High Prevalence of Multi-drug Resistant Diarrheagenic Escherichia coli among Hospitalised Diarrheal Patients in Kolkata, India

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Abstract : Acute diarrhoea caused by diarrheagenic Escherichia coli (DEC) is one of the major public health problem in developing countries, mainly in Asia and Africa. DEC consists of six pathogroups, but the majority of the cases were associated with the three pathogropus, enterotoxigenic E. coli (ETEC), enteroaggregative E. coli (EAEC), and enteropathogenic E. coli (EPEC). Hence, we studied the prevalence and antimicrobial resistance of these three major DEC pathogroups in hospitalized diarrheal patients in Kolkata, India, during 2012-2019 with a large sample size. 8,891 stool samples were processed, and 7.8% of them was identified as DEC infection screened by multiplex PCR, in which ETEC was most common (47.7%) followed by EAEC (38.4%) and EPEC (13.9%). Clinical patient history suggested that children <5 years of age were mostly affected with ETEC and EAEC, whereas people within >5-14 years of age were significantly associated with EPEC and ETEC infections. Antibiogram profile showed a high prevalence of multidrug resistant (MDR) isolates among DEC (56.9%), in which 9% were resistant to antibiotics of six different antimicrobial classes. Screening of the antibiotic resistance conferring genes in DEC showed the presence of blaCTX-M (30.2%) in highest number followed by blaTEM (27.5%), tetB (18%), sul2 (12.6%), strA (11.8%), aadA1 (9.8%), blaOXA-1 (9%), dfrA1 (1.6%) and blaSHV (1.2%) which indicates the existence of mobile genetic elements in those isolates. Therefore, the presence of MDR DEC strains in higher number alarms the public health authorities to take preventive measures before the upsurge of the DEC caused diarrhea cases in near future.
Keywords : diarrheagenic escherichia coli, ETEC, EAEC, EPEC