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ASSESSMENT OF PREVALENCE, DIAGNOSTIC TESTS AND PRESCRIPTION TRENDS OF TYPHOID FEVER IN CHILDREN BELOW 12 YEARS IN SIALKOT, PAKISTAN

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Abstract

The main objective of study is to assess the prevalence of typhoid fever in children below 12 years, diagnostic tests and prescription trends.Typhoid fever is leading cause of sickness and deathworldwide among the children and adolescents.*Salmonella typhi* is main causative agent of typhoid fever.Incubation period of typhoid fever is 10-14 days. The typhoid fever is associated with poor sanitation and use of contaminated food and water. Prevalence of typhoid fever in Asia is due to less approach to typhoid vaccines. The Peak incidence is reported to occur in children between 5-15 years of age. In 2000, it was estimated that over 2.16 million episode of typhoid occurred worldwide, resulting in 216000 deaths. Typhidotis most commonly used diagnostic testdue to rapid, easy to perform and more reliable test for typhoid fever as compared to Widal test. Widal testshows less predictive value due to association with geographical areas. The therapeutic regimen of typhoid fever involves the use of Ceftriaxone, Ibuprofen or Paracetamol and paeds solution,although Azithromycin is more effective for treatment of uncomplicated typhoid fever. Present study involves multistage clinical study in randomized recruited 50 patients below 12 years of age including both male and female in district hospital Sialkot, Pakistan. At the end, our research concluded that prevalence of typhoid fever is more in males than females between age groups of 7-11 years and Typhidot is most commonly used test for diagnosis of typhoid fever. However, Ceftriaxone is the most commonly prescribed drugs in typhoid patients.

Keywords: *Typhoid fever, prevalence, diagnostic tests, prescription trends.*

Introduction

Typhoid fever is a systemic infection that is caused by *Salmonella* serotypes which commonly effectshumans particularly Salmonella enteric serovar Typhi (*S.typhi*), Paratyphi A, B and C [1]. Salmonella genus is one of the frequent causes of food-borne infectious disease in the world. A characteristics feature of this organism is its wide host range which comprises most animal species including mammals, cold blooded animals and human beings [2]. Typhoid fever remains a major health problem in developing countries. Human beings are the host of typhoid fever caused by *Salmonella typhi*[3]. Salmonellosis infections are the second common cause of bacterial food-borne illness in US i.e. 95% of cases. Salmonellosis are associated with the use of contaminated meat, poultry, eggs, milk and sea food [4].

The classical findings of typhoid fever include rose spots, bradycardia and stepwise fevers. The gastrointestinal manifestations may include diffuse abdominal pain, bleeding pain, bleeding, perforations and cholecystitis [5].The diagnosis of typhoid fever based on following factors: clinical symptoms, sign serological marker, bacterial culture and antigen detection although no oneshows satisfactory results. The detection of organism from bone marrow, blood and stool currently the most reliable method [6]. Typhidot (dot-EIA)is simple, commercially available and rapid serological diagnostic test. The dot-enzyme immune assay is relatively new serological test based on the presence of IgM antibodies. Typhidot (IgM) become positive as early as first week of fever and result can be interpreted visually and available within 1 hour [7]. Now most widely immunological assay is the Widal test for serum antibodies to H and O antigen. In endemic area of the world whereprevalence of typhoid fever was common, Widal test found to be sensitive but does not shown effectiveness in specific city [8]. The chloramphenicol(chloromycetin) has been drug of choice for typhoid fever for 40 years but the wide spread emergence of multidrug resistance (MDR),*Salmonella typhi* (resistant to ampicillin, cloramphenicol and trimethoprim- sulphamethoxazole) has necessitate the search for other therapeutic regimen. Floroquinolones are not approved for use in children due to potential damage cartilage in growing bones. Children and adults with MDR typhoid fever have been successfully treated with Cefrtiaxone, Cefixime and Aztreonam [9]. The World Health Organization recommends the fluoroquinolones or cefixime for the treatment of MDR typhoid fever and Azithromycin. 3rd generation cephalosporin of 10-14 days of course of high-dose than older generation fluoroquinolones (e.g Ofloxacin or ciprofloxacin)are recommended for treatment of Nalidixic acid resistant typhoid fever[10]. Improvementsin the provision of clean water and sanitation are critical to reduce the burden of typhoid fever. The use of combination chemotherapy, availability of cheap, new active drugs and vital use of effective low-cost vaccination are useful strategies. In Thailand yearly vaccination program for school children have dramatically reduced the incidence of typhoid fever. The routine useof washing vegetables and using a latrine for defecation has found to be protective. While living in crowded household independently is associated with typhoid fever.The overcrowding probably represents a greater opportunity for person-to-person transmission [11]. The prevalence of typhoid is more in males than females because male population is more exposed for working. The other reasons are greater mobility, social behavior, lack of immunity due to lack of previous exposure etc. for more prevalence of typhoid in males[12].

Materials and methods

Study sample and its recruitment:

It was randomized control trial clinical study involving 50 patients below 12 years of age suffering from typhoid among residents in district of Sialkot and eligible to take part during relevant phase of data collection. Different hospitals of Sialkot were visited for data collection (patient profile, patienthistory, and patient consent form laboratory findings). Written or verbal consent was taken from the patient and encourage participating in study. Proforma was filled for each patient and data collection on work sheet was done. The patients of different age groups were divided in three subgroups of age i.e. 0-6, 7-11 and 12. The subjects (male and female) of all socioeconomic level age below 12 years in wide range of community of Sialkot. The number of

maleand female patients included in our studies were 33 (66%) &17 (34%) respectively.***Study Design/ Type of study:***

It was multicenter randomized controlled trial study for determining prevalence in both male and female patients, to assess the efficacy of various medicines prescribed and the various diagnostic tests used for typhoid fever.

Methods of Data collection:

Data was collected with the use of Proforma by taking face to face interview. Proforma was used to record patient medical history and physical examination. The patients were included in study by taking verbal/written consent form in English counter signed by patients/guardian and pharmacist. The informed consent was obtained from all study subjects. Different hospitals of Sialkot, Punjab, Pakistan, were visited. The patients were recruited for study were febrile patients with symptoms clinically compatible with typhoid fever and therefore with typhoid fever as a provisional diagnosis.

Patients with fever and gastrointestinal symptoms such as anorexia, nausea, vomiting, diarrhea and abdominal pain were enlisted that is also accompanied by other symptoms such as headache, fatigue, malaise or cough. The patients with morbidity conditions and aged above 12 years were not included in our study.

Selection criteria for study:

The patient with age below 12 years and positive results of diagnostic tests were included in our study. The patients that were unwilling to participate in investigation process and above the age 12 years were excluded from the study.

Data Analysis:

Analyses were performed by using the Microsoft Excel 2007 spreadsheets and various statistical modelssuch as graphical presentation and table charts. For each assay, we estimated the percentage of prevalence by comparing with various parameters like gender, age groups, diagnostic tests and prescription trends.

Results

In order to assess the prevalence of typhoid fever, prescription errors, effectiveness of therapy, monitoring the level of compliance in different age groups of patients,data of 50 male and female patients below 12 years in different hospitals of Sialkot were statistically compare. The prevalence rate of typhoid is more in males than females.Utility (Percentage) of typhidot test wasin 49 patients (98%) out of 50 patients and Widal test was 1 patient (2%) according to our research data.

Discussion:

Widal test was used for a century in developing countries for diagnosing typhoid fever as it has low sensitivity, specificity and positive predictive value, sharing antigen H and O by salmonella serotypes and other member of Enterobacteriaceae species. While typhoid test is reliable new inexpensive and safeavailable in many areas with reports of higher specificity and sensitivity [13]. Percentage usage of Ceftriaxone, Ibuprofen, Paracetamol was 96%, 58%and 24% respectively.

Because it was proved that Ceftriaxone as Cephalosporins is safe and effective evaluated in clinical trials of typhoid fever, Cefoperazone and Cefotaxime have also proved effective. The peak drug levels of Ceftriaxone of > 140 microgram/mililitre and trough level of > 22 microgram/mililitre provide unbound concentration as it is safe to use, including children, was slowly bactericidal against Salmonella typhi for 7-14 days [14]. The results were shown in percentage table [4.1, 4.2, 4.3] and Figures [4.1, 4.2, 4.3].

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Compliance with ethical standards

Competing Interests. The authors state no competing interests

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Table 4.1: Percentage Prevalence of Typhoid Fever in Male and Female Patients

Sr.No.	Gender	Total no. of patients (n)	Sample Size	Percentage Prevalence (%)
1	Male	50	33	66
2	Female	50	17	34

Table 4.2: Percentage Prevalence of Diagnostic Tests used in Typhoid patient

Sr.No.	Diagnostic Tests	Total no. of patients	Sample size	Percentage Prevalence (%)
1	Typhoid test	50	49	98
2	Widal test	50	1	2

Table 4.3: Percentage of Medicines used in Typhoid Patients

Sr.No.	Medicines	Frequency (n)	Drug percentage in prescriptions (n=50)
1	Clarithromycin	1	2
2	Ampiciilin		
3	Amoxicillinclavulanate		
4	Cefixime		
5	Acefylline	2	4
6	Diphenhydramine		
7	Metronidazole		
8	Azithromycin	4	8
9	Ciprofloxacin	5	10
10	Domperidone	7	14
11	Ranitidine	7	14
12	Paracetamol	12	24
13	Ibuprofen	29	58
14	Ceftriaxone	49	98
15	Paeds solution	50	100

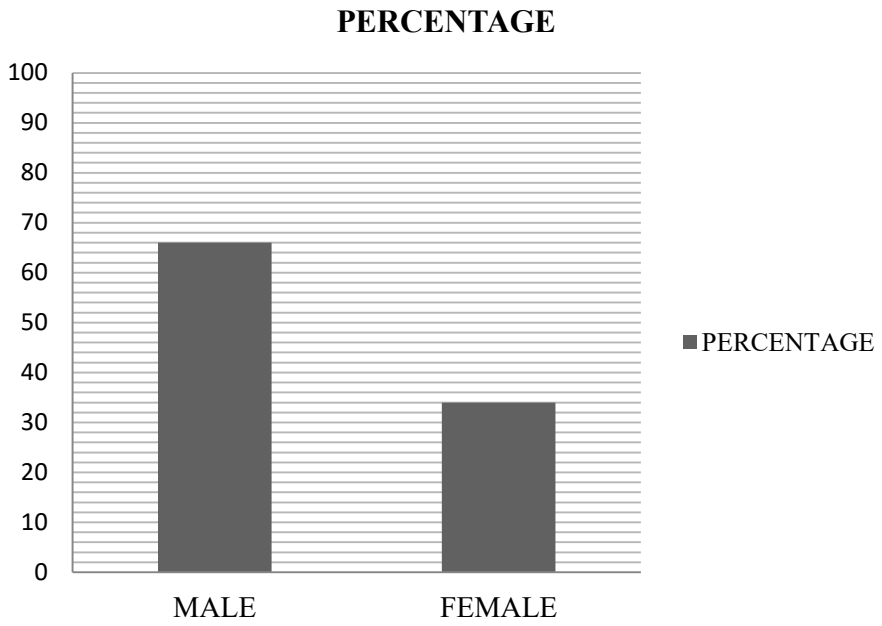

Figure 4.1: Percentage Prevalence of Typhoid Fever in Male and Female Patients

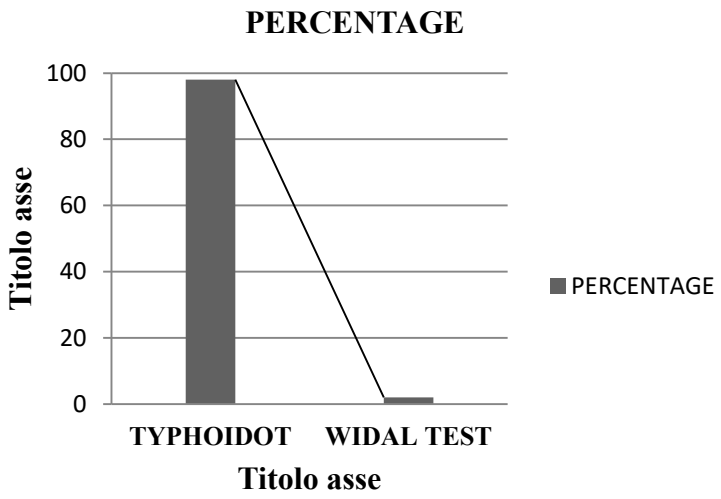

Figure 4.2: Percentage Prevalence of Diagnostic tests used in Typhoid

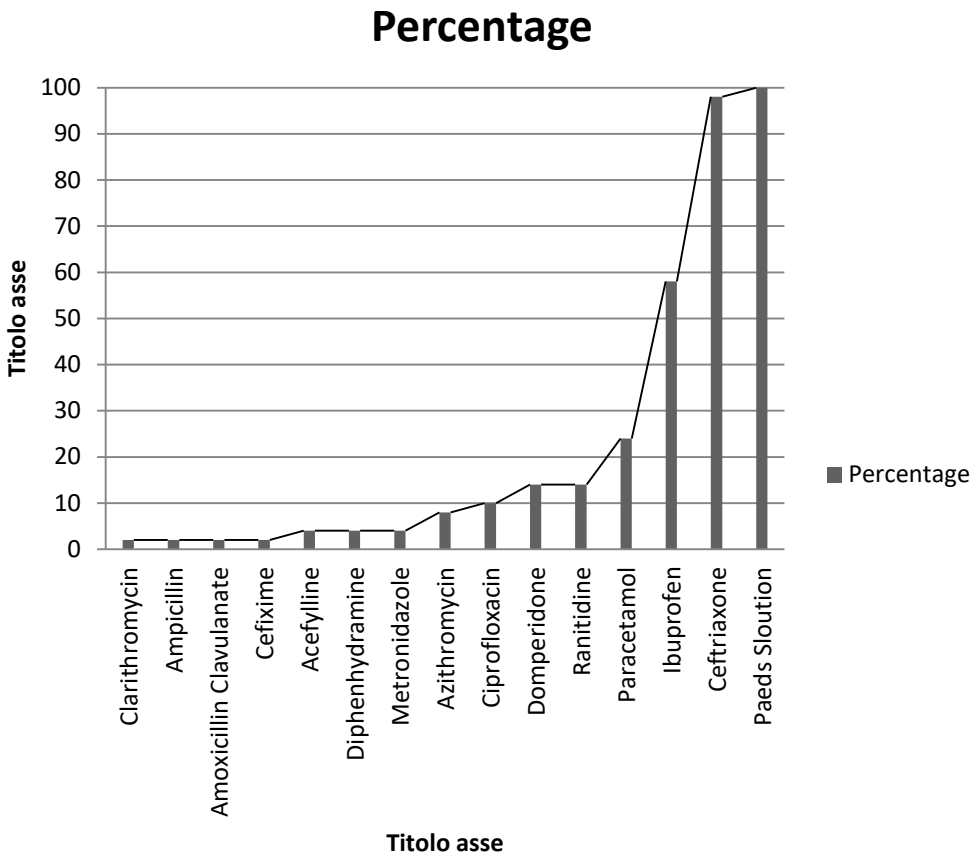

Figure 4.3: Percentage of medicines used in Typhoid patient