

Clinicodemographic Study Of Enteric Fever In Children Admitted At Tertiary Care Hospital

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Abstract :

Background : Typhoid is a multi-systemic bacterial illness caused by Salmonella species, mainly by ingestion of the organism by ingestion of contaminated food or water is responsible for entry of the organism into the human body, manifesting typically as step wise increasing, high grade fever, vomiting, abdominal pain. Delay in diagnosis and treatment, can lead to severe complications including death. Ceftriaxone, Cefixime and azithromycin are mainstay of treatment. However, multidrug resistant S. Typhi (MDRST) strains are emerging, hence public health interventions shall help for the prevention of enteric fever in children.

Aims & Objectives: To describe demographic, clinical and investigation profile of children admitted with enteric fever and study complications and outcome of children admitted with Enteric Fever.

Material & Methodology : A descriptive observational study of children admitted with enteric fever was done over 12 months. The demographic and clinical profiles were documented, investigations were done. Then each case was followed up for improvement or occurrence of any complication till discharge or death. Data was entered in excel sheet and analysis was done with standard statistical software.

Results: 110 patients were enrolled in this study. Most number of cases were in age group of >5-10 years (45.45%) and maximum cases were seen in January, February, and October. Most common symptoms observed during study was fever (100%) followed by abdominal pain (53.6%). On clinical examination pallor (40.0%) was the most common finding followed by coated tongue (37.2%). Commonly observed complications during our study were hepatobiliary (14.5%) followed by genitourinary complications (2.72%).

Conclusion: Enteric fever continues to be a major health problem in pediatric population in developing countries like India. Early identification and management of complication is necessary for better outcome. Public health education and intervention can help in reducing the disease burden, morbidity and mortality.

Keywords: Enteric fever, abdominal pain, hepatobiliary complications, immunization, antibiotics.

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I. INTRODUCTION

Typhoid is a multi-systemic bacterial illness caused by Salmonella species S. Typhi and Paratyphi A, B and C.^[1] It is estimated that 26.9 million typhoid cases occur annually of which 1% results in death, with majority of the cases reported in Asia.^[2] The clinical presentation of typhoid varies widely from mild constitutional symptoms to severe complicated disease. Typhoid fever has wide range of manifestations present as septicaemia in neonates, diarrhoea in infants, and lower respiratory tract infections in older children. Typically, it manifests as step wise increasing, high grade fever, headache, lethargy, vomiting, abdominal pain and hepatosplenomegaly.^[3] This is mainly a disease of school age children and young adults.^[2] Complications include intestinal, hepatobiliary, neurological, cardiovascular, nephrological, bone marrow suppression, DIC.^[4] Delay in diagnosis and treatment, can lead to severe complications including death.^[2] The Widal test continues to be important in the work up of patients with typhoid fever despite its variable sensitivity and specificity in India.^[2] Blood culture is the Gold standard for diagnosis, but blood culture can be negative in 70% cases due to use of antibiotics before admission.^[5] Ceftriaxone and Cefixime, are highly effective even in nalidixic acid resistant strains. Azithromycin has been found to be efficacious in MDR S. Typhi.^[6] Public health interventions like clean drinking water supply, maintenance of hygiene, regular handwashing and vaccination at a nearly age shall help for the prevention of enteric fever in children.^[5]

II. AIMS & OBJECTIVES

To describe demographic, clinical and investigation profile of children admitted with enteric fever and study complications and outcome of children admitted with enteric fever.

III. METHODOLOGY

Study title: CLINICODEMOGRAPHIC STUDY OF ENTERIC FEVER IN CHILDREN ADMITTED AT TERTIARY CARE HOSPITAL

Study Design: Descriptive observational study

Study Location : Pediatric ward of a tertiary care hospital affiliated with medical college

Study Duration: Study period extended from 1st January 2020 to 31st December 2020.

Inclusion criteria:

1. Children admitted in pediatric ward between 1-14 yrs. of age diagnosed as enteric fever based on clinical features and laboratory investigations such as serum Widal test positive (O titer \geq 1:160 and H titer \geq 1:160) and/or blood culture found to be positive for salmonella typhi or paratyphi.
2. Parents of patients who gave informed and written consent.

Exclusion criteria:

1. Children Admitted for enteric fever who were $<$ 1 yr old and $>$ 14 yrs old.
2. Admitted children having widal titer $<$ 1:160 for O and/or H antigen.
3. Children whose parents not willing to give consent.

All children diagnosed with enteric fever as per inclusion criteria admitted between 1st Jan 2020 to 31st Dec 2020 in a pediatric ward of tertiary care hospital affiliated with medical college were included in the study. In all the cases age, sex, duration of illness, presenting symptoms and other symptoms pointing towards complication, history of previous treatment, socio-economic status and typhoid immunization were noted. Information regarding clinical examination and investigations was noted in predefined Proforma. Blood investigations like complete hemogram, Widal test and blood culture were done in all children. Other investigations like LFT, RFT, smear for malarial parasite, serum dengue NS1 or IgM, CRP, chest X-ray, USG abdomen, urine routine examination and culture were done as per requirement and to rule out other causes of fever. Patients were treated as per standard protocol. Each case was followed up for improvement or occurrence of any complication. Cases were followed till discharge or death. Data was entered in excel sheet and analysis was done with standard statistical software.

IV. RESULTS & DISCUSSION

DEMOGRAPHIC PROFILE

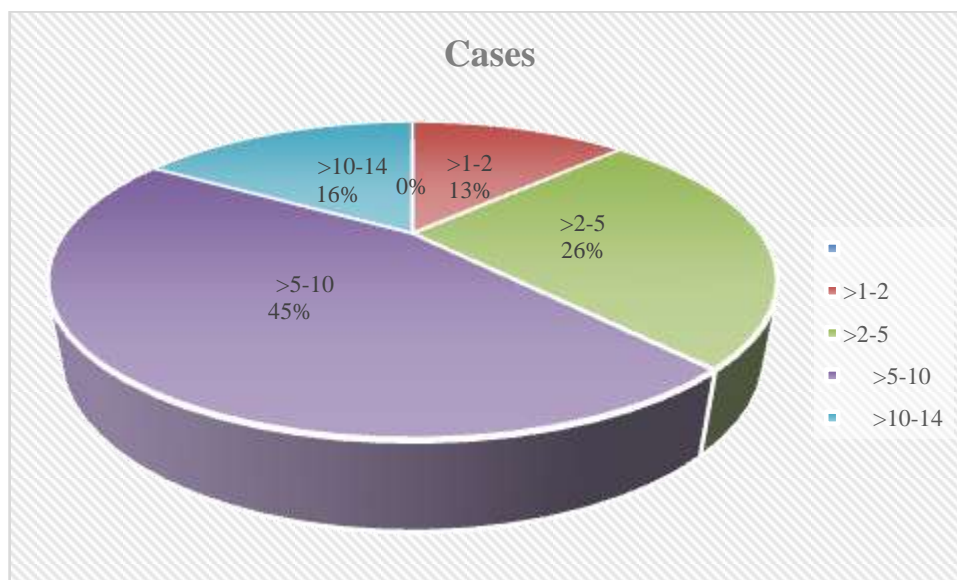
During the study period from January 2020 to December 2020, of the total 1714 admissions in a pediatric ward, 110 were due to Enteric Fever accounting for 6.42%.

• GENDER

Total number of males out of 110 reported cases were 72 (65.45%) while 38 (34.55%) were females. The male to female ratio thus is 1.89 in this study. This is also corroborated by few other studies like Bandyopadhyay et al. ^[1] and Behera J et al. ^[5] They have observed male to female ratio of 1.07 and 1.66 respectively.

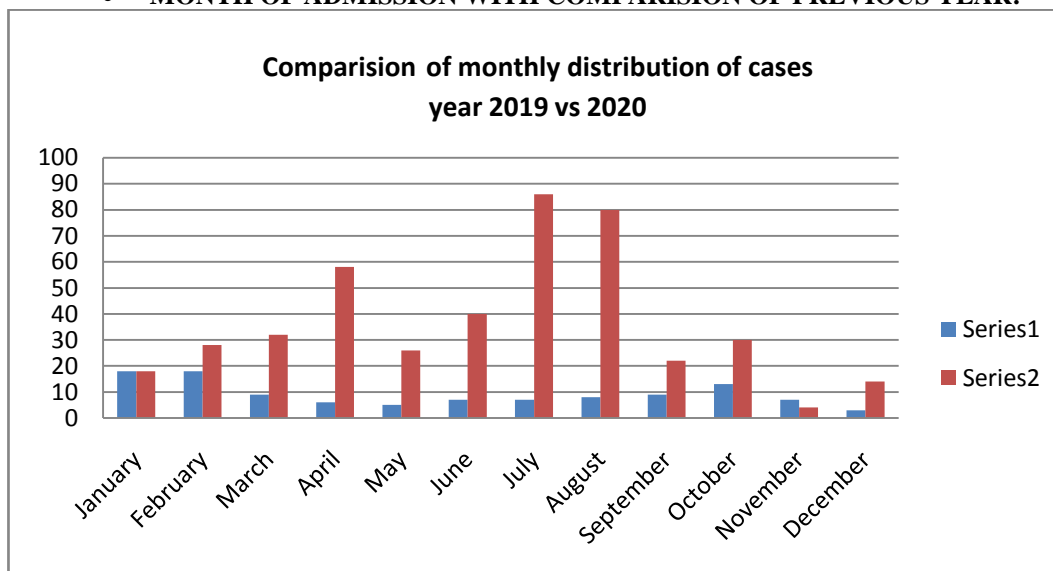
• AGE

The children studied were in the age group of 1yr to 14yrs. The mean age of presentation was 6.91 years with standard deviation of 3.52 years (6.9 \pm 3.5) years. Studies by Behera J et al. observed mean age of presentation to be 7.6 \pm 3.6 years. ^[5] The majority of children (45.45%) were between $>$ 5-10 years of age similar to a study done by Bandyopadhyay et al. which is 35.21%. ^[1] Walia e al. also showed that more than one third cases were from age group 5-10 years. ^[7] percentage of age group between 1-2 years is least 12.7% (18/110), Bandyopadhyay et al. has observed occurrence of 12.61% among children of 1-2 years, ^[1] which was 11.2% in studies done by Behera J. et al. ^[5] High occurrence of disease in young children shows changing trend of the disease and highlights the importance of early immunization and improvement in water supply and sanitation.



Graph no. 1: Age distribution

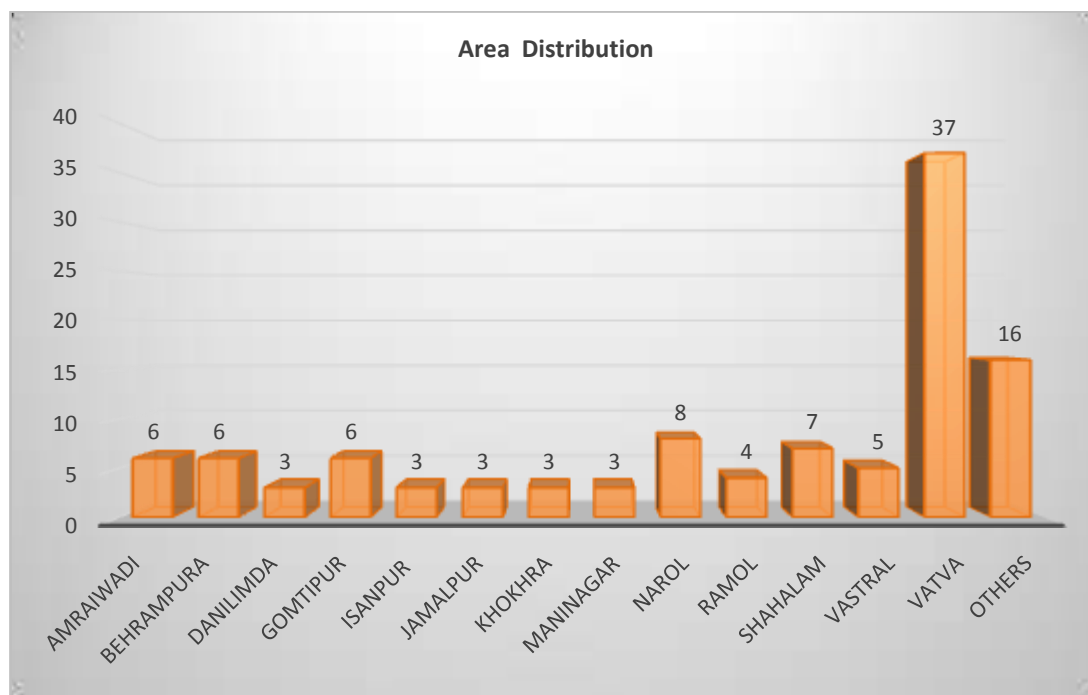
• MONTH OF ADMISSION WITH COMPARISION OF PREVIOUS YEAR:



Graph no. 2: Monthly distribution of cases
 series1 no.of admitted cases of enteric fever in a peditric ward during year 2020
 series2 no.of admitted cases of enteric fever in a peditric ward during year 2019
 x axis - no. of cases of enteric fever. y axis - name of month

In present study, most of the cases were detected in January, February, and October months of year 2020. In the year 2019, maximum number of cases of enteric fever were recorded in the month of April, July, and August. Mohanty et al. observed peak in June to September(2006).^[8] In another study from Bhopal, Maheshwari et al. also showed maximum cases during the months of June to September (2011-2013).^[9] As this study was conducted in the year 2020, when Covid 19 pandemic had significantly affected the region. Change in epidemiological trend observed in this study can be due to effect of covid 19 pandemic and lockdown which led to decrease exposure to outdoor activities and access to outside meals during this period.

• AREA OF RESIDENCE



Graph no. 3 Area distribution
x axis - no. cases of enteric fever
y axis - area of residence of patient

Present institute is located in South zone of Ahmedabad and clustering of cases has been noticed in maximum in Vatva followed by Narol and Shah-alam. Several factors may contribute to development of such hotspots, namely - increased population density, poverty, and unhygienic living conditions, less awareness, lower education, and socioeconomic standards.

TYPHOID VACCINATION

Only 7 children (7.7%) had prior history of vaccination, this is similar to a study of Behera J et al. which had only 9.8% children having history of prior vaccination.^[5] This shows there less awareness regarding typhoid vaccine. Its availability and awareness need to be increased.

CLINICAL PROFILE

- CLINICAL SYMPTOMS**

Table no. 1 - Clinical Symptoms

Symptom	Cases	Percentage
Fever	110	100%
Abdominal Pain	59	53.6%
Nausea/Vomiting	41	37.2%
Anorexia	22	20.0%
Cough	22	20.0%
Altered Bowel Habits	19	17.2%
Urinary Complaints	6	5.45%
Myalgia/Arthralgia	3	2.72%
Altered sensorium	3	2.72%
GI bleed	1	0.9%

As per shown in above table, fever and GI symptoms were predominant. Fever was present in 100% of children. Other studies like sarswat et al.,^[10] Sinha et al.^[11] and siddiqueet al.^[12] also observed fever in 100% of children.

Maheshwari et al.^[9] had also predominance of gastrointestinal symptoms like abdominal pain (53.8%), vomiting(50.9%) and altered bowel habits (53.8%), headache and cough were uncommon symptoms.

• **CLINICAL EXAMINATION**

Coated tongue (37.2%) to be the most common findings followed by pallor (40.0%), then petechiae (6.36%) and rashes (6.36%). On per abdomen examination found hepatomegaly (19.09%) and splenomegaly (9.09%) to be most common finding followed signs of free fluid (5.45%). In other systemic examination 6.36% pts had tachypnea while, 3/110 (2.72%) had altered sensorium. These results are consistent with a study Laishram et al. which showed coated tongue, hepatomegaly, and splenomegaly as the most common findings.^[13] Another study, Maheshwari et al. also showed pallor, coated tongue, hepatomegaly, and splenomegaly as most common finding.^[9]

INVESTIGATION PROFILE

Out of 110 patients positive for widal test only 4 were having *S.paratyphi* infection and rest 106 had *S.typhi* infection. Out of 110 widal positive patients, 21 patients showed growth of *S.typhi* in blood culture i.e. 21 cases (19.09%) were culture positive. Behera J. et al.^[5] also showed only 26.7% cases to be blood culture positive. Siddique et al.^[12] also showed 12.3% cases of blood culture positivity.

According to antibiotic sensitivity pattern report, out of 21 blood culture positive reports, 20 patients (95%) showed culture growth sensitive to all antibiotics i.e., Fluoroquinolones, Ampicillin, Cotrimoxazole, Cephalosporin and Azithromycin while 1 culture (5%) growth showed resistance to Ceftriaxone, Cefixime, Ampicillin and Cotrimoxazole but sensitive to Azithromycin, Ciprofloxacin, and Levofloxacin. Saraswat et al. observed 100% sensitivity to ceftriaxone, 80% and 87.5% sensitivity to ampicillin and ciprofloxacin and 47.5% sensitivity to cotrimoxazole.^[10]

• **LAB PARAMETERS**

Table no.2 – Laboratory Parameters

Lab parameter	Cases	Percentage
Anaemia	71	64.5%
Leukocytosis	18	16.3%
Leukopenia	46	41.8%
Eosinopenia	3	2.72%
Thrombocytopenia	21	19.09%
Altered LFT	16	14.54%
CRP positive	17	15.45%

Hematological profile of cases in this study is shown in above table. According to Bandyopadhyay et al. anemia was observed in 23.04% cases, 17.6% cases had leukocytosis, 40% had leukopenia, 14.34% had eosinopenia, 10.87% had thrombocytopenia.^[11] Behera J. et al. showed anemia in 42.86%, leukopenia in 10.71%, leukocytosis in 19.64%, thrombocytopenia in 14.29%, eosinopenia in 58.93% and raised crp in 73.21% and altered LFT in 30.36%.^[5]

TREATMENT

Table no. 3- Antibiotic Treatment

Antibiotic	Cases (n=110)	Percentage
Cephalosporin alone	85	77.27%
Cephalosporin + Azithromycin	19	17.27%
Cephalosporin+ Fluoroquinolones	3	2.73%
Imipenem	3	2.73%
Total	110	100%

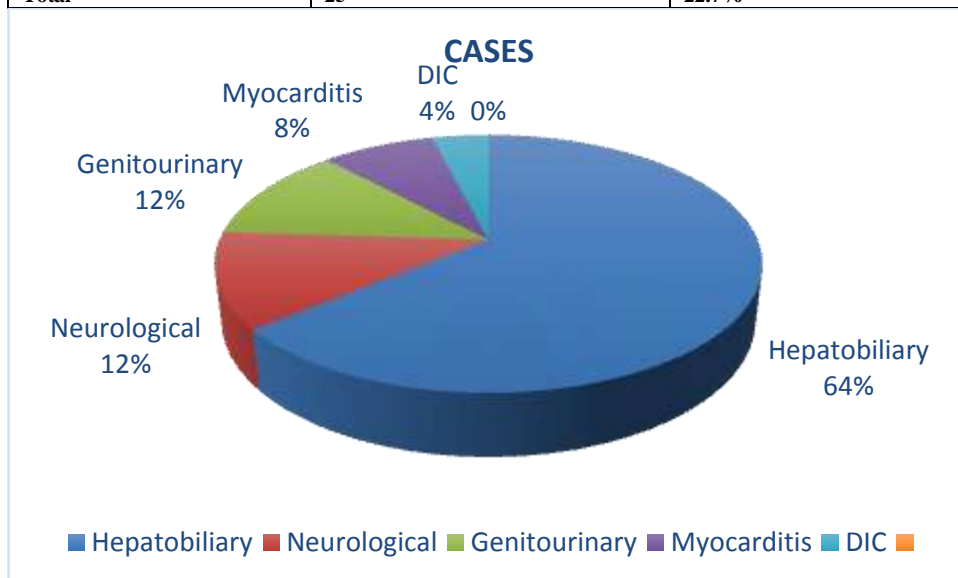
In this study, 77.27% patient were treated with cephalosporin alone. The decision of addition of another antibiotic was taken according to clinical condition. Another study Behera J et al. showed 70% children were treated with cephalosporin alone, 24% requiring addition of azithromycin and 3.57% requiring imipenem group of drugs.^[5] Bandyopadhyay et al. showed 77.17% children responding to cephalosporin alone while 21.52% requiring addition of azithromycin.^[11]

Mean fever defervescence period was 4.3+/-2.5 days. Behera J et al showed mean defervescence period to be 3.5+/-2.1 days. ^[5]

COMPLICATIONS

Table no. 4 - Complications of Enteric fever

COMPLICATION	CASES	PERCENTAGE
Hepatobiliary	16	14.5%
Neurological	3	2.72%
Genitourinary	3	2.72%
Myocarditis	2	1.81%
DIC	1	0.90%
Total	25	22.7%



Graph no.4: Complications

Out of 110 patients studied, 25 (22.7%) patients had complications with hepatobiliary complications being the commonest (14.5%) followed by genitourinary complications (2.72%) and Neurological complications (2.72%), followed by rare complications like myocarditis (1.81%) and DIC (0.90%). It is similar to a study from Orissa, Behera J et al. also, complications were recorded in 21% cases with hepatitis being the commonest (10.71%), while neurological complications were present in 1.71%. ^[5]

DURATION OF STAY

The duration of stay of majority of patients was up to 5 days. Patients staying more than 10 days were only 1.82%. Mean duration of stay was 5.27days (5.27+/-2.24 days). Another studies, Saraswat et al. shows mean duration of hospital stay to be 7.17 days ^[10] and Ganesh R et al. shows 6.5 days respectively. ^[14]

OUTCOME

Out of 110 patients, 104(94.55%) patients were discharged, 5(4.55%)patients left against medical advice and 1(0.9%) patient expired due to respiratory failure, shock,DIC with hydronephrosis.

LIMITATIONS OF STUDY

As Covid 19 pandemic had affected the region significantly during study period, so epidemiological trends depicted from the study might differ from actual trends.

CONFLICT OF INTEREST: None

V. CONCLUSION

Enteric fever continues to be a major health problem in pediatric population in developing countries like India. Early identification and management of complication is necessary for better outcome. Public health education and intervention like minimizing human carrier contact, improving personal hygiene and sanitation, typhoidvaccination and judicious use of antibiotics can help in reducing the disease burden, morbidity, and mortality.

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