



## Original Research Article

# Clinico-Epidemiological Profile of Confirmed Cases of Enteric fever in Rural area of central India

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## ABSTRACT

Enteric Fever is a systemic disease caused by *Salmonella typhi* and *Salmonella paratyphi*, though occurs in all parts of the world, is endemic in many developing countries. It is a significant cause of morbidity in India. The disease can lead to complications like Intestinal perforation, haemorrhage, circulatory collapse requiring hospitalisation. Enteric Fever mainly is a disease of older children and young adults. So this study was undertaken to study the Clinico-epidemiological and Socio-demographic features among enteric fever cases. The study was conducted with objectives to study the Clinico-epidemiological and Socio-demographic features among enteric fever cases. A Cross-sectional, analytical study was carried out in the Department of Microbiology, People's College of Medical Sciences and Research Centre, Bhopal from Nov 2011 to June 2013. There were total 163 clinically suspected patients of enteric fever who were evaluated. A total of 104 patients were confirmed further using Reference Standard. Out of 104 confirmed enteric fever cases, majority (30.76%) were in the age group of >10-20 years. Males outnumbered the females giving M:F ratio of 1.2:1. A significant association was found between educational status, socioeconomic status with the development of enteric fever. All confirmed cases reported with fever. Around (53.84%) had complaint of Abdominal Pain and Diarrhea. Amongst clinical signs elicited, (81.73%) presented with Pallor. Conclusion: - Thus present study found majority of patients in the age group between 10-20 years (school children and adolescents). There was significant association of educational status, socioeconomic status with the development of enteric fever.

## Keywords

Enteric fever,  
Reference  
Standard,  
Literary  
status,  
Seasonal  
variation

## Introduction

Enteric Fever is a systemic disease caused by *Salmonella typhi* and *Salmonella paratyphi*, though occurs in all parts of the world, is endemic in many developing countries including India & other Southeast Asian countries, where it is estimated that 80% of the world's typhoid fever cases occur. According to an estimate of US Centers for Disease Control and Prevention, 21.6 million cases occur annually,

predominantly in school-age children and young adults.[1].

Enteric Fever is a serious public-health problem in developing countries with inadequate sanitation and hygiene, and in matters dealing with food, water and disposal of human excreta. The disease has been virtually eliminated in the developed countries mainly as a result of clean water

supply and improvement in sanitation. [2]

The earliest symptom of Enteric fever being very nonspecific and as its clinical picture is mixed with other febrile infections. Its diagnosis on clinical grounds is difficult. Definitive laboratory based diagnosis is thus required to differentiate between these infections.

An incidence of 500-980 per 100,000 population has been reported in different studies varying with age and geographical area. [2] Limited studies in the country reveal more than 3,00,000 cases and more than 650 deaths(approx) that occur each year. [3]The disease occurs at all ages but is probably more common in the age group of 5-20 years but population based studies from South Asia report the highest incidence in children aged less than 5 years, with higher rates of complications and hospitalization .1% of children between 0-17 yrs are infected per year. In 2005 alone, there were 6,53,580 cases and approx 417 deaths due to enteric fever[4]

Antimicrobial resistance is a major issue and one of the serious obstacle in the management of enteric fever.

So this study was undertaken to study the Clinico-epidemiological and Socio-demographic features in enteric fever cases.

### **Materials and Methods**

This Cross-sectional, analytical study was carried out in the Department of Microbiology, People's College of Medical Sciences and Research Centre, Bhopal from Nov 2011 to June 2013 after obtaining permission from the Institutional Ethical Committee. Patients of either sex and of any age showing signs and symptoms suggestive of enteric fever were included in the study.

A total of 163 clinically suspected patients of enteric fever were evaluated. After obtaining the informed written consent, the patients details were noted in a predesigned and pre-validated case record form, including educational, socioeconomic status, chief complaints, signs & symptoms with their duration, past history of similar illness and vaccination status.

### **Results and Discussion**

A total of 163 clinically suspected patients of enteric fever were evaluated over a period from Nov 2011 to June 2013. There is no failsafe method in the diagnosis of enteric fever with a sensitivity and specificity of 100%. To increase the specificity, the two test criteria has been adopted for the diagnosis of enteric fever infection. By this criteria , all the culture positive cases; & in the absence of culture positivity, patients with any two(2) tests positive out of four(4) serodiagnostic tests i.e a)Tube Widal b) IgM c)IgG d) Both IgM and IgG ) that have been carried out were considered as Confirmed cases and constitutes a Reference Standard. This reference standard has also been utilised by various other workers[5,6,7,8,9]

A total of 104 patients out of 163 clinically suspected cases of enteric fever were found to be positive either by culture or by any other two(2) serodiagnostic tests and hence formed the "Reference Standard positive" group, while the remaining 59 fell into the category of "Reference Standard negative" group

Age wise distribution showed that majority of the patients i.e. 32 ( 30.76%) patients were in the age group of >10-20 years followed by 25 (24.03%) patients in the age group of >20-30 patients were males and 47 (45.19%) were females. [Table 1] Male to female ratio was observed to be 1.2:1.

A total of 59 (56.73%) patients were from rural area whereas 45( 43.26%) were from urban area. Seasonal variation among enteric fever cases showed that maximum no. of patients were observed during summer and rainy seasons.[Table 1]

More number of cases were observed amongst Illiterate as compared to educated [Table 2] emphasizing the role of education in containment of disease.

Typhoid fever cases present with fever only at the initial stage. Diagnostic clinical sensitivity increases with the duration of fever. [Table 3]

All confirmed cases reported with fever. Around 3/4<sup>th</sup> of the cases 56(53.84%) had complaint of Abdominal Pain and Diarrhea. 53(50.96%) patients had Vomiting and 44(42.30%) patients had Headache. [Graph 1]

Amongst clinical signs elicited, majority 85(81.73%) patients had shown Pallor. Relative bradycardia 51(49.03%) & Coated tongue 47(45.19%) & Dehydration among 46(44.23%) were observed as other major signs [Graph 2]

Distribution of cases according to socioeconomic status showed that out of 104 cases, more than ¾ th of the patients 85(81.73%) were from category of Lower class (<5-10score), 17(16.34%) to middle class whereas only 2(1.92%) patients belonged to Upper class (26-29 score) according to Modified Kuppuswamy scale.[10]

Enteric fever continues to be major public health problem in India affecting all age groups and both sexes. Enteric fever is still a major cause of morbidity and mortality.

Out of 163 enteric fever cases, majority 32 (30.76%) were in the age group between 10-

20 years. Contributing factors include low socioeconomic status, unhygienic practices, overcrowding, lack of proper sanitation and carrier state. The case fatality rate of typhoid fever in the pre- antibiotic era was around 10%, which came down to <2% with the use of antibiotics.[11] These observations were consistent with various studies[12][3]

Typhoid fever affects all age groups mostly young children and adults. In the present study the average mean age was found to be 25years with the minimum affected age found was 3 years and maximum affected age was 65years. The highest incidence of cases of enteric fever diagnosed was in the age group of 5–19 years. After the age of 20 years, the incidence falls, probably due to acquisition of immunity from clinical/subclinical infection.[14]

Males 57/104 (54.80%) outnumbered females 47/104(45.19%) giving M:F ratio of 1.2:1. This finding was comparable with finding of Roxas and Mendoza[15] who reported 56% male and 44% females. Butler et al[16](1991) also showed that infection rate is slightly higher in male, perhaps reflecting greater exposure of male to contaminated food and water out side the home.

Among 104 patients, 51.92% were illiterate and 48.07% were literate. Enteric fever was more common among illiterate and low educational status people as is usually associated with ignorance, poverty and poor personal hygiene. This observation was consistent with study done by S.Bhatti et al [17]

In the present study the commonest presenting symptom in clinically suspected enteric fever patients observed was fever (100%). These findings are similar to the results of earlier studies.[18][19][20][21].

**Table.1** Age ,Sex Distribution and Seasonal Variation Observed among Confirmed Cases of Enteric Fever (n=104)

Age Group (Years)	Sex	Seasons				
		Summer	Rainy	Winter	Total	Total (%)
Below 10	Male	2	8	1	11	19 (18.26)
	Female	2	5	1	8	
>10 - 20	Male	5	7	2	14	32 (30.76)
	Female	7	9	2	18	
>20 - 30	Male	5	10	2	17	25 (24.03)
	Female	5	3	0	8	
>30 - 40	Male	3	5	1	9	17 (16.34)
	Female	5	2	1	8	
>40 - 50	Male	1	1	1	3	5 (4.80)
	Female	1	1	0	2	
>50 - 60	Male	1	0	1	2	4( 3.84)
	Female	0	1	1	2	
Above 60	Male	0	1	0	1	2(1.92)
	Female	0	0	1	1	
<b>Total</b>		<b>37(35.57%)</b>	<b>51(49.03%)</b>	<b>14(13.46%)</b>	<b>104</b>	<b>104</b>

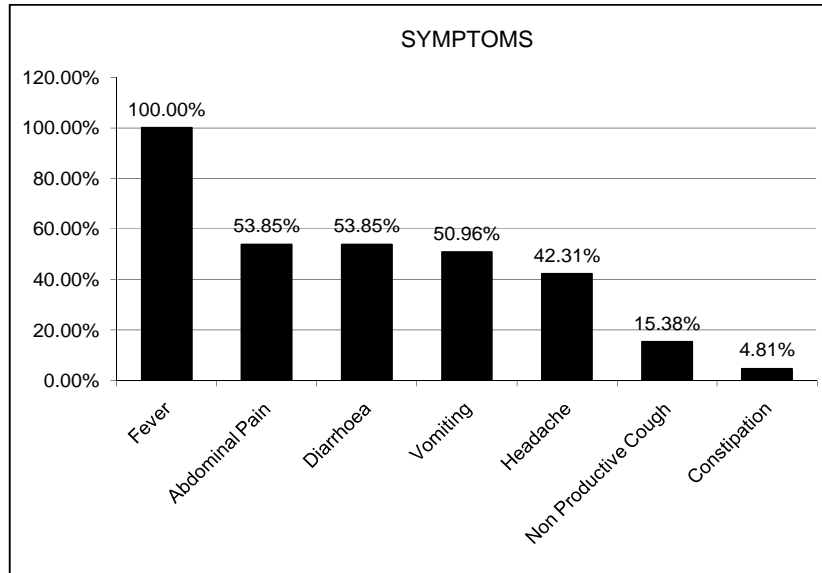
**Table.2** Distribution of Cases According to Educational Status

Educational Status	No. of patients(%)
Illiterate	54 (51.92)
Primary	15 (14.42 )
Middle School	12(11.53)
HSC	9(8.65 )
Higher secondary school	7 (6.73)
Graduate and higher	7 (6.73)
Total	104 (100.00)

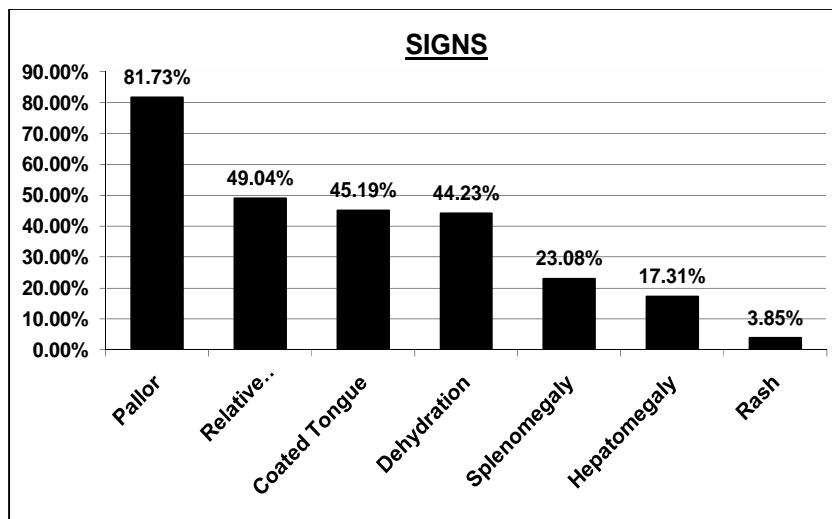
**Table.3** Distribution of Cases According to Duration of Fever

Duration of Fever	No. of patients (%)
<5 days	13(12.5 )
5-10 days	38 ( 36.53)
>10 days	53(50.92)
Total	104 ( 100.00 )

**Graph.1** Symptoms Narrated by Clinically Suspected Patients of Enteric Fever (n=104)



**Graph.2** Signs Elicited among Clinically Suspected Patients of Enteric Fever (n=104)



Gastrointestinal symptoms like vomiting (50.96%), diarrhea (53.84%) and pain in abdomen (53.84%) were common , but constipation was rare. Other symptoms like Non- productive cough was not a common finding in clinically suspected enteric fever patients. Bhutta Z et al[20] (2006) reported vomiting in 39%, diarrhea in 35%, abdominal pain in 28%, constipation in 11% patients. These findings were also consistent with Sudhindra B[21].

The present study found pallor (81.73%) and relative bradycardia (49.03%) to be the most common signs among enteric fever case followed by coated tongue (45.19%), dehydration(44.23%), splenomegaly (23.07%), hepatomegaly (17.30%). These results were consistent with other studies [18][22][23].

Enteric fever is known to occur throughout the year with some seasonal variation. In the

present study, it was observed that there was a peak of cases during the months of June, July, August and September followed by an increase in the number of cases during February, March. In a study by Karkey et al [24] it was observed that the peak season of enteric fever occurs in July, which corresponds with a peak in both *S. Typhi* and *S. Paratyphi A* cases. Siddiqui et al [25] noted that there was a peak incidence in May-June in Pakistan, which corresponds to the dry summer season. Mohanty et al [14] found in a study in Delhi that for typhoid fever, the peak incidence was between April-June, followed by the monsoon season from July to September.

The present study found a significant association between socioeconomic status and enteric fever ( $p < 0.001$ ). Several studies [17][26][27] also support the finding that enteric fever was more common in lower socioeconomic groups. The low socioeconomic status usually goes parallel with poor standard of living and poor personal hygiene making persons more prone for enteric fever.

In conclusion, this present study found majority of patients in the age group between 10-20 years (school children and adolescents). There was significant association of educational status, socioeconomic status with the development of enteric fever.

### **Recommendation**

- 1) High risk group such as lower age group like school going children and adolescents should be identified and given health education towards prevention of enteric fever.
- 2) Effort should be more towards improving the educational status of people, parents especially of mothers in

case of children through health education measures.

- 3) Preventive strategies such as immunization and improvements in water and sanitation conditions should be the focus of typhoid control.

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