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Preface

Infection caused by bacteria has always been a major medical health issue for humans. Historically, humans neglected the cause of microbial diseases and instead tried to find ways to treat infected people. Various treatments included isolating patients from contact with healthy people, using certain chemicals such as mercury and using plant powders that were able to inhibit microbial growth, also known as medicinal plants.

One of the most famous epidemic disease in the last centuries is plague, Athens's plague was destructive during the time of 430 BC. The disease was coming from Ethiopia and passing through Egypt and Libya to Greece. The epidemic disease was so severe and deadly that no where else like, the physicians untaught of its nature and they were the fastest to died, since they had the most contact with the infected people. The disease killed an estimated one third to two thirds of the population of Athens. The plague was a typical epidemic disease that returned several times during the human life that they identify it as a serious epidemic and should not be contacting with the sick and infected people and they should be isolated from the healthy people.

In the covenant of the Islamic era, prophet Muhammad commanded not to visit a place where the epidemic, and not to break them from it. Narrated ‘Abdullah bin ‘Amir bin Rabi’a ‘Umar bin Al-Khattab left for Sham, and when he reached a placed called Sargh, he came to know that there was an outbreak of an epidemic (of plague) in Sham. Then ‘AbdurRahman bin ‘Auf told him that Allah’s Apostle said, “*If you hear the news of an outbreak of an epidemic (plague) in a certain place, do not enter that place: and if the epidemic falls in a place while you are present in it, do not leave that place to escape from the epidemic.*” So ‘Umar returned from Sargh.[1]

In the last century, Alexander Fleming discovered the antibiotic that initiated the development of generations of the most effective agents used to treat diseases caused by microorganisms. Since then, thousands of antibiotics have been discovered, which have saved thousands of millions of lives.

Antibiotics should be used in such as way as to prevent side effects caused by the continued use of antibiotics. The most important rule for using an antibiotic is that it should be taken in very low concentrations without causing damage to human tissue. However, even using antibiotics in low concentrations for short periods of time or for lifelong therapy can increase the potential for antibiotic resistance to bacteria. Moreover, antibiotics are often used in situations where they do not provide any benefits; this is common in populations of developing countries. The full course of antibiotics should be taken; shortening the length of treatment makes the surviving bacteria more resistant.

However, bacteria may also develop resistance to specific antimicrobial agents due to their genetic variability. Mechanisms of resistance may include inactivated enzymes, reduced influx or increased efflux. The most frequent resistant bacterial strains are associated with hospital flora such as Enterobacteriaceae, pseudomonads, staphylococci and enterococci. For these strains, laboratory resistance testing is required for specific antibiotic therapy.

In this special issue on epidemic microbial diseases in developing countries, we focus on resistant bacteria that may cause epidemics in developing countries, the variety of pathogenic strains, antimicrobial activity, microbial resistance, sensitivity of drugs and the investigation of new antimicrobial agents that are needed, especially from natural sources.

Authors of this issue discuss the antibiotic-resistant bacteria that may cause epidemic infections in some cases. The core of bacterial resistance is the change in the genome structure and its characteristics; genetically it is important to know and to understand the mechanisms of this change. Some authors in this issue focused on the genetic structures of five of the most important antibiotic-resistant pathogenic bacteria, whereas others isolated pathogenic bacteria, studied the antimicrobial susceptibility of these isolated bacteria and investigated new sources that can affect the resistant strains. Tuberculosis is a disease of grave concern which infects one-third of the global population, to understand the transmission dynamics of the disease molecular epidemiological studies, based on the assumption that patients infected with clustered strains has been done and that helped the authors to investigate the basis of variation in *Mycobacterium tuberculosis* (MTB) strains, differences in transmission, and severity of disease or drug resistance mechanisms from across the globe.

This interesting issue provides answers to questions about some of the most important pathogenic bacteria and some solutions to control them.

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[1] [Bukhari Volume 9, Book 86, Number 103]