

The Goodness of the Creation - 14

Anti Microbial Resistance (AMR): A Silent Crisis Unfolding

Mathew Koshy Punnackadu

In modern medicine, few things are as daunting as the spectre of Anti Microbial Resistance (AMR). This phenomenon, where once-effective medications lose their power against microbes, threatens to reverse a century of medical progress.

My encounter with AMR's harsh reality began in 2017 in a hospital Intensive Care Unit, where my ninety-two-year-old father battled with an infection impervious to drugs. The helplessness of doctors in the face of drug-resistant bacteria was not just a medical challenge but a wake-up call. This painful experience ignited my journey into understanding and combating AMR. Globally, organisations like **ReAct**¹ are spearheading efforts to educate and advocate for effective responses to this crisis. Understanding AMR is not just about comprehending a medical issue; it's about recognising a looming threat that could redefine our relationship with the microbial world.

Early Alarms and Modern Misuse

The discovery of antibiotics by Alexander Fleming in 1928 marked a turning point in medical history, offering a potent weapon against bacterial infections. However, Fleming, aware of the potential risks, cautioned against the misuse of antibiotics as early as 1945. He warned that improper use could develop resistance in bacteria, rendering these life-saving drugs ineffective.

Fast forward to the present, Fleming's warnings resonate louder than ever. The rise of antimicrobial resistance can be attributed to a combination of factors, chief among them being the overuse and misuse of antimicrobials, including antibiotics. This includes not only human medicine but also veterinary and agricultural practices. The common habit of prescribing antibiotics for minor infections or not completing the prescribed course has exacerbated the problem. Similarly, the routine use of antibiotics in livestock for growth promotion and disease prevention has contributed significantly to the rise of resistant strains.

As a result, we now face a situation where even common infections could become deadly once again, turning back the clock on decades of medical advancements. AMR can make medical procedures like surgeries, organ transplantation, cancer chemotherapy and even routine caesarean sections



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riskier. This highlights the urgent need for global awareness and action to preserve the efficacy of these crucial drugs.

Understanding Microbes and Resistance Mechanisms

Micro-organisms, including bacteria, viruses, fungi, and parasites, are integral to our existence, playing vital roles in our health and the environment. In the human body alone, trillions of these microbes aid in processes like digestion and vitamin production. While most microbes are harmless or beneficial, some are pathogenic, causing diseases that necessitate antimicrobial intervention.

Antimicrobial resistance emerges when these micro-organisms are exposed to antimicrobial drugs like antibiotics, antivirals, antifungals, and antiparasitics. Misusing these drugs, such as taking antibiotics for viral infections or not completing the entire course, provides a selective environment where only the resistant strains survive and multiply. Over time, some microbes evolve to withstand various antimicrobials, becoming 'superbugs'. These superbugs pose a significant challenge with their enhanced survival capabilities, as they can spread rapidly and are found in over a hundred countries.

The development and spread of AMR is a natural phenomenon, but human actions have accelerated this process. This alarming situation necessitates a deeper understanding of microbial ecosystems and the impact of our actions on them. By comprehending the intricacies of microbial resistance, we can devise more effective strategies to combat the spread of AMR.

The Ripple Effect of Antibiotics in Nature

Antimicrobial resistance (AMR) is not confined to clinical



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settings; it pervades our natural environments, particularly water bodies. A concerning aspect of AMR is the role of environmental contamination in exacerbating the issue. Pharmaceuticals, including antibiotics, are often inadequately filtered by wastewater treatment facilities and end up in rivers, lakes, and oceans. This contamination creates hotspots for the development and spread of resistant microbes.

A striking example of this was revealed in a 2019 global study by the University of York, which examined the presence of 14 commonly used antibiotics in rivers across 72 countries. The study found that over 60% of the tested sites contained detectable levels of these drugs. This widespread contamination underscores the severity of the problem and its global reach.

In India, a major producer of antibiotics, the situation is particularly alarming. Many pharmaceutical companies have been accused of dumping antibiotic-laden effluents directly into water bodies, turning rivers into toxic streams brimming with

drugs and superbugs. These water bodies, often used for drinking, bathing, and irrigating crops, become conduits for AMR, posing serious health risks to communities.

The consequences of such environmental contamination are far-reaching. It disrupts aquatic ecosystems, alters microbial communities, and contributes to the spread of resistance genes. The persistence of antibiotics in the environment also applies selective pressure on bacteria, further promoting the development of resistance. This situation highlights the need for stringent regulations and innovative solutions to prevent pharmaceutical pollution and curb the spread of AMR in the environment.

Local Action with Global Impact

In 2018, as the Director of the CSI Community Health Programmes, I had the opportunity to participate in a ground-breaking initiative in Mallappuzhassery Panchayat, Pathanamthitta District, Kerala, with Dr. Philip Mathew² of ReAct Asia Pacific. This collaboration was part of a broader effort to create a health-literate community guided by the motto "Healthy Body, Mind, and Environment." The 'Antibiotic Smart Communities' project focused on raising awareness about AMR and promoting responsible antibiotic use. Various strategies for community engagement and mobilisation on the issue of antimicrobial resistance were tested in Mallappuzhassery Panchayat through the project. This project also resulted in an indicator framework for measuring the level of AMR-related progress in the community, and the indicator framework was validated in other parts of the country and the Southeast Asian region.

One of our achievements was the joint publication of an illustrated children's book³ on antibiotic-smart communities, translated into five South Indian languages. This book aims at educating young readers about the prudent use of antibiotics and the importance of maintaining a balanced microbial ecosystem.

Additionally, the research done in Mallappuzhassery Panchayat was published in the prestigious journal 'Antibiotics'⁴ in 2024. This paper illustrated the effectiveness of community-based approaches in combating AMR and is now receiving broad appreciation internationally. The project demonstrated that localised actions could significantly impact global health challenges like AMR by engaging with local populations and addressing specific cultural and environmental factors.

This project is a testament to the power of community engagement and education in addressing complex health issues. It underscores the potential of targeted, culturally sensitive interventions in changing behaviours and reducing the spread of drug-resistant microbes.

Foodnotes

¹ Created in 2005, ReAct is one of the first international independent networks to articulate the complex nature of antibiotic resistance and its drivers. ReAct was initiated with the goal of being a global catalyst, advocating and stimulating global engagement on antibiotic resistance by collaborating with a broad range of organisations, individuals, and stakeholders.

² He was the Associate Professor of Community Medicine at Pushpagiri Medical College, Thiruvalla. He was in charge of ReAct Asia during that period. Now, he is the WHO technical expert stationed in Geneva.

³ Healthy Mind, Body & Environment, illustrated book for Children, published in English, Telugu, Kannada and Malayalam. Authored by Dr Philip Mathew and Dr Mathew Koshy Punnackadu. Published jointly by ReAct Asia and CSI Synod Department of Ecological Concerns. Pdf is available at <https://csimkdecological.org/healthy-mind-body-environment-english/>

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To be continued

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A United Front
Against AMR