Case Report

Diphtheria outbreak in a district in Meghalaya, India: an overview

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ABSTRACT

Diphtheria is an infectious disease which has continued to cause illness and death in children even after the advent of vaccine and diphtheria anti-toxin. Since, immunization is an important tool against this disease, countries with poor immunization coverage still continue to experience several outbreaks of diphtheria, both reported and unreported. India is one of the worst affected countries of diphtheria and here mortality remains to be high as well due to unavailability of diphtheria anti-toxin. The present article aims to highlight one such outbreak in the remote part of North-eastern region of the country wherein diphtheria anti-toxin is not available in the entire region making the chances of fatality higher. A total of 7 cases of diphtherias were found in the present outbreak. Case fatality rate was 28.6%. 6 out of the 7 cases were unvaccinated. Low immunization coverage along with poor living conditions as well as ignorance of community was found to be the major risk factors leading to this outbreak.

Keywords: Diphtheria, Infectious, Outbreak, Vaccine

INTRODUCTION

Diphtheria is a highly contagious and potentially life threatening bacterial disease caused by *Corynebacterium diphtheriae*.¹ The name of the disease is derived from the Greek word “diphthera” meaning leather hide. The disease was described in the 5th century BCE by Hippocrates.² Even though the epidemiology and treatment of Diphtheria has been known for a long time but it still continues not only to occur but also kill our children, adolescents and even adults now.

The EPI of WHO recommends three doses of DPT vaccine starting at six weeks of age with additional doses of diphtheria vaccine in countries where resources permit.³ Though increasing immunization coverage has shown a decreasing trend of the disease, this is mainly observed in the developed countries.⁴ Large outbreaks of Diphtheria still continue to be reported from India, Indonesia, Thailand.⁵ In 2013, 87% of the total cases reported worldwide were in South-East Asia region. In

2014, 7236 out of 7344 cases globally were from South-East Asia.⁶ India reported 4233, 2525, 3133, 6094, 2365 cases of diphtheria, respectively from 20011 to 2015. More than 80% of cases globally are reported from India.⁷ This re-emergence of diphtheria in the country seems mainly due to low coverage of primary immunization as well as booster doses. Recent reports show the changing epidemiology of diphtheria in India. Initially the disease was common among under-five children but is now affecting older children (5–19 years) and adults.⁸

CASE REPORT

The present article aims to highlight a localized outbreak of Diphtheria and its characteristics which occurred in three villages under the Bhoirymbong CHC, the rural field practice area of the Department of Community Medicine of a tertiary care Institute in Meghalaya in the month of May-June, 2016. The investigation team from the Department of Community Medicine in collaboration

with the district health officials conducted the investigation. Around 100 cases with symptoms of RTI were screened and village households were visited for contact tracing. The diagnosis of diphtheria infections was based on clinical manifestations with bacteriological

confirmation. Those cases that met the clinical description and were laboratory confirmed or linked epidemiologically to a laboratory confirmed case were defined as confirmed cases.

Table 1: Line list of diphtheria cases in the present outbreak.

Village	Age (in yrs)	Sex	Vaccination status	Status
Mawhati	6	Male	Unvaccinated	Lab Confirmed
Liarbang	11	Male	Unvaccinated	Lab Confirmed
Liarbang	2 ½	Male	Vaccinated	Epidemiologically linked
Umtngam	14	Male	Unvaccinated	Lab confirmed
Umtngam	12	Male	Unvaccinated	Epidemiologically linked
Umtngam	10	Male	Unvaccinated	Epidemiologically linked
Umtngam	16	Female	Unvaccinated	Epidemiologically linked

A total of 7 cases of Diphtheria were reported during this outbreak. The index case was a male child, aged 6 years presenting with complaints of sore throat, fever and cough. He was initially taken to the nearest CHC following which he was referred to the tertiary care and confirmed by laboratory investigations as Diphtheria positive. He recovered after receiving medications. He belonged to a village called Mawhati which was around 30 km from Bhoirymbong CHC. The second child a 11 year old male, belonged to a village called Liarbang situated at a distance of 12 km from Bhoirymbong CHC presented with similar complaints.

This child was also referred to tertiary care and recovered after treatment. The third child a 2 year 6 months old child from Liarbang village also belonged to the same family as the previous case presented with complaints typical of upper respiratory tract infection. He was admitted for 3 days during which he was started on medications. He recovered completely within a week and had no symptoms during our follow up visit. The subsequent cases which developed were all from a village called Umtngam 21 km from Bhoirymbong CHC and all belonged to the same family.

The fourth case was a 14-yr-old male who presented with neck swelling and difficulty in swallowing to the CHC from where he was referred to tertiary care. Thereafter he was bacteriologically confirmed as diphtheria. He was advised to undergo tracheostomy as he developed breathing difficulty but his parents refused the same and the following day, the child succumbed to respiratory distress. On visiting this household, the family members informed that his younger brother had similar illness around 2 weeks back.

As he had developed dysphagia, he was taken to the nearest CHC and started on medication. He had no respiratory distress and was discharged after 5 days of

treatment. 2 days after the death of the 14-yr-old child his 10-yr-old cousin who stayed in the same house developed similar complaints and was admitted to the nearest CHC. After 2 days, he succumbed to his illness. On visiting this household by our team, it was informed that the eldest child of this family, 16-year-old female had also developed neck swelling and pain with fever. She was immediately taken to doctor and was treated with antibiotics. She was cured in a few days.

DISCUSSION

In this outbreak, we observed that there was a shift in the mean age to school age, 10.23 years (Median age 11 years), from the classic pre-school age. Case fatality rate in the present outbreak is 28.6%. Most of the cases (85.7%) were unvaccinated. This was similar to a study done by Sharma et al in and around Delhi where unvaccinated children (70.2%) were the main sufferers.⁹ In a study done by Dandinarasaiah M et al, they found that only 11.54% cases were either partially or fully immunized and the case fatality rate was 36.53%. This was similar to our finding.¹⁰ Majority of cases (85.71%) were males. In an outbreak in Dibrugarh, Assam in 2008-09 more males (53.33%) were affected.¹¹ In a retrospective study done in and around Delhi, the sex ratio among male to female was higher too 1.6:1.⁹

No single focus of outbreak was identified, which implies there were multiple sources of infection. The average time interval between onset of symptoms and visit to the health facility was 2.86 days. C. diphtheria could be isolated from 42.86% of cases. 2 cases from the same family were unreported.

The analysis of risk factors leading to this outbreak revealed that most of the affected child were not vaccinated. The major obstacles leading to poor immunization status in this area are difficult terrain and

accessibility issues, illiteracy of the caretakers lead to poor understanding and awareness of the importance of immunization, irregular supply of vaccine in some remote areas, cold chain maintenance issues and lack of motivation and training of vaccinators and vaccine handlers.

Other contributing factors were low socio-economic status, overcrowding and poor ventilation in the houses which facilitated the spread of disease as well as ignorance among the care-takers about the disease including low health seeking behaviour in all the areas. The risk factors of the fatality in this outbreak were delay in seeking treatment, refusal of appropriate treatment (tracheostomy) in this situation.

Another important cause of fatality is that diphtheria anti-toxin is not available in the entire state of Meghalaya as well as North East region which is lifesaving especially in complicated cases. This non availability of Diphtheria anti toxin has to be urgently addressed as the North East region has reported several localized outbreaks of Diphtheria in the recent past which has a potential to develop into epidemic proportions considering the low immunization coverage in the entire area.

Measures taken by present investigation team for outbreak containment

Present team visited all the affected villages and met the headmen and ASHAs and with their help conducted IEC activities to educate the masses about the diseases and its prevention and control.

Emphasis was given on vaccination and parents were advised to take their children to complete the immunization schedule in case of drop out. We also counseled the villagers and tried to lessen the panic especially in the village of Umtngam which lost two young children to the disease. Around 100 cases with symptoms of RTI were screened and village households were visited for contact tracing. Monitoring and reporting of suspected cases was done.

All suspected cases were referred to tertiary care hospital. Cases were followed up and advised for completion of treatment succeeded by visit to hospital for microbiological confirmation of cure. Contacts were distributed erythromycin and asked to immediately visit hospital if any symptoms develop. ANMs were given refresher training on vaccination and cold chain maintenance.

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