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STATUS OF ANTIBIOTIC RESISTANT *SALMONELLA TYPHI* STRAINS FROM CLINICAL ISOLATES IN DHAKA

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Enteric fever remains an important public health problem in many countries of the world. Typhoid fever is a fatal infection of adults and children that causes bacteremia and inflammatory destruction of the intestine and other organs. Typhoid fever is endemic in developing countries, especially in Southeast Asia and Africa. Chloramphenicol has been a choice of treatment for typhoid fever for about 40 years, but alternative drugs for treatment are now required by the emergence of multidrug-resistant (MDR) *Salmonella typhi* (resistant to ampicillin, chloramphenicol, and trimethoprim and sulfamethoxazole). Fluoroquinolones have proven to be effective for the treatment of typhoid fever caused by MDR strain, and have become the drugs for the first line of treatment of typhoid fever.(1) But some *S. typhi* strains resistant to fluoroquinolones have already been reported.(2) Further, several failures of clinical treatment of typhoid patients with ciprofloxacin and other fluoroquinolones have also been reported.(3) In 1989, 1% of 71 *S. typhi* isolates from blood of patients in Bangladesh were reported to be resistant to ampicillin, cotrimoxazole and chloramphenicol in comparison to 35% of 453 isolates in 1993.(4)

In this study, the susceptibility of *S. typhi* strains isolated from the patients of Dhaka city, Bangladesh was investigated against different antimicrobial agents to provide supportive implications for the proper treatment of typhoid fever.

Patients were referred by community practitioners, clinics, and hospitals throughout Dhaka city, Bangladesh. Fifty isolates of *S. typhi* obtained from these patients were chosen for the present study. The blood samples were obtained according to Cheesbrough.(5) Specimens were cultured on XLD (Xylose lysine deoxycholate agar) and MacConkey agar plates, after which the cultural and morphological characteristics of the isolates were studied. Identification of the isolates was done by standard microbiological methods as described by Cheesbrough and Cowan.(5,6)

The antimicrobial sensitivity test of each of the isolates was carried out by the Kirby-Bauser disc diffusion method(7) as per recommendation of National Committee for Clinical Laboratory Standards.(8) This method allowed for rapid determination of *in vitro*

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efficacy of an antibiotic by measuring the diameter of the zone of inhibition of growth of *S. typhi* that resulted from diffusion of the agent into the medium surrounding the disc. Mueller-Hinton agar medium were used for the disc diffusion tests. The discs used contained following antibiotics: amoxicillin, AMX (30 μg/disc); azithromycin, AZM (30 μg/disc); ceftazidime, CAZ (30 μg/disc); ceftriaxone, CRO (30 μg/disc); chloramphenicol, CHL (30 μg/disc); ciprofloxacin, CIP (5 μg/disc); co-trimoxazole, CRX (25 μg/disc); tetracycline, TET (30 μg/disc). Thus the 50 clinical isolates of *S. typhi* obtained from different diagnostic centres, were subjected to antimicrobial sensitivity test against amoxicillin, azithromycin, ceftazidime, ceftriaxone, chloramphenicol, ciprofloxacin, co-trimoxazole, and tetracycline and the observed sensitivity was recorded (Table 1). With the sensitivity of 92%, ceftriaxone was demonstrated as the most susceptible antimicrobial followed by tetracycline (74%), and ceftazidime (70%). A lower sensitivity was observed for azithromycin (50%), amoxicillin (54%), co-trimoxazole (58%), ciprofloxacin (62%), and chloramphenicol (62%).

Table 1. Antimicrobial sensitivity pattern of clinical isolates of *S. typhi*.

Isolates	No. of isolates	AMX	AZM	CAZ	CRO	CHL	CIP	CRX	TET
S. typhi	50	27 (54%)	25 (50%)	35 (70%)	46 (92%)	31 (62%)	31 (62%)	29 (58%)	37 (74%)

AMX : Amoxicillin; AZM: azithromycin; CAZ : ceftazidime; CRO: ceftriaxone; CHL : chloramphenicol; CIP : ciprofloxacin; CRX: co-trimoxazole; TET: tetracycline.

Typhoid fever is endemic in Bangladesh, where there is a high incidence in children. Initially, reduced use of amoxicillin, cotrimoxazole, or chloramphenicol was associated with a decreased prevalence of MDR strains[9], but more recently, continued dependence on ciprofloxacin or ceftriaxone for the empirical treatment of typhoid fever in Bangladesh and elsewhere has led to the emergence of resistance of *S. typhi* to these drugs.[10] The variation found in the sensitivity pattern to these commonly used drugs in present study could be attributed to the prevailing usage and abuse of the drugs in the area under study. The lower sensitivity to the commonly used drugs indicates the dependence of the prescribers on these drugs in contrast to ceftriaxone, and tetracycline, which are less commonly used. This further suggests the relation between antibiotic usage and the level of drug resistance encountered. The judicious use of antibiotic by the health professional and efforts to control procurement and use of antibiotics officially in the locality will probably help to limit the increasing rate of drug resistance in the pathogens. In Bangladesh, empirical therapy is the rule rather than the exception and in this context of changing the dynamics of resistance to antibiotics, it is imperative for optimal patient care that constant evaluation of antibiotic sensitivity pattern of pathogens for commonly used antimicrobial agents in a particular environment should be carried out.

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