

ANTIMICROBIAL RESISTANCE : REAL THREAT FOR THE CLINICIAN

MD. ABUL KALAM AZAD

Professor, Department of Internal Medicine, BSMMU, Dhaka, Bangladesh. Email: drasad1971@gmail.com

Antimicrobial resistance (AMR) occurs when microbes evolve mechanisms that protect them from the effects of antimicrobials (drugs used to treat infections). All classes of microbes can evolve resistance where the drugs are no longer effective. Fungi evolve antifungal resistance, viruses evolve antiviral resistance, protozoa evolve antiprotozoal resistance, and bacteria evolve antibiotic resistance. Together all of these come under the umbrella of antimicrobial resistance. Microbes resistant to multiple antimicrobials are called multidrug resistant (MDR) and are sometimes referred to as superbugs. Although antimicrobial resistance is a naturally occurring process, it is often the result of improper usage of the drugs and management of the infections. Antimicrobial resistance (AMR) is one of the top global public health and development threats. It is estimated that bacterial AMR was directly responsible for 1.27 million global deaths in 2019 and contributed to 4.95 million deaths. In the U.S., more than 2.8 million antimicrobial-resistant infections occur each year. In addition to death and disability, AMR has significant economic costs. The World Bank estimates that AMR could result in US\$ 1 trillion additional healthcare costs by 2050, and US\$ 1 trillion to US\$ 3.4 trillion gross domestic product (GDP) losses per year by 2030. Antimicrobial resistance has the potential to affect people at any stage of life, as well as the healthcare, veterinary, and agriculture industries. This makes it one of the world's most urgent public health problems. Resistance in bacteria can arise naturally by genetic mutation, or by one species acquiring resistance from another. Resistance can appear spontaneously because of random mutations, but also arises through spreading of resistant genes through horizontal gene transfer. However, extended use of antibiotics appears to encourage selection for mutations which can render antibiotics ineffective. Antimicrobial stewardship programmes appear useful in reducing rates of antimicrobial resistance. The WHO AWaRe (Access, Watch, Reserve) guidance and antibiotic book has been introduced to guide antibiotic choice for the 30 most common infections in adults and children to reduce inappropriate prescribing in primary care and hospitals. Narrow spectrum antibiotics are preferred due to their lower resistance potential and broad- spectrum antibiotics are only recommended for people with more severe symptoms. Some antibiotics are more likely to confer resistance, so are kept as reserve antibiotics in the AWaRe book. The world faces an antibiotics pipeline and access crisis due to inadequate research in the face of rising levels of resistance. Priorities to address AMR in human health include preventing all infections, which may result in inappropriate use of antimicrobials; ensuring universal access to quality diagnosis and appropriate treatment of infections; and strategic information and innovation.

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