IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 11 Ver. 2 (November. 2018), PP 45-50 www.iosrjournals.org

"Clinical profile of Typhoid fever in children aged between 6 months to 18 years: A study in a tertiary care hospital, Chittagong, Bangladesh"

Dr. Zabeen Choudhury[1], Dr.Shanjana Islam[2], Dr A M M Minhazur Rahman[3]

1. *Resident Physician, Department of Pediatrics, Chittagong Medical College Hospital, Chittagong, Bangladesh*
2. *Assistant Professor, Department of Pediatrics, Bangabandhu Memorial Hospital,Chittagong, Bangladesh.*
3. *Associate Professor (Ex), Department of Radiology & Nuclear Imaging, Chattagram Maa O Sishu Hospital Medical College, Chittagong, Bangladesh..*

Corresponding Author: Dr. Zabeen Choudhury

Abstract: *This cross sectional study, carried out in the Pediatric & Medicine wards of Chittagong Medical College Hospital (CMCH), Chittagong during the period of July 2012 to June 2013, aims to describe clinical profile of typhoid fever in children admitted in a tertiary care hospital, Chittagong, Bangladesh. We conducted this study with a total number of 150 suspected cases of typhoid fever (age >6 months to18years) admitted in the above mentioned hospital and enrolled in this study maintaining inclusion criteria. Majority (56.7%) of the patients, age was between 1-5 years and male to female ratio was 1.2:1. More than a half (56.0%) of the patients came from rural area. Most (62.7%) of the patients suffered from fever for ≤5 days, 50.7% had change of bowel habit, 38.7% had abdominal pain, 26.0% had diarrhea and 18.7% had constipation. One third (33.3%) of the patients had tongue coating, 19.3% had palpable liver, 7.3% had palpable spleen and only0.7% had caecal gurgling. The mean Hb was found 10.78±1.55 g/dl, TC 13018.44±6510.33/cumm, N was 67.78±15.61% L was 27.59±15.24% M was 2.57±0.93 %, E was 1.68±0.87 % and B was 0.31±0.54 %. Blood Culture for Salmonella typhi was found positive in 16(10.7%) patients out of whom only 1(6.25%) received typhoid vaccination. Antibiotic Sensitivity among culture positive patients revealed that, Azithromycin, Ceftriaxone and Imipenam were 100% sensitive followed by Cefixime 68.8%, Nalidixic acid 56.3%, & Chloramphenicol 38.35%. Almost half (47.3%) of the patients received pre admission antibiotic and among culture positive patients, 07(43.8%) received antibiotic during pre-admission period. In the conclusion, we can say that clinical profile can guide treatment of febrile patients and provide a good knowledge about specific disease patterns.*

Key words: *Clinical profile, suspected cases, typhoid fever*

Date of Submission: 25-10-2018 Date of acceptance: 06-11-2018

I. Introduction

Typhoid fever is an acute systemic infection caused by Salmonella enterica serotype Typhi or Paratyphi. This disease is endemic in most developing countries, including South and Southeast Asia, Central America and other countries which are populous, have high urbanization and a lack of proper hygiene and sanitation (Parry et al, 2002)[1]. The worldwide incidence of typhoid fever is estimated to be approximately 16 million cases annually, of which 7 million cases occur in Southeast Asia. More than 600,000 people die due to this disease each year (Ivanoff, 1995)[2].

Typhoid fever is generally considered a disease of school children and young adults, although there is evidence of a substantial disease burden in preschool children in some countries where disease is endemic (Sinha et al. 1999 and Brooks et al. 2005)[3]. Surveillance in India, Indonesia, Pakistan, Vietnam and China from the Diseases of the Most Impoverished (DOMI) study carried out by the International Vaccine Institute (IVI) found typhoid fever to be predominantly a childhood illness, with similar incidence rates in preschool and school-aged children (Ochiai et al. 2008)[4]. By contrast, in a recent study from Kathmandu, Nepal, the burden of disease was greatest in school-aged children and young adults, possibly because of a large transient workforce traveling from locations outside the city where exposure to the infecting organisms may be less common (Karkey et al. 2010)[5]. S. Typhi is the dominant cause of typhoid fever in most areas, although the proportion of infections attributed to S. Paratyphi A has been increasing in the north of the Indian subcontinent and China (Ochiai et al. 205 and Dong et al. 2010)[6]. ICDDR, B in 2001 conducted a study at Kamalapur in Dhaka and concluded approximate incidence of typhoid fever in our population documented by positive blood culture is 3.9

episodes per year per 1000 populations. The main symptom of this disease is fever with a step ladder pattern, followed by headache, malaise, anorexia, nausea, generalized aches and abdominal disturbances like discomfort, constipation or diarrhea. In severe cases intestinal bleeding and perforation can occur which may potentially be fatal. Disturbance in consciousness from apathy, delirium or coma may be present. Other symptoms, such as a coated tongue, enlargement of the liver and spleen, relative bradycardia and rose spots definitely support the diagnosis (Gill and Beeching, 2004)[7]. Strategies to control and eventually eliminate typhoid fever from an area include: improving the provision of clean water and adequate sanitation, the identification of carriers, and sustained vaccination programs (WHO 2008). For governments to make rational decisions about committing resources for this purpose, information concerning the burden of disease in the human population in defined areas is essential. The required information must include detecting the majority of cases. Case detection should incorporate those individuals that have been exposed but experienced an asymptomatic or mild infection that did not require medical attention and those that are transiently of chronically carrying the organism. There is a lack of current diagnostic tests that can serve any of these purposes (Crump and Mintz 2010)[8]. A rapid, simple, point-of-care test suitable for use in a healthcare center or outpatient clinic may fit the profile required for acute diagnosis.

II. Objectives

a) General objective

- To assess the clinical profile of typhoid fever in children aged between >6months to 18 years

b) Specific objectives

- To observe socio-demographic profile of typhoid fever in children, Chittagong, Bangladesh
- To know the laboratory parameters of typhoid fever in children Chittagong, Bangladesh

III. Methods and Materials

We conducted a Laboratory based descriptive cross sectional study during the period of July 2012 to June 2013 in Chittagong Medical College Hospital, Department of Pediatrics & Medicine. Suspected cases of typhoid fever (age >6 months to18 yrs) admitted in Pediatric & Medicine wards of CMCH were taken as study population. Clinically suspected patients of typhoid fever who were > 06 months to 18 years old and presented with ≥ 3 days of fever during the study period were eligible for enrollment. One hundred & fifty patients of such clinical Typhoid Fever cases were evaluated for the study. Parents of enrolled patients were asked to give informed written consent and answer a brief questionnaire about clinical signs and symptoms, antimicrobial treatment and history of typhoid fever and vaccination. Then under all aseptic precaution on the day of admission blood culture samples were collected (1ml. for children aged > 6months to <5years, 5ml for children aged 5 - < 15years and 8ml. for patients aged 15 – 18years) using pediatric bottle as appropriate. Bottles were incubated in the ßacT / Alert automated system for 5-7 days at a renowned well-equipped quality controlled clinical laboratory at Chittagong. Positive bottles were processed by preparing a smear for Gram stain and sub culturing onto sheep blood, chocolate and MacConkey agars. The sheep blood & chocolate agar was incubated in CO2 (candle jar) at 35 – 37c for 48hrs; the MacConkey agar in air for at 35-37c for 48hrs. Suspected colonies were identified by serological test. Antimicrobial sensitivity was assessed by the disc diffusion methods or E-test on a Muller-Hilton agar plate according to CLSI guidelines

Selection Criteria:

Inclusion Criteria:

1. Suspected (clinical) cases of typhoid fever admitted in Pediatrics & medicine wards of CMCH
2. Age limit > 6 months – 18 yrs

Exclusion Criteria:

1. Age >18 years & < 6 months.
2. Very critically ill and haemodynamically unstable patients.
3. Attendants of cases unwilling to give informed consent.

Sample size:

To determine the sample size the following formula was followed

$$n = \frac{z^2 pq}{d^2}$$

N= The desired sample size

z= Standard normal deviate usually set at 1.96
p= Proportion in the population (30.8% i.e. 0.308)
q= 1-p =0.692
Examination of the microbiology laboratory records showed that 30.8% (95% CI 26.8 - 35.1%) consecutive patients admitted to the hospital and investigated with a blood culture and a Widal test had a blood culture positive for S. typhi. (Parry et al. 1999)
d= Degree of accuracy which is considered as 0.05

According to this formula the targeted sample was 327.5 = 328. The duration of data collection in current study is only 6 months. So due to time constrain 150 patients of clinically suspected typhoid fever were taken in this study. Before conducting the study, we took permission from ethical committee of CMCH and took written consent from all respondents maintaining Belmont ethics criteria's. Patients data was evaluated meticulously using SPSS (Statistical package for social science) for windows. The measure of mean and Standard deviation was performed. Analysis of the significance of categorical variables was performed with the chi-square test. P value was obtained. A probable value of less than 0.05 was considered as significant. Data was presented by appropriate method by frequency table, bar chart & pie chart in a simplified manner.

IV. Results

Table I: Background characteristics of the study patients (n=150)

Age (years)	**Number of patients**	**Percentage**	Mean/±SD	Range
1-5	85	56.7	5.41/±3.53	1-15
6-10	52	34.7		
11-15	13	8.7		
Sex				
Male	83	55.3		
Female	67	44.7		
Residence				
Urban	66	44.0		
Rural	84	56.0		

Table 2: Distribution of the study patients according to clinical presentation (n=150)

Clinical presentation	**Number of patients**	**Percentage**
Fever (days)		
≤ 5	94	62.7
6-10	39	26.0
>10	17	11.3
Change of bowel habit	76	50.7
Constipation	28	18.7
Diarrhoea	39	26.0
Constipation followed by diarrhea	10	6.7
Abdominal Pain	58	38.7
Hematemesis/ melaena	0	0.0

Table 3: Distribution of the study patients according to physical examination (n=150)

Variable	**Number of patients**	**Percentage**
Tongue coating		
Present	50	33.3
Absent	100	66.7
Liver		
Palpable	29	19.3
Not Palpable	121	80.7
Spleen		
Palpable	11	7.3
Not Palpable	139	92.7
Caecal gurgling		
Present	1	0.7
Absent	149	99.3

Table 4: Pre-Admission Antibiotic and blood C/S among study participants (n=150)

Pre Admission Antibiotic	**Number of patients**	**Percentage**
Received	71	47.3
Not received	79	52.7
Blood C/S		
Blood C/S for Salmonella Typhoid	16	10.7
Negative	134	89.3

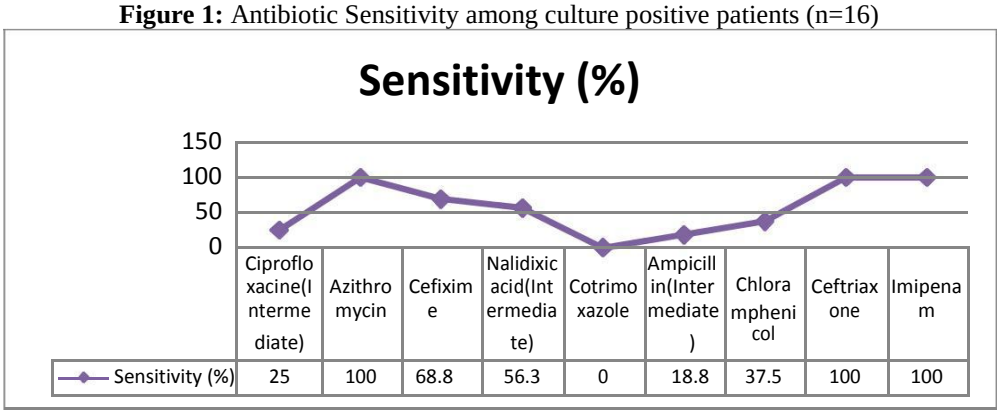
Table 5: Distribution of the study patients according to investigations (n=150**)**

Investigations	**Mean**	**±SD**	**Min**	**-max**
HB (g/dl)	10.78	±1.55	(5	-14.5)
TC (/cumm)	13018.44	±6510.33	(1060	-42000)
N (%)	67.78	±15.61	(25	-92)
L (%)	27.59	±15.24	(6	-72)
M (%)	2.57	±0.93	(1	-6)
E (%)	1.68	±0.87	(0	-6)
B (%)	0.31	±0.54	(0	-2)

Table 6: Pre- Admission Antibiotic and Typhoid vaccination among culture positive patients (n=16)

Pre Admission Antibiotic	Number of Patients	Percentage
Received	07	43.8
Not received	09	56.2
Typhoid vaccination		
Received	1	6.25
Not received	15	93.75

Figure 1: Antibiotic Sensitivity among culture positive patients (n=16)



V. Discussion

In this current study it was observed that the mean age was found 5.41±3.53 years varied from 1 to 15 years and more than a half (56.7%) of the patients belonged to 1-5 years. Naheed et al. (2008) showed 57.0% of their studied patients by 5 years old, which is comparable with the current study. Similarly, House et al. (2001) found the median age was 7 years of the typhoid patients with IQR was 5 to 14 years. Choo et al. (1994) included one patient with typhoid fever in the birth to l-year age group, three patients in the 1 to 2 year age group and 38 patients in the >2 year age group. In another study, Kawano et al. (2007) showed the mean age was 2.5 years, which is lower than the current study. On the other hand, House et al. (2001) has observed the median age 18 years with interquartile range [IQR] 11 to 26 years. Similarly, Tam et al. (2008) showed the typhoid patients aged from 11 to 43 years with median age 24.5 years, which is higher than the current study. In this present study it was observed that typhoid fever was more common in male subjects. Male was found 55.3% and female 44.7% and male to female ratio was 1.2:1, which is consistent with Mathura et al. (2005) study, where they found male to female ratio of almost 3.1, Similar observation was also found by House et al. (2001); Kawano et al. (20070 and Nagshetty et al. (2010) where all the above authors found typhoid fever to be predominant in male subjects. We observed that more than a half (56.0%) of the patients came from rural area and 44.0% came from urban area. In this present series it was observed that only 6.25% patient received typhoid vaccine and rest of the patients didn't received vaccine. We observed that those majority (62.7%) patients suffered from fever upto 5 days, 26.0% had fever for 6 – 10 days and 11.3% had > 10 days of fever. Choo et al.(1994) showed the mean duration of fever was 8.5 days. Similarly, House et al. (2001) obtained that the median duration of illness for the typhoid patients was 8 days with IQR from 5 to 14 days. In another study Tam et al. (2008) found 14 culture-confirmed typhoid patients who had fever for 4 days range from 1–21 days. Gasem et al. (2002) obtained the mean duration of fever before admission was 10.5±4.9 days range from 5 to 35 days. Most culture-confirmed typhoid fever patients (65; 71.4%) were admitted during the second week of illness, 13(14.3%) during the first week and another 13 (14.3%) after the second week of illness. Hatta et al. (2002) found 43.5% confirmed typhoid cases in patients with 4 - 6 days of fever prior to admission to the hospital and laboratory testing, 92.9% typhoid cases in patients with 7 - 9 days of fever, and 100% typhoid cases in patients with > 9 days of fever. Abdoel et al. (2007) found 30.8% patients as typhoid cases from samples collected during the first 4 - 5 days of illness to 45.5% typhoid cases from samples collected between 7 to 9 days of fever, and 84.6% cases from the samples collected more than 9 days of onset of fever. All these results are comparable with the present study regarding the duration of illness.

We observed that more than a half (50.7%) of the patients had change of bowel habit, 38.7% had abdominal pain, 26.0% had diarrhoea and 18.7% had constipation. Mathura et al. (2005) found abdominal pain in 26.1% patient, 20.3% patient had diarrhea while 13% patient complained of constipation. One third (33.3%) of our patients had tongue coating, 19.3% had palpable liver, 7.3% had palpable spleen and 0.7% patient had caecal gurgling. Hatta et al.(2002) found palpable liver (19.2%) more than palpable spleen (13.5%) in their study patients. These observations are consistent with our study. We observed that the mean Hb was 10.78±1.55 g/dl varied from 5 to 145 g/dl, TC was 13018.44±6510.33/cumm with range from 1060 to 42000 /cumm, N was 67.78±15.61% with range from 25 to 92%, L was 27.59±15.24% with range from 6 to 72 %, M was 2.57±0.93 % with range from 1 to 6 %, E was 1.68±0.87 % with range from 0 to 6 %, B was 0.31±0.54 % with range from 0 to 2 %.

In this present study it was observed that positive blood C/S for salmonella typhi was found in 10.7% cases. In a super-speciality children hospital at New Delhi done by Manchanda et al. (2006) showed that a total of 56 S. typhi and five S. paratyphi isolates were obtained among the 673 blood culture cases that comprises 8.3% of culture positivity in their study, which is comparable with the current study. Krishnan et al. (2009) found in their study that 70% and 30% of the isolates were Salmonella enterica serovar typhi and Paratyphi A, respectively. The diagnosis of typhoid fever was confirmed in 47.0% of 97 cases by the isolation of S. typhi on blood and/or bone marrow cultures observed by Bhutta and Mansurali (1999). In another study, Abdoel et al. (2007) found 42.5% culture-positive patients in their study. The final diagnosis was based on a positive blood culture in 118 (65.9%) patients and on clinical symptoms and signs consistent with typhoid or paratyphoid fever in 61 (34.1%) patients found by Hatta et al. (2002). In this present study it was observed that almost half (47.3%) of the patients received antibiotic during pre-admission period and 43.8% of the culture positive patients had history of prior antibiotic intake.

VI. Conclusion

This study was undertaken to observe the clinical profile of typhoid fever in children admitted in a tertiary care hospital. Typhoid fever remains to be as an endemic disease in this locality. All the signs and symptoms of the disease are nonspecific common with other acute febrile illnesses; a definitive diagnosis of the disease is required for treatment and to prevent transmission.

VII. Limitations of the study

The study population was selected from one selected hospital in Chittagong, so that the results of the study may not be reflect the exact picture of the country. The present study was conducted at a very short period of time. Small sample size was also a limitation of the present study. Therefore, in future further study may be under taken with large sample size.

VIII. Recommendations

In future further study may be under taken with large sample size where include PCR method. PCR method much superior to other method yielding very high sensitivity and specificity. Although the PCR method requires extensive infrastructure and specialized skilled personnel, and cannot be made available everywhere, especially in developing countries, it can be made available to the reference centres for utilizations by other healthcare facilities following referral system. So it is strongly recommended to take necessary steps for setup and start PCR at least in the tertiary care hospitals.

References

[1]. Parry, C.M., Hien, T.T., Dougan, G., White, N.J., Farrar, J.J., 2002. Typhoid fever. N Engl J Med, 347, pp.1770-80.
[2]. Ivanoff, B., 1995. Typhoid fever: global situation and WHO recommendations. Southeast Asian J Trop Med Public Health, 26,(2), pp. 1-6.
[3]. Sinha, A., Sazawal, S., Kumar, R. et al. 1999. Typhoid fever in children aged less than 5 years. Lancet, 354, pp.734−737.
[4]. Ochiai, R.L., Acosta, C.J., Danovaro- Holliday, M.C. et al. 2008. A study of typhoid fever in five Asian countries: disease burden and implications for control. `Bull. World Helath Organ, 86, pp.260–268.
[5]. Ochiai, R.L., Wang, X.Y., von Siedlein, L., et al. 2005. Salmonella Paratyphi A rates, Asia. Emerg. Infect. Dis, 11, pp. 1764–1766.
[6]. Karkey, A., Arjyal, A., Anders, K.L. et al. 2010. The burden and characteristics of enteric fever at a healthcare facility in a densely populated area of Kathmandu. Plos ONE, 5, p.e13988.
[7]. Gill, G.V., Beeching, N.J., 2004. Typhoid and paratyphoid fever, Lecture notes on Tropical Medicine. Oxford: Blackwell Publishing, pp.245-51.
[8]. Crump, J.A., Mintz, E.D., 2010. Global trends in typhoid and paratyphoid fever. Clin. Infect. Dis, 50, pp.241–246.
[9]. Khosla, S.N., 1992. Severe typhoid fever: an appraisal of its profile. In: Nelwan RHH, ed. Typhoid fever: Profiled, diagnosis and treatment in the 1990s. Jakarta: Acta Medica Indonesia, pp. 51-82
[10]. Naheed, A., Ram, P.K., Brooks, W.A., Mintz, E.D., Hossain, A., Parsons, M.M., Luby, S.T., Breiman,R.F et al. 2008. Clinical value of Tubex™ and Typhidot® rapid diagnostic tests for typhoid fever in an urban community clinic in Bangladesh. Diagnostic Microbiology and Infectious Disease,61,pp.381-386
[11]. House, D., Chinh, N.T., Diep, T.S., et al. 2005. Use of paired serum samples for serodiagnosis of typhoid fever. J. Clin. Microbiol, 43, pp.4889–4990.
[12].

[12] House, D., Wain, J., Ho, V., Diep, T., Chinh, N.T., Bay, P. et al. 2001. Serology of Typhoid Fever in an Area of Endemicity and Its Relevance to Diagnosis. Journal of Clinical Microbiology, p.1002-1007.
[13] Choo, K.E., Davis, T.M., Ismail, A., Tuan Ibrahim, T.A., Ghazali, W.N., 1999. Rapid and reliable serological diagnosis of enteric fever: comparative sensitivity and specificity of Typhidot and Typhidot-M tests in febrile Malaysian children. Acta Trop, 72, pp. 175−183.
[14] Choo, K.E., Oppenheimer, S.J., Ismail, A.B., Ong, K.H., 1994. Rapid serodiagnosis of typhoid fever by dot enzyme immunoassay in an endemic area. Clin. Infect. Dis, 19, pp. 172–176.
[15] Nagshetty, K., Channappa, S.T., Gaddad, S.M. 2010. Antimicrobial susceptibility of Salmonella Typhi in India. J Infect Dev Ctries, 4(2), pp. 070-073.
[16] Gasem, M.H., Keuter, M., Dolmans, W.M.V., van der Ven-Jongekrijg, J., Djomoeljanto, R., van der Meer, J.W.M., 2003. Persistence of salmonellae in blood and bone marrow: Randomised controlled trial comparing ciprofloxacin and chloramphenicol treatments in against enteric fever. Antimicrob. Agents Chemother, 47, pp. 1727–1731.
[17] Gasem, M.H., Smits, H.L., Gqris, M.G.A and Dolmansf, W.M.V., 2002. Evaluation of a simple and rapid dipstick assay for the diagnosis of typhoid fever in Indonesia. J. Med Microbiol, 51, pp.173-177.
[18] Abdoel, T.H., Pastoor, R., Smits, H.L., Hatta, M., 2007. Laboratory evaluation of a simple and rapid latex agglutination assay for the serodiagnosis of typhoid fever. Transactions of the Royal Society of Tropical Medicine and Hygiene, 101,pp.1032-1038.
[19] Krishnan, P., Stalin, M., Balasubramanian, S., 2009. Changing trends in antimicrobial resistance of Salmonella enterica serovar typhi and salmonella enterica serover parathyphi A in Chennai. Indian J Pathol Microbiol, p.1.
[20] Tam, F.C.H., Lim, P.L., 2003. The TUBEX typhoid test based on particle-inhibition immunoassay detects IgM but not IgG anti-O9 antibodies. Immunol. Methods, 282, pp.83–91.
[21] Anusha, R, Ganesh, R and Lalitha, J., 2011. Comparison of a rapid commercial test, Enterocheck WB, with automated blood culture for diagnosis of typhoid fever. Annals of Tropical Paediatrics: International Child Health, 31(3), pp. 231-234.
[22] Banchuin, N., Appassakij, H., Sarasombath, S., et al. 1987. Detection of Salmonella Typhi protein antigen in serum and urine: a value for diagnosis of typhoid fever in an endemic area. Asian Pac J. Allergy Immunol, 5, pp. 155–159.
[23] Bhutta, Z.A and Mansurali, N., 1999. Rapid Serologic Diagnosis Of Pediatric Typhoid Fever In An Endemic Area: A Prospective Comparative Evaluation Of Two Dot-Enzyme Immunoassays And The Widal Test. Am. J. Trop. Med. Hyg, 61,4,pp. 654-657.
[24] Manchanda V, Bhalla P, Sethi M, Sharma VK. Treatment of enteric fever in children on the basis of current trends of antimicrobial susceptibility of Salmonella enterica serovar typhi and paratyphi A. Indian J Med Microbiol. 2006 Apr;24(2):101-6.

Dr. Zabeen Choudhury. "Clinical profile of Typhoid fever in children aged between 6 months to 18 years: A study in a tertiary care hospital, Chittagong, Bangladesh" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 11, 2018, pp 45-50.