

ABSTRACT

Background: *Klebsiella species* are potential pathogens that are associated with wide range of infections in humans such as blood infections, airway, urogenital, gastrointestinal sepsis and wound sepsis. They are also connected with antimicrobial resistance because they have the capacity to acquire resistance genes that encode for ESBL and carbapenamases.

Aim: The focus of this research was to find out the prevalence as well as mechanisms of resistance associated with carbapenem resistance *Klebsiella Species* isolates from humans and environment stored at microbiology laboratory of MUST through determining phenotypic and genotypic resistance mechanisms.

Technique: This was a one point in time study carried out in the laboratory which took place from July 2021 through July 2022 in the microbiology laboratory of MUST. *Klebsiella species* were identified through culture and biochemical methods. Antibiotic susceptibility testing was done using the Kirby-Bauer disc diffusion method. Carbapenem resistance was determined using meropenem and imepenem antibiotic discs whereas ESBL exhibition in *Klebsiella species* were assessed by combined disc method, double disc synergy and Carbapenemase production by EDTA test phenotypically. Carbapenem resistance was confirmed genotypically through the use of conventional PCR.

Results: of the 120 *Klebsiella species* from humans and environment, 70 (58.3%) were resistant to carbapenems. Of the 60 *Klebsiella spp* in humans, 31(51.6%) and of 60 from environment 39(65%) were resistant to carbapenems. Of the 60 in humans, 26(43.3%) were *K.pneumoniae*, 28(46.6%) *K. oxytoca* and 6(10%). In the environment, 31(51.6%) were *K. pneumoniae*, 20(33.3%) *K. oxytoca* and 9(15%) other *species of Klebsiella*. In human, of the 60 *Klebsiella species*, 31 were resistant to Meropenem, 26 to Imepenem and 24 to both. In the environment, 38 were resistant to Meropenem, 40 to Imepenem and 36 to both. In humans, 42(70%) produced beta lactamases while 25(41.6%) produced beta lactamases in environment. 5(7.1%) TEM, 3(4.3) CTX-M and 1(1.4%) SHV genes were found in 70 carbapenem resistant *Klebsiella species*. KPC, OXA-48 and VIM carbapenemase encoding genes were not found in 70 carbapenem resistant *Klebsiella species*.

Conclusion. This study analyzed the prevalence together with mechanisms of resistance associated with carbapenem resistant *Klebsiella species* isolates from humans and human

surrounding using phenotypic and genotypic methods of determining beta lactamase and carbapenemase production.