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Emergence of Extremely Drug Resistant and Pan Drug Resistant *Acinetobacter baumanii* and *Pseudomonas aeruginosa* Isolated from Diverse Samples in Delhi

Puneeta Singh[1], Vandana Lal[2], Shalabh Malik[1,*]

[1]Department of Microbiology and Serology, Dr Lal Path Labs National Reference Laboratory, Delhi, India
[2]Dr Lal Path Labs National Reference Laboratory, Delhi, India
*Corresponding author: Shalabh.malik@lalpathlabs.com

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Abstract **Aims and objectives:** The purpose of this study is to observe the recent prevalence to assess drug resistance pattern of Extremely-drug resistant (XDR) and Pan drug resistant (PDR) isolates of *Acinetobacter baumanii* and *Pseudomonas aeruginosa* among clinically diagnosed cases from diverse samples in Dr Lal Path Labs, Delhi. **Materials and Methods**: Retrospective analysis of XDR and PDR resistance in 1655 isolates of ***Acinetobacter baumanii*** and 4238 isolates of ***Pseudomonas aeruginosa*** considered between one-year period March 2019-2020, performed at Microbiology department of *Dr Lal Path Labs.* Identification was carried out by MALDI-TOF and antimicrobial susceptibility was evaluated by VITEK® 2 with respective susceptibility card (AST 281, BioMerieux, India) as per as CLSI M100-S-29. **Results:** This Retrospective study conducted to analyse XDR resistance prevalence among 258 (15.6%) in *Acinetobacter baumanii* and 512 (12.1%) in *Pseudomonas aeruginosa* isolates from various clinical specimens. Of the1655 total isolates 41, (2.5%) of *Acinetobacter baumanii* and 4328 total isolates 166, (3.8%) of *Pseudomonas aeruginosa* were resistant to all available antibiotics (Pan Drug Resistant). Variability of *Acinetobacter baumanii* XDR isolates was seen in different sample type that is pus (23.8%), respiratory (21.8%), fluid (21.2%), whereas XDR *Pseudomonas aeruginosa* was largely isolated from fluid (15.1%), followed by urine (12.8%), pus (11.4%). PDR strains of both species were isolated from respiratory and urine specimens. The other variable included in this study was impact of age with respective of isolates detection. The most predominant age group infected with *Acinetobacter baumanii* were Young adults (<=21-40 years) constituted 37.2% while in *Pseudomonas aeruginosa* constituted 46.4% elderly adults (≥ 60 years of age) of all isolates. **Conclusion:** XDR and PDR isolates of *Acinetobacter baumanii* and *Pseudomonas aeruginosa* become more virulent; is a reality and leading to clinical treatment failure leaving very few or no treatment options in our hand. XDR and PDR has become the concern for policy makers and urgent need of strictly adhere to the concept of reserve drugs policy, to minimize the misuse of available antimicrobial Colistin in our country.

Keywords: *Extremely drug resistant (XDR), Pan drug Resistant (PDR), Colistin, Acinetobacter baumanii, Pseudomonas aeruginosa*

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1. Introduction

The *Pseudomonas aeruginosa* and *Acinetobacter baumannii* are among the most common non-lactose-fermenting Gram-negative pathogens responsible for hospital-acquired infections, especially in intensive care units[1]. XDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* strains, which is resistant to all approved antimicrobials such as carbapenems, fluoroquinolones and aminoglycosides, are increasingly isolated from clinical specimen's worldwide cause for global concern, being responsible for nosocomial infections that may lead to fatal outcomes due to limited therapeutic options [1,2]. Finally, PDR ***Acinetobacter baumanii*** **and** ***Pseudomonas aeruginosa*** shall be XDR that is resistant to colistin and tigecycline [3,4,5,6]. The highest resistance rate reported in Asia, followed by Europe [2]. Colistin has an excellent antibacterial activity mainly against Gram-negative bacteria such as *Escherichia coli*, *Klebsiella pneumonia*, *Enterobacter*, *Pseudomonas aeruginosa* and *Acinetobacter baumanii*. Over the last decade, an increase in carbapenem resistant isolates and MDR in the wide spread use of combination therapy with Colistin as the most suitable drug for treatment of XDR. This can cause increase of cell permeability and cell death by cell lysis. The main side effects of Colistin are nephrotoxicity and

neurotoxicity. However, Colistin resistance is beginning to emerge, rising of untreatable infections resulting in difficult to treat and increase mortality, scarce to date. Especially in immunosuppressed patients, ventilator-associated pneumonia (VAP) and bacteremia [7].

In this study, we report the emergence of XDR and PDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* isolates that were isolated from various clinical specimens in Delhi indicating great challenge and causing threat because previously Colistin comes back into use as effective antibiotic for the treatment of nosocomial and serious infection, therefore selection of appropriate antibiotic therapy is essential.

2. Material and Methods

In this study, 4328 *Pseudomonas aeruginosa* and 1655 *Acinetobacter baumanii* isolated from different clinical specimens during one-year period (March 2019 to 2020) at Microbiology department of *Dr Lal Path Labs*, Delhi. More advanced and standardized methods, such as MALDI-TOF (Bruker, Daltonics) were used for identification and the antimicrobial susceptibility was evaluated by VITEK® 2 using susceptibility card (AST 281, BioMerieux, India) as per as CLSI M100-S-29. Isolates were tested against with the following antibiotics: Piperacillin-tazobactum, Gentamicin, Amikacin, Ceftazidime, Cefoperazone-sulbactum, Cefepime, Imepenem, Meropnem, Ciprofloxacin, Levofloxacin, Trimethoprim sulfamethoxazole, Minocycline, Colistin and Tigecycline for analysis of XDR and PDR isolates. XDR defined as resistant to cephalosporins, fluroquinolones, and aminoglycosides shall be resistant to carbapenems. Moreover, PDR that was also resistant to above-mentioned antibiotics, including all cephalosporins, aztreonam, aminoglycosides, and colistin. Pattern of XDR and PDR was studied based on variables of sample type and age.

3. Statistical Analysis

For the evaluation of the data Myla (Bio Merieux, India Pvt. Ltd) Statistical analysis program used.

4. Results

1655 (4.1%) *Acinetobacter baumannii* and 4328 (10.8%) *Pseudomonas aeruginosa* were isolated from various clinical specimens such as respiratory tract (sputum, Broncho alveolar lavage, endotracheal tip) pus, urine, high vaginal swab, blood, sterile body fluids. The most prevalent source of **XDR** *Acinetobacter baumanii* was largely isolated from pus (23.8%) followed by respiratory (21.8%), fluid (21.2%), whereas PDR *Acinetobacter baumanii* was largely isolated from respiratory (4.5%) then fluid (3.7%), urine (2.9%) (Table 1). In this study, most prevalent source of **XDR** *Pseudomonas aeruginosa* was largely isolated from fluid (15.1%) followed by Urine (12.8%) and other specimens. In total 166 PDR *Pseudomonas aeruginosa* from various clinical specimens during the study period, (4.9%) isolates of PDR obtained from urine, (2.8%) from pus, (2.7%; 2.6%) fluid; respiratory, and (2.2%) from blood respectively. More than 4% PDR strains of *Acinetobacter baumanii* and *Pseudomonas aeruginosa* were isolated from respiratory and urine infection respectively (Table 1 and Table 2).

Table 1. Total number and percentage wise prevalence of XDR and PDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* positive isolates in different type of samples during 2019-2020

Samples	Total *Acinetobacter baumanii* (N=1655)	XDR *Acinetobacter baumanii* N=258 (15.6%)	Total *Pseudomonas aeruginosa* N=4328	XDR *Pseudomonas aeruginosa* N=512 (11.8%)
Blood	351	18 (5.1%)	186	5 (2.7%)
Pus	449	107 (23.8%)	852	97 (11.4%)
Fluid	354	75 (21.2%)	478	72 (15.1%)
Respiratory	133	29 (21.8%)	492	47 (9.6%)
Urine	272	20 (7.4%)	2249	288 (12.8%)
Genital vaginal	96	1 (1.1%)	71	3 (4.2%)

Table 2. Total number and percentage wise prevalence of PDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* positive isolates in different type of samples during 2019-2020

Samples	Total *Acinetobacter baumanii* (N=1655)	PDR *Acinetobacter baumanii* N=41 (2.5%)	Total *Pseudomonas aeruginosa* N=4328	PDR *Pseudomonas aeruginosa* N=166 (3.8%)
Blood	351	6 (1.7%)	186	4 (2.2%)
Pus	449	8 (1.8%)	852	24 (2.8%)
Fluid	354	13 (3.7%)	478	13 (2.7%)
Respiratory	133	6 (4.5%)	492	13 (2.6%)
Urine	272	8 (2.9%)	2249	112 (4.9%)
Genital vaginal	96	0	71	0

Data were then analysed for variables such as age range was 0 to 99 years.The most predominant age group infected with *Acinetobacter baumanii* were Young adults (<=21-40 years) constituted 37.2% while in *Pseudomonas aeruginosa* constituted 46.4% elderly adults (≥ 60 years of age) of all isolates (Figure 1).

Table 3 and Table 4 also depicts correlation with the age of XDR and PDR isolates of *Acinetobacter baumanii* and *Pseudomonas aeruginosa*. The majority of XDR *Acinetobacter baumanii* were isolated from young adults (21-40years) and PDR *Acinetobacter baumanii* were elder adults (>=50years) which constituted 6.4% and 1.2% respectively, whereas most prevalent age group of XDR and PDR *Pseudomonas aeruginosa* were elder adults(>=51 years) constituted 7.5% and 2.7%. (Table 3 and Table 4)

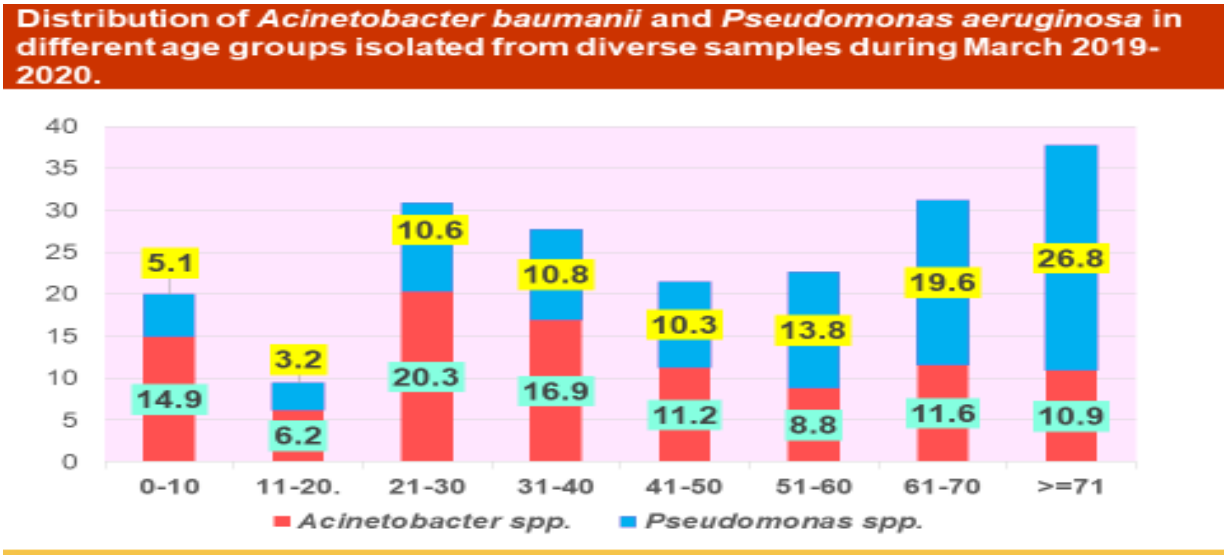

Figure 1. Age specific distribution of *Acinetobacter baumanii* and *Pseudomonas aeruginosa* positive isolates during March 2019 to 2020

Table 3. Age specific prevalence of XDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* positive isolates during March 2019 to March 2020

Age	Total *A. baumanii in %*	XDR *A. baumanii in %*	*Total P. aeruginosa* in %	XDR *P. aeruginosa* in %
0-10	14.9	1.3	5.1	0.3
11-20	6.2	0.4	3.2	0.3
21-30	20.3	3.2	10.6	1.1
31-40	16.9	3.2	10.8	1.2
41-50	11.2	1.6	10.3	1.7
51-60	8.8	1.9	13.8	2.2
61-70	11.6	2.2	19.6	2.7
>=71	10.9	1.7	26.8	2.6

Table 4. Age specific prevalence of PDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* positive isolates during March 2019 to March 2020

Age	Total *A. baumanii* in %	PDR A. *baumanii in %*	*Total P. aeruginosa* in %	PDR *P. aeruginosa* in %
0-10	14.9	0.2	5.1	0.001
11-20	6.2	0.1	3.2	0.002
21-30	20.3	0.5	10.6	0.3
31-40	16.9	0.3	10.8	0.4
41-50	11.2	0.2	10.3	0.4
51-60	8.8	0.5	13.8	0.7
61-70	11.6	0.4	19.6	0.9
>=71	10.9	0.3	26.8	1.1

Antibiotic resistance studies revealed that XDR isolates of 258 (15.6%) in *Acinetobacter baumanii* and 512 (11.8%) in *Pseudomonas aeruginosa* isolated from various clinical specimens.

In addition, this study describes for the cumulative MIC interpretation of antimicrobial sensitivity and resistant patterns among 41, (2.3%) isolates of *Acinetobacter baumanii* and 166 (3.8%) isolates of pan drug-resistant Pseudomonas aeruginosa (intermediately-resistant or resistant to all cephalosporins, carbapenems, quinolones and aminoglycosides) with the help of Myla statistical analysis (Biomerieux, India) in *Dr Lal Path Labs* during 2019-2020. All the isolates of PDR *Acinetobacter baumanii* and Pseudomonas shown highly resistant to

colistin MICs >4µg/ml. Colistin activity ($MIC_{50/90\ <=0.5}$) against 258 XDR *Acinetobacter baumanii* demonstrated that 50 % and 90% isolates were within 0.5µg/ml MIC. Total 258 XDR *A. baumanii* isolates tested against all antimicrobial, 74.8% sensitive to tigecycline was having $MIC_{50/90}$ (2/4µg/ml) and 51.4% of minocycline sensitive isolates having $MIC_{50/90}$,4/16µg/ml were noted, the notable exception being 20% of PDR *Acinetobacter baumanii* demonstrated sensitive to minocycline in Delhi.

On the other hand, 512 tested isolates of XDR Pseudomonas aeruginosa were recorded decreased susceptibilities to Colistin 79.2% (MIC at which 50% and 90% of isolates were inhibited (MIC_{50} & MIC_{90}), <=0.5 and 8 µg/ml respectively). In addition, colistin activity ($MIC_{50/90,}$ 4/16 µg/ml) were showed 100% resistant to all PDR Pseudomonas. In the present study, all drugs were found resistant in XDR Pseudomonas aeruginosa except Colistin, which noted sensitive in 79.2% isolates. However, PDR isolates of Pseudomonas showed 100% resistant to all tested drugs in Delhi. (Table 3) The distribution of antimicrobial drugs MIC values against sensitivity patterns of XDR and PDR *Acinetobacter baumanii* and Pseudomonas aeruginosa followed in (Table 5 and Table 6).

Table 5. Antimicrobial susceptibilities with cumulative MIC for Extremely drug resistant (XDR) and Pan drug resistant (PDR) isolates of *Acinetobacter baumanii* determined by broth dilution

Antibiotics	Range	XDR (n=258) *A. baumanii* MIC (µg/ml)		S %	R %	PDR (n=41) *A. baumanii* MIC µg/ml)		S %	R %
		50	**90**			**50**	**90**		
Ticarcillin/Clavulanic acid	≤ 16 - ≥ 128	128	128	1.2	98.8	128	128	0	100
Piperacillin/tazobactum	≤ 16 - ≥ 128	128	128	1.6	98.4	128	128	0	100
Ceftriazone	≤ 8 - ≥ 16	64	64	0	100	64	64	0	100
Cefoperazone/Sulbactum	≤ 16 - ≥64	64	64	19.4	80.6	64	64	0	100
Cefepime	≤ 2 - ≥ 16	64	64	3.9	96.1	64	64	0	100
Doripenem	≤ 1 - ≥ 4	8	8	0.4	99.6	8	8	0	100
Imepenem	≤ 1 - ≥ 4	16	16	0.9	99.1	16	16	0	100
Meropenem	≤ 1 - ≥ 4	16	16	0.4	99.6	16	16	0	100
Minocycline	**≤ 4 -≥ 16**	**4**	**16**	**51.4**	**48.6**	**8**	**16**	**20.6**	**79.4**
Amikacin	≤ 16 - ≥64	64	64	22.2	77.8	64	64	0	100
Gentamicin	≤ 4 - ≥16	16	16	6.6	93.4	16	16	0	100
Levofloxacin	≤ 0.5 - ≥2	8	8	3.5	96.5	8	8	0	100
Ciprofloxacin	≤ 0.5 - ≥2	4	4	2.3	97.7	4	4	0	100
Tigecycline	≤ 0.5 - ≥2	0.5	4	74.8	25.2	4	4	0	100
Colistin	≤ 0.5 - ≥2	**<=0.5**	**0.5**	**92.6**	**7.4**	**4**	**16**	**0**	**100**
Trimethoprim Sulfamethoxazole	≤ 20 - ≥80	320	320	12.4	87.6	320	320	0	100

Table 6. Antimicrobial susceptibilities with cumulative MIC for Extremely drug resistant (XDR) and Pan drug resistant (PDR) isolates of *Pseudomonas aeruginosa* determined by broth dilution

Antibiotics	Range	XDR (n=512) *P. aeruginosa* MIC (µg/ml)		S %	R %	PDR (n=166) *P. aeruginosa* MIC µg/ml)		S %	R %
		50	**90**			**50**	**90**		
Ticarcillin/ Clavulanic acid	≤ 16 - ≥ 128	32	128	1.6	98.4	128	128	0	100
Piperacillin/tazobactum	≤ 16 - ≥ 128	128	128	3.5	96.5	128	128	0	100
Ceftazidime	≤ 4 - ≥ 16	64	64	5	95	64	64	0	100
Cefoperazone/Sulbactum	≤ 16 - ≥64	64	64	6.3	93.7	64	64	0	100
Cefepime	≤ 2 - ≥ 16	64	64	5	95	64	64	0	100
Doripenem	≤ 1 - ≥ 4	8	8	9.6	90.4	8	8	0	100
Imepenem	≤ 1 - ≥ 4	16	16	7.4	92.6	16	16	0	100
Meropenem	≤ 1 - ≥ 4	16	16	8.6	91.4	16	16	0	100
Aztreonam	≤ 4 -≥ 16	8	16	20.6	79.4	16	64	0	100
Amikacin	≤ 16 - ≥64	64	64	10.9	89.1	64	64	0	100
Gentamicin	≤ 4 - ≥16	16	16	10.3	89.7	16	16	0	100
Levofloxacin	≤ 0.5 - ≥2	8	8	2.3	97.7	8	8	0	100
Ciprofloxacin	≤ 0.5 - ≥2	4	4	2.1	97.9	4	4	0	100
Colistin	≤ 0.5 - ≥2	**<=0.5**	**8**	**79.2**	**20.8**	**4**	**16**	**0**	**100**
Trimethoprim Sulfamethoxazole	≤ 20 - ≥80	80	320	10	90	160	320	0	100

5. Discussion

In our study, *Pseudomonas aeruginosa* (10.8%) were more common than *Acinetobacter baumannii* (4.1%) similar to studies by Grewal, *et al* in recent time [8]. Management of XDR and PDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* is a serious growing health challenge for clinical physicians, microbiologists, and one of the major causes of nosocomial infection in worldwide [1,3,4,5,6,9-14]. An increasing prevalence of infections caused by extremely drug-resistant (XDR) isolates has been report in many countries and in different part of India [1,2,6,9,10,12-20]. XDR defined as resistant to all available antibiotics that is resistant to all penicillins, cephalosporins, fluroquinolones, and aminoglycosides shall be resistant to carbapenems [4]. Unfortunately, XDR (all drug with carbapenem-resistant) strains have been reported worldwide; colistin remains the only effective antibiotic and can be administered orally, topically, by inhalational route, intramuscularly and intravenously [4,5,6,11,21].

The most common prescribed antimicrobial colistin have long provided effective treatment for XDR *Acinetobacter and Pseudomonas* while development of high level colistin resistance is a problem of critical importance in clinical settings, therefore this research has focused on investigating its virulence. Colistin resistance increasing is worrisome about the therapy for *Acinetobacter baumanii* and *Pseudomonas aeruginosa*. However, the emergence of Pan drug-resistant isolates, and especially, the emergence of Colistin resistance, are of concern in our study because in India very few studies reported against PDR isolates [22,23].

Of the interest in emergence of *Acinetobacter baumannii*, an opportunistic gram-negative frequently causes nosocomial infections, which has been associated with longer hospital stay associated with a tendency to colonize the hospital environment: bed rails, floors, ventilator pads, supply carts and infusion pumps in the Intensive Care Unit (ICU) mainly ventilator-associated pneumonia and bloodstream infection [7,11].

Reportedly, one of the current globally health concerns is the rise of infection due to XDR *Acinetobacter baumanii* infections usually involve organ systems with a high fluid content (e.g., respiratory tract, blood, fluid, pus, urinary tract) [4,6,8].

In the present study, proportion of XDR *A. baumannii* were highest from pus and surgical site infections were 23.8%, 21.8% respectively and PDR (4.5%) *A. baumannii* from patients with respiratory infection, which is higher than that of bacteremia, and UTI were agreement with previous study [6].

During the early 1970s, the clinical isolates of *Acinetobacter* were susceptible to mostly drugs. However, since 1975, increasing resistance in all groups including cephalosporins. By the late 1990s emergence of carbapenems resistance decreased the therapeutic options [2,21] in our study among the colistin susceptible *A. baumanii* isolates, were none susceptible to carbapenems. Such high variations noted among different geographical locations with XDR causing infection and it prevalence varies across geographic region [9,3,11] in our findings other previous studies by worldwide were concords with this study [6,22,24].

Since colistin-resistant Acinetobacter *spp.* first reported in the Czech Republic in 1999 [2]. In our study, according to susceptibility results, frequency of resistance to Colistin is 7.4 % in XDR *Acinetobacter baumanii* suggesting that colistin are suitable available drug for treatment of XDR *Acinetobacter baumanii*, this finding were concord with other studies [16,24].

In Delhi, Further, Colistin considered as effective last resort reserved drug for the treatment of severe nosocomial infections by XDR *A. baumanii*.

Clinicians for treating *Acinetobacter baumanii* infections should use minocycline judiciously [4]. In this study, 50% susceptibility to minocycline was noted in Delhi among XDR *A. baumanii*, which is slightly less than the finding of study from US and Thailand who reported 72.1% and 81.4% susceptibility to minocycline respectively [17]. Minocycline works effectively when used for treatment of respiratory and blood infection. However, due to its limited solubility in urine, it might not be effective in urinary infection by *Acinetobacter baumanii* [10].

On the other hand, tigecycline susceptibility of 74.8% to *A. baumanii* reported in this study. Tigecycline are usually consider the treatment for XDR infections but the burden of tigecycline resistance is still worry some in patients with XDR infections due to *Acinetobacter baumanii* therefore should be used according to the results of susceptibility testing. It is therefore inappropriate to use for managing blood stream infection, respiratory, abdominal, tissue infection caused by XDR *A. baumanii*. Here we show that *A. baumanii* can rapidly develop resistance to tigecycline appeared less effective for achieving a microbiological cure and is less appropriate for treating XDR infections this is similar with previous findings [14,20]. Notably, a study has reported tigecycline based therapy for the treatment of MDR and XDR *A. baumanii* was reported with higher mortality rate. Further, tigecycline combination therapy reported with lower mortality than monotherapy [21].

The number of colistin resistant *Acinetobacter baumanii* have increased year by year all over the world such as from Spain, Korea [1,2]. PDR *Acinetobacter baumanii* causing threat because colistin comes back into use as effective antibiotic for the treatment of nosocomial serious infection. In this study 2.5%, isolates were PDR, which is very similar with the finding of Gales *et al*, 2006 [3] who found 2.7 - 3.3%. In addition, emergence of 2.5% PDR isolates of *A. baumanii* in our study has been no choice of treatment similar with some of the cases described by the authors; the isolates have become truly pan drug resistant (PDR) with resistance seen to all tested antimicrobials [3,5,6].

Pseudomonas aeruginosa is an opportunistic pathogen that frequently causes nosocomial infections. It causes diseases in all age groups although this infection documented to be extremely common in older adults >=60 years of age and is major cause of morbidity and mortality has substantially increased worldwide in the past decade. Our data showed that *Pseudomonas aeruginosa* in the Urinary system infection and wound infection, as the main

infection sites, are up to 70%, which correlates well with other study by Gill *et al*, 2016 [18].

Due to alarming rise of carbapenem resistance, management of XDR infections becomes a challenge; it was found that 93% isolates of *Pseudomonas aeruginosa* were resistant to carbapenems. Similarly, other study such as Moazami and Eftekhar, 2012, in their study found 94.7% isolates resistant to carbapenem [13]. Resistance pattern of each antimicrobial agent (except colistin) was all above 80-95% (Table 4). In our study, prevalence of XDR was 11.8% and 3.8% isolates were PDR *Pseudomonas aeruginosa*, which is similar from the study conducted in 2014 [22].

In our study, XDR *P. aeruginosa* have showed significantly higher resistant to all antibiotics except colistin, whereas colistin has alarmingly increased, observed notable resistance (20.8%) to XDR P. aeruginosa in Delhi. Nevertheless, reports from other countries showed resistance to colistin varied from 0-31.7% [18,25,26].

Taneja et al considered an organism PDR if it was resistant to all antipseudomonal agents such as penicillins, cephalosporins, carbapenems, aminoglycosides, quinolones, monobactams and polymyxins. Most of the PDR Pseudomonas aeruginosa resistant strains were isolated from UTIs infection, which is, correlates with another study [23]. Whereas other studies not reported any PDR isolates of *Acinetobacter baumanii* and *Pseudomonas aeruginosa* [16,26].

Our paper is a retrospective study and addresses the colistin may be an alternative for the treatment of XDR *P. aeruginosa* isolates rather than PDR indicating this will acquire colistin resistance over carbapenem resistance leading to pan drug resistant isolates, which have already started emerging and leading to no treatment options in our hand. Colistin resistance increasing is worrisome about the therapy for *Pseudomonas aeruginosa* infection.

Hence, based on the observations of present study, rise in the emergence of XDR and PDR *Acinetobacter baumanii* and *Pseudomonas aeruginosa* in current scenario can be severe and strict infection control strategies to prevent worst outcomes.

6. Conclusion

Due to the different geographical regions, XDR and PDR isolates of *Acinetobacter baumanii* and *Pseudomonas aeruginosa* have changed over a period with increasingly resistant to primary antimicrobial drugs become more virulent, and important to see the difference in antimicrobial susceptibility in different samples. XDR and PDR have already started emerging and leading to clinical failure leaving very low or no treatment options in our hand, has become the concern for policy makers and urgent need of strictly adhere to the concept of reserve drugs policy to minimize the misuse of available antimicrobials. Judicious selection of antimicrobial drugs as per recommendation by CLSI M-S-29 is the need of hour in our country. We should be concern about the national emergence of resistant and awareness of these bacteria as a cause of invasive infection and severe sepsis. Strict implementation of antibiotic stewardship programme is essential to Colistin resistance spread.

Ethical Approval

It is not applicable.

Conflicts of Interest

There are no conflicts of interest.

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