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– Short communication

IN VITRO ANTIMICROBIAL SENSITIVITY OF *ESCHERICHIA COLI* ISOLATED FROM CLINICAL SOURCES

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ABSTRACT

A study of antimicrobial sensitivity of *Escherichia coli* (*E. coli*) isolated from clinical sources of different diagnostic centers of Dhaka, Bangladesh was carried out to facilitate the choice of drug in the management of *E. coli* induced symptoms. Very low sensitivity of *E. coli* towards ampicillin (4%), aztreonam (4%), cloxacillin (5%), nalidixic acid (5%), ciprofloxacin (7.5%), ceftriaxone (12.5%), doxycycline (12.5%), ceftazidime (16.25%), co-trimoxazole (20%), chloramphenicol (22.51%), tetracycline (25%), and netilmicin (35%) was observed. Higher sensitivity pattern was observed for gentamicin (56%) and only imipenem (95%) showed sensitivity pattern possibly susceptible enough to consider for the management of *E. coli* induced cases in the area under study. The low sensitivity to different antimicrobial could be attributed to their prevailing usage and abuse in the area under study.

Key words: *E. coli*, Antimicrobial sensitivity, Clinical isolates

E. coli is the most common cause of food and water-borne human diarrhoea worldwide in developing countries causing 80 thousand deaths out of 650 million cases per year primarily in children under the age of five years (Turner *et al*. 2006). It also causes urinary tract infection and other complications in humans.

In this study, the susceptibility of *E. coli* strains isolated in Dhaka city, Bangladesh was investigated against different antimicrobial agents to provide supportive implications for the proper treatment of *E. coli* induced infections and related complications.

The specimens were obtained from urine, pus, stool, blood samples. The samples were collected according to Cheesbrough (1984). 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. Isolates were identified following standard microbiological methods as described by Cheesbrough (1984) and Cowan (1993).

The antimicrobial sensitivity test of each isolate was carried out by the Kirby-Bauser disc diffusion method (Bauser *et al*. 1966) as per recommendation of National Committee for Clinical Laboratory Standards (NCCLS 1997). This method allowed for rapid

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determination of *in vitro* efficacy of a drug by measuring the diameter of the zone of inhibition that results from diffusion of the agent into the medium surrounding the disc. Mueller-Hinton agar plates were used for the disc diffusion tests. The discs used contained following antibiotics: ampicillin, AMP (25 mcg); aztreonam, ATM (30 mcg), ceftazidime, CAZ (30 mcg), ceftriaxone, CRO (30 mcg), chloramphenicol, CHL (30 mcg), ciprofloxacin, CIP (5 mcg), cloxacillin, CXL (5 mcg), co-trimoxazole, CRX (25 mcg), doxycycline, DOX (30 mcg), gentamicin, GEN (10 mcg), imipenem, IPM(10 mcg), nalidixic acid, NAL (30mcg), netilmicin, NET (10 mcg) and tetracycline, TET (30 mcg).

Eighty clinical isolates of *E. coli* obtained from Medinova and Popular Diagnostic Centres were subjected to antimicrobial sensitivity test (Table 1). With the sensitivity of 95%, imipenem was demonstrated as the most susceptible antimicrobial followed by gentamicin (56%). Incredibly diminutive sensitivity was observed for ampicillin (4%), aztreonam (4%), cloxacillin (5%), nalidixic acid (5%), ciprofloxacin (7.5%), ceftriaxone (12.5%), doxycycline (12.5%), ceftazidime (16.25%), co-trimoxazole (20%), chloramphenicol (22.51%), tetracycline (25%), and netilmicin (35%).

Table 1**. Antimicrobial sensitivity pattern of clinical isolates of *E. coli.***

Isolates	No. of isolates	AMP 3 (4%)	ATM 3 (4%)	CAZ 13 (16.25%)	CRO 10 (12.5%)	CHL 18 (22.5%)	CIP 6 (7.5%)	CXL 4 (5%)
E. coli	80	CRX 16 (20%)	DOX 10 (12.5%)	GEN 45 (56%)	IPM 76 (95%)	NAL 4 (5%)	NET 28 (35%)	TET 20 (25%)

Key: Ampicillin = AMP, aztreonam = ATM, ceftazidime = CAZ, ceftriaxone = CRO, chloramphenicol = CHL, ciprofloxacin = CIP, cloxacillin = CXL, co-trimoxazole = CRX, doxycycline = DOX, gentamicin = GEN, imipenem = IPM, nalidixic acid = NAL, netilmicin = NET, tetracycline = TET.

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 imipenem, which is 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. Rational drug policy should be in use before potent antibiotics are introduced to the country (Aseffa and Yohhannes 1996). Antibiotic administration should follow certain minimal requirements (Wellington and Van Elsas 1992). To restore efficacy, to earlier antibiotics and to maintain the success of new antibiotics that are introduced, it is necessary to use antibiotics in a way, which assures an ecological balance that favors the predominance of susceptible bacterial flora (Bower 1999). In Bangladesh, empirical therapy is the rule rather than the exception (Bennish 1987) 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 is carried out.

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