

# Reporting measles case fatality due to complications from a tertiary care hospital of Kolkata, West Bengal 2011-2013

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## ABSTRACT

**Introduction:** Measles is affecting millions of people in the developing countries particularly in India with significant morbidity and responsible for thousands of death in spite of having a safe, effective, and cheap vaccine. Pulmonary complications account for 90% measles-related death. The objectives of this study were to describe age distribution, clinical features, complications, and clinical outcomes of measles cases in a referral infectious disease hospital of West Bengal. **Methods:** We conducted a retrospective descriptive study including 584 patients and collected information from record section on demographics, clinical features, complications, and clinical outcomes using data abstraction form. **Results:** The mean age of 584 measles cases was 3.7 years ( $\pm 1.2$  years). The most common complication was pneumonia (149 cases) followed by diarrhea and encephalopathy. Very severe pneumonia occurred in 34 cases requiring intensive care out of which 13 patients died. The average duration of stay in the hospital was 5.7 days ( $\pm 3.2$  days). Surprisingly, 45 cases admitted to this hospital were <9 months of age with subsequent death in 5 cases. **Conclusion:** Substantial number of measles cases was seen in zero to <9 months of age group and fatality due to complication was more among them.

**Keywords:** Complications, immunity, measles

## Introduction

Measles is affecting millions of people in the developing countries with significant morbidity and sometimes responsible for death in spite of having a safe, effective, and low-cost vaccine. After the World Health Organization (WHO) declared India along with whole South-East Asia region as polio-free on March 27, 2014, much attention is now on measles as it is a highly contagious and one of the leading causes of death among young children. According to United Nations International Children's Emergency Fund in 2008, an estimated 164,000 died in India only which was responsible for three-fourth of overall global death. In 2012, there were 122,000 measles deaths globally – about 330 deaths

every day or 14 deaths every hour (WHO). Worldwide measles vaccination resulted in a 78% drop in measles deaths between 2000 and 2012 and in November 2010, the Government of India introduced a second dose of measles vaccination drive in 14 high-risk states, targeting 134 million children, to prevent estimated 60,000–100,000 child deaths annually. The overall median age of patients in India was 5 years, whereas in West Bengal, it was estimated to be 4 years.<sup>[1]</sup> Complications are more common in children under the age of five, or adults over the age of 20. The most common complications are measles-associated diarrhea, pneumonia, and other respiratory complications and otitis media. Pneumonia is the most common life-threatening complication. This occurs in <10% cases in developed countries and 20%–80% cases in developing countries.<sup>[2]</sup> Pulmonary complications account for >90% of measles-related death.

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Pneumonia develops in 3%–15% adults with measles but fatalities are rare. Other serious complications are blindness (due to Vitamin A deficiency), encephalopathy, subacute sclerosing panencephalitis, hepatitis, miscarriage, and preterm delivery in case of measles in pregnancy.

Hence, we are reporting measles cases and related fatality from a tertiary care hospital situated in Kolkata which is one of the oldest and biggest infectious disease hospital in Asia with the objective of describing measles patients’ characteristics, clinical profile, complication, and clinical outcome in a tertiary infectious disease hospital of Kolkata, West Bengal.

## Methods

### Study design

We conducted a descriptive retrospective study. We conducted this study in Infectious Diseases and Beliaghata General Hospital (ID and BG Hospital), Kolkata which is a referral center. The information was collected record section of the mentioned hospital from January 2011 to December 2013. All the admitted clinical measles patients during the study at ID and BG Hospital were included as the study population.

### Data analysis

We collected information on age, gender, presenting features, complications, and clinical outcome using data abstraction form. The proportion of measles cases were computed in different age groups. We also calculated age group specific case fatality rate. Further, we calculated the proportion of different complications among the measles cases. We obtained permission from the human ethics committee of ID and BG Hospital before abstracting the data.

## Results

A total of 584 patients were included in this study. It had been observed in almost all the seasons of the year though incidence is most during winter fall. The mean age group in this study was 3.7 years ( $\pm 1.2$  years). The most common age group involved was 1–5 years followed by 5–10 years’ age group [Table 1]. The most common complication was pneumonia (149 cases). Very severe pneumonia occurred in 34 cases requiring intensive care. The other important complications were diarrhea and encephalopathy [Figure 1]. Forty-two percent of measles cases were malnourished. The mortality rate in patients <6 months were 17% whereas mortality rate in patients of 6–9 months of age was 7% [Table 1]. The overall mortality was 3% in this study, and the most common cause of death was very severe pneumonia with respiratory failure (13) followed by encephalopathy (2 cases). The average duration of stay in the hospital was 5.7 days ( $\pm 3.2$  days). Among the 9–12 months of age group 6 patients developed vaccine acquired disease which was benign, and all of them recovered without any complications.

## Discussion

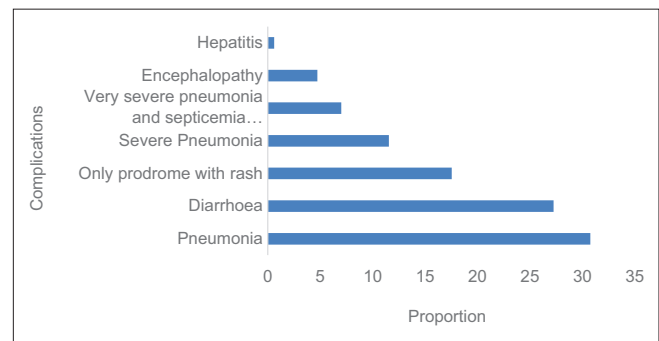
In our study, we found that though mean age of measles cases was >3 years, but a substantial number of cases were in <9 months of age. The average hospital stay varied between 2.5 and 9 days. Highest mortality was observed among the measles cases aged <6 months followed by 6–9 months of age. Another important observation in our study was that 42% of patients were malnourished. Pneumonia was the most common complication that occurred among the measles cases and very severe pneumonia with respiratory failure was reported to be the most common cause of mortality among the measles cases.

Measles is an important cause of morbidity and mortality among the children of India. In spite of this, it is not considered till now a serious problem by the health authorities. The most recent systemic review on measles case fatality ratio for India was published in 2009.<sup>[3]</sup> There are no data regarding incidence and mortality of measles after 2008 from India. Practically, no cases are reported with the provision of reporting of only epidemic, and only those children with significant complications are hospitalized.<sup>[4]</sup> Thus, hospital records do not reflect the magnitude of the problem.

In our study, the most interesting observation was that 45 cases, admitted to this hospital were <9 months of age with subsequent death in 5 cases which challenges the concept of even the health authorities. Studies done at Bihar also reported substantial number

**Table 1: Age-specific fatality rate among measles cases of Infectious Diseases and Beliaghata General Hospital, Kolkata, West Bengal, 2011-2013 (n=584)**

Age group	Number of measles cases	Percentage of cases	Number of deaths	Case fatality rate (%)
0-5 months	18	3	3	17
6-8 months	27	4	2	7
9 months to 1 year	42	7	2	5
2-5 years	210	36	7	3
6-10 years	148	25	1	0.7
>10 years	139	24	0	0



**Figure 1: Proportion of different complications among 484 measles patients, Infectious Diseases and Beliaghata General Hospital, Kolkata, West Bengal, 2011–2013**

of measles cases and deaths in <1 year age group.<sup>[5]</sup> According to universal immunization program implemented by government of India, first dose of measles vaccine is given at 9–12 months which means a good number of infants are vulnerable to develop measles before 9 months of age. Another consideration is that coverage of measles, mumps, and rubella (MMR) vaccine in young women in India is very low, thus infants of mothers who are even not immune by natural infection become vulnerable at very early age. There is also a misconception among the common people that breast milk contain protective antibody for measles but on the contrary, there is little or no antimeasles antibody passed through breast milk.<sup>[6]</sup> However, there is evidence that >3 months of breast feeding can modify the outcome of measles in comparison to those who are not breastfed.<sup>[7]</sup> In the absence of reliable estimates, it is presumed that almost everyone in India suffers from measles before the age of 10 years. Hospital-based studies have found that 20%–70% of children with measles develop minor and major complications.<sup>[8]</sup> In 2005, WHO considered that from 1999 to 2005, measles deaths had been reduced by 60% globally, though India accounted for a substantial part of the remaining burden.<sup>[9]</sup> In 2005, the vaccination rate was only 56% which was way below the 90% vaccination status set by WHO.<sup>[10,11]</sup> Vaccination rate may have increased in last decade, but it is still an undeniable fact that measles is still a significant public health problem in India. Another important observation in our study was that 42% of patients were malnourished thus it may be an important contributor to the increased complications, particularly in malnourished patients. Measles case fatality rate is a critical input in model used by WHO for estimation of measles-related death.<sup>[9]</sup> However, unavailability of complete and reliable data from countries like India who are still overburdened with infectious diseases has been a major challenge in measuring measles mortality reduction goal. Hence, our endeavor of analyzing available data of measles cases from a tertiary care hospital itself justifies its importance.

The major limitation of this study was that being a retrospective study, information on vaccination status, detail socio-demographic history, and contact history was not available.

## Conclusion

In our study, we observed that though the mean age of the measles cases were 3.7 years, a substantial number of cases were seen in <9 months of age and fatality due to complication was more among them. The most common complications were pneumonia, diarrhea, and encephalopathy. Case fatality was high among measles cases who developed very severe pneumonia.

## Recommendations

After the grand success of polio eradication in India, the time is ripe when focus should be on measles eradication as a cheap and highly effective \$1 vaccine can not only prevent measles, its complications, and subsequent death but also saves the country from a huge health expenditure.<sup>[12]</sup> Moreover, in

the current scenario, few measures must be taken to decrease the incidence of measles and successive complications and mortality. (1) Aggressive vaccination strategy (in the path of polio vaccination program) to increase the coverage of measles vaccination in India to >90%. (2) To vaccinate those children who missed their schedule dose in time. (3) Screening for vaccination in schools. (4) Implementation of MMR vaccine to all women particularly college students should be targeted. (5) Promotion of childhood vaccination along with breastfeeding through social media. (6) To conduct a community-based serological survey in different parts of the country to detect the time of decline of antibody level and to reschedule the vaccination if needed.

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## Conflicts of interest

There are no conflicts of interest.

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