

Prevalence of Typhoid Fever in Pediatric Patients of Adilabad

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Abstract: Enteric fevers are a common occurrence in pediatric patients especially in rural and tribal areas where the conditions of sanitation are generally poor. The common causative organisms are gram-negative bacteria *Salmonella Typhi* and *Salmonella Paratyphi A*. There is a limited data regarding the burden of the disease in Tribal Adilabad region. With this background, we in the present study tried to evaluate the prevalence of enteric fever in pediatric patients with RIMS Adilabad. Method: The data were collected from the Department of Pediatrics, Rajiv Gandhi Institute of Medical Sciences [RIMS], Adilabad from August-October 2017. All the febrile patients attending the pediatric OPD, Rajiv Gandhi Institute of Media [RIMS] presenting with clinical signs and symptoms of typhoid fever and the fever were lasting for more than 3 days. They were not on antibiotic therapy. A total of [n=66] 34 male and 32 female patients aged 0-14 years were found to have positive cultures for *S.typhi*. Patients were treated with ceftriaxone IV dosage based on the 100 mg/kg IV 24h for 10-14 days Results: the Most important symptom of typhoid is fever which was seen in all the 66 (100%) of cases involved in the study. The next common symptom was headache in 37 (56.06%) of cases followed by hypotension 22 (33.33%), diarrhea 21(31.81%), Abdominal pain 19 (28.79%), constipation 18 (27.27%), vomiting 14 (21.21 %) and only 7 (10.60%) and 6 (9.0 %) presented with cough and bradycardia. Maximum 45.45% patients get rid of typhoid fever after one week of medication. 22.73% of patients get rid of typhoid fever in two weeks of medication. 9.0% were cleared of infection after 3 weeks of medication. Conclusion: Typhoid fever is common in this group of the population especially in children. Fever, diarrhea and abdominal pain were the major clinical symptoms. No multi-drug resistant *S.typhi* was found in this population. Increase awareness regarding hygiene maintenance, sanitation and vaccinations in the population is required to reduce the burden of the disease in this area.

Keywords: Typhoid fever, Pediatric patients, Adilabad.

INTRODUCTION

Enteric fever is most commonly caused by bacteria *Salmonella enteric serovar Typhi (S.typhi)* and *S.paratyphi (S.paratyphi A, B, C)* [1, 2]. The prevalence of the disease is most commonly seen in low-income countries [3-6]. The global burden was estimated at approximately 12 million cases for the year 2010 [5, 7] It has an estimated global burden of 27 million new cases and 200,000 death annually [7]. The bacteria are transmitted by feco-oral routes. *Salmonella* is gram-negative, flagellate, non-sporulating, facultative anaerobic bacilli that ferment glucose, reduce nitrate to nitrite and synthesize peritrichous flagella when motile. *Salmonella* is a genus in the family Enterobacteriaceae that has more than 2,300 serotypes, based on the presence of three main antigens: somatic O antigen (lipopolysaccharide cell wall component), surface Virulent (Vi) antigen (*S. Typhi* and *S. Paratyphi C* only), and flagellar H antigen [8]. After an incubation

period of 7-14 days symptoms of fever with malaise will be presented. The clinical signs and symptoms include fever (with a typical step-ladder pattern), headache, and malaise, abdominal discomfort (constipation or diarrhea). Hepatomegaly, anemia and other manifestations are more frequent in children up to 5 years of age [9] Rare symptoms such as rose spots, relative bradycardia and other neurological symptoms are also reported in some cases [10]. Most of the patients recover and complications such as mucosal ulceration along with perforation and bleeding and mortality are infrequent when antibiotics are administered promptly [11, 12]. Accurate diagnosis of enteric fever relies on laboratory confirmation along with the bone marrow cultures that remains gold standard for diagnosis of enteric fever [13]. Blood culture is considered a less sensitive method however due to practical considerations especially in a low resource setting conditions the diagnosis is based on

blood culture. [14] The only effective treatment of enteric fever was antibiotic therapy with chloramphenicol in the past. However, with the emergence of drug resistance and development of multidrug resistant *S.typhi* in the 1980s, *S.typhi* was found to be resistant to antibiotics such as chloramphenicol, ampicillin, TMP-SMX, streptomycin, and tetracycline. For children, ceftriaxone injections are given for the treatment of enteric fever but its long-term use may lead to antibiotic resistance. Together, these constitute about 80% of the world's typhoid burden, where various rates of multi drug resistance (16 to 37%) and nalidixic acid resistance (5 to 51%) were found during 2002-2004 [9]. After the clinical illness recovery, about 1-4% of patients become chronic fecal carriers. Organisms can remain in bile ducts and gallbladder stones [15]. This is what contributes to spreading the disease through asymptomatic carriers [15, 16]. With this background, we in the present study tried to evaluate the prevalence of enteric fever in pediatric patients of Rajiv Gandhi Institute of Medical Sciences [RIMS] Adilabad. This institute caters to mostly the rural and tribal populations of Adilabad district. Such a study would contribute to understanding the epidemiology and characteristics of the Enteric fever in this population.

METHOD AND METHODS

The data was collected from the Department of Pediatrics, Rajiv Gandhi Institute of Medical Sciences [RIMS], Adilabad from August-October 2017. Institutional Ethical Committee permission was obtained for the study. All the febrile patients attending the pediatric OPD, Rajiv Gandhi Institute of Media

[RIMS] presenting with clinical signs and symptoms of typhoid fever and the fever were lasting for more than 3 days. They were not on antibiotic therapy. A total of [n=66] 34 male and 32 female patients aged 0-14 years were found to have positive cultures for *S.typhi*. The blood samples were collected and subjected to WIDAL test (Lab-care diagnostic India Pvt Ltd, Maharashtra India) it is a latex agglutination slide test for *S.typhi* 'O' and 'H' and *S.paratyphi* 'AH' and 'BH' and typhoidot test it is one step IgG/IgM detection kit by (Reliable protect biomedical Pvt Ltd, Shimla, HP). Blood samples from the positive tested patients were collected and inoculated to Brain Heart Infusion [BHI] broth; it was then incubated aerobically at 37°C for 48 hours. Positive Subcultures were then made on both blood agar and MacConkey agar 12Hrs and 24Hrs after collection. The *S.typhi* colonies were tested as per standard protocol. [17] All isolates were subjected against Chloramphenicol (30 µg), Gentamycin (10µgm), Ampicillin (10µg), Co-Trimoxazole (1.25/23.75µg), Ciprofloxacin (5µg), and Erythromycin (15µg), Amikacin (10µgm), ceftriaxone (30 µgm) by Kirby Bauer's disc diffusion technique. [18] Most of the *S.typhi* was found to be sensitive to ceftriaxone and patients were treated with ceftriaxone IV dosage based on the 100 mg/kg IV 24h for 10-14 days. The patients were followed up for one month.

RESULTS

Total of confirmed 66 cases was included in the study there was almost an equal distribution of cases with 48% of female cases and 52% of male cases. There was no significant gender distribution of cases involved shown in figure-1.

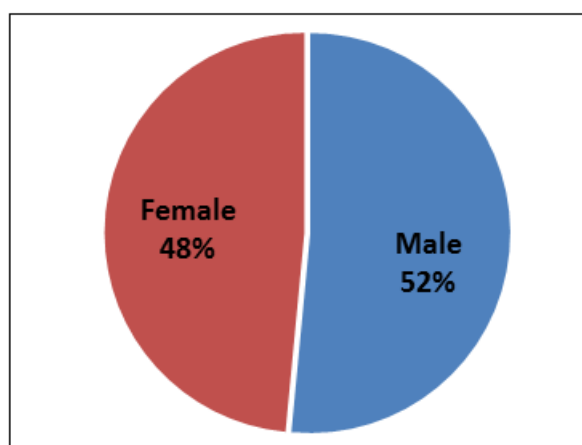


Fig-1: Percentage of Male and Female involved in the study

The youngest patient involved in the present study was 8-month-old female detected with *S.typhi*. The maximum numbers of patients involved in the study were between 5 -10 year age group had 42.42% of cases 11 male and 17 female patients. The next age

group having more numbers of patients were 1- 5 years included the total of 24 patients having 36.36% followed by 13 cases 19.7% of cases in 10 -14 years age group. There was poor vaccination record for children in this area shown in table 1.

Table-1: showing the results of positive *S.typhi* cultures in patients

Age Group [Yrs]	Male	Female	Total	Percentage
0 - 1	-	1	1	1.51
1-5	15	9	24	36.36
5-10	11	17	28	42.42
10-14	8	5	13	19.7
Total	34	32	66	100

The most important symptom of typhoid is fever which was seen in all the 66 (100%) of cases involved in the study. The next common symptom was headache in 37 (56.06%) of cases followed by hypotension 22 (33.33%), diarrhea 21(31.81%), Abdominal pain 19 (28.79%), constipation 18 (27.27%), vomiting 14 (21.21 %) and only 7 (10.60%)

and 6 (9.0 %) presented with cough and bradycardia. Maximum 45.45% patients get rid of typhoid fever after one week of medication. 22.73% of patients get rid of typhoid fever in two weeks of medication. 9.0% were cleared of infection after 3 weeks of medication see table-2.

Table-2: common Clinical features in the patients with *S.typhi* infection

Clinical feature	Male	Female	Total / Percentage
Fever	34	32	66 (100%)
Head Ache	22	15	37 (56.06%)
Diarrhea	10	11	21(31.81%)
Constipation	8	10	18 (27.27%)
Vomiting	6	8	14 (21.21 %)
Abdominal Pain	9	10	19 (28.79%)
A cough	4	3	7 (10.60%)
Hypotension	10	12	22 (33.33%)
Bradycardia	4	2	6 (9.0 %)

DISCUSSION

The present study was conducted for the prevalence of *S.typhi* in pediatric patients with RIMS, Adilabad in a predominantly rural tribal area situated in North Telangana. Since it a backward area socioeconomically and the population of this an area is predominantly tribal, there are inadequate sanitation and hygiene conditions in the population with unsafe drinking water for consumption. It is common for patients here to suffer from infections disease like typhoid. In the present study, we found 34 male and 32 female patients with confirmed *S.typhi* infection. Usually, children under the age of 15 years or younger are more susceptible to typhoid and mostly the adults develop immunity from recurrent infection and subclinical cases. One of the reasons for lesser age group involvement is due to their underdeveloped immune system in growing children making them more vulnerable to this enteric pathogen [19]. A study in North India found that majority of the cases of *S.typhi* were found in children from 5-12 yrs of age and 24.8% of cases were below 5 years of age [9]. Salmonella serovars showed age-related prejudice with paratyphoid more common in adults. A study done in Kolkata showed the incidence of paratyphoid fever was 0.8/1000/year and mean age of paratyphoid patients was older than 17.1 years compared to typhoid fever incidence of 1.4/100/year and the mean age was 14.7 years [20] In the present study we found the male patients 52% and female patients with *S.typhi* 48% giving a ratio of 1:1 suggesting typhoid is independent

of sex. Similar findings were reported by Khan *et al*; Malik *et al*; and Jaffer *et al*; [19, 21, 22] compare to *S.paratyphi* A enteric fever due to *S.typhi* is more common and having more severe clinical course and more frequent sequelae [25]. In the present study we found fever in 66 (100%) of cases involved in the study. The next common symptom was a headache in 37 (56.06%) of cases followed by hypotension 22 (33.33%), diarrhea 21(31.81%), Abdominal pain 19 (28.79%) similar results were found by Gamal *et al.*, and Aatekah *et al.*, [23, 24] We in the present study collected the data from period from August to October 2017. This period coincides with rainy season and chances of contamination of water are high especially in crowded areas [23] Exposures of individuals to contaminated food or water correlates closely with a risk of enteric fever. Public health interventions and water improvement including vaccinations and enteric fever surveillance will result in the decrease in the burden of the disease [25]. In this study we found recovery in 68.18% of cases after 2 weeks of antibiotic therapy and same results were found in another similar study [26]. Vaccination against *S.typhi* plays an important role and incidence of typhoid fever is reduced to half in vaccinated cases (38.18%) as compared to non-vaccinated (64.28%) of cases.

CONCLUSION

Typhoid fever is common in this group of the population, especially in children. Fever, diarrhea and abdominal pain were the major clinical symptoms. No

multi-drug resistant *S.typhi* was found in this population. Increase awareness regarding hygiene maintenance, sanitation and vaccination in the population are required to reduce the burden of the disease in this area.

Conflict of interest: None

Source of support: Nil

Ethical Permission: Obtained

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