

## Molecular Epidemiology and Antimicrobial Susceptibility of Extended-Spectrum $\beta$ -lactamases Produced by Clinical Isolates of *Escherichia Coli* Collected from ICU Patients in Shiraz, Iran

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**Background & Objectives:** Extended-spectrum  $\beta$ -lactamase (ESBL) producing gram negative bacilli are a growing concern in human medicine today. When producing these enzymes, organisms (mostly *E.coli* and *K.pneumoniae*) become highly efficient at inactivating the newer third-generation cephalosporins. The aim of this study was to understand the molecular epidemiology of *E.coli* ESBL producers and to identify the ESBL genes carried by them.

**Methods:** In this descriptive cross-sectional study, 195 clinical isolates of *E.coli* collected from ICUs was tested. In vitro susceptibility testing, screening for ESBL production and minimum inhibitory concentration (MIC) was carried by the disk diffusion methods according to the CLSI (Clinical & Laboratory Standard Institute) guideline. All isolates were screened for the resistance genes TEM, CTX-M and SHV by a Multiplex PCR assay using universal primers. Data were analysed using ANOVA, chi-square or Fisher exact tests. For all tests,  $p < 0.05$  was considered significant.

**Results:** The occurrence of ESBL-producing strains in the studied population of patients was 60.51% based on initial screening using the double disk synergy test. The MIC of resistant isolates against cephalexime using the E-test strips was determined: 23.86. The prevalence of ESBL-producing strains by PCR assay was 60.51%. The presence of the ESBL genes was confirmed by DNA sequence analysis.

**Conclusion:** These studies are essential for clinicians need to be aware of resistance rates observed in clinical isolates. Different prescription policies may influence the rates and patterns of resistance.

**Keywords:** ESBLs; *Escherichia coli*; Multiplex PCR; ICU