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Supplementary File

Figure 4. Distribution of the obtained *P. aeruginosa* isolates among ICUs and different hospital departments.

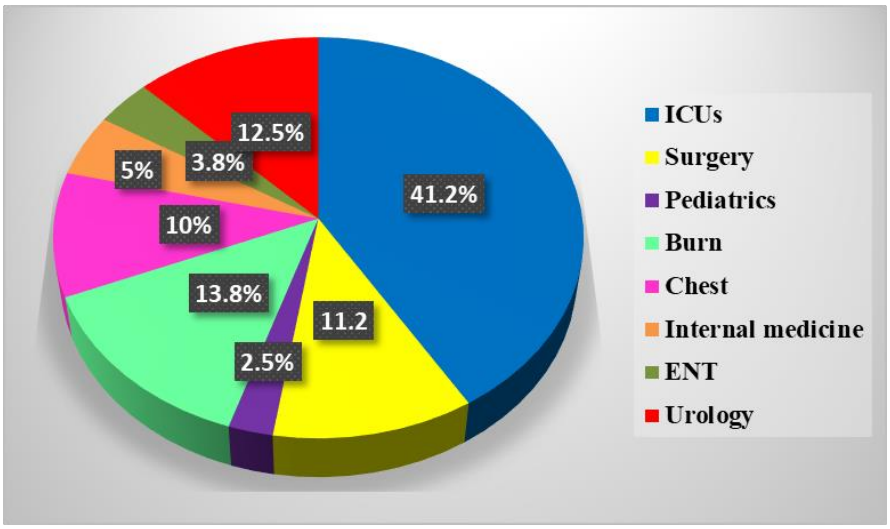

Figure 5. Distribution of the obtained *P. aeruginosa* isolates among different clinical specimens

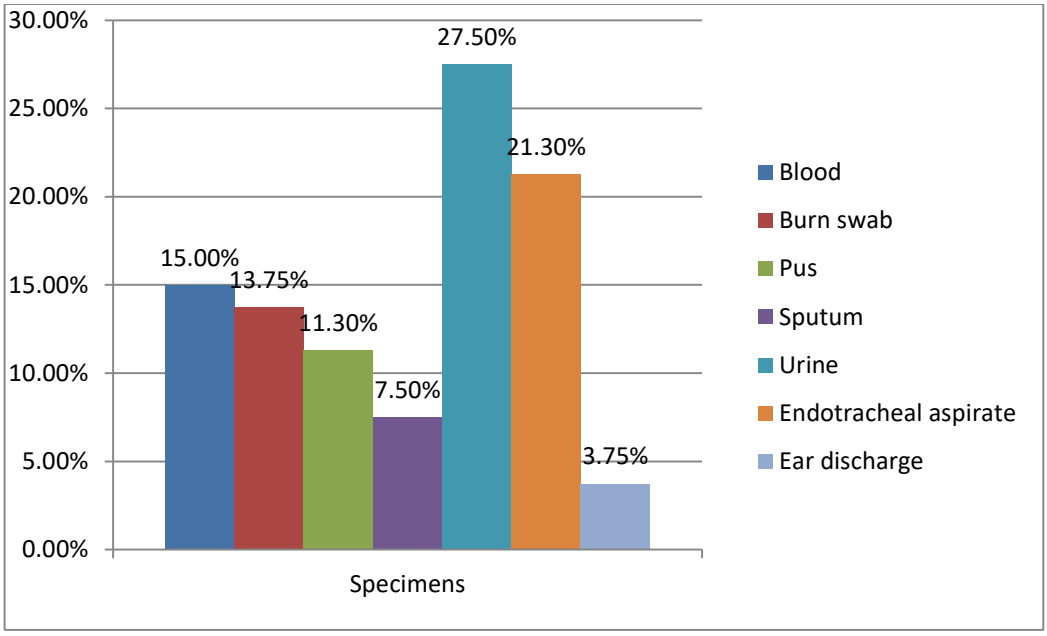

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Figure 6. Antimicrobial resistance phenotypes of the obtained *P. aeruginosa* isolates.

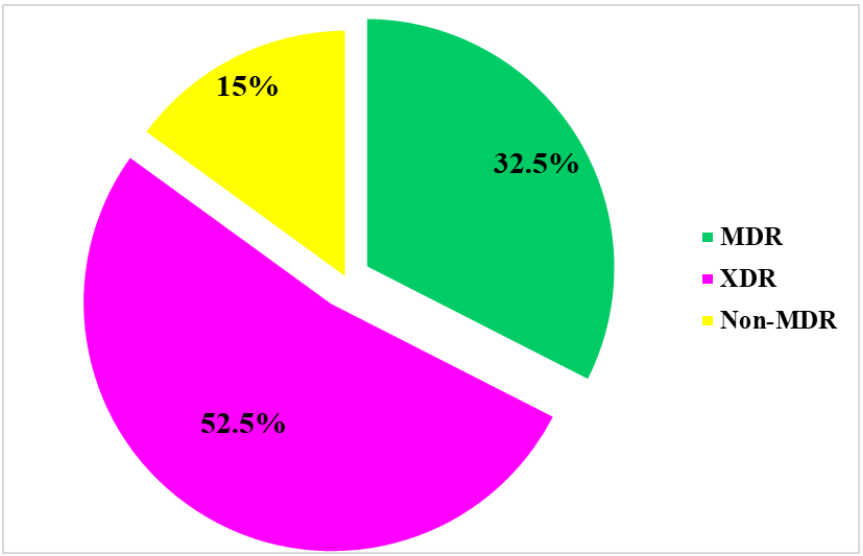

Figure 7. Modified Congo Red agar plate (MCRA) for detection of biofilm production among *P. aeruginosa* isolates Letter A: Dry black crystalline colonies i.e. positive for biofilm production. Letter B: Red colored colonies i.e. negative for biofilm production.

Table 4. Antimicrobial susceptibility pattern of the obtained *P.aeruginosa* isolates (n=80) by disk diffusion method (CLSI, 2022).

Antimicrobial groups	Antimicrobial agents	Abbrev.	Disk content (µg)	*P.aeruginosa* isolates (n=80)					
				Interpretive categories					
				S		I		R	
				No	%	No	%	No	%
Penicillins	Piperacillin	PRP	100µg	29	36.3	4	5	47	58.7
B-lactam/β-lactamase inhibitor combinations	Piperacillin-tazobactam	TZP	100/10µg	38	47.5	8	10	34	42.5
	Ceftazidime-avibactam	CZA	30/20 µg	65	81.3	0	0	15	18.7
	Ceftolozane-tazobactam	C/T	30/10 µg	51	63.7	0	0	29	36.3
Cephems	Ceftazidime	CAZ	30µg	21	26.3	0	0	59	73.8
	Cefepime	FEP	30µg	27	33.7	0	0	53	66.3
Monobactams	Aztreonam	ATM	30µg	25	31.3	4	5	51	63.7
Carbapenems	Doripenem	DOR	10µg	25	31.3	0	0	55	68.7
	Imipenem	IPM	10µg	23	28.7	1	1.3	56	70
	Meropenem	MEM	10µg	26	32.5	0	0	54	67.5
Aminoglycosides	Gentamicin	CN	10µg	20	25	0	0	60	75
	Tobramycin	TOB	10µg	21	26.3	0	0	59	73.8
	Amikacin	AK	30µg	30	37.5	4	5	46	57.5
Fluoroquinolones	Ciprofloxacin	CIP	5µg	40	50	0	0	40	50
	Levofloxacin	LEV	5µg	37	46.3	1	1.3	42	52.4
	Norfloxacin	NOR	10µg	47	58.7	0	0	33	41.3
	Ofloxacin	OFX	5µg	45	56.3	0	0	35	43.7
Phosphonic acid	Fosfomycin	FF	50µg	50	62.5	0	0	30	37.5

Table 5. Agreement between phenotypic screening and confirmatory methods for ESβLs and AmpC production among *P.aeruginosa* isolates

Phenotypic tests		***P. aeruginosa* isolates (n=80)**			***Kappa agreement***	**p-value**
		Combined disk confirmatory test (CDT) for ESβLs		**Total**		
		+ve (n=10)	**-ve (n= 70)**			
Disk diffusion screening test	**+ve (n=59)**	9 (15.3%)	50 (84.7%)	59 (100%)	*K*1= 0.060*****	**p1 <0.001***
	-ve(n= 21)	1 (4.8%)	20 (95.2%)	21 (100%)		
		AmpC disk confirmatory test				
		+ve (n=37)	**-ve (n=43)**	**Total**		
Cefoxitin disk diffusion screening method	**+ve (n=74)**	35 (47.3%)	39 (52.7%)	74 (100%)		
	-ve (n=6)	2 (33.3%)	4 (67.7%)	6 (100%)	*K*2= 0.036*****	**p2 <0.001***

**K*1: Kappa forESβLs*K*2: Kappa for AmpC*: Statistically significant

Kappa interpretation:

Kappa < 0: No agreement
Kappa between 0.00 and 0.20: Slight agreement
Kappa between 0.21 and 0.40: Fair agreement
Kappa between 0.41 and 0.60: Moderate agreement
Kappa between 0.61 and 0.80: Substantial agreement
Kappa between 0.81 and 1.00: Almost perfect agreement.

Table 6. Frequency of class A and class B carbapenemases production among *P. aeruginosa* isolates by phenotypic screening and confirmatory methods

Phenotypic tests		***P. aeruginosa* isolates (n=80)**					***Kappa agreement***	**p-value**
		Imipenem/boronic acid CD test for class A carbapenemases (KPC)		**Imipenem/EDTA CD test for class B carbapenemases (MBL)**		**Total**	*K*1= 0.141	**p1= 0.013***
		+ve (n=12)	**-ve (n=68)**	**+ve (n=31)**	**-ve (n=49)**			
Disk diffusion screening test	**+ve (n=56)**	12 (21.4%)	44 (78.6%)	31(55.4%)	25(44.6%)	56 (100%)		
	-ve (n= 24)	0 (0%)	24 (100%)	0 (0%)	24 (100%)	24 (100%)	*K*2= 0.427	**p2<0.001***

*K*1: Kappa for KPC *K*2: Kappa for MBL CD: combined disk
p1: p-value for KPC p2: p-value for MBL
*: Statistically significant
Kappa interpretation:
Kappa < 0: No agreement
Kappa between 0.00 and 0.20: Slight agreement
Kappa between 0.21 and 0.40: Fair agreement
Kappa between 0.41 and 0.60: Moderate agreement
Kappa between 0.61 and 0.80: Substantial agreement
Kappa between 0.81 and 1.00: Almost perfect agreement.

Table 7. Susceptibility pattern of MDR and XDR *P. aeruginosa* isolates to the new beta-lactam/beta-lactamase inhibitor combinations: ceftazidime-avibactam and ceftolozane-tazobactam by disk diffusion method

P. aeruginosa	**Ceftazidime-avibactam (Disk diffusion)**				**Z**	**p-value**	**Ceftolozane-tazobactam (Disk diffusion)**				**Z**	**p-value**
	S		**R**				**S**		**R**			
	No.	**%**	**No.**	**%**			**No.**	**%**	**No.**	**%**		
MDR isolates (n=26)	21	80.8	5	19.2	4.16	**<0.001***	17	65.4	9	34.6	1.94	0.052
XDR isolates (n=42)	32	76.2	10	23.8	3.60	**<0.001***	22	52.4	20	47.6	0.22	0.825

*: Statistically significant

Table 8. Correlation between antimicrobial resistance phenotypes and biofilm formation among *P. aeruginosa* isolates

Biofilm formation	**MDR *P. aeruginosa* (n=26)**		**XDR *P. aeruginosa* (n=42)**		**Non-MDR *P. aeruginosa* (n=12)**		**Total (n=80)**		**χ2**	**p-value**
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**		
Yes (n=47)	13	50	34	81	0	0	47	58.8	28.205	**<0.001***
No (n= 33)	13	50	8	19	12	100	33	41.2		

Table 9. Univariate analysis of different risk factors associated with colistin-resistant *P. aeruginosa* isolates infection

Characteristics	Colistin-resistant isolates (n=15)		Colistin– non resistant isolates (n=65)		χ^2	p-value
	No.	%	No.	%		
Hospitalization in ICU	10	66.7	23	35.4	Z= 4.23	<0.001*
**Prolonged hospitalization>21 days	9	60	6	9.2	Z= 4.18	<0.001*
Invasive procedures	15	100	65	100	21.48	<0.001*
Co-morbidities						
• Diabetes mellitus	12	80	45	69.2		
• Hypertension						
• COPD****	0	0	2	3.1		
• Chronic renal failure						
• Chronic liver diseases	0	0	14	21.5		
• Malignancy						
• Combined comorbidities	5	33.3	11	16.9	0.69	0.406
	0	0	0	0		
	0	0	0	0		
	4	26.7	7	10.8		
	3	20	11	16.9		
VAP***	7	46.7	6	9.2	Z=3.550	0.004*
Prior antibiotic exposure	15	100	65	100	Z=1.147	0.250
Prior colistin therapy						
• Monotherapy	15	100	5	7.7		
• Combination therapy					16.94	<0.001*
	0	0	12	18.5		