

Evaluation of Epidemiological Parameters of Typhoid Fever Among Known Population: A Clinical Study

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ABSTRACT

Introduction: Salmonella enterica subspecies enterica serovar Typhi (Salmonella Typhi) is the cause of typhoid fever. Hence; the present study was undertaken for assessing the epidemiological parameters of typhoid fever among known population.

Materials & Methods: A total of 50 subjects within the age group of 18 years to 65 years, who were diagnosed with typhoid fever were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. Modified Kuppuswamy scale was used for assessing the socio-economic status of the patients. Details regarding various epidemiological factors and medical details were obtained through the questionnaire. All the results were compiled in Microsoft excel sheet and were analyzed by SPSS software.

Results: 58 percent of the patients were males while the remaining were females. 36 percent of the patients belonged to the age group of less than 3 years. Fever was found to be present in 100 percent of the patients. Vomiting was found to be present in 86 percent of the patients. Hepatomegaly and splenomegaly were found to be present in 74 percent and 66

percent of the patients respectively. 48 percent of the patients belonged to the lower class, while 26 percent of the patients each belonged to upper and middle class respectively.

Conclusion: Typhoid fever is a major health problem in India with lower class children being the most commonly affected.


Key Words: Epidemiology, Fever, Typhoid.

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INTRODUCTION

Salmonella enterica subspecies enterica serovar Typhi (Salmonella Typhi) is the cause of typhoid fever. Together, Salmonella Typhi and Salmonella serovar Paratyphi A are the major agents of enteric fever. Like other typhoidal Salmonella serovars, Salmonella Typhi is a human host-restricted organism. The role of water as a vehicle for typhoid fever has been appreciated since the late 1800s and the role of food not long after.¹⁻³

Typhoid fever is more common in children and young adults and is associated with low-income areas in which poor sanitation is prevalent. In 2000, typhoid fever was estimated to cause 21.7 million illnesses and 216,000 deaths globally, and the International Vaccine Institute estimated that there were 11.9 million cases of typhoid fever and 129,000 deaths in low to middle-income countries in 2010.⁴⁻⁶ Despite the high burden of disease, challenges in the diagnosis and management of enteric remain. Clinical diagnosis of enteric fever is nonspecific and mimics other febrile illnesses like malaria and dengue fever and influenza.⁶

Hence; present study was done for assessing the epidemiological parameters of typhoid fever among known population.

MATERIALS & METHODS

The present study was conducted in the Department of Community Medicine, Viswabharathi Medical College, Kurnool, Andhra Pradesh (India) and it included evaluation of epidemiological parameters of typhoid fever among known population. A total of 50 subjects within the age group of 18 years to 65 years, who were diagnosed with typhoid fever were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. Modified Kuppuswamy scale was used for assessing the socio-economic status of the patients.⁷

Exclusion Criteria

- Patients with history of any systemic illness,
- Patients with any known drug allergy,
- Patients of more than 65 years of age,
- Patients who didn't gave informed consent

Details regarding various epidemiological factors and medical details were obtained through the questionnaire.

All the results were compiled in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

In the present study, a total of 50 patients with typhoid fever were analyzed. 58 percent of the patients were males while the remaining were females. 36 percent of the patients belonged to the age group of less than 3 years. 44 percent of the patients

belonged to the age group of 3 to 6 years and 14 percent of the patients belonged to the age group of 7 to 10 years. Fever was found to be present in 100 percent of the patients. Vomiting was found to be present in 86 percent of the patients. Diarrhea and coated tongue were found to be present in 48 percent and 22 percent of the patients. Hepatomegaly and splenomegaly were found to be present in 74 percent and 66 percent of the patients respectively.

In the present study, 48 percent of the patients belonged to the lower class, while 26 percent of the patients each belonged to upper and middle class respectively. In 58 percent of the patients, the mean duration of hospitalization was 5 to 10 days.

Table 1: Age and gender-wise distribution

Parameter		Number of patients	Percentage of patients
Gender	Males	29	58
	Females	21	42
Age group (years)	Less than 3	18	36
	3 to 6	22	44
	7 to 10	7	14
	more than 10	3	6

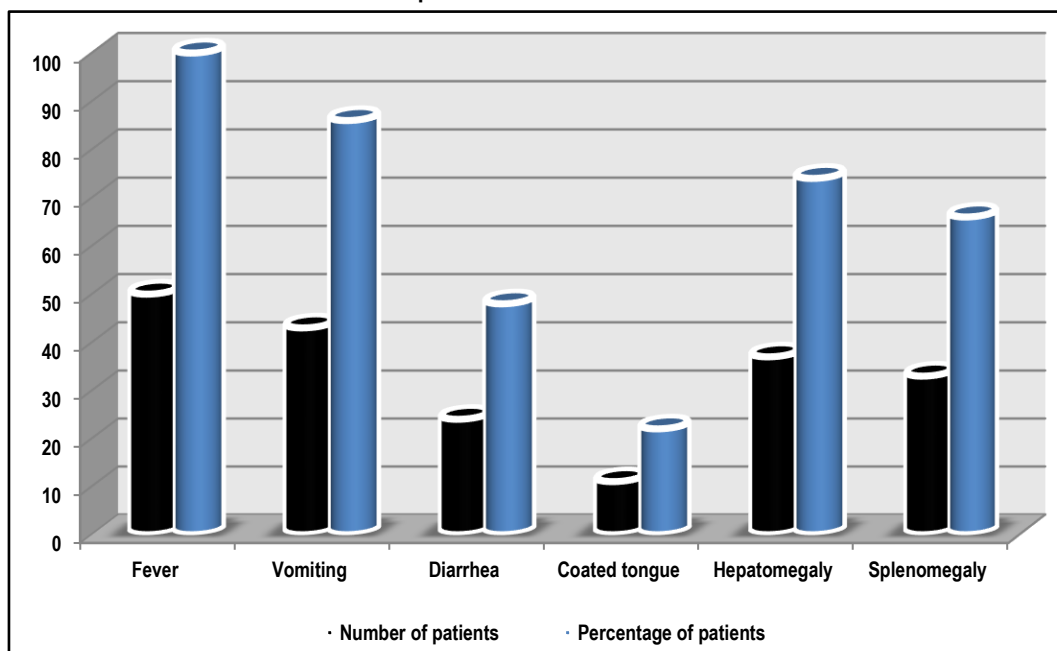
Table 2: Distribution of patients according to socioeconomic status

Socioeconomic status	Number of patients	Percentage of patients
Upper	13	26
Middle	13	26
Lower	24	48

Table 3: Distribution of patients according to duration of hospitalization

Duration of hospitalization	Number of patients	Percentage of patients
Less than 5 days	11	22
5 to 10 days	29	58
More than 10 days	10	20

Graph 1: Clinical manifestation



DISCUSSION

Typhoid fever is a systemic infection caused by *Salmonella enterica* serovar Typhi (S Typhi). S typhi, a highly adapted human-specific pathogen that evolved around 5000 years ago, has remarkable mechanisms for persistence in its host. Though provision of clean water and good sewage system has led to great decline in the incidence of typhoid fever in Europe and the USA since the early 20th century; the disease has remained a serious public health problem in developing countries.^{8,9}

In the present study, a total of 50 patients with typhoid fever were analyzed. 58 percent of the patients were males while the remaining were females. 36 percent of the patients belonged to the age group of less than 3 years. 44 percent of the patients belonged to the age group of 3 to 6 years and 14 percent of the patients belonged to the age group of 7 to 10 years. Fever was found to be present in 100 percent of the patients. Wang M et al assessed the typhoid epidemics and determined and monitored regional resistance characteristics of the shift of drug resistant profile on *Salmonella* (S.) Typhi. The susceptibility of 475 S. Typhi isolates from patients on ten antibiotics was tested by broth micro-dilution method and minimum inhibition concentration was obtained and interpreted based on the CLSI standard. There was no significant difference on incidence between male and female, but farmers and students were among the hardest hit groups. More cases were seen from the northern part of the province. Cases appeared all year round with the peak from May to October. A total of 13 major outbreaks during 2001 to 2013 were reported and the main transmission route was water-borne. All the strains were sensitive to third generation cephalosporins cefotaxime and fluoroquinolones norfloxacin. The susceptibility rates to tetracycline, chloramphenicol, ampicillin and gentamicin was around 98% but relative lower susceptible rate to ciprofloxacin was seen as 89.89%. The lowest susceptibility was found for streptomycin and sulfamethoxazole agents, with the rates as 67.73% and 65.89%, respectively. One strain was found to have been resistant to ciprofloxacin and another 47 isolates with reduced susceptibility to ciprofloxacin. Twenty eight isolates were found to be resistant to multiple antibiotics and one displayed ampicillin, chloramphenicol, streptomycin, sulfamethoxazole tetracycline and nalidixic acid (ACSSxT-NAL) resistance profile. The incidence of typhoid fever in Guangxi was still high and some strains showed multi-drug resistance and reduced susceptibility to ciprofloxacin, indicating that the surveillance and monitor programs on drug resistance of S. Typhi should be strengthened, to prevent large scale outbreaks of typhoid fever.¹⁰

In the present study, vomiting was found to be present in 86 percent of the patients. Diarrhea and coated tongue were found to be present in 48 percent and 22 percent of the patients. Hepatomegaly and splenomegaly were found to be present in 74 percent and 66 percent of the patients respectively. 48 percent of the patients belonged to the lower class, while 26 percent of the patients each belonged to upper and middle class respectively. In 58 percent of the patients, the mean duration of hospitalization was 5 to 10 days. Makkar A et al conducted a study on 782 non-repeat blood-culture isolates of S. Typhi, S. Paratyphi A and S. Paratyphi B obtained from 29,184 blood cultures received at a 1000-bedded tertiary-care hospital of North-India from 2011-2017. Identification and antibiograms were obtained by Vitek-2 compact

and Kirby-Bauer's disc diffusion with resistance to ampicillin, chloramphenicol and cotrimoxazole being labeled as multidrug-resistant. Decreased ciprofloxacin-susceptibility and ciprofloxacin-resistance were defined as MIC 0.125-0.5 and >1 µg/ml. S. Typhi and S. Paratyphi A in a ratio of 3.9:1 were seen between July-September predominantly distributed between 6-45 year age group. Resistance to co-trimoxazole, chloramphenicol, ceftriaxone and azithromycin was 6.1%, 13.8%, 16.1 and 5.78% respectively. Multidrug-resistant S. typhi and S. paratyphi A were 2.73% and 1.91% respectively.¹¹

Most studies on enteric fever represent hospitalized subjects and the differences in the clinical features and severity of the disease may also differ substantially from those not requiring hospitalization. Hospitalization rates of up to 2-40% among culture-confirmed ambulatory enteric cases were found in five different study sites in Asia, but data from those not hospitalized could represent a different disease severity and pattern. Differences in health seeking behavior of hospitalized vs community based subjects as well as differences in access may also limit generalization of available literature on clinical patterns of enteric fever.¹²⁻¹⁴ Identifying and tracking the relative contributions of short-cycle and long-cycle patterns of transmission, and the relative contributions of water, food vehicles, and other sources to transmission will be central to control strategies in a given location. Presumably reflecting both the remaining uncertainties and the variations in typhoid epidemiology, experts differ in their opinions on the role of different exposure pathways for *Salmonella* Typhi infection by region.¹⁴

CONCLUSION

From the above results, it can be concluded that typhoid fever is a major health problem in India with lower class children being the most commonly affected. However; further studies are recommended for better exploration of results.

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