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Extended spectrum beta-lactamase in clinical isolates of *Escherichia coli* and *Klebsiella pneumoniae* from the Tamale teaching hospital

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Extended spectrum beta-lactamase (ESBL) producing Escherichia coli and Klebsiella pneumoniae are pathogens of significant public health interest to which new antibiotics therapies are urgently needed. This study was designed to determine the prevalence of ESBLs in clinical isolates of E. coli and K. pneumoniae from patients attending the Tamale teaching hospital (TTH). A total of 140 isolates of E. coli (83.6%; n=117) and K. pneumoniae (16.4%; n=23) were cultured from clinical specimens of consenting patients. Antimicrobial susceptibility was determined using the Kirby-Bauer disc diffusion method. Screening and confirmation for ESBL-producing phenotypes among the clinical isolates were performed according to the guidelines of the Clinical and Laboratory Standard Institute, 2012. Escherichia coli and K. pneumoniae positive for ESBL phenotype were examined for the presence of TEM, SHV and CTX-M genes. Sixty two (44.3%) of the 140 isolates expressed ESBLs phenotypically. Of these, 83.9% (n=52) were E. coli and 16.1% (n=10) were K. pneumoniae isolates. The proportion of ESBL-producing isolates were found to be relatively higher in adults (15-65 years) than in neonates (<28 days) [p=0.14]. Majority of the isolates showed high percentage resistance to ampicillin (96%) and tetracycline (89%), but relatively low resistance for amikacin (36%). None of the isolates were resistant to meropenem. The ESBL producers were multidrug resistant compared to non-ESBL-producers (23%, n=14/62 versus 18%, n=14/78; p=0.573). Overall, 74.2% (n=46/62) of the ESBL genotypes expressed BlaCTX-M-1 genes followed by 62.9% (n=39/62) BlaTEM and 16.1% (n=10/62) BlaSHV. Two (3.2%) isolates had both TEM and SHV genes, 29 (46.8%) harbored TEM and CTX-M-1, 2 (3.2%) had SHV and CTXM-1, while 4 (6.5%) harbored all three genes. None expressed genes for CTX-M 2 and CTX-M 9. In univariate comparisons, patients who reported their previous medication as having being prescribed by a Physician and those who reportedly completed their previous medication were more likely to be infected by ESBL organisms. The study showed high ESBL positive E. coli and K. pneumoniae, mostly CTX-M-1 producers in Tamale teaching hospital. Routine laboratory ESBL detection is warranted.

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