveillance system shall be in place to detect the disease activity. We also need changes in policy and more research as to determine the immune status of our population. Measles outbreaks will continue to occur unless population immunization rates can be increased and maintained at essentially universal levels.<sup>17</sup>

## CONCLUSION

In developing countries an enormous toll of measles deaths and disability continues, despite considerable efforts and increasing immunization coverage. Empirical evidence from a number of countries suggests that a two-dose measles vaccination programme, by improving individual protection and herd immunity can make a major contribution to measles control and elimination of local circulation of the disease. Awareness of the masses about the measles and its prevention needs to be emphasized through advocacy by the Government and non-government institutions on large scale. Vaccine coverage in excess of 95% interrupts endemic transmission of measles in many countries, but achievement of such coverage almost always requires coordinated supplementary mass vaccination campaigns.

### Author's Contribution:

Concept & Design of Study:	Shahzada Bakhtyar Zahid
Drafting:	Anwar Zeb Jan
Data Analysis:	Humaira Achakzai, Maria Aleem
Revisiting Critically:	Shahzada Bakhtyar Zahid, Anwar Zeb Jan
Final Approval of version:	Shahzada Bakhtyar Zahid

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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