Prevalence of faecal carriage of carbapenemase-producing Enterobacteriaceae in asymptomatic Indian subjects

Nasheed Shaikh¹, Kulakkattil Abdul Ghafur²*, Ratna Rao³, Thirunarayan M A⁴, Vidyalakshmi Devarajan², Mubin Kazi¹, Camilla Rodrigues¹

¹P.D. Hinduja Hospital & Medical Research Centre, Microbiology, Mumbai, India, ²Apollo Cancer Institute, Infectious Diseases, Chennai, India, ³Apollo Hospitals, Microbiology, Hyderabad, India, ⁴Apollo Cancer Institute, Microbiology, Chennai, India

Background:
The emergence of Carbapenem resistance in Enterobacteriaceae is a growing public health problem worldwide due to their high prevalence, multidrug resistance and rapid dissemination of resistance to other organisms. Based on our knowledge, this will be the first study investigating the prevalence of faecal carriage of CPE on asymptomatic subjects from three different centres in India.

The purpose of this study was to determine the prevalence of faecal carriage of Carbapenemase Producing Enterobacteriaceae (CPE) from fresh stool from asymptomatic Indian subjects from community using ChromID CARBA SMART for screening and confirmation using RAPIDEC CARBA NP and molecular biology methods.

Materials/methods:
A total of 1000 fresh stool sample were obtained by informed consent from healthy asymptomatic individuals from Chennai, Hyderabad and Mumbai centre from 2015 to 2016.

One loopful of 10ul of stool sample was vortexed in 1ml of sterile Saline and 50ul was plated on each side of the chromID CARBA SMART biplate – CARB & OXA side, incubated at 37°C for 18-24 hrs.

Colonies recovered were identified using Vitek 2 system and MICs were checked by Doripenem & Imipenem E-test. Carbapenemase production was confirmed using RAPIDEC CARBA NP and PCR assay for NDM, OXA, IMP, VIM & KPC genes.

Prevalence of faecal carriage was calculated as the percentage positive sample divided by the total number of samples.

Results:
A total of 67 CPE carriers were identified from all the 3 centres. From Mumbai, 51 E.coli harbouring 19 NDM and 30 OXA, 1 K.pneumoniae isolated had NDM and 2 Enterobacter spps. having OXA genes were isolated from 766 samples (6.6%). From Chennai, 3 CPE isolates harbouring NDM were isolated from 50 samples. From Hyderabad, 5 CPE were isolated from 234 samples. Isolates growing on the chromID plate with low levels of MIC were negative for harbouring these CPE genes.
Conclusions:

The faecal carriage rate of CPE was found to be 6.7% among healthy asymptomatic individuals. Urgent measures are needed to prevent further dissemination of the Carbapenem Resistant Enterobacteriacea in the country.