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Original Research Article

A study of etiopathogenesis, clinical and laboratory profile evaluation of typhoid fever in paediatric age group in Bijapur

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ABSTRACT

Background: *Salmonella typhi* causes typhoid illness. In India, it is a huge public health issue. Several impoverished nations have endemic typhoid fever. The wide range of clinical symptoms of typhoid fever makes diagnosis difficult. The purpose of this study was to better understand the vast range of clinical symptoms, comorbidities, and drug sensitivity patterns associated with typhoid fever in children.
Methods: From March 2021 to October 2022, 100 children hospitalised to the paediatric unit at Al-Ameen Medical College and Hospital in Bijapur with proven typhoid fever were included in the study. Age, gender, presenting complaint, laboratory tests, and antibiotic sensitivity pattern are all gathered and analysed in each patient.
Results: There were 58 men (58%) and 42 females (42%) among the 100 cases. The most typical age range was 5 to 15 years. Fever was the most prevalent symptom, occurring in 100% of patients, headache (80%), coated tongue (100%), vomiting (45%), and abdominal pain (70%). In 68% of cases, the most prevalent indication was a toxic look, and hepatomegaly in 44%. In 28% of instances, leukocytopenia was discovered. In every case, the blood culture proved positive. The length of hospital stay ranged from 3 to 10 days. There was no recorded death.
Conclusions: Unhygienic habits and consuming meals from the outside are the main causes of typhoid fever. By raising people's understanding of disease transmission and its many preventative methods, this serious public health issue can be resolved.

Keywords: Clinical profile, Coated tongue, Children, Typhoid fever

INTRODUCTION

A systemic infection caused by the *Salmonella enterica* serotype typhi bacteria results in typhoid fever. This very well-adapted disease, which only affects humans, has developed exceptional mechanisms for persistence in its host, which support its survival and propagation. In the 19th century, typhoid fever was a major source of disease and death in the congested and filthy cities of the United States and Europe.[1]

In these areas, the prevalence of typhoid was drastically reduced as a result of the availability of clean water and effective sewage systems. Today, the developing world, where sanitary standards are still subpar, bears a disproportionately heavy weight of the illness. Since many hospitals lack capabilities for blood culture and up to 90% of patients with typhoid are treated as outpatients, it is challenging to gather reliable data from which to estimate the incidence of illness in these locations. Public health statistics persistently understate the prevalence of typhoid, according to community-based studies. Recent reports have indicated annual incidence rates of 198 per 100,000 in the Mekong Delta area of Vietnam and 980 per 100,000 in Delhi, India.[2,3]

Hydration, electrolyte balance correction, antipyretic therapy, and the proper medicines are all part of the

treatment for typhoid. The prognosis is based on how quickly the diagnosis is made and what kind of antibiotics are given. In addition, the patient's age, general health, and diet are prognosticating variables. Children who are underweight and have treatment resistance are more susceptible. After urinating and before consuming meals, wash your hands thoroughly with antiseptic solution. These steps will aid in stopping the spread of typhoid and lessen the disease's impact. Eating of outside food products, particularly in the summer, including ice cream and cut fruits, is linked to a significant risk of contracting typhoid. Typhoid vaccinations are crucial in lowering the disease's toll. Parents should be urged to have their kids immunized.

The objective of the study was to study the age incidence, clinical and lab profile evaluation, complications, culture and antibiotic sensitivity profile of typhoid fever patients in pediatric age group in Bijapur.

METHODS

This was a prospective observational research conducted at Al-Ameen Medical College and Hospital Bijapur's Department of Pediatrics. The research was carried out over an 18-month period, from March 2021 to October 2022. This research included children aged 5 to 15 years who arrived to the pediatric department with a history of fever lasting longer than 7 days. After eliminating out other sources of infection such as respiratory, nervous system, cardiac, and genitourinary, these individuals were included in this study; they were either Widal positive (Widal test TO titer >1:100 or TH titre >1:200) or blood culture positive for *Salmonella* species. The parents of the children who were a part of the study were asked for written informed consent and ethical clearance was taken from ethical committee of the institute. According to the proforma which was predesigned, a thorough history, clinical examination, and necessary investigations were used to determine the diagnosis of typhoid fever. Our inclusion criteria were satisfied by 100 instances in total.

Sample size estimation

With 95% confidence level and margin of error of ±10%, a sample size of 100 subjects were allowed to study by using the formula,

$$n=\frac{z^2p\,(1-p)}{d^2},$$

where,

Z=z statistic at 5% level of significance,

D=margin of error,

p=maximum anticipated incidence rate of typhoid fever.

Statistical analysis

Categorial data was represented in the form of frequency and percentage. Association between variables were assessed with Chi square test. P<0.05 was considered statistically significant. Data was analyzed with IBM SPSS version 25 for windows.

Selection of cases and methods

Inclusion criteria

All cases in pediatric age group from 5 to 15 years who had fever for more than 7 days duration; all cases who were Widal positive or blood culture positive for *S. typhi*; and patients who had taken any antibiotics prior to admission to this episode of fever were included.

Exclusion criteria

Associated infections (mixed infections) like UTI, malaria; all patients whose blood culture grew other species of *Salmonella*; all patients with negative blood culture for *Salmonella*; and all cases who had received intravenous antibiotics before obtaining blood culture samples were excluded.

RESULTS

Out of 100 cases, 58 cases (58%) were males and 42 cases (42%) were females. This shows male predominance in this study (Figure 1). As shown in Figure 2, most of the cases were aged between 5 and 15 years. 18 cases were below 8 years, 45 cases were aged above 9-12 years representing and 37 cases were aged between 13 and 15 years. In all the above age groups male predominance was seen.

Table 1: Duration of fever prior to admission.

Duration (days)	Number	Percentage
5-7	46	46
8-14	40	40
>14	14	14

Duration of fever prior to admission varied 5 to 7 days (46%), 8-14 days (40%) and >14 days (14%) (Table 1).

As shown in Figure 3, typhoid fever presents with a wide range of symptoms. Due to the use of antibiotics prior to diagnosis, children may not present with typical symptoms. However, in our study, the most common symptom was fever (100%), loss of appetite (85%), headache (80%), chills (65%), vomiting (45%), pain abdomen (70%), and cough (40%) (Table 2).

Coming to physical findings in Figure 4, the most common sign we observed was coated tongue (80%), followed by toxic look in 70% of the cases, hepatomegaly

60%, pallor 30% splenomegaly 20%, hepatosplenomegaly in 25% of cases (Table 3).

Complications in our study, ileal perforation (1 case), typhoid meningitis (1 case), pneumonia (1 case), hepatitis (1 case) (Table 4).

Table 5 depicts the laboratory parameters. Anemia found in 20 (20%) cases, leucopenia and leucocytosis was observed in 28 (28%) cases and 12 (12%) cases respectively. Neutropenia found in (28.6%) cases. Eosinopenia was seen in (70.66%) cases, and thrombocytopenia in 17 cases. SGOT levels was elevated (>200 IU/ml) in 10 (8.8%) cases and SGPT (>200 IU/ml) in 13 (11.5%) cases. The elevated levels of liver enzymes lasted only few days. Widal test was done in all the cases, 71% showed positive response. Blood culture positive for *S. typhi* noted in 100 (100%) cases. Out of 100 cases only 10 cases had been immunized with typhoid vaccine. All of them had taken typhoid polysaccharide vaccine more than 3 years prior to illness (Table5).

Table 2: Clinical symptoms.

Symptoms	Age (years)			P value
	5-8	9-12	13-15	
Fever	17	46	37	
Headache	12	34	34	0.054, sig
Loose stools	17	46	37	
Vomiting	10	25	10	0.021, sig
Urinary symptoms	0	0	0	
Cough	8	15	17	0.378, not sig
Pain abdomen	12	32	26	0.996, not sig
GI bleed	0	1	0	0.553, not sig

Table 3: Clinical signs.

Signs	Age (years)			P value
	5-8	9-12	13-15	
Coated tongue	9	34	37	0.001, sig
Hepatomegaly	10	25	25	0.471
Splenomegaly	9	11	0	0.001, sig

Table 4: Complications.

S. No.	Complications or atypical presentation	No. of cases
1.	Ileal perforation	1
2.	Typhoid meningitis	1
3.	Pneumonia	1
4.	Hepatitis	1
5.	Brodie's abscess	0
6.	Typhoid myocarditis	0

Table 5: Lab findings.

Investigation		Widal positive (n=71)	Widal negative (n=29)	P value
HB (gm%)	<10	6	14	0.001
	>10	65	15	
Total leucocyte count (/cumm)	<4000	4	24	0.001
	4000-10000	55	5	
	>10000	12	0	

Table 6: Antibiotic sensitivity.

Drugs	Sensitivity	No of cases widal positive (n=71)	Percent	P value
Chloramphenicol	10	7	0.7	0.941
Ciprofloxacin	80	54	67.5	0.123

Continued.

Drugs	Sensitivity	No of cases widal positive (n=71)	Percent	P value
Cotrimoxazole	15	13	86.7	0.001
Cefotaxim	100	71	71.0	0.001
Ceftriaxone	100	71	71.0	0.001
Ofloxacin	80	71	88.8	0.001
Pefloxacin	80	71	88.8	0.001
Azithromycin	60	60	100.0	0.001

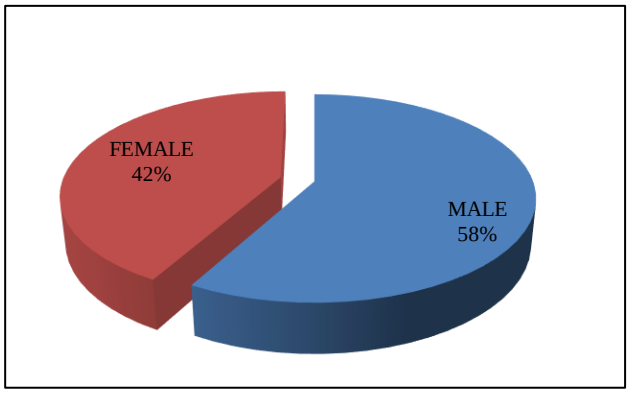

Figure 1: Sex distribution.

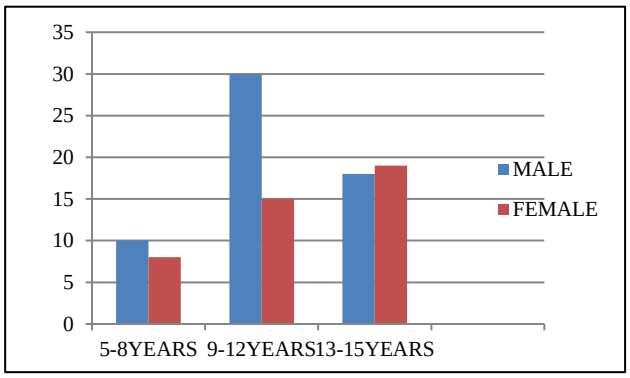

Figure 2: Age distributions.

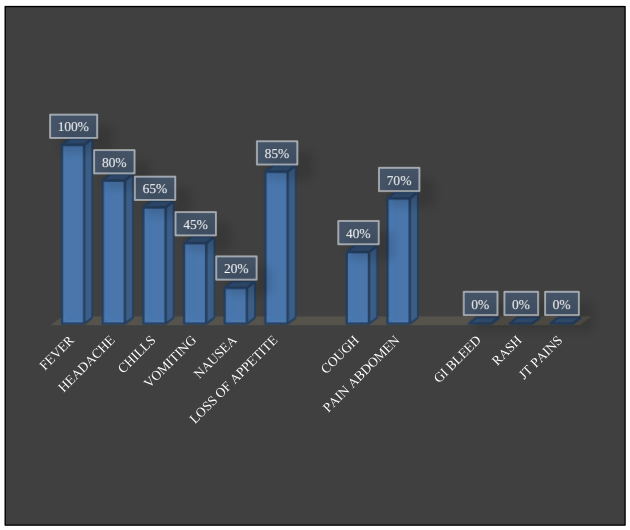

Figure 3: Clinical symptom.

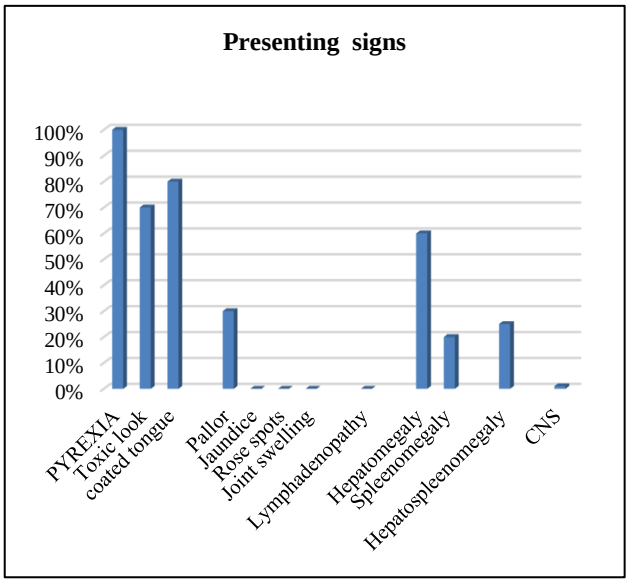

Figure 4: Clinical signs.

Table 6 depicts antibiotic sensitivity patterns among culture positive cases. As mentioned in the table, ceftriaxone and cefixime sensitivity was seen in all the cases (100%) followed by ofloxacin (80%), ciprofloxacin (80%), chloramphenicol (10%), cefotaxime (100%), and azithromycin in (60%). *S. typhi* was more sensitive to ceftriaxone, cefixime followed by ofloxacin.

DISCUSSION

The current study was conducted to have better knowledge of many of the characteristics of typhoid fever as they occur in Bijapur. This investigation included 100 patients included showed clear bacteriological support and 100% bacteriological isolation of *S. typhi*.

In present study, male predominance was seen. Similar results were reported in other studies.[4-7] Common age group reported in our study was 9 to 12 years. 58 male cases and 42 female cases were present in our study. Devaranavadagi et al reported male:female ratio of 1.7:1 in their study. Sarswat et al reported male:female ratio of 2.8:1 in his study.

Typhoid fever manifestations are diverse. The most common symptoms apart from fever were pain abdomen, headache and cough.

A study done by Sinha et al, Kapoor et al also reported similar results.[8] Contradictory to this, a study done by Joshi et al reported headache as the most common symptom next to fever.[9]

In our study we reported coated tongue (80%) as the most common sign followed by toxic look (70%), hepatomegaly (60%), splenomegaly, hepatosplenomegaly. Study done by Laishram et al reported coated tongue (80%) as the most common sign followed by hepatomegaly (76%) and splenomegaly (38%). 10 other study reported toxic look (93%) and coated tongue (66%) as most common signs. In some study they had reported relative bradycardia and hepatomegaly as the most common sign.

In our study 10% of the cases were sensitive to chloramphenicol, 60% sensitive to azithromycin, 80% to ciprofloxacin, 15% to cotrimoxazole, 100% sensitive to cefotaxim and ceftriaxone.

In the study by Devaranavadagi et al 70% of cases were sensitive to amoxycillin, 84% to chloramphenicol, 87% to ciprofloxacin, 100% sensitive to 3rd gen cephalosporins.

In the study by Sarswat et al 87.5% sensitive to ciprofloxacin, 70% to chloramphenicol, 80% to ampicillin, 82.5% to amoxiclav, 100% to ceftriaxone.

Limitations of our study was with early treatment with antibiotics may have resulted in the resolution of fever in some children, which would have meant that they were ineligible for blood culture, a factor that could have contributed to an underestimation of the true incidence.

CONCLUSION

In poor nations, typhoid fever is still a serious public health concern that mostly affects school-age children. Public health measures include the provision of clean water for drinking, proper sanitation, education on the illness and how it spreads, and excellent hygiene habits may be used. Proper hand washing practises should be taught to food workers, especially in hotels, hostels, and public schools. Moreover, typhoid vaccination and prudent antibiotic administration based on the culture sensitivity pattern will aid in lowering the illness burden.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Osler W. The principles and practice of medicine: designed for the use of practitioners and students of medicine. 8th ed. New York: D. Appleton; 1912: 1-46.
2. Lin FY, Ho VA, Bay PV. The epidemiology of typhoid fever in the Dong Thap Province, Mekong Delta region of Vietnam. Am J Trop Med Hyg. 2000;62:644-8.
3. Sinha A, Sazawal S, Kumar R, Sood S, Reddaiah VP, Singh B, et al. Typhoid fever in children aged less than 5 years. Lancet. 1999;354(9180):734-7.
4. Mithilesh S, Raju G. Pediatric nature of enteric fever with emerging antibiogram: a cross sectional study. Int J Pediatr Res. 2018;4(2).
5. International Journal of current Microbiology and Applied sciences 2015;4(12):541-7.
6. Devaranavadagi RA. A study on clinical profile of typhoid fever in children.Int J Contemp Pediatr. 2017;4(3);1067-107.
7. Mehul MG, Hareshwaree. BH, Payal HP, Abeda. GM. A study of clinical profile of multidrug resistant typhoid fever in children. NJIRM. 2011;2(3):87-90.
8. Sinha A, Sazawal S, Kumar R, Sood S, Singh B, Reddaiah VP, et al. Typhoid fever in children aged less than 5 years. Lancet. 1999;354(9180):734-7.
9. Joshi BG, Keyal K, Pandey R, Shrestha BM. Clinical profile and sensitivity pattern of salmonella serotypes in children: a hospital based study. J Nepal Paediatr Soc. 2011;31(3):180-3.
10. Laishram N, Singh PA. Clinical profile of enteric fever in children. J Evolution Med Dent Sci. 2016;5(2):114-6.

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