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Original article:

Incidence of typhoid fever in a tertiary care hospital in Panipat district

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Abstract:

Purpose: This study was undertaken to detect the incidence of typhoid fever among patients visiting a tertiary care hospital, Panipat. Typhoid or enteric fever caused by *Salmonella typhi* (*S. typhi*) is an important human pathogen responsible for typhoid fever. Most of these cases were treated with effective antibiotics, although the case fatality rate remains at about 1% such that about 130,000 typhoid deaths occur yearly. The antibiotic resistance becomes a challenge for effective treatment of typhoid due to the spread of multi-drug resistant strains.

Materials and Methods: This is a prospective and experimental study were conducted on 550 febrile patients in which patients were screened for typhoid fever and suspected patients enrolled in the study, the blood samples collected in plain sterile tube after taking informed consent from patient (from parents in case age below 18 years).

Results: A total of 550 febrile patients attending tertiary care centre were enrolled for this study. The incidence of typhoid fever in our study was 19.64%. The male to female ratio was 1:2 (36 males and 72 females). Outpatient department (OPD) and Inpatient department (IPD) wise distribution was 69.44% and 30.56% respectively. Age wise distribution – maximum incidence of typhoid fever was recorded in the age group 41 to 70 years followed by 11 to 30 years and lowest in age group 71 and above.

Conclusion: The incidence of typhoid fever in our study was 19.64%. It is difficult to diagnose the typhoid fever clinically because the symptoms are diverse and similar to those observed with other febrile illnesses. This is a reason for the preference for Widal test.

Keywords: Widal test, Salmonella typhi, Fever, Laboratory diagnosis, Antigen, Panipat.

INTRODUCTION:

Typhoid or enteric fever caused by *Salmonella enterica* serovar typhi (*S. typhi*) is an important human pathogen responsible for typhoid fever. The burden of the disease was estimated around 12 million cases annually worldwide for the year 2010.[1,2] Most of these cases were treated with effective antibiotics, although the case fatality rate remains at about 1% such that about 130,000 typhoid deaths occur yearly. The antibiotic resistance becomes a challenge for effective treatment of typhoid due to the spread of multi-drug resistant strains[3]. Increased incidence of S. *paratyphi* A in some countries is a major cause of enteric fever[4]. This serovar is not prevented by currently available typhoid vaccines and represents an increasing threat to human health[5].

Incidence of typhoid and paratyphoid fever varies geographically. Highest incidence reported from South-Central and South-East Asia, 100 cases per 100,000 persons annually for typhoid and lower (variable) for paratyphoid. A study reported that the annual incidence of typhoid fever per 100,000 children in age group of 5 to 15 years was 180,

413 and 494 in North Jakarta (Indonesia), Karachi, (Pakistan) and Kolkata (India) respectively[6]. However, the annual incidence of paratyphoid fever was considerably lower, with the highest annual incidence reported from Pakistan of 72 per 100,000 children age group 2 to16 years[7]. There is a wide variation of reports of incidence of typhoid fever in India and other countries. This can be due to impurity of drinking water, poor sanitation, inadequate hygiene practices, low socio-economic status and knowledge about healthcare and public health practices[5].

The outbreaks of the disease may occur due to consumption of food or water contamination with the bacterium, in which case locally-specific risk factors or exposures may be identified e.g. eating milk products from a sweet shop. In some instances the originating infection may be a chronic carrier who persistently sheds the bacterium as a result of infection of the gall bladder. Chronic carriage occurs following primary infection in approximately 2–5% of cases in the absence of antibiotic treatment and is strongly dependent on age and sex. However, the contribution of chronic carriers to typhoid transmission in endemic regions is unknown[5].

AIM AND OBJECTIVES:

1. To study the incidence of typhoid fever in a tertiary care centre.
2. Age and sex wise correlation of typhoid fever.

MATERIALS AND METHODS:

1. Study area and period:

This is a prospective and analytical study for Widal slide agglutination test carried out over a period of 6 month from September 2016 to February 2017 at the Serology Laboratory of Department of Microbiology, N. C. Medical College and Hospital, Panipat, India. N. C. Hospital, the tertiary care hospital in India, is located in Panipat, Haryana. It has 300 beds.

2. Study design and patients population:

This is a prospective and experimental study were conducted on 550 febrile patients in which patients were screened for typhoid fever and suspected patients enrolled in the study, the blood samples collected in plain sterile tube after taking informed consent from patient (from parents in case age below 18 years). All these cases were being investigated for their febrile illness and information concerning the duration of illness before admission, presenting complaints, clinical signs and symptoms and personal details of each case was recorded on a proforma. Clinical signs and symptoms defined by the Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA in the case definition of typhoid fever were used for clinical diagnosis of typhoid fever cases[8].

3. Ethical clearance: The project was reviewed and approved by Ethical committee of N.C. Medical College and Hospital, Israna, Panipat, Haryana, India.

4. Inclusion criteria: All febrile suspected patients will be included.

5. Exclusion criteria: 1. Patients received antibiotic treatment for typhoid.

2. Diagnosed for other fever such as dengue and malaria.

6. Widal test:

Qualitative slide agglutination was performed using febrile antigen kits of *Salmonella typhi*. The slide agglutination test is used as a screening test for the presence of anti O and anti H antibodies in the patient's serum. For the slide agglutination test a drop of *Salmonella typhi* O and H antigens are added on a drop of serum on card and rotated at

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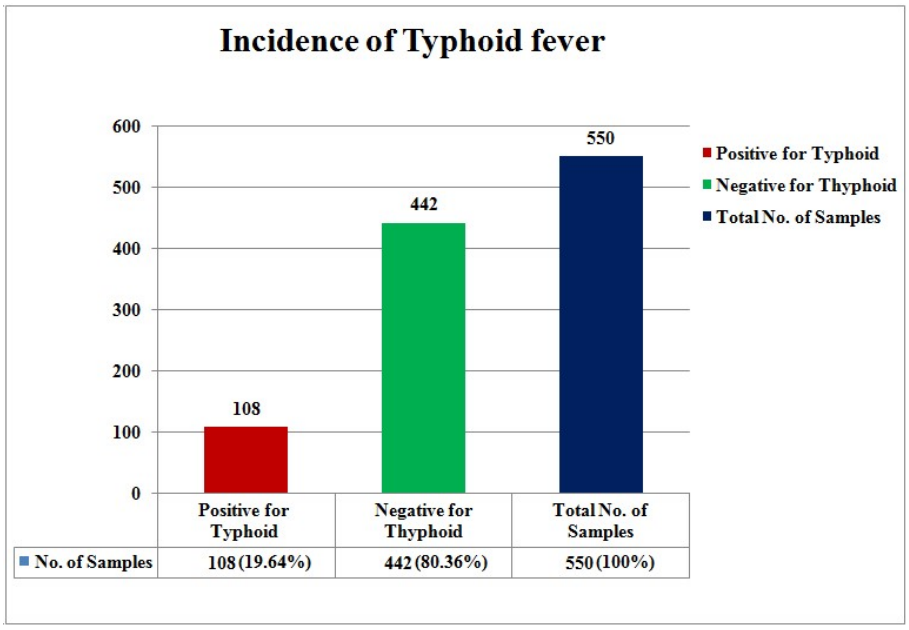
100 rpm for one minute and reported as reactive or non reactive. For those slide agglutinations whose results are reactive and weakly reactive titer was determined.

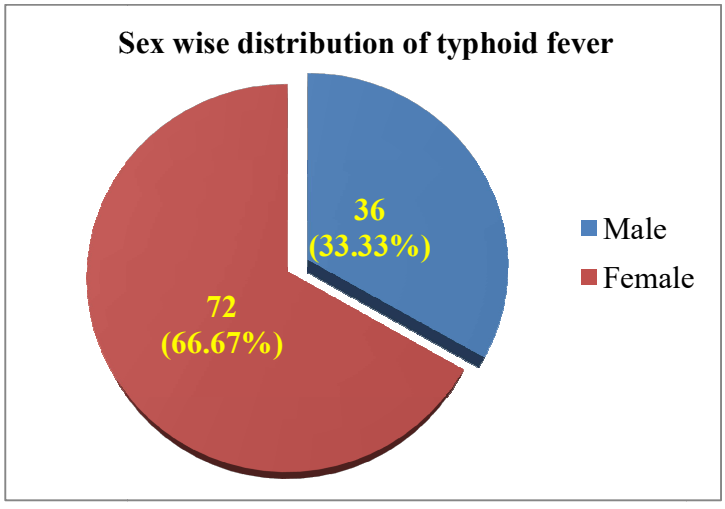
RESULTS:

The present study was undertaken for incidence of typhoid fever in and around Panipat district, Haryana. A total of 550 febrile patients attending tertiary care centre were enrolled for this study. The incidence of typhoid fever in our study was 19.64%. (Graph 1)



Graph 1. Showing incidence of typhoid fever.

The male to female ratio was 1:2 (36 males and 72 females). (Graph 2)



Graph 2. Showing Sex wise distribution of typhoid fever.

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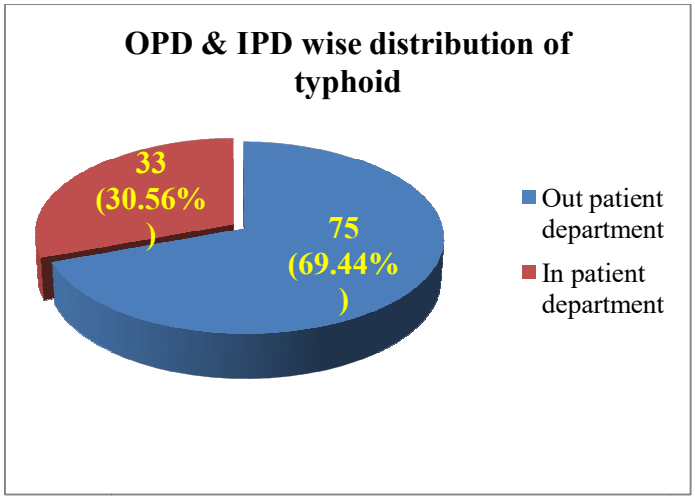
Outpatient department (OPD) and Inpatient department (IPD) wise distribution was 69.44% and 30.56% respectively. (Graph 3)



Graph 3. Showing ward wise distribution of Typhoid fever.

Age wise distribution – maximum incidence of typhoid fever was recorded in the age group 41 to 70 years followed by 11 to 30 years and lowest in age group 71 and above. (Table 1)

Table 1. Showing age wise distribution of typhoid fever.

Age group (in years)	Positive	Total No. of Samples	Percentages
0 - 10	9	41	21.95%
11 - 20	23	93	24.73%
21 - 30	25	101	24.75%
31 - 40	15	69	21.74%
41 - 50	15	52	28.85%
51 - 60	14	47	29.79%
61 - 70	6	23	26.09%
71 & above	1	16	6.25%

DISCUSSION:

Widal test has been used for over a century in developing countries for diagnosis but it has been reported to have low sensitivity, specificity and positive predictive value [9-10].

In developing countries like India and others typhoid fever remains major public health burden. The diagnosis can be made by isolation of *Salmonella typhi* mainly from blood and faeces, identification and drug sensitivity testing

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takes 48 to 72 hours or more than that for results. However, the rapid test such as Widal slide test is an agglutination based method and it is useful in rapid diagnosis of typhoid or paratyphoid fever in early phase of illness[11].

In developing countries, the set up for culture and drug sensitivity testing are available at very few places. In many hospitals, the treatment of patient starts on the basis of clinical diagnosis and rapid test such as Widal slide test. Now days Widal test very extensively used in serodiagnosis of typhoid fever in developing countries particularly. However, the test is difficult to interpret in areas where *S. typhi* is endemic when basal titre of the population is not known. Further, in areas where occurrence of fever is common due to other infection, in that case false positive reactions may occur [12].

Early and accurate diagnosis can revealed the etiological agent which is responsible for typhoid fever, also identify the person who acted as a carrier that can transfer the infection among individuals and may favour outbreaks of enteric fever[13].

The present study was undertaken for incidence of typhoid fever in and around Panipat district, Haryana. A total of 550 febrile patients attending tertiary care centre were enrolled for this study. The incidence of typhoid fever in our study was 19.64%. (Graph 1).

Sharma A et al.[14] from Rohtak (Haryana), reported prevalence 9.7% in 2012 to 12.1% in 2014, similar study also reported by Kumar et al. 2008[15] and Banerjee et al. 2014[16]). They reported that increase in seropositivity can be attributed to the increasing population and poor hygienic conditions prevailing in the region. Since this is largely a preventable disease, health education must be imparted to people regarding safe hygienic practices and the available vaccination strategies. However, a study reported by Jose WPM and Savio R on 50 suspected cases of typhoid fever, out of which Widal test was 100% positive, blood culture 16% positive and Enterocheck WB was 90% positive.[17]

Maximum of the positive cases were patients of the age group 15-30 years. Sharma A et al. from Rohtak (Haryana), reported Slight male preponderance was seen with a male to female ratio of 1.16, during the study period.[14]

The male to female ratio was 1:2 (36 males and 72 females). (Graph 3), outpatient department (OPD) and Inpatient department (IPD) wise distribution was 69.44% and 30.56% respectively. (Graph 2). Age wise distribution – maximum incidence of typhoid fever was recorded in the age group 41 to 70 years followed by 11 to 30 years and lowest in age group 71 and above. (Table 1),

LIMITATION OD THE STUDY:

A high rate of false positives results in over diagnosis of typhoid fever leading to a worsening of antibiotic resistance in the country. Therefore the results of this test must be interpreted with caution taking into account the patients clinical details and history of vaccination etc. thus emphasizing the importance of laboratory clinic communication. A highly specific and sensitive diagnostic test is therefore urgently required to contribute to better health in endemic resource poor settings where access to highly trained laboratory workers with adequate time is rare.

CONCLUSION:

The incidence of typhoid fever in our study was 19.64%. It is difficult to diagnose the typhoid fever clinically because the symptoms are diverse and similar to those observed with other febrile illnesses. It is a time taking process for isolation, identification of *Salmonella typhi* or *Salmonella paratyphi* from the patient samples (up to 7

days). However, the clinician may prescribe antibiotics to patients prior to a sample collection; bacteria may isolate from the blood cultures in very few cases. This is a reason for the preference for Widal test.

REFERENCES:

1. Buckle GC, Walker CL, Black RE (2012) Typhoid fever and paratyphoid fever: Systematic review to estimate global morbidity and mortality for 2010. J Glob Health 2: 010401
2. Mogasale V, Maskery B, Ochiai RL, Lee JS, Mogasale VV, et al. (2014) Burden of typhoid fever in low-income and middle-income countries: a systematic, literature-based update with risk-factor adjustment. Lancet Global Health 2: E570–E580. doi: 10.1016/S2214-109X(14)70301-8
3. Wain J, Hendriksen RS, Mikoleit ML, Keddy KH, Ochiai RL (2014) Typhoid fever. The Lancet.
4. Crump JA, Mintz ED (2010) Global Trends in Typhoid and Paratyphoid Fever. Clinical Infectious Diseases 50: 241–246. doi: 10.1086/649541
5. John J, Van Aart CJ, Grassly NC (2016). The burden oftyphoidand paratyphoid in India: systematic review and meta-analysis. PLoS Negl. Trop. Dis. 10:e0004616. 10.1371/journal.pntd.0004616
6. Ochiai RL, Acosta CJ, Danovaro-Holliday MC, Baiqing D, Lhattacharya SK, et al. (2008) A study of typhoid fever in five Asian countries: disease burden and implications for controls. Bulletin of the World Health Organization 86: 260–268.
7. Ochiai RL, Wang XY, von Seidlein L, Yang J, Bhutta ZA, et al. (2005) Salmonella paratyphi A rates, Asia. Emerging Infectious Diseases 11: 1764–1766.
8. Case definitions for infectious conditions under public health surveillance. Centers for Disease Control and Prevention. MMWR Recomm Rep. 1997; 46(RR-10): 1-55.
9. Sherwal Bl, Dhamija RK, Randhawa VS, Jais M, Kaintura A, Kumar M. A comparative study of Typhidot and Widal test in patients of Typhoid fever. JIACM. 2004; 5:244-6.
10. Begum Z, Hossain Md A, Shamsuzzaman AKM, Ahsan Md M, Musa AKM, Mahmud Md C, et al. Evalutaion of Typhidot(IgM) for Early Diagnosis of Typhoid fever. Bangladesh J Med Microbiol. 2009; 3:10-3.
11. Sherwal BL, Dhamija RK, Randhawa VS, Jais M, Kaintura A, Kumar M. A comparative study of typhiDot and Widal test in patients of Typhoid fever. J Indian Acad Clin Med 2004; 5(3): 244-6.
12. Pang T, Puthucheary SD. Significance and value of Widal test in the diagnosis of typhoid fever in an endemic area. J Clin Pathol 1983; 36:471-475.
13. Gopalakrishnan V, et al. Typhoid fever in Kuala Lumpur and a comparative evaluation of two commercial diagnostic kits for the detection of antibodies to*Salmonella typhi*. Singapore Med J2002;43:354-8.
14. Sharma A, Bala K, Agarwal S and Chaudhary U. Seroprevalence of *Salmonella typhi* in a Tertiary Care Facility in North India, Int.J.Curr.Microbiol.App.Sci (2015) 4(5): 946-949.
15. Kumar, S., Rizvi, M., & Berry, N. Rising prevalence of enteric fever due to multidrug-resistant Salmonella: an epidemiological study. J Med Microbiol 2008; 57(10):1247-1250.
16. Banerjee T, Shukla BN, Filgona J, Anupurba S, Sen MR. Trends of typhoid fever seropositivity over ten years in north India. Indian J Med Res 2014;140:310-313.
17. Jose WPM, Savio R. Evaluation of Enterocheck WB - a rapid test for diagnosis of typhoid fever. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), 2013; 11:6, 48-51.