

Research Article

**Prevalence of multi drug resistant *S. typhi* and its range
of MIC in Gulbarga & Raichur region.**

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ABSTRACT:

Enteric fever is endemic in many developing countries, including India and if not treated appropriately, has a mortality rate of 30%. Appropriate treatment reduces the mortality rate to as low as 0.5%-1%. Isolation of *Salmonella typhi* from blood is the diagnostic method of choice in typhoid fever. However, the reported incidence of the isolates varies enormously. In a series in Delhi, India, only 527 isolates were obtained from 5,735 suspected cases (9.2%)(5). This compares with 175 isolates in 243 cases (72%) in Rhodesia(8) and 219 isolates from 298 clinical cases in a pediatric group in Natal(73%)(4). After removal of the serum and dissolution of the clot with streptokinase(6)

In India, it is mainly caused by *S.typhi* and is endemic in all states with periodic outbreaks of multidrug resistance typhoid occurring in epidemic proportions thus posing a public health problem and anxiety to the medical community. Enteric fever occurs in all age groups, but is most common in children. Since 1972(1), outbreaks of enteric fever by resistant plasmid carrying multidrug resistant strains of *S.typhi* have reported from South(2,3) north(4), east(5), west(6) and central(7) India.

Keywords: Clot Culture, Streptokinase, Bile broth, Enteric fever, *Salmonella typhi*.

INTRODUCTION:

Salmonella spp, are an important cause of enteric fever in humans world wide. Almost eighty percent of the cases and deaths are in Asia and rest occur in Africa and Latin America. The

organisms are transmitted by contaminated food and inadequate hygiene. Investigators from the U S center for disease control and prevention estimate that there are 21.6 million typhoidal cases

annually, with the yearly incidence varying from 100 to 1,000 per 100,000 people. An estimated 600,000 deaths from enteric fever occur annually throughout the world.

Emergence of multidrug resistant strains (MDRST) poses a risk to public health. And complicated the treatment and management of enteric fever. In India, antibiotic resistance among *s.typhi* has been reported since 1960s and first outbreak of multidrug resistant *s.typhi* was reported in Calicut. Since then multidrug resistant *s.typhi* has appeared throughout the world, especially in South America, Africa and South Asia. In Delhi in India the incidence of enteric fever is 9.8 cases per 1,000 people –years. The incidence of multidrug resistant *s.typhi* has been reported to be as high as 60% but then declined in Pune (1999) Nagpur (2001), Delhi (2004) and Calcutta (2000). However occurrence of resistant strains in Ludhiana in 2002 is of concern. In Bangladesh there has been a reported decrease in MDR isolates with no corresponding increase in sensitive strain. For ciprofloxacin there has been increase in MIC strain imported in to United Kingdom, Bangladesh and India.

These observations with changes in the sensitivity patterns to provide suitable guidelines for treatment. Hyderabad Karnataka region is a socio-economically underdeveloped where both personal and community hygiene are minimal. Since there are no reports from these regions, this study enumerates the multidrug resistance among *s.typhi* isolates.

MATERIALS AND METHODS:

The present study screened a total of 1200 blood samples collected from the symptomatically suspected patients suffering from typhoid fever and attending the various private and public hospitals of this region from May 2010 to 2012 may and isolated a total of 83 *s.typhi* isolates.

In the isolation both bile salt broth (broth culture) and streptokinase broth (clot culture) were used for the enrichment of blood samples. The enriched samples were incubated till visible turbidity. Were

streaked on the MacConkey and Wilson Blair bismuth sulfite agar. The isolates producing the characteristic colonies were identified by standard biochemical tests and confirmed serotypically by agglutination with salmonella O9,Vi specific and Hd antisera for *s.typhi* and paraA for the *S.paratyphi A* (Kings Institute of Preventive Medicine Guindy)

Antimicrobial susceptibility testing: The antibiotic susceptibility testing of the isolates was done by Kirby-Bauer disk diffusion method according to CLSI guidelines. The following antibiotics were used. Ampicillin (10µg/disk), chloramphenicol (30µg/disk), co-trimoxazole (25 µg/disk) ciprofloxacin (5µg/disk), tetracycline (30µg/disk) ceftriaxone (5 µg/disk) nalidixic acid (30µg/disk), cefataxime (30µg/disk) Imipenem (10µg/disk). *Escherichia coli* ATCC. Was used as a negative control and *s.typhi* with MTCC. Was used as a positive control commercially available six mm disks (HiMedia Laboratories Mumbai) were used. (1999,2004).

MICs of isolates resistant to Ciprofloxacin, nalidixic acid, Ampicillin and co-trimoxazole were done by using HiComb strips (Hi media laboratories, Mumbai) MICs of ciprofloxacin were determined for both ciprofloxacin resistant and selected nalidixic acid resistant isolates. Isolates resistant to Ampicillin, chloramphenicol and co-trimoxazole were termed as MDR.

RESULTS & DISCUSSION:

A total of 83 *s.typhi* isolates were isolated from 1200 samples showing the incidence of 6.91%. Antibiogram of these isolates revealed that all the isolates are sensitive to the Imipenem. (Table-1) highest resistance was observed equally in Ampicillin (90.3%) and nalidixic acid (90.30%) followed by chloramphenicol (86.02%). The *s.typhi* isolates showed low level resistance against the majority of remaining antibiotics.

Around 80% (n=67) of the isolates were resistant to multiple antibiotics. MDR isolates were mainly

resistant to three antibiotics Ampicillin chloramphenicol and co-trimoxazole.

MICs of the isolates, among the 75 Ampicillin resistant *S. typhi* isolates, 15 isolates showed an MIC of 64 µg/ml while 25 isolates showed MIC of 128 µg/ml. and remaining 35 isolates showed, the MIC of 256 µg/ml. among the 71 chloramphenicol resistant *S. typhi* isolates, 24 have shown MIC of 32 µg/ml while the remaining 47 isolates have shown the MIC of 256 µg/ml. among the 68 co-trimoxazole resistant isolates, 7 isolates have

shown the MIC of 10 µg/ml and 11 isolates have shown the MIC of 30 µg/ml and remaining 50 isolates have shown the MIC of 240 µg/ml. out of 11 ciprofloxacin resistant isolates 6 have shown the MIC 0.25 µg/ml and remaining 5 isolates have shown (Table-2) the MIC of 0.5 µg/ml.

Among the 35 nalidixic acid resistant isolates chosen for the ciprofloxacin MIC, 21 have showed an MIC of 0.25 µg/ml and remaining 14 isolates have the MIC of 0.50 µg/ml.

Table 1: Percentages of antibiotics are resistance to different antibiotics:

Antibiotics screened	No of isolates	Percentage
Ampicillin	75	90.36%
chloramphenicol	71	86.02%
Co-trimoxazole	63	75.90%
Nalidixic acid	75	90.36%
Ciprofloxacin	23	27.7%
Ceftriaxone	3	3.6%
Imipenem	0	0%
Cefazidime	11	13.25%
Azithromycin	65	78.31%
Gatifloxacin	61	73.49%
Sparofloxacin	59	71.08%
cefotaxime	11	13.25%
MDR	67	70.72%

MDR resistant to Ampicillin, chloramphenicol and co-trimoxazole

Table 2. MIC value of resistant *S. typhi* to various antibiotics.

Antibiotic	No. of isolates	Range (µg/ml)
Ampicillin N = 75	15	64 µg/ml
	25	128 µg/ml
	35	256 µg/ml
Chloramphenicol N=71	24	32 µg/ml
	47	256 µg/ml
Cotrimoxazole N=68	7	10 µg/ml
	11	30 µg/ml
	50	240 µg/ml .
ciprofloxacin N=23	13	0.25 µg/ml
	10	0.50 µg/ml

SUMMARY & CONCLUSION:

Our study highlights that typhoid fever remains a major problem in most resource –poor countries such as India. This report is very important in this region. One more observation in this present study, different seasons we collected samples and this disease is more occurs especially as per our studies in the month of April-June, these months are very hot and dry seasons and July-Sept monsoon are more people are suffering from this infection. It was observed that large number of typhoid cases decreases during winter than summer and monsoon months the water is contaminated due to pollutants and proper sanitation systems are not properly utilized and maintained (1999, 1986).

In these districts temperature is very high (extreme) so, it is also one important factor to higher incidence in these months.

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