OHA-26

CHIRAL Bangladesh

Prevalence, Antibiotic Resistance Pattern for Bacteriuria from Patients with Urinary Tract Infections

Authors

Md. Shahadat Bin Shahid [a], Abul Kalam Azad [a,b], Syeda Tasneem Towhid [a,b], Jannatul Ferdous [a,c] and Md. Jubayer Hossain [a,*]

[a] Center for Health Innovation, Research, Action, and Learning - Bangladesh (CHIRAL Bangladesh), 9-10 Chittaranjan Ave, Dhaka 1100

[b] Department of Microbiology, Jagannath University, 9-10 Chittaranjan Ave, Dhaka 1100

[c] Department of Transfusion Medicine, Mugdha Medical College, and Hospital, Dhaka-1223.

Introduction

Urinary tract infection comes in the second position as the most common infection affecting 150 million people world wide. UTIs complicate the daily lives of people of all ages, notably middle-aged women and the elderly. Antibiotics are commonly used to treat UTIs because it is often caused by bacterial agents, but fungi and viruses can also be responsible. Consequently, self-medication and overuse of antimicrobial drugs are taking place in the vast majority of people. Undoubtedly the long-term misuse of antimicrobial agents has created a rise in antibiotic resistance, becoming a global problem. Antimicrobial resistance in microbes is a rigorously evolving phenomenon. Maintaining a continuous surveillance regime is crucial to track their susceptibility toward different commonly used antibiotics.

Objective

The goal of the study is to find out how susceptible or resistant to antibiotics bacterial pathogens are in patients at Mugda Medical College Hospital who have urinary tract infections. Thoroughly examine antibiotic resistance trends by age and gender in patients with urinary tract infections. Also, study the distribution of predisposing factors and suggest a treatment for UTI, which will surely enhance future treatment strategies.

Methodology

Study Design and Population: The study population comprises a wide range of ages (1-95). A total of 243 patient records/reports were collected with a confidential collaboration.

Data Collection and Management: Patient records were collected from Mugda Medical College Hospital. Google Sheets was used to store as well as sort the data.

Statistical Analysis: Descriptive statistics were conducted to analyze and summarize the data. The R program was used for data analysis and summarizing, and Power BI was used for visualizing data. Different well-known R libraries were run for analytical purposes e.g., dplyr, ggplot2, etc.

Results

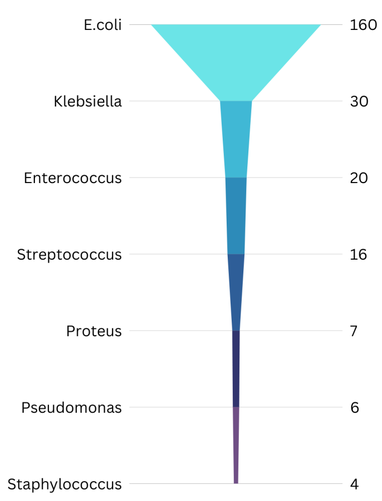
- Frequency of etiologic agents over the course of the study. (Funnel chart)
- Distribution of infection among different gender and age groups (Table 1)
- Sensitivity pattern among isolated uropathogens to tested antibiotics. (Figure 1 - 6)

Table 1

		Names of the isolates							Total
		E. coli (n=160)	Klebsiella (n = 30)	Enterococcus (n = 20)	Streptococcus (n = 16)	Proteus (n = 7)	Pseudomonas (n = 6)	Staphylococcus (n = 4)	
Sex	Female	139 (87%)	22 (73%)	17 (85%)	14 (88%)	2 (29%)	3 (50%)	3 (75%)	200 (82%)
	Male	21 (13%)	8 (27%)	3 (15%)	2 (12%)	5 (71%)	3 (50%)	1 (25%)	43 (18%)
Age groups	1-18	29 (18%)	5 (17%)	4 (20%)	0 (0%)	6 (86%)	1 (17%)	1 (25%)	46 (19%)
	18-33	41 (26%)	6 (20%)	7 (35%)	4 (25%)	0 (0%)	0 (0%)	1 (25%)	59 (24%)
	33-50	39 (24%)	6 (20%)	2 (10%)	6 (38%)	1 (14%)	0 (0%)	1 (25%)	55 (23%)
	50-95	51 (32%)	13 (43%)	7 (35%)	6 (38%)	0 (0%)	5 (83%)	1 (25%)	83 (34%)

Key Findings

- Surprisingly, *Proteus spp.* were the most common isolates in infants and adolescents (86%, 6/7).
- On the other hand, *Pseudomonas spp.* was the most prevalent isolate in the elderly age group (83%, 5/6) and, at the same time, the least prevalent in infants and adolescents (17%, 1/6).
- *Pseudomonas spp.* in our study exhibited the highest level of increased resistance (100) against ten commonly used antibiotics.



Conclusions

A gradual rise in antimicrobial resistance can be noticed throughout the results. This scenario can help[envision the future treatment strategy for UTI patients. It will also help to catch the eye of policymakers in the public health administration of Bangladesh to make a very move.

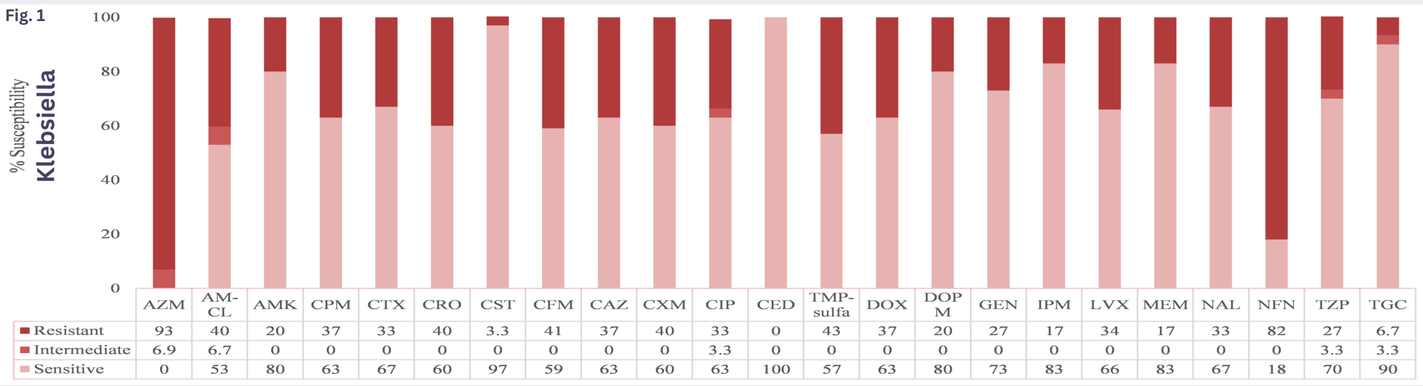
List of abbreviations

AML = Amoxycillin, AMP = Amphicilin, AZM = Azithromycin, AM-CL= Amoxyclav, AMK = Amikacin, CPM = Cefepime, CTX = Cefotaxime, CRO = Ceftrioaxone / Rocephin, CHL = Chloramphenicol, CLOXA = Cloxacillin, CST = Colistin, CB = Carbinicillin, CFM = Cefixime, CAZ = Ceftazidime, CXM = Cefuroxime, CIP = Ciprofloxacin, CED = Cephradine, TMP-sulfa =Cotrimoxazole, CLI = Clindamycin, DOX = Doxycycline, DOPM = Doripenem, ERY = Erythomycin, FA = Fusidic Acid, GEN = Gentamicin, IMP = Imipenem, LVX = Levofloxacin, LZD = Linezolid, MEM = Meropenem, NAL = Nalidixic Acid, NOR = Norfloxacin, NFN = Nitrofurantoin, PEN = Penicillin-V, TZP = Piperacillin / Tazobactam, TCY = Tetracycline, TGC = Tigecycline, TOB = Tobramycin, TIC = Ticarcillin, TEC = Teicoplanin, VAN = Vancomycin

References

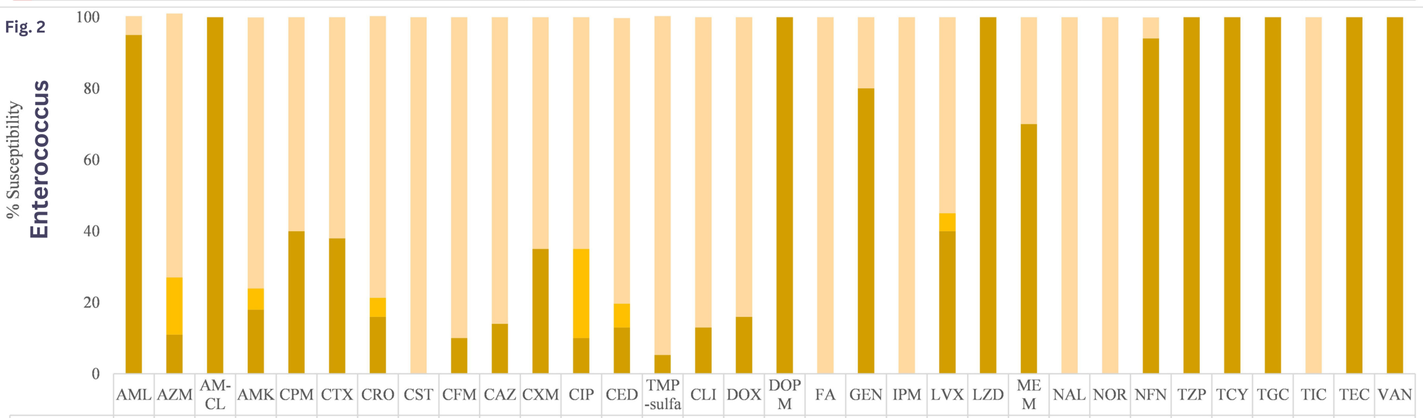
- Kushwaha, A., Pokharel, K., & Kadel, A. R. (2021). Antibiotic resistance to Escherichia coli among urine culture-positive patients in a tertiary care hospital in Nepal: A descriptive cross-sectional Study. JNMA: Journal of the Nepal Medical Association, 59(233), 39.
- Karlowsky, J. A., Kelly, L. J., Thornsberry, C., Jones, M. E., & Sahm, D. F. (2002). Trends in antimicrobial resistance among urinary tract infection isolates of Escherichia coli from female outpatients in the United States. Antimicrobial agents and chemotherapy, 46(8), 2540-2545.

Fig. 1



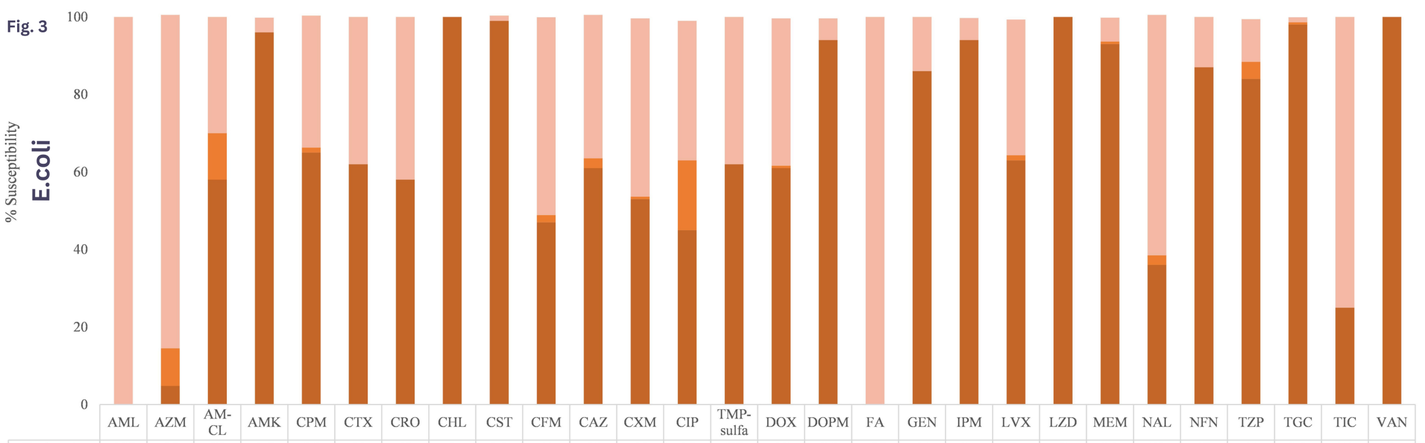
	AZM	AM-CL	AMK	CPM	CTX	CRO	CST	CFM	CAZ	CXM	CIP	CED	TMP-sulfa	DOX	DOPM	GEN	IPM	LVX	MEM	NAL	NFN	TZP	TGC
Resistant	93	40	20	37	33	40	3.3	41	37	40	33	0	43	37	20	27	17	34	17	33	82	27	6.7
Intermediate	6.9	6.7	0	0	0	0	0	0	0	0	3.3	0	0	0	0	0	0	0	0	0	0	3.3	3.3
Sensitive	0	53	80	63	67	60	97	59	63	60	63	100	57	63	80	73	83	66	83	67	18	70	90

Fig. 2



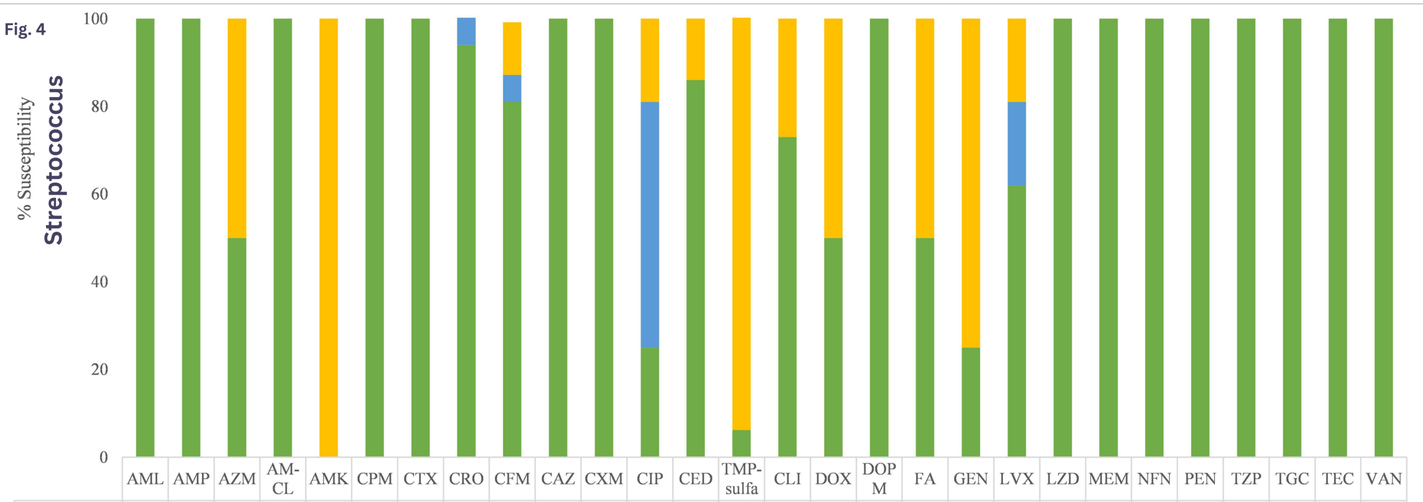
	AML	AZM	AM-CL	AMK	CPM	CTX	CRO	CST	CFM	CAZ	CXM	CIP	CED	TMP-sulfa	CLI	DOX	DOPM	FA	GEN	IPM	LVX	LZD	MEM	NAL	NOR	NFN	TZP	TCY	TGC	TIC	TEC	VAN
Resistant	5.3	74	0	76	60	62	79	100	90	86	65	65	80	95	87	84	0	100	20	100	55	0	30	100	100	5.9	0	0	0	100	0	0
Intermediate	0	16	0	5.9	0	0	5.3	0	0	0	0	25	6.7	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
Sensitive	95	11	100	18	40	38	16	0	10	14	35	10	13	5.3	13	16	100	0	80	0	40	100	70	0	0	94	100	100	100	0	100	100

Fig. 3



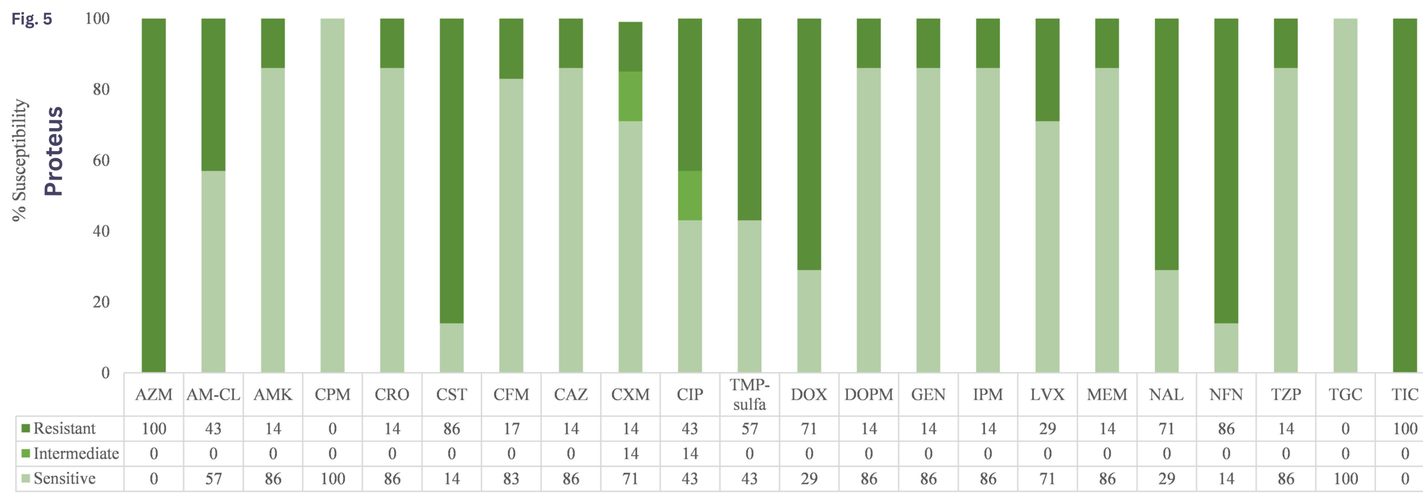
	AML	AZM	AM-CL	AMK	CPM	CTX	CRO	CHL	CST	CFM	CAZ	CXM	CIP	TMP-sulfa	DOX	DOPM	FA	GEN	IPM	LVX	LZD	MEM	NAL	NFN	TZP	TGC	TIC	VAN
Resistant	100	86	30	3.8	34	38	42	0	1.3	51	37	46	36	38	38	5.6	100	14	5.7	35	0	6.2	62	13	11	1.3	75	0
Intermediate	0	9.7	12	0	1.3	0	0	0	0	1.9	2.5	0.6	18	0	0.6	0	0	0	0	1.3	0	0.6	2.5	0	4.4	0.6	0	0
Sensitive	0	4.8	58	96	65	62	58	100	99	47	61	53	45	62	61	94	0	86	94	63	100	93	36	87	84	98	25	100

Fig. 4



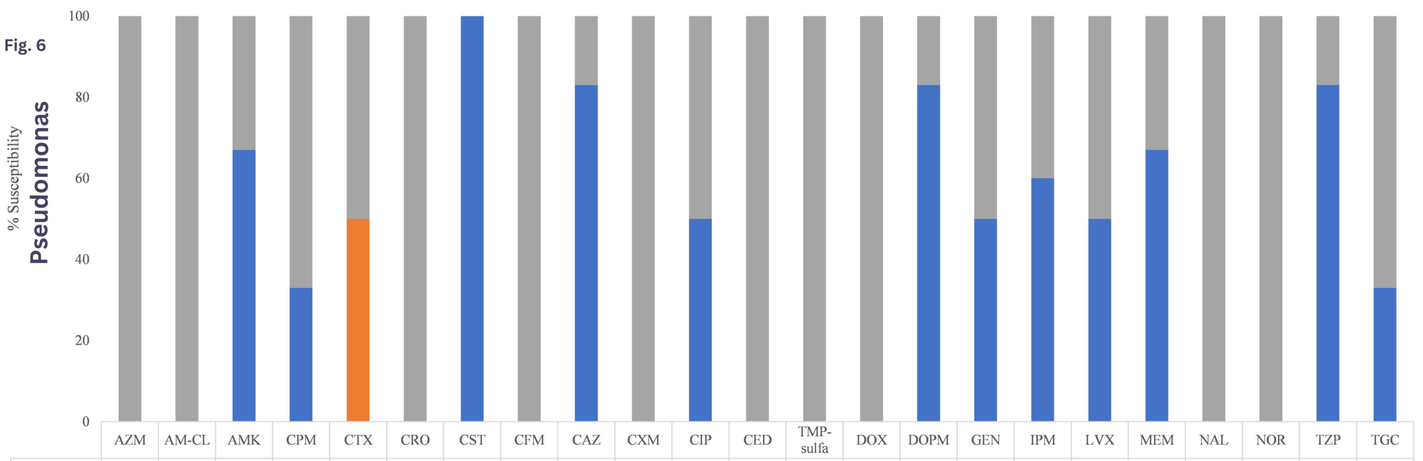
	AML	AMP	AZM	AM-CL	AMK	CPM	CTX	CRO	CFM	CAZ	CXM	CIP	CED	TMP-sulfa	CLI	DOX	DOPM	FA	GEN	LVX	LZD	MEM	NFN	PEN	TZP	TGC	TEC	VAN
Resistant	0	0	50	0	100	0	0	0	12	0	0	19	14	94	27	50	0	50	75	19	0	0	0	0	0	0	0	0
Intermediate	0	0	0	0	0	0	0	6.2	6.2	0	0	56	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0
Sensitive	100	100	50	100	0	100	100	94	81	100	100	25	86	6.2	73	50	100	50	25	62	100	100	100	100	100	100	100	100

Fig. 5



	AZM	AM-CL	AMK	CPM	CRO	CST	CFM	CAZ	CXM	CIP	TMP-sulfa	DOX	DOPM	GEN	IPM	LVX	MEM	NAL	NFN	TZP	TGC	TIC
Resistant	100	43	14	0	14	86	17	14	14	43	57	71	14	14	14	29	14	71	86	14	0	100
Intermediate	0	0	0	0	0	0	0	0	14	14	0	0	0	0	0	0	0	0	0	0	0	0
Sensitive	0	57	86	100	86	14	83	86	71	43	43	29	86	86	86	71	86	29	14	86	100	0

Fig. 6



	AZM	AM-CL	AMK	CPM	CTX	CRO	CST	CFM	CAZ	CXM	CIP	CED	TMP-sulfa	DOX	DOPM	GEN	IPM	LVX	MEM	NAL	NOR	TZP	TGC
Resistant	100	100	33	67	50	100	0	100	17	100	50	100	100	100	17	50	40	50	33	100	100	17	67
Intermediate	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sensitive	0	0	67	33	0	0	100	0	83	0	50	0	0	0	83	50	60	50	67	0	0	83	33