

## EDITORIAL

# Increasing Antimicrobial Resistance “A Crisis for Today and Challenge for Future”

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From time immemorial man has been interested in trying to control disease. It is true that medicine was conceived in sympathy and born out of necessity. The first doctor was the first man and the first woman the first nurse. Primitive medicine is timeless. Primitive medicine still persists in many parts of the world if we look around the world. Today the world stands on the threshold of a new era in which hundreds of millions of people will be safe from some of the most terrible diseases.<sup>1</sup> Soon poliomyelitis neonatal tetanus, measles, leprosy will join smallpox as diseases of the past. On the other hand the world also stands on the brink of global crises in infectious diseases. No country is safe from them and no country can afford to ignore their threat any longer. Some infectious diseases once thought to be conquered have returned with revenge. Remaining others has developed obdurate resistance to antimicrobial drugs. Previously unknown and new diseases continue to emerge making crisis for today and challenge for future. Antimicrobial are the most important life saving drugs used to cure microbial diseases. The first antimicrobial discovered was penicillin, which was discovered accidentally in 1940s. More than hundred 100 different antibiotics are available to treat small illnesses as well as fulminating and life threatening infections. Frequent use of antibiotics in inappropriate dosage for long duration causes resistance to antimicrobials.

Ability of microbes to grow in the presence of a chemical (drug) that would normally kill them or limit their growth is called Antimicrobial resistance. The antimicrobial resistance makes it difficult to eliminate infections from the body as the drugs become ineffective or less effective. According to WHO Antimicrobial resistance is ineffectiveness to antimicrobial agents in standard doses is called Antimicrobial resistance. A phenomenon which is natural biological and unstoppable is driven by unchecked and misuse of antimicrobial agents. More

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than half of the antibiotics are prescribed inappropriately, 50% of patients have poor compliance, and 50% of populations do not have access to essential antibiotics. A large number of antibiotics in some countries are used for animal growth promotion. In the near past some infectious diseases were not difficult to treat as they are today. As more microbes become resistant to antimicrobials, the defending and curative value of these medicines is decreased.<sup>2</sup> Antimicrobial resistance (AR) is a world over phenomenon which has severe epidemiological outcome. We are worried about Antimicrobial resistance because the drugs which are doing wonders today are losing their efficacy and are becoming ineffective. More than 130000 cases of Multidrug resistant Tuberculosis are reported annually. Extensively drug-resistant (XDR) tuberculosis was reported from 84 countries till March 2013. High resistance is observed against Kala-azar (60% for pentavalent antimony) and 25% in pentamidine. Over all the Region multidrug resistant Salmonella Typhi is prevalent and Causing 10% Case Fatality Rate in children while it was 12.8 % in pre-antibiotic time. Hospital acquired infections like isolates of Staphylococcus aureus: more than 50% isolates are methicillin-resistant (MDR), patients with resistant strains die up to 50% or more in different regions of the world. Patients infected with resistant strains of Pseudomonas, Klebsiella and Serratia die very frequently. MDR persist in hospital settings causing huge mortality and morbidity by Escherichia coli, Pseudomonas, Klebsiella, Serratia, enterococci. Parasitic infestations are another threat and 400 million people are at risk of infestation with resistant parasites.<sup>3</sup>

Antimicrobial resistance is not a new problem, but it has become a huge problem in the last decade because the invention or pace of development of new antimicrobials has slowed down and the development of resistance has increased rate greater than before. There is strong evidence that a major cause of current situation is the unrestrained and unsuitable use of antibiotic drugs in developing and developed countries both. Antimicrobials are used by too many people to treat wrong kind of

infection, by in appropriate dosage and for an incorrect period of time. In developing countries the problem is compounded by the availability of over the counter drugs. These allow and attract the patients to treat themselves either with wrong medicine or in quantities that are too small to be effective. Poor quality and fake drugs further worsen the problem.<sup>4</sup>

Global public health has serious threats due to Antimicrobial resistance (AMR). AMR develops when a microorganism (bacteria, fungus, virus or parasite) no longer responds to a drug to which it was originally sensitive. This leads to that standard treatments no longer work, infections are difficult, harder or impossible to control, due to this the spread of infection to others is amplified, sickness and duration of hospital stays are extended, increasing the economic and social costs and the risk of death is in some cases twice as compared to the patients who have infections by drug sensitive bacteria.<sup>5</sup> Achievements of modern medicine have been threatened by the seriousness of the problem of antimicrobial resistance. There is real possibility that in post-antibiotic era in 21st century common infections and minor injuries can kill in is not an exaggeration.<sup>6</sup> The Emergence and re-emergence factors responsible for infectious diseases are inadequate public health structure, rapid population growth, overcrowding, poor sanitation, antimicrobial resistance, vectors and reservoirs of infection in nature, rapid and massive international travel.<sup>7</sup> Resistance against the antimicrobials by most of the organisms is due to mutation, gene transfer, adding antibiotics to agriculture feed, inappropriate use, inadequate diagnosis, and extensive use of antimicrobials and close contact among sick patients creates a fertile environment for the spread of antimicrobial-resistant organisms.<sup>8</sup>

Antimicrobial resistance results in increased morbidity, mortality, and health-care costs. Antimicrobial effectiveness is a precious, limited resource. Preserving the effectiveness and efficacy of antimicrobials should be taken as seriously as we are thinking about the response to overconsumption and depletion of other precious limited resources, such as oil, energy sources, clean water, air, and forests. Whenever the supply and resource depletion or species extinction of these is threatened, society has to steps out to protect them from further exhaustion.

Prevention and control to reduce these infections and their transmission will require better public

health practices, invention of new antimicrobial agents, sensible use of available resources (antimicrobials). Further required activities consist of a group of activities including better diagnosis of the disease, appropriate and accurate investigations to understand the source of transmission, Proper control programs and strategies, research to develop adequate means to treat the disease and prevent its spread, and the production and distribution of necessary drugs and vaccines. Possible solutions are to discover new drugs faster than emergence of resistance, Promote discovery, development and dissemination of new antimicrobial agents. Prevent emergence of resistance by appropriate control measures to rationalize the use of available antimicrobial agents. Implementation requires Governance, Regulatory Capacity building, Community education, Research and comprehensive national initiatives as a strategy. Today possibly the single biggest threat facing the world in the area of a infectious diseases is Antimicrobial resistance. All of us have to do tremendous efforts to defeat the drug resistance and admit and believe our self and inform, motivate and guide the healers (doctors) and the community to realize that the Antibiotics are a valuable reserve. We need to safeguard this asset by working together by "Use Antibiotics rationally".

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