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Distribution of Typhoid fever in different rural and urban areas of Lakhimpur District of Assam

COMMUNITY MEDICINE

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ABSTRACT:

Typhoid is one of the infectious bacterial diseases of human in Assam. Blood samples were collected from 5474 patients suspected with enteric fever from different rural as well as urban areas of Lakhimpur district of Assam during the period from January to December, 2012.Among the suspected patients 26.2% were found typhoid positive in Widal test. It was observed that among the typhoid positive patients, 2% had only H-flagellar antibodies, 40% had only O-somatic antibodies and 58% had both O-somatic and H-flagellar antibodies. The H2S test of water sample collected from typhoid reporting areas also showed presence of sulphur producing bacteria. All age groups and both the sexes are equally affected. Muslim communities and Tea garden communities were highly afflicted with this fever. The proportion of cases was higher in rural areas as compared to urban areas.

***Key words:* H-flagellar antibodies, O-Somatic antibodies, Typhoid**

Introduction

Typhoid, a common worldwide bacterial disease which is spread through contaminated food and water that causes septicemia, a causes liver inflammation. Typhoid fever is an infection that causes clinical symptoms of fever, abdominal pain, body rashes, terry stool, weakness, poor appetite, headaches, generalized aches and pains, and lethargy etc [1].It is caused by *Salmonellae typhi,* Enterobacteria under Enterobacteriaceae family Gram negative motile bacteria. Diagnosis of typhoid fever is made when the *Salmonella* bacteria is detected with blood culture or stool culture.

Besides this, several other tests were also performed for early diagnosis of Typhoid fever like immunochromatographic assay (detection of IgM of Salmonella typhi by ICT) and Widal test (demonstration of salmonella antibodies against antigens O-somatic and H-flagellar).

It was observed that approximately 3%-5% of patients become carriers of the bacteria after the acute illness [2]. In 2000, it was estimated that over 2.16 million episodes of typhoid occurred worldwide, resulting in 216 000 deaths, out of which more than 90% of this morbidity and mortality occurred in Asia [3].It is also found that almost one third of the global population is living in developing South Asia where disease occurrence is high especially in rural areas and people are unaware of water-borne diseases and cost of illness [4]. To maintain rural health, water-borne diseases can be reduced by introducing health interventions like proper water and sanitation facilities. Two safe and efficacious typhoid vaccines, the injectable Vi polysaccharide and the oral Ty21a, have been licensed; and new, improved candidate vaccines are currently being tested for example Vi-rEPA which is yet to get licensed [5, 6, 7].Ty21a used from 6 years to elderswhich boosters are requires annually again Vi capsular polysaccharide vaccine used from 2 years and older whose boosters are required in every three years of intervals [8, 9].

Typhoid fever is treated with antibiotics also. In the year 1960 oral treatment started to prevent death of typhoid positive patient's as it was found that almost

10-30% patients were died if they were not treated within two weeks to one month [10].

Cefixime is a suitable oral antibiotic for treatmentof Typhoid fever [11].Even though there are several vaccines and antibiotics against typhoid, it becomes a major threat among public. Our study was conducted to find out the prevalence of typhoid in Lakhimpur district of Assam and to find out their associating risk factors. The study gives state of knowledge regarding socio-demographic and economic status among the study subject as well as to find out the hot spots of typhoid cases in this part of Assam which helps in better understanding regarding authentic cause of fever and helps in intriguing appropriate control strategies.

Materials and Methods

There is a strong evidence of presence of water borne disease causing bacteria in Lakhimpur District of Assam. Blood samples were collected from the patients suspected with Enteric fever who came at North Lakhimpur Civil hospital for treatment. We also visited in different Typhoid reporting areas in Lakhimpur District of Assam depending upon previous data, during the period from January to December-2012 and collected blood samples from the suspected patients. The study includes all age groups and both the sexes. Informed consent was taken from the patients before taking blood sample.Ethical clearance was obtained from Institutional ethical body from the office of Joint director of health services and North Lakhimpur civil hospital. Serum was separated and screened for the presence of Salmonella through Widal test. Although there are number of tests available now days notably molecular to immunological and biochemical to microbiological. In our study we used widal test for the diagnosis of typhoid fever as it was found that even today, it remains one of the best, easily accessible, cheap and simple methods in comparison to other molecular and biochemical test for the diagnosis of typhoid fever [12].

Water samples were also collected from typhoid reporting area for H_2S test, to check the presence or absence of Sulphur producing bacteria (eg- Enterobacteria)

Results

A total of 1219patients suspected with Enteric fever were treated at North Lakhimpur civil hospital during the period from January to December-2012. Blood samples were collected from all the patients out of whom 33.96% were found typhoid positive in widal test. Data regarding typhoid positive cases from different block primary health centers were also collected in this year. 23.97% of suspected enteric fever patients were found typhoid positive in different health centers of Lakhimpur district. Among the typhoid positive cases, 2% had only H-flagellar antibodies, 40% had only O-somatic antibodies and 58% had both O-somatic and H-flagellar antibodies were detected. The H_2S test of water sample collected from typhoid reporting areas also showed presence of sulphur producing enterobacteria.

The analysis of monthly incidence of Typhoid fever in Lakhimpur district during the year 2012 indicated a predominance of Typhoid fever over the year. Typhoid fever in Lakhimpur district has been increasing during the middle part of the calendar year-2012 (Figure: 1). There is an increase in the incidence during the month of July-September that is probably caused by an increase in mode of transmission. Incidences are high in all age and sex group suggesting lack of immunity (Table: 1). Overall, these finding may suggest a change in the epidemiology of typhoid. It was found that change in the epidemiology is related to fecal contamination of water supplies, contaminated food/drink due to poor personal hygiene and food handlers including carriers.

The distribution of incidence of Typhoid fever indicated that the South-western part of Lakhimpur district (Dhalpur and Nowboicha) is more affected (Figure: 2). There may be due to close proximity of rivers in the nearby areas.

During the study it was observed that Muslim community and Tea garden community (Figure: 3) were more prone to typhoid fever as compared to other. Most of them were in below poverty line. People residing in rural areas were highly afflicted with typhoid as compared to urban people. This is due to use of unsafe drinking water, improper sanitation and inadequate medical care, using raw fruits and vegetables by those people,unhygienic conditions in their surrounding environment.

A simple linear regression was performed to determine if there was a significant relationship between increasing age trend and number of Typhoid cases. The regression line describes the value of slope (b) = (-) 0.06571 with Y intercept (a) of 48.800 and a standard error of 22.040. The correlation

coefficient (r) shows a negative correlation with a value of (-) 0.05796 and r^2=0.003359.

The t-statistic for the slope was not significant at the 0.05% level, with a two tailed p value of 0.9132. Thus, we conclude that there was a negative co-relationship between increasing age trend and number of Typhoid cases. Furthermore, only 0.3% of the variability in Typhoid cases could be explained by increasing age trend which is an indication of unsatisfactory model as the independent variable does not become successful explaining dependent variable.

Figure: 1. Month wise distribution of Typhoid cases in Lakhimpur district

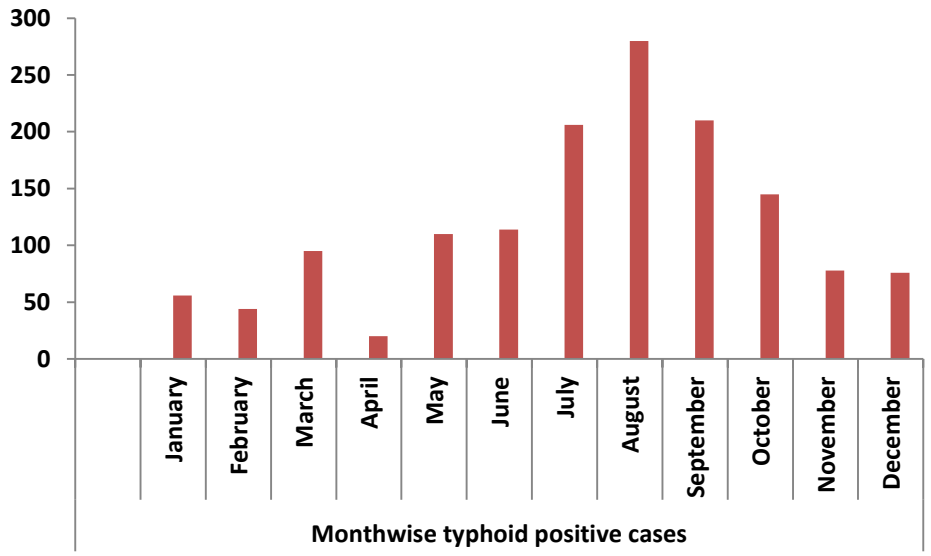


Table: 1. Age& sex wise distribution of Typhoid cases during the period from January to December-2012

Age group	Number of Typhoid positive cases
0-10 years	95
11-20 years	370
21-30 years	339
31-40 years	209
41-50 years	266
≥51 years	155
Sex	
Male	684
Female	750
Total	1434

Figure: 2. Block wise IR of Typhoid cases in Lakhimpur district

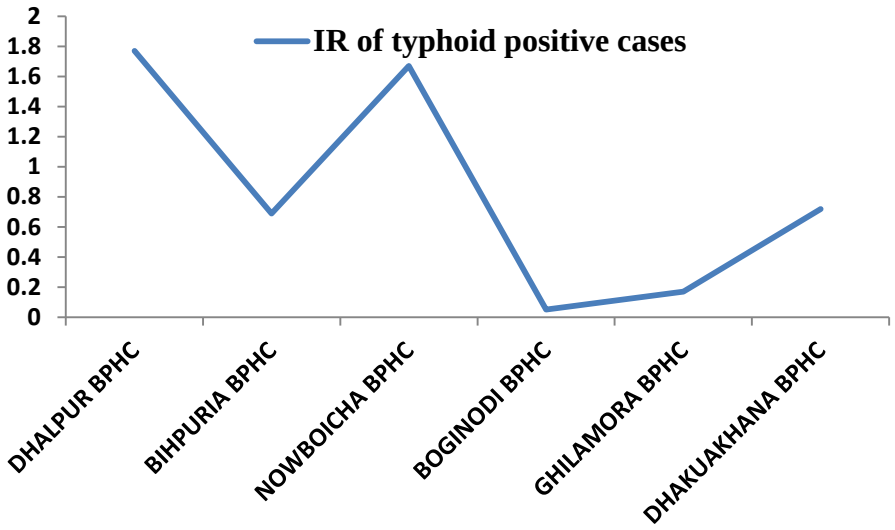
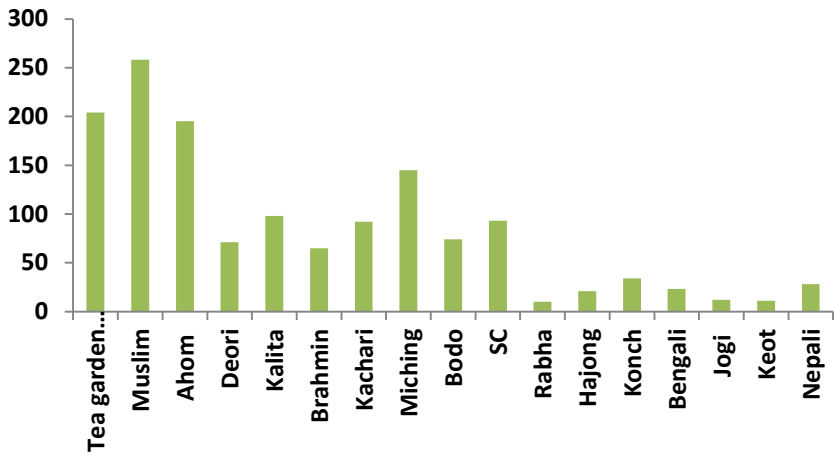


Figure: 3. Community wise distribution of Typhoid cases in Lakhimpur district of Assam



Discussion

There is an increase in the incidence of Typhoid during the month of July-September which supports few previous studies [16] but in contrast to some of the earlier finding, which showed that April was found to be the optimum time for the immunoprophylaxis of typhoid fever in the presence of epidemiological indications [13].

In high and medium incidence areas for typhoid, maximum proportion of cases occurs in 11-30 year age group which revealed in accordance with previous finding [20] but in contrast to many other studies, it revealed that the age-specific incidence rate was highest among the children [16, 21] suggesting to facilitate that there is an indication of age shifting may take place among the typhoid patients. The maximum attack rate was noted in 11-20 year age group

signifying lack of immunity among that people and also improper sanitation.

Our study reports high rates of typhoid fever in rural areas. Incidence rates in rural squatter settlements may be even higher due to increased population density and poor sanitation. There is also many evidences of typhoid fever being prevalent in rural areas of highly endemic countries [17-19].

This finding is consistent with other investigated reports of typhoid in India where contaminated drinking water was found as risk factors [14, 15]. Environmental condition around open well supported the possibilities of its contamination. Fecal contamination seen in water samples provided additional evidence for the source of infection.

Our study did not detect any typhoid-related deaths, probably because of the early diagnosis and the prompt referral for appropriate antibiotic treatment of our patients. Though this level of medical care for typhoid is not routinely available in the developing world, the absence of typhoid mortality suggests that, in addition to disease prevention, early diagnosis and appropriate treatment can prevent typhoid mortality and possibly reduce the severity of the disease, even in areas with limited resources

Conclusion:

As the rate of prevalence of Typhoid cases elevated in this part of Assam, it needs to aware people about their risk factors as well as to support continuous water check-up facility by public health Engineering department and also to maintain proper hygiene by the general public themselves. The findings that we have reported in this study can assist in making decisions on which geographical areas to target and age groups to vaccinate in this part of Assam against typhoid fever. Although improvements in sanitation and water systems are the ultimate solutions to the control of the disease, vaccination should be considered in the near-to-intermediate term.

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