**Introduction**

Pseudomonas aeruginosa is an increasing prevalent opportunistic human pathogenic most common gram-negative bacteria found in nosocomial infections. Despite improvements in antibiotic therapy, *Pseudomonas aeruginosa* is intrinsically resistant to a number of antimicrobial agents [1]. It is mainly present as a saprophyte in warm moist conditions in the environment including sinks, drains, respirators, humidifiers and disinfectant solutions.

The chances of *Pseudomonas aeruginosa*, carriage increases in the Nosocomial infection, reaching 30% after 3 weeks, *Pseudomonas aeruginosa* that is encountered in healthy individuals has emerged as the aetiological agent in a variety of serious infections in hospitalized patients (Nosocomial infection) with impaired immune defenses [3].

Among the beta lactams, carbapenems are considered as the potent drug for serious treatment of gram-negative bacteria infections. These antibiotics are well-suited to this use because they show broad spectrum activity and resistance to hydrolysis by most β-lactamases enzymes, including the extended-spectrum β-lactamases (ESBL)[4]. The emergence of multidrug resistance among gram negative bacteria is a matter of serious concern. Clinically relevant species of gram-negative bacilli are quite resistance to β-lactam antibiotics such as extended spectrum cephalosporins (ESBL) and AmpC Beta lactamase, but shows lesser resistance among carbapenems group [5]. Carbapenems acts as the drug of choice for treatment of infections in case of penicillin or cephalosporin resistance among gram negative bacilli (enterobacteriaceae and non fermenters). *Pseudomonas aeruginosa* causes urinary tract infections (UTI), bloodstream infections, intra-abdominal infections, and ventilator associated pneumonia (VAP). Worldwide, the prevalence of gram negative bacteria with multi-drug resistance profiles is now recognized.[6,7,8] However, over the decades resistance to carbapenems is caused due to production of carbapenemases have been reported. Carbapenemases acquires resistance belongs to Ambler molecular classes A, B and D. Metallo–beta-lactamases (MBL) enzymes are the most significant carbapenemases [9,10,11]. It belongs to class B require divalent cations as cofactors for optimum
enzyme activity, and are inhibited by the action of metal ion chelator. They hydrolyse all the beta lactams including carbapenems except the monobactams such as aztreonem. These strains shows resistance towards different classes of antimicrobial agents shows transferable properties towards various types of bacteria.\[10,12\] Infections caused by MBL producing organisms are associated with high rate of mortality, morbidity and rising health-care costs because of less alternative of treatment left.

In early 1990s an integron mediated metallo β-lactamase gene was first isolated among enterobacteriaceae, Pseudomonas and other non fastidious gram negative bacilli isolated in several hospitals in Japan [13]. Over the last decade MBL producing isolates have emerged in *Pseudomonas aeruginosa* mainly. These isolates are responsible for serious infections such as septicaemia and pneumonia and responsible for failure of therapy with carbapenems. In recent years, resistance to carbapenem among members of Enterobacteriaceae and non fermenters have become a major health related concern worldwide.[14]

Clinical trials are developing that could simulate the global spread of extended-spectrum beta-lactamases [11,15]. When patients develops serious infections due to MBL producing organisms are treated with antibiotics to which the organism is completely resistant than no outcome comes out of the therapy given. [11,16]

Six types of MBL genes have been reported among *Pseudomonas aeruginosa* that are IMP, VIM, SPM, GIM AIM and NDM 1. SPM, GIM and AIM have rarely been detected beyond their region of first detection, i.e. the SPM types is restricted to Brazil, while GIM and AIM types are scarce and limited concerned to Germany and Australia respectively. However, VIM and IMP genes are isolated from worldwide and have also been detected in several enterobacterial species [25] and continue to have increasing rates worldwide and NDM positive *Pseudomonas aeruginosa* is present all across Southern Asia. VIM-2 producing *Pseudomonas aeruginosa* has been responsible for nosocomial outbreaks [17,18].

Clinical infection with such organisms is responsible for serious therapeutic challenges with increasing reports of poor patients outcomes and morbidity [19,20,21,36].
MBL producing non fermenters (Pseudomonas species and Acinetobacter species) can appear sensitive to carbapenems (imipenem, meropenem) using current Clinical and Laboratory Standards Institute (CLSI)[22] failure. Genotype VIM-1 and VIM-2 producing strains of Pseudomonas aeruginosa have been reported in Europe [13]. Therefore, detection of MBL producing GNBs especially Pseudomonas aeruginosa is crucial for accurate treatment of patients particularly critically ill and hospitalized patients and to prevent from resistance.

The gram-negative pathogens are often highly resistant to multiple classes of antibiotics, they are cephalosporins, fluoroquinolones and aminoglycosides[23,24]. Members of the family enterobacteriaceae are among the most important bacterial human pathogens isolated from clinical samples.[25] The gram negative bacilli rapidly acquires resistance to one or more antimicrobial agents which are being used for treatment is a emerging matter of concern. Till now, extended spectrum β-lactamase (ESBL) production by GNB was considered as the most important threat to clinical therapeutics [6,26]. Due to the misusage of β- lactamases and carbepenems, since from, last few years plays role in resistance to these drugs as well.[7,8]

Emergence of MBL-producing Pseudomonas aeruginosa and Acinetobacter species in the hospitals reflects that no measures taken from antibiotic policy as excessive use of carbapenems and selective antibiotic leads to pan-resistance among bacteria. Therefore, a strict antibiotic policy should be applied and strictly followed in every hospital to prevent further spread of MBLs. Clinicians should be concerned regarding the problem of MBLs, so that they can prescribe antibiotics properly.[27] this might be a therapeutic challenge to clinicians as well as to microbiologists. Timely implementation of proper infection control practices reduces, eliminates, and prevents from establishment of antibiotic-resistanance in bacteria mainly as Nosocomial flora of burn unit and prevent cross-contamination.[27]