EDITORIAL

Emerging Infectious Diseases and Antimicrobial Resistance – Dual Global Threats

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The global healthcare system is facing a double burden of emerging infectious diseases and antimicrobial resistance (AMR), both of which are a threat to medical progress and have a tendency to destabilize healthcare system infrastructure worldwide. According to World Health Organization (WHO) estimates, AMR was associated with 1.27 million deaths annually worldwide, and it is expected that this estimate could rise to 10 million deaths per year by 2050 if left unaddressed [1, 2]. Low- and middle-income countries, specifically South Asia and Sub-Saharan Africa, are the most affected regions for this issue due to already compromised health care infrastructure [3]. Infections arising due to AMR are resistant to most of the common antibiotics and lead to prolonged hospital stays, increased healthcare costs, and higher morbidity and mortality rates, thus placing an additional burden on the healthcare system [4].

In Pakistan, the situation is particularly concerning as AMR is considered a major cause of mortality, with approximately 200,000 deaths annually linked to antimicrobial-resistant infections [5]. Patients with common infections do not respond to first-line antibiotics and therefore require multiple courses of higher-generation antibiotics, increasing the risk of preventable complications. Multi-drug-resistant and extensively drug-resistant (XDR) bacterial strains now pose a significant threat nationwide [6].

This growing crisis is due to various factors, including unregulated over-the-counter antibiotic availability, inappropriate prescribing practices by physicians due to knowledge issues and influenced by the pharmaceutical industry, and extensive use of antibiotics in agriculture.

National and regional surveillance data further highlight the severity of the problem. Reported rates of methicillin-resistant Staphylococcus aureus (MRSA) exceed 80% in some Pakistani hospitals, severely limiting treatment options for skin, soft tissue, and invasive staphylococcal infections [7]. Similarly, extended-spectrum β-lactamase (ESBL)-producing Escherichia coli and Klebsiella pneumoniae show resistance to more than 70% of third-generation cephalosporins, forcing physicians to rely more on higher-generation agents such as Imipenem and Carbapenems [7, 8]. In addition, Streptococcus pneumoniae is showing increased resistance to penicillin and Macrolides, groups endangering the effectiveness of standard treatments for community-acquired pneumonia and other respiratory tract infections [8].

A study conducted in Karachi on urinary tract infections found that E. coli was the most common pathogen causing UTIs (82%), particularly among male patients. The organism was highly resistant to antibiotics such as penicillin and Cephalosporin while remaining sensitive to Amikacin. This reflects the growing resistance to commonly prescribed first-line antibiotics [9].

In addition, the emergence of new viral pathogens, including influenza variants and coronavirus variants, has further worsened the problem. The H1N1 influenza pandemic in 2009 and the COVID-19 pandemic in 2020 clearly showed how rapidly respiratory viruses can spread, particularly among older adults, individuals with chronic illnesses, and populations with limited access to healthcare. These outbreaks have also contributed to increased and inappropriate antibiotic use, further accelerating the development of AMR [10].

In this context, family physicians play an important role, as many of the antibiotics they prescribe in the community are used for self-limiting or viral illnesses, such as upper respiratory tract infections. A Pakistani multicenter study identified inappropriate prescribing, patient expectations, and limited diagnostic support as major barriersbarriers to effective antibiotic stewardship [10]. These findings emphasize the need for family physician training, including awareness of first-line antibiotic use for common illnesses presenting in primary care, patient awareness of the potential side effects of unnecessary antibiotics, and stronger government regulatory measures to address the irrational use of antibiotics [11].

To address these challenges, family physicians should take the following measures:

- Educate patients about the appropriate use and side effects of antibiotics.
- Adhere to evidence-based clinical guidelines to stay updated with recent knowledge.
- Utilize rapid diagnostic tests, including point-of-care testing, to reduce diagnostic uncertainty.

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- Promote vaccination programs, including influenza, pneumococcal, and routine childhood immunizations, to minimize infection risk.

In conclusion, addressing antimicrobial resistance and the burden of emerging infectious diseases requires strong national and international collaboration among healthcare professionals, researchers, policymakers, and public health organizations to share surveillance data and develop guidelines and policies informed by surveillance reports. These teams need to work together to improve infection prevention strategies and enhance necessary steps to reduce the growing burden of these threats [12].

GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

Grammarly was used for checking grammar and reference formatting. All scientific content, interpretations, and final decisions were made independently by the authors.

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