

# Editorial



## Antibiotic Resistance in Bangladesh: Should Take Necessary Action Before the Situation Goes Out of Control!

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A number of articles regarding antibiotic resistance in Bangladesh were published in past five years (2014-2018) in the different national and international journals, social and electronic-print media. From this, total 46 relevant articles revealed that a high prevalence of resistance was detected in commonly tested pathogens, and the common first-line drugs were mostly resistant.<sup>1</sup> Antimicrobial resistance (AMR) has become an emerging issue worldwide as well as in Bangladesh. AMR is aggravated by irrational use of antimicrobials in a largely unregulated pluralistic health system<sup>2</sup> and also it is developed more rapidly due to the misuse and overuse of antibiotics.<sup>3</sup> An alarming report was published in the Daily Financial Times on 28 November 2021 regarding the serious antibiotic resistance situation in Bangladesh. They have reported that researchers of ICDDR'B with co-authored by researchers from Massachusetts General Hospital (MGH) have found that young children with pneumonia in Bangladesh frequently do not respond to common antibiotics, often resulting in their deaths!<sup>4</sup>

According to another report, almost all clinically important and widely used antibiotics have lost their effectiveness by more than 50 percent.<sup>4</sup> The reporter has also mentioned, 'Most worryingly, five of the most critical medicines listed by the World Health Organization (WHO) are progressively becoming ineffective (Figure 1), according to the surveillance study by the Institute of Epidemiology, Disease Control and Research (IEDCR) conducted between 2017 and 2023.<sup>4</sup> WHO recommended antibiotic categorization (total 21) is now in three groups as a) 'access group' (first or second choice antibiotics; offer the best therapeutic value, while minimizing the potential for resistance), b) 'watch group' (first or second choice antibiotics; only indicated for specific, limited number of infected syndromes) and c) 'reserve group' (last resort; life threatening infections due to multi-drug resistant bacteria)<sup>4</sup> (Figure 2).

Interesting things are, lead investigator and head of the microbiology, IEDCR reported that most of the physicians and also unrecognized health care providers have used most of the antibiotics to treat infections from 'watch group' and 'reserve group' instead of 'access group'. Scoping of development of resistance is due to lesser use of antibiotic from 'access group' he added.<sup>4</sup>

**Figure 1:** Chronological development ineffectiveness of top most 6 antibiotics for the last 5 years in Bangladesh (2017-2021).<sup>4</sup>

Name	2017	2018	2019	2020	2021
Ceftazidime	62	68	67	61	70
Cefixime	52	86	92	73	58
Cefepime	57	60	60	57	61
Ceftriaxone	52	63	67	60	65
Azithromycin	66	81	79	82	50
Ciprofloxacin	57	68	70	68	67

In figure 1, azithromycin and cefixime, which were very promising antibiotic became ineffective by 50% and 58% respectively.

**Figure 2:** WHO categorizes the clinically important antibiotics into 3 groups- a) 'access group', b) 'watch group' and c) 'reserve group'.<sup>4</sup>


ACCESS GROUP	WATCH GROUP	RESERVE GROUP
<ul style="list-style-type: none"> <li>• first or second choice antibiotics</li> <li>• offer the best therapeutic value, while minimizing the potential for resistance</li> </ul>	<ul style="list-style-type: none"> <li>• first or second choice antibiotics</li> <li>• only indicated for specific, limited number of infective syndromes</li> <li>• more prone to be a target of antibiotic resistance and thus prioritized as targets of stewardship programs and monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• last resort</li> <li>• highly selected patients (life threatening infections due to multi - drug resistant bacteria)</li> <li>• closely monitored and prioritized as targets of stewardship programs to ensure their continued effectiveness</li> </ul>

In figure 2, for the confirmation of rational use of antibiotic, WHO always give emphasis prescribing an antibiotic from the 'access group' whatoffer the best therapeutic value, while minimizing the potential for resistance; not from the 'watch group' or 'reserve group' last one called the 'last resort'.

Antibiotic susceptibility reports from laboratory service departments of various health institutions of Bangladesh showed serious and alarming situations regarding antibiotic ineffectiveness!

One of such report from the Laboratory Services Department of Khwaja Yunus Ali Medical College & Hospital revealed that 17 out of 20 antibiotics were found resistant to gram-negative bacilli, oxalate-positive microorganisms! (~85% ineffectiveness)<sup>6</sup> (Figure 3).

**Figure 3:** An antimicrobial susceptibility report from the Laboratory Services Department Khwaja Yunus Ali Medical College & Hospital <sup>5,6</sup>



**Khwaja Yunus Ali Medical College & Hospital**  
(FOUNDER: DR. M. M. AMJAD HUSSAIN)

**Wound Swab for C/S Report**

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HN : R211001566460	CN :
AN : N/A	Age : 49Y 8M 18D
VN : V211101995455	Gender : Male
Name : Md. Monnaf Pramanik	Consult By :
Ref By : Dr. khairul anam (lincon)	

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Sample collected : 21/11/2021 11:49      Sample Rcv at Lab : 22/11/2021 09:44      Finalization Date : 23/11/2021 09:49  
Specimen : **Wound Swab**

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*R21100156646	HN	VN	*V211101995455
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**Test Name : Wound Swab for C/S** **1st Initial Report**

**Incubation :** Aerobically at 37 C for 48 Hours

**Organism Isolated**

( A )	Pseudomonas sp.
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SL	Antibiotics	A	SL	Antibiotics	A
1	Amikacin	S	3	Amoxyclav	R
4	Ampicillin	R	5	Azithromycin	R
6	Aztreonam	R	10	Ceftazidime	R
11	Ceftriaxone	R	12	Cefixim	R
13	Cefotaxime	R	14	Cefuroxime	R
16	Cephadrine	R	17	Ciprofloxacin	R
20	Doxycycline	R	24	Gentamicin	R
25	Imipenem	S	26	Levofloxacin	R
38	Tobramycin	S	39	Vancomycin	R
40	Meropenem (MEM)	R	41	Clindamycin	R

**Remarks :** \*Gram negative bacilli.  
\*Oxidase test positive

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This Is Computer Generated Report. Does Not Require Signat  
R = Resistant, S = Sensitive, I = Intermediate

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In figure 3 only amikacin, imipenem & tobramycin are sensitive among 20 antibiotics, reports from the Laboratory Services Department of a specialized hospital in Bangladesh.

A very recent study in Bangladesh, the authors demonstrated that pathologically important some pathogens, like *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas* and *Klebsiella* showed resistance against older and common antimicrobials and these antibiotics were used in the treatment of fever In, In respiratory and urinary In tract infections that are the 50% of total infections.<sup>7</sup>

Prof. Dr. Md. Sayedur Rahman, Chairman, Pharmacology Department, BSMMU and Founder Chairman, BARA (Bangladesh AMR Response Alliance) has reported that the impact of increasing resistance of antibiotics are difficulty in the treatment in simple infections, prolonged staying in hospital, increase cost of treatment. Our irrational, unscientific and unfair attitude regarding antibiotic use are responsible for this alarming situation, not only for a health care provider but also for pharmaceutical companies and medicine sellers.<sup>7</sup>

Prof. Dr. Md. Sayedur Rahman has also alerted the people of Bangladesh that there is no chance of coming novel antibiotics in the next few years! So, let us very cautious to antibiotic use, stop the irrational & indiscriminate use of antibiotics immediately. For this reason, we have to develop a strong awareness program against irrational & indiscriminate use of antibiotics nationwide, he added.<sup>7</sup>

World Antimicrobial Awareness Week (WAAW) is celebrated from 18-24 November every year. The 2021 theme, 'Spread Awareness, Stop Resistance', called on One Health stakeholders, policymakers, health care providers, and the general public to be Antimicrobial Resistance (AMR) Awareness campaign.

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