Burden of Enteric fever at tertiary level hospital of western Rajasthan: A descriptive analysis

Dr. Rajeev Yadav[1], Dr. Anukool Gaur[2§], Dr Divyansh Gupta[3] and Dr. Anuradha Yadav[4]

[1]Associate Professor, Department of Community Medicine, SMS Medical College, Jaipur (Rajasthan) India
[2]MBBS Students, Guizhou Medical University China
[3]MBBS Students, SMS Medical College, Jaipur (Rajasthan) India
[4]Senior Professor, Department of Physiology, SMS Medical College, Jaipur (Rajasthan) India
[§]Corresponding author's Email: drksusumgaur@gmail.com

Abstract*—Enteric fever is a public health problem in developing world like India. So this descriptive study was conducted on confirmed enteric fever cases attended at Medicine department of SMS Medical College, Jaipur (Rajasthan) India. Majority of patients were above 60 years of age followed by 15 to 30 years, 45 to 60 years and 30 to 45 years of age. Male female ratio was observed 1.32. Sex wise proportion of enteric fever cases had significant variation with age. In younger and older age group males were higher than females whereas in middle age group females were more than males. It present throughout the year but majority (*73.64%*) were found in November to April. Salmonela Typhi was resistance to Ampicillin and Co-trimaxazole and sensitive to Cefixime*.

Keywords: Enteric Fever, Salmonella Typhi, Seasonal Trend, Epidemiological factors.

I. INTRODUCTION

Enteric fever, also known as typhoid, is a common worldwide bacterial disease caused by the ingestion of contaminated food or water which contain the bacterium Salmonella Typhi.

Typhoid fever remains an important public health problem in developing countries with majority of population living under conditions of limited resources and constrained sanitation infrastructure. A recent study on longitudinal analysis of typhoid fever in Asian countries has estimated that there are 12–20 million cases and 13000–220,000 deaths each year in Asia.[1]

India has an annual incidence of 493.5/100,000 persons per years with 340.1/100,000 cases per years occurring in children of 2–5 years.[2] In a recent systematic review, the pooled estimates of annual incidences of enteric fever in India were 377 (178–801) cases in 100,000 person per year.[3]

Symptoms usually develop one to two weeks after exposure and it may be mild to severe. Symptoms include high fever, malaise, headache, constipation or diarrhoea, rose-colored spots on the chest, and enlarged spleen and liver may be there. Healthy carrier state may follow acute illness. Typhoid fever can be treated with antibiotics.

In view of such a problem of emerging antimicrobial resistance, prevention of disease becomes a priority in public health. Some of the major issues responsible for incomplete information on the actual burden of typhoid fever in India are the uneven disease distribution of this infection in different geographical areas. So this study was conducted to assess the burden of enteric fever in a tertiary care hospital of western Rajasthan.

II. METHODOLOGY

This present descriptive observational study was conducted at Medicine department of SMS Medical college, Jaipur (Rajasthan) in year 2019.

After taking approval of Institutional Ethical committee this study was conducted from records of patients of confirmed (Widal test positive and stool culture positive for Salmonela Typhi) enteric fever attended at medicine department of SMS Medical College Jaipur (Rajasthan in year 2018. All the information available in records were noted down. Incomplete records were excluded from the study.

Data thus obtained were compiled and anlysed with the help of Microsoft Excel 2010. Data were expressed in Percentage and Chi square test was used to analysed the significance of difference in proportion. The P value <0.05 is considered as statistically significant.

III. RESULTS

The present study observed that majority (38.08%) of cases were above sixty years of age followed by cases in 15 to 30 years of age, 45 to 60 years of age and 30 to 45 years of age group. Overall there was male predominance with M:F ratio 1.32.

When sex wise distribution was anlysed as per age it was found with significant variation (p<0.001). In age group 15 to 30 years and above 60 years of age proportion of male were higher than females whereas in age group 30 to 45 years and 45 to 60 years females were more than males. (Table 1)

Table 1
Age and sex wise distribution of Enteric Fever cases

S. No.	Age Groups	Males	Females	Total	
				Number	Percentage
1	15 to 30 Years	67	15	82	34.31
2	30 to 45 Years	12	14	26	10.88
3	45 to 60 Years	14	26	40	16.74
4	>60 Years	43	48	91	**38.08**
	Total	136	103	239	100

Chi-square = 33.078 with 3 degrees of freedom; P <0.001 LS= Significant

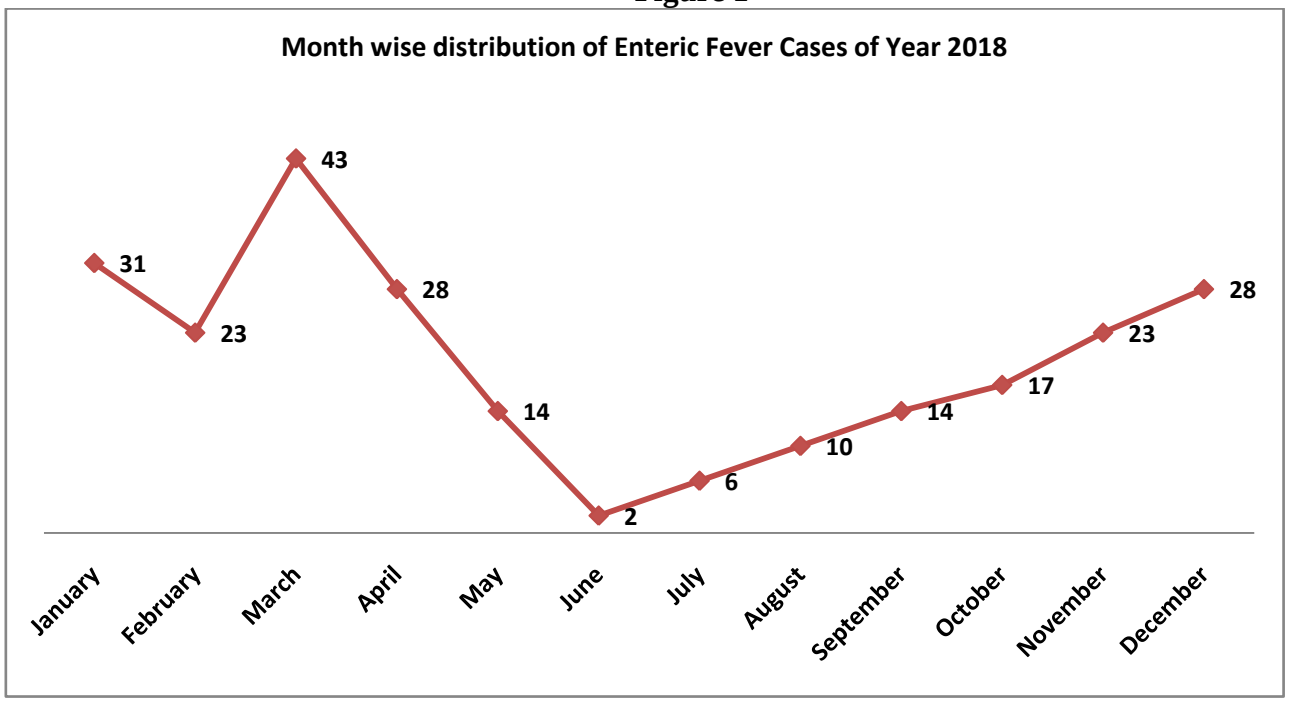
When month wise distribution of these cases was analysed. It was observed that majority of cases (73.64%) were found in November to April i.e. in January to April and November and December. In other month it is present at low level. (Table 2)

Table 2
Month wise distribution of Malaria Cases of Year 2018

S. No.	Month	Number of Malaria Cases	Percentage of Malaria Cases
1	**January**	31	12.97
2	**February**	23	9.62
3	**March**	43	**17.99**
4	**April**	28	11.72
5	**May**	14	5.86
6	**June**	2	0.84
7	**July**	6	2.51
8	**August**	10	4.18
9	**September**	14	5.86
10	**October**	17	7.11
11	**November**	23	9.62
12	**December**	28	11.72
	Total	239	100.00

On further analysis it was found that peak was in March then cases start decreasing from March upto June then again start increasing. So lowest were in June. (Figure 1)

Figure 1



Fever was the symptom which was present in every case, diarrhea was symptom in 158 (66.11%) cases, pain abdomen was complaint by 182 (76.15%) cases. (Figure 2)

Figure 2

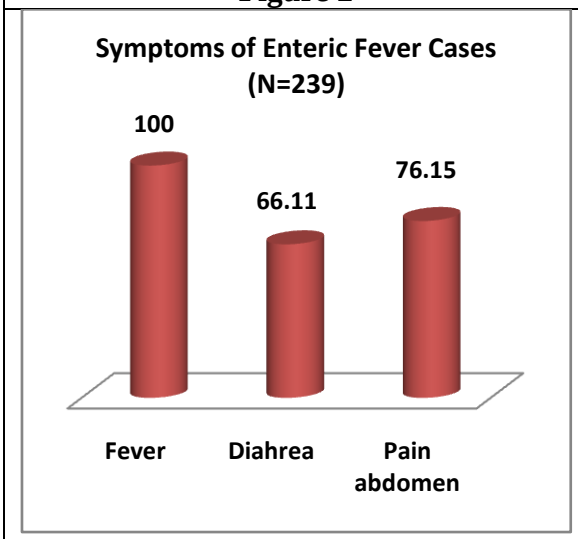
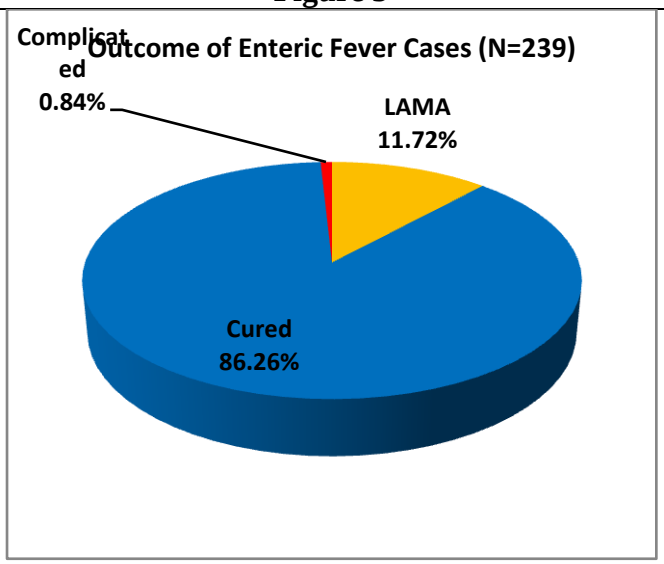


Figure 3



Out of 239 enteric fever cases, 206 has culture sensitivity report. As per culture sensitivity reports majority (About 50%) of cases were resistance to Ampicillin and Co-trimaxazole but each case was sensitive to Cefixime.(Table 3)

Table 3
Antimicrobial resistance in *Salmonella* Typhi (N=206)

S. No.	Antimicrobial Agent	Resistance	
		Number	Percentage
1	**Ampicillin**	101	49.03
2	**Co-trimaxazole**	112	54.37
3	**Ciprofloxacin**	33	16.02
4	**Cefixime**	0	0.00

Out of 239 cases, 28 (11.72%) cases left against medical advice (LAMA) remaining all the cases were cured except two (0.84%) who got complicated as intestinal perforation. (Figure 3)

IV. DISCUSSION

The present study observed that majority of cases were above sixty years of age followed by cases in 15 to 30 years of age, 45 to 60 years of age and 30 to 45 years of age group. Overall there was male predominance with M:F ratio 1.32.

An ICMR report[4] observed the age-wise distribution showed that 117 (10.9%) cases occurred in <5 years age group, 644 (60.4%) cases in 5–19 years age group and 305 (28.6%) were found in >19 years of age.[4] But in the present study patient above 15 years were allowed to attend as there is the separate hospital for children (upto 15 years of age).

Another study conducted in a tertiary hospital of North India[5] observed male-to-female ratio for the culture-positive enteric cases 1.56:1 (651 males and 415 females). Another study conducted in Assam (India) reported that out of 79 patients, 43 (54.4%) were males with a male:female ratio of 1.2:1[6]

In the present study fever was present in every case, diarrhea was in 66.11% cases, pain abdomen was complaint by 76.15% cases. Study conducted in a tertiary hospital of North India[5] reported fever in all cases followed by pain abdomen in 46%, vomiting in 38% and diarrhoea in 12.65% patients.

As per seasonal distribution, a majority of cases (73.64%) were found in November to April. Mohanty S etall[7] found that although the disease occurred throughout the year, there was an increase from July to September months. A similar observation was found in our earlier study reported during 1999–2005. A similar observation was found in our earlier study reported during 1999–2005[8] and is in concordance with other reports from India which have related it to rainfall and water contamination.[8]

In the present study as per culture sensitivity reports about half of cases were resistance to Ampicillin and Co-trimaxazole but all were sensitive to Cefixime. Manezes GA etall reported that 87.9% were susceptible to Chloramphenicol, 75.5% to amoxicillin and 674 87.3% were susceptible to Cotrimoxazole. Emergence of this decreased susceptibility to fluoroquinolones is a matter of concern in south and southeast countries of Asia.[9] With the upcoming reports of decreased susceptibility from different regions of world, fluoroquinolones are no longer a drug of choice for enteric fever.[10,11] Multidrugresistant strains of S. Typhi have been reported in India.[12.13.14]

V. CONCLUSION

The present study concluded that majority of patients were above 60 years of age followed by 15 to 30 years, 45 to 60 years and 30 to 45 years of age. Male female ratio was observed 1.32. Sex wise proportion of enteric fever cases had significant variation with age. In younger and older age group

males were higher than females whereas in middle age group females were more than males. It present throughout the year but majority (73.64%) were found in November to April. Salmonela Typhi was resistance to Ampicillin and Co-trimaxazole and sensitive to Cefixime.

CONFLICT OF INTEREST

None declared till now.

REFERENCES

[1] Mogasale V, Maskery B, Ochiai RL, Lee JS, Mogasale VV, Ramani E, *et al.* Burden of typhoid fever in low-income and middle-income countries: A systematic, literature-based update with risk-factor adjustment. Lancet Glob Health 2014;2:e570-80

[2] Ochiai RL, Acosta CJ, Danovaro-Holliday MC, Baiqing D, Bhattacharya SK, Agtini MD, *et al.* A study of typhoid fever in five Asian countries: Disease burden and implications for controls. Bull World Health Organ 2008;86:260-8

[3] John J, Van Aart CJ, Grassly NC. The burden of typhoid and paratyphoid in India: Systematic review and meta-analysis. PLoS Negl Trop Dis 2016;10:e0004616

[4] Dahiya S, Sharma P, Kumari B, Pandey S, Malik R, Manral N, *et al.* Characterisation of antimicrobial resistance in *Salmonellae* during 2014-2015 from four centres across India: An ICMR antimicrobial resistance surveillance network report. Indian J Med Microbiol 2017;35:61-8

[5] Priyanka Sharma, Sushila Dahiya, Neelam Manral, Bhavana Kumari, Sambuddha Kumar, Sangeeta Pandey, Seema Sood, Bimal Kumar Das, Arti Kapil. Changing trends of culture-positive typhoid fever and antimicrobial susceptibility in a tertiary care North Indian Hospital over the last decade. Indian Journal of Medical Microbiology. 2018;36(1):70-76

[6] Jashbeer Singh Roy, Lahari Saikia, Mithu Medhi & Dipak Tassa. Epidemiological investigation of an outbreak of typhoid fever in Jorhat town of Assam, India. Indian J Med Res. October 2016;144:592-596

[7] Mohanty S, Renuka K, Sood S, DAS BK, Kapil A. Antibiogram pattern and seasonality of *Salmonella* serotypes in a North Indian tertiary care hospital. Epidemiol Infect 2006;134:961-6

[8] Sur D, von Seidlein L, Manna B, Dutta S, Deb AK, Sarkar BL, *et al.* The malaria and typhoid fever burden in the slums of Kolkata, India: Data from a prospective community-based study. Trans R Soc Trop Med Hyg 2006;100:725-33

[9] Menezes GA, Harish BN, Khan MA, Goessens WH, Hays JP. Antimicrobial resistance trends in blood culture positive *Salmonella* Typhi isolates from Pondicherry, India, 2005-2009. Clin Microbiol Infect 2012;18:239-45

[10] Sharma P, Dahiya S, Kumari B, Balaji V, Sood S, Das BK, *et al.* Pefloxacin as a surrogate marker for quinolone susceptibility in *Salmonella enterica* serovars Typhi and Paratyphi A in India. Indian J Med Res 2017;145:687-92

[11] Arjyal A, Basnyat B, Koirala S, Karkey A, Dongol S, Agrawaal KK, *et al.* Gatifloxacin versus chloramphenicol for uncomplicated enteric fever: An open-label, randomised, controlled trial. Lancet Infect Dis 2011;11:445-54

[12] Misra RN, Bawa KS, Magu SK, Bhandari S, Nagendra A, Menon PK. Outbreak of multi-drug resistant Salmonella Typhi enteric fever in Mumbai Garrison. Med J Armed Forces India 2005; 61 : 148-50

[13] Rathish KC, Chandrashekar MR, Nagesha CN. An outbreak of multidrug resistant typhoid fever in Bangalore. Indian J Pediatr 1995; 62 : 445-8

[14] Saha MR, Dutta P, Bhattacharya SK, Rasaily R, Mitra U, Dutta D, et al. Occurrence of multi-drug resistant Salmonella Typhi in Calcutta. Indian J Med Res 1992; 95 : 179-80.