



## Editorial

## Ayurveda and anti-microbial resistance



## 1. New threats

Discovery of antibiotics has undoubtedly laid a strong foundation for effective treatment of infectious disease. However, in reality, the effective control of diseases like cholera, and typhoid was possible not merely because of antibiotics, but mainly because of techniques like pasteurization and disinfections contributed by Pasteur, Lister, and others. Vaccination, and not antibiotics, was responsible for eradicating diseases such as smallpox.

The influence of antibiotics and confidence in scientific discoveries at one time was so high, that in 1967 the Surgeon General of the United States made a statement in US Congress that “It is time now to close a book on infectious disease”. In reality, this book continued to grow in size with several new, emerging and re-emerging infectious diseases. The recent outbreak of Nipah virus in Kerala is a typical case in point. Global learnings indicate that the key reasons for such outbreaks are not necessarily biological but many times are due to social and environmental changes.

To add to these problems anti-microbial resistance (AMR) has emerged as a major global threat. The inappropriate use of antibiotics has resulted in more and more bacterial strains developing resistance over the last few decades with fatal consequences. AMR can adversely affect prevention and treatment of infectious diseases, complicate the therapeutic management of diseases like HIV, malaria; compromise chemotherapy, surgery and increase cost of medical care. According to World Health Organization (WHO) estimates, around 25,000 people die each year from AMR infections in Europe alone. According to WHO fact sheet, 490,000 people developed multi-drug resistant TB globally in 2016.

As per the US Centre for Disease Control and Prevention estimates more than two million people suffer every year due to AMR, resulting in at least 23,000 deaths. The crude infectious disease mortality rate in India is estimated to be 416.75 per 100,000 persons, which is twice the rate prevailing in the US. According to the Indian Network for Surveillance of Antimicrobial Resistance, there is 41 per cent of methicillin-resistant *Staphylococcus aureus* while multi-resistant enterobacteriaceae is also very high. Few studies have reported resistance to *Salmonella typhi* to nalidixic acid (96.7%), ciprofloxacin (37.9%) and azithromycin (7.3%) and multi-drug resistance in 3.4% isolates. Studies in India have also reported that most isolates of *V. cholerae* O1 are resistant to the commonly used antibiotics, such as ampicillin, furazolidone, ciprofloxacin, and tetracycline.

Poorly implemented regulations on prescription drugs, inadequate knowledge among medical practitioners as well as general public on rational use of antibiotics are some of the main reasons responsible

to aggravate AMR threat in India. The serious concern of AMR threat is much more intense for India particularly because of highest bacterial disease burden in the world. Moreover, the burden of AMR in livestock and food animals has been poorly documented in India.

AMR requires action across all government sectors and society. Risk of AMR to public health as well as to global health security has been profoundly proclaimed by the World Health Assembly. The Global Health Security Agenda to which India is one of the contributing countries has prioritized AMR.

## 2. Global efforts and India

Few recent developments in this context need to be mentioned. As this editorial is being written, on May 22, 2018, coinciding with the meeting of the World Health Assembly in Geneva, the German government has launched the Global Antimicrobial Resistance Research and Development Hub in collaboration with 18 countries including Russia, China, the United States and France and organizations such as the Bill & Melinda Gates Foundation, the Wellcome Trust and the European Commission. This initiative is expected to provide up to 500 million Euros for AMR research. In the same spirit, the British Government has decided to invest £30 million to address AMR challenge to build the Combating Antibiotic Resistant Bacteria Biopharmaceutical Accelerator, to develop new vaccines and alternatives-to-antibiotics, diagnostics and research on AMR in agriculture and the impact on the environment.

In November 2016 India and the United Kingdom came together to fight against AMR with £13 million UK–India research program to conduct collaborative research across multiple disciplines to come up with comprehensive and creative solutions to overcome AMR. In January 2017, the Indian Council of Medical Research (ICMR) and Pfizer have decided to set up a centre in New Delhi, to combat AMR with a grant of ₹6.97 crore!

The Ministry of Health & Family Welfare Government of India has identified AMR as one of the top 10 priorities for the ministry's collaborative work with WHO. National Action Plan on Antimicrobial Resistance (NAP-AMR) 2017–2021. It is encouraging that NAP-AMR boldly considers AYUSH Research Council among others for strategies related to innovations and research interventions for developing alternatives to antimicrobials and adjuvant remedies for infectious diseases.

## 3. Opportunity for Ayurveda

There is emerging global consensus that health and medicine need to be looked holistically beyond the drugs and pharmaceutical based curative approach where prevention should prevail. Inter-linkages between human, animal and environmental health is

better appreciated with the emergence of One Health approach that focuses on the risks associated with animal and environmental factors. This situation provides a huge opportunity for holistic inter-sectoral collaboration across human, animal and environmental health. Ayurveda promotes conceptual approach to *Svasthya* from the premises of the inter-relatedness of macrocosm and microcosm broadly depicted as *loka* and *purusha*. Indian approach to *svasthya* has always been in the context of ecosystems, geography, culture, seasons, and dietary diversity among several other factors. In line with the One Health approach, Ayurveda has dealt with animal health and plant health as well. The applications and scope of Ayurveda is not limited to human health but include agriculture, food safety and security, nutrition, livestock farming and animal sciences, antimicrobial resistance, newly emerging and re-emerging infectious diseases, zoonotics, pollutants, environmental health, conservation medicine, entomology, water systems, global trade, climate change, biodiversity and ecosystems, land degradation, integrative medicine, public health, veterinary sciences, wildlife conservation. In addition, with Yoga it offers more subtle dimensions to mental health, spiritual and cognitive development, recreation and aesthetic experiences, therapeutic values landscapes and ecosystems among others.

#### 4. Way ahead

In current situation, India should not depend merely on external funding but should put sincere efforts to maximize existing strengths. We must innovate in AMR research and lead rather than blindly follow the western approach of killing microbes with drugs and antibiotics. Ayurveda approach is unique, natural and

gentle that considers microorganisms as symbiotic part of the entire ecosystem avoiding wars or conflicts but its focus is on strengthening immunity and regaining homeostasis. We must involve top laboratories from India and abroad to collaborate and scientifically explore strengths of Ayurveda. This can be viable approach for truly sustainable and futuristic strategy to address current problem of AMR.

Globally, there is a major push from multilateral organizations like WHO to enhance inter-sectoral coordination at multiple levels of governance in health. The National Health Policy 2017, while making references to nutrition, hygiene and good environment as requisites of optimal health and wellness, remains silent on these emerging perspectives. It is timely to reflect on the areas where Ayurveda and Integrative Medicine could play role. How should AYUSH assimilate this diversifying and widening landscape of global health and public health?

A Thought Leadership article in this issue sheds more light on contemporary futuristic scenario. Let's hope that a time bound national execution plan leveraging scientific strengths and Indian knowledge systems is soon evolved.

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