Research Article

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ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF *E. COLI* AMONG PATIENTS ATTENDING AT APADANA HOSPITAL IN AHWAZ, IRAN

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ABSTRACT
The pathogenic strains of *Escherichia coli* have long been recognized as the agents of food borne diarrhoea. The volume of antibiotics prescribed is the major factor in increasing rates of bacterial resistance rather than compliance with antibiotics. The aim of present study was to explain the drug resistance pattern in *E. coli* isolated from community acquired Urinary tract infection (UTIs). A total of 115 urine samples were collected from the UTI patients followed by isolation and identification of *E. coli* strains. Anti-biotic sensitivity and resistance analysis was performed by the disc diffusion method employing antibiotic discs. The sensitivity was monitored by zone of inhibition around the disc. Clinical study revealed that this infection is more common in women. This study concludes that *E. coli* is one of the important causative agents of urinary tract infection in women.
Key words: *Escherichia coli*, UTI, antibacterial resistance

INTRODUCTION

Escherichia coli has an important nosocomial and community acquired pathogen and one of the commensals of the human intestinal tract[1]. The pathogenic strains have been recognized as the agents of food borne diarrhoea[2].

Escherichia coli is a member of the family *Enterobacteriaceae*, which includes many genera and known pathogens such as *Salmonella*, *Shigella*, and *Yersinia*. Microscopically the cells of these organisms generally appear as Gram-negative cocobacilli; or straight rods with rounded ends. *Enterobacteriaceae* ferment glucose, grows on Mac Conkey agar, oxidase-negative with rare exceptions and reduces nitrates. Although most strains of *E. coli* are not regarded as pathogens. They can be opportunistic pathogens that cause infection in immune compromised hosts. These strains when ingested in normal healthy person, it causes gastrointestinal illness[3]. The organism is of clinical importance due to its cosmopolitan nature and ability to initiate, establish and cause various kinds of infections. It is one of the organisms frequently isolated from different clinical cases of diarrhoea and others[4,5,6]. Resistance to antibiotics is highly prevalent in bacterial isolates worldwide particularly observed in developing countries. Routine monitoring of antibiotic resistance provides data for antibiotic therapy and resistance control (s), prescription programs, making policy decisions and assessing the effectiveness of both[7].

E. coli bacteria are resistance to antibiotics and result into complication of treatments. In general, up to 95 % of cases with severe symptoms are treated without bacteriological investigation[8]. Occurrence and susceptibility profiles of *E. coli* show substantial geographic variations as well as significant differences in various human populations and environments[9].

Present work deals with monitored trends in antibiotic resistance prevalence *E. coli* isolates from different clinical isolates from humans by measuring resistance to nine antimicrobial drugs in *E. coli* from 115 clinical specimens collected from Apadana Hospital in Ahwaz, Iran over a period of four month.

MATERIAL AND METHODS

A total 115 urine samples were collected from patients who were attending to Apadana hospital located in Ahwaz province, Iran with community acquired UTI during a 4 months period.

Strains were plated on to the Mac Conkey agar plates. Pink colonies were observed (Figure 1). A well-isolated single colony was picked and incubated in nutrient broth, at 37º C for 12-16 h. The inoculums were spread on Eosine methylene blue agar plates and incubated at 37 ºC for 24 h, green colonies having a metallic sheen were observed (Figure 1). A single colony was picked up from same and streaked on to the hard agar plates. These plates were kept in the incubator at 37 ºC for overnight followed by characterized by battery of biochemical test. The strains were stored at -80 ºC for further studies.

Antimicrobial resistance was determined by the disc diffusion method. Isolates showing an intermediate level of susceptibility were classified as resistant. The following antimicrobial agents at the indicated concentrations were tested: Amp (Ampicillin), Ch (Chloramphinicol), Er (Erythromycin), Ka (Kanamycin), Nx (Norfloxacin,), Rf (Rifampicin), St (Strteptomycin), Smy (Sulphamathizole), Tr (Tetracycline). Results were interpreted according to the National Committee for Clinical Laboratory Standards for broth micro-dilution and disc diffusion methods[10].

Table 1: Physical profile of UTI patients

Sex	Age group Year	No. of UTI samples identified as *E. coli*
Males	15-50	25
Females	10-65	49

(a) (b)

Figure 1: *E. coli* growth on Mc Conkey Agar (a), on Eosin Methylene Blue Agar (b)

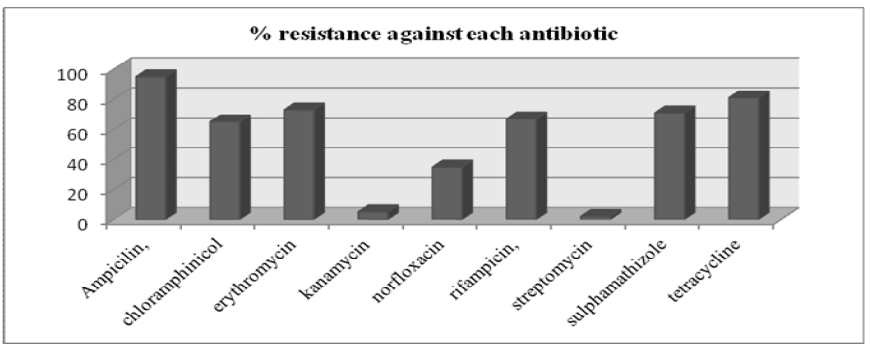

Figure 2: Percent resistance against each antibiotic

RESULTS AND DISCUSSION

E. coli has widely been implicated in various clinical infections as hospital acquired and community infections as reported by researcher[11]. Pathogenic isolates of *E. coli* have relatively high potentials for developing resistance[12]. High resistance of *E. coli* to antimicrobial agents tested was observed in present work.

A total of 115 samples were collected. All the samples were inoculated on different culture and biochemical test. Out of which 74 samples were identified as *E. coli* having age group and gender monitored as shown in table 1.

Their antibiotic sensitivity and resistance were tested by standard method. Present studies showed that 65-81% isolates were resistant against chloramphinicol, erythromycin, rifampicin, sulphamathizole and tetracycline. Data showed that 95% isolates were resistant against ampicilin. Intermediate resistance showed in Norfloxacin while kanamycin and streptomycin were found the most effective antibiotics in our study against *E. coli*. Result are supported by previous studies[13,14]. *E. coli* is one of the important causative agents of urinary tract infection in young women. Most of the isolates showed that maximum resistance was found against ampicillin whereas, least resistance was detected against streptomycin and hence it might be the drug of choice to treat UTI (Figure 2).

CONCLUSION

E. coli has widely been implicated in various clinical infections as hospital acquired and community infections as reported by researcher[12]. Pathogenic isolates of *E. coli* have relatively high potentials for developing resistance[13]. High resistance of *E. coli* to antimicrobial agents tested was observed. Present data showed that the prevalence of resistance to most drugs tested in *E. coli* isolates from patients also coincides with study of apparently healthy student reported previously[15]. This work is also similar to what was observed by scientist Aibinu[16] who reported 100% resistance of their *E. coli* isolates to ampicillin while our study showed 95% resistance to ampicillin. The increases in prevalence of resistance to tetracycline were also statistically significant. In most drugs tested, the proportion of resistant isolates has increased rapidly. The prevalence of resistance showed that resistant profile of *E. coli* reached > 50% for all drugs except kanamycin, norfloxacin and streptomycin. For tetracycline, the proportions of resistant strains show 81%. Present work is supported to Lamikanra[15].

The data confirms that indiscriminate use of antibiotics in the region and along with poor hygiene and infection control (risk factors for antibiotic resistance in bacteria), are highly prevalent in Ahwaz-Iran and other developing countries[17]. The possible sources of contaminations are food, water, and person-to-person transfer. We observed rapid increases in the susceptibility to *E. coli* in older persons. Hospitals used less expensive antimicrobial drugs in the management of infections in Ahwaz, Iran.

Control of antibiotic resistance is needed to conserve the usefulness of the remaining drugs. The data suggest that kanamycin and possibly streptomycin may be useful in treating infections caused by pathogenic *E. coli* bacteria in Ahwaz. The future usefulness of these drugs will

depend on effective interventions to halt the selection and spread of resistance among enteric organisms. Since antimicrobial resistant patterns are constantly evolving and it is present at global public health problem. There is a need for constant antimicrobial sensitivity surveillance. This will help clinicians to provide safe and effective empiric therapies.

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