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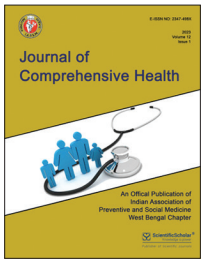

Review Article

Antimicrobial Stewardship Program in Perspective to One Health Approach

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ABSTRACT

One Health is a coordinated, collaborative, multidisciplinary approach. Recognizing the importance of a coordinated global effort, the utility of the One Health approach has been established in India. It has been implemented in combating antimicrobial resistance and infection control in hospitals and the community.

Keywords: One Health, Antimicrobial resistance, Antimicrobial stewardship program

INTRODUCTION

One Health is an approach to optimize the health of humans, animals, and the environment by integrating them with shared and effective governance, communication, collaboration, and coordination. According to the US Centers for Disease Control and Prevention and the One Health Commission, "One Health is a collaborative, multisectoral, and transdisciplinary approach – working at the local, regional, national, and global levels – with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment." As per the One Health Global Network, "One Health recognizes that the health of humans, animals, and ecosystems are interconnected. It involves applying a coordinated, collaborative, multidisciplinary, and cross-sectoral approach to address potential or existing risks that originate at the animal-human-ecosystems interface".[1]

Human populations are expanding into new geographic areas. New environments and contact with their animals provide more opportunities for diseases to pass between animals and people. Globally, about 60% of infectious diseases come from animals (zoonosis), both wild and domestic. Interaction among humans, animals, and the environment is rapidly changing due to many factors (climate, land use, and intensive farming), which multiplies the risk of developing new zoonotic diseases and spreading of new as well as endemic diseases through contamination of water, vector-borne infections, infections from animal foods, and antimicrobial resistant germs.[1]

Recognizing the importance of a coordinated global effort, the World Health Organization (WHO), the Food and Agriculture Organization, the United Nations Environment Programme, and the World Organization for Animal Health have launched the One Health Joint Plan of Action, 2022 – 2026. One Health approach aims at strengthening One Health's capacities, ensuring food safety, and combating zoonotic diseases and antimicrobial resistance (AMR) with the help of technical support from different approaches. It involves professional experts from all relevant fields for monitoring and controlling public health threats.[1,2]

Frequent indiscriminate and inappropriate use of antimicrobial agents (AMAs) leads to the emergence of AMR, which is facilitated by irrational use, misuse, or overuse of medicines and self-medication. It results in the selective replication of drug-resistant bacteria with genomic changes and the spread of R-plasmids among the bacteria. AMAs are also used in animal husbandry. AMR was first discovered with the spread of R-plasmids from animal sources. Resistance range widely varies depending on the type of healthcare setting, geographical location, availability of AMAs in hospitals, easy access to over-the-counter medicines, and the prescribing habits of treating clinicians of different fields (Allopathy, Homeopathy, Ayurveda, or Quacks). Poverty also encourages the development of drug resistance due to the under-utilization of appropriate AMAs. Drug resistance can reverse medical progress. Consequences of AMR are increased morbidity and mortality, delayed healing, the appearance of more adverse drug reactions, longer hospital stays due to prolonged infectivity, and long-term disability due to the killing of protective microbial flora. Infections caused by antimicrobial-resistant micro-organisms are associated with treatment failure, ineffective management, and difficult or sometimes impossible treatment (multidrug-resistant microbes). The community becomes exposed to the risk of contracting infection. These lead to the use of costly second-line AMAs. Ultimately, all these factors result in increased healthcare costs. On World Health Day, April 7th, 2011, the slogan of WHO was "Combat drug resistance: No action today, no cure tomorrow". [2-4]

Hence, there is a need for antimicrobial policy to develop and improve the surveillance system. Thus, a better tracking and monitoring system in the country is generated. Global containment of AMR has two broad strategies: Antimicrobial stewardship and Hospital infection control. Ministry of Health, Government of India, launched the "National Programme for AMR Containment" under the 12th 5-Year Plan (2012 – 2017), i.e., AMR surveillance to promote rational use of AMAs. The National Centre for Disease Control published "National Treatment Guidelines for Antimicrobial Use in Infectious Diseases," which paved the way for rationalizing the use of AMAs. Every hospital should have its antimicrobial policies and infection control guidelines.[2-4]

Process for Development of Hospital Antimicrobial Policy: Hospital-associated infection → Surveillance of AMR or consumption → Development of cumulative antibiogram of Hospital or Community → Antimicrobial Policy → Standard treatment guidelines → Antimicrobial Stewardship. The antimicrobial policy aims to reduce the need for prescription of AMAs and to combat AMR, to spread the knowledge of infection control measures (ICM), to initiate best efforts for ICM in the hospital areas, to implement hospital ICM forming active teams, to monitor the spread of infections by good hygienic practices and access to clean water, to prevent acquisition of infection by vaccination for different microbial infections, to treat serious infections more effectively, to prevent resistant strains to spill into critically ill patients in Hospital and Society (community-associated infections - A growing concern in Developing World), to create awareness on AMAs misuse, and to educate all concerned staffs regarding Good Clinical Practice and Good Laboratory Practice.[2-4]

One Health approach can tackle AMR and prevent its development by implementing the Antimicrobial Stewardship Program (AMSP), including all stakeholders. Antimicrobial stewardship is an integrated approach to infection prevention and control to strengthen the healthcare system, especially in hospitals. AMSP is a coherent set of actions to implement antimicrobial policy, i.e., careful and responsible planning for the management of infections by a team. The team comprises Clinicians, Microbiologists, Pharmacologist, Pharmacist, Nurses, other Health care Professionals, Hospital Administrators, Epidemiologist, and IT Professionals. They create a plan to promote and monitor responsible use of AMAs across the hospital. Thus, AMSP is a teamwork, coordinated intervention designed to improve and measure the appropriate use of AMAs by promoting the selection of optimal antimicrobial regimen, including dosing, duration of therapy, and route of administration. The primary goal of AMSP is to optimize the safe and appropriate use of AMAs to maximize clinical outcomes and minimize adverse effects, and the secondary goal is to reduce the incidence of AMR and, subsequently, healthcare costs. Regular monitoring of the process, the impact of intervention, and outcome measurement with reporting of information is the must-do job of AMSP.[5-8]

Policies or guidelines are a continuous review process, revised periodically depending on changing patterns of AMR, data generated, and updated by prospective audit and feedback. Guidelines do not supplant clinical judgment or consultation for expert advice and should always be tailored to individual patient needs. Rational antimicrobial prescribing prevents the development of AMR. The use of AMAs must be carried out appropriately and judiciously. Hence, it must be "Right Drug for Right Bug": Right Drug, Right Dose, Right Duration, Right Dosing interval, Switch from Parental to Oral streamlining, or de-escalation. World AMR Awareness Week was observed on 18 – 24 November 2023 by the WHO. The theme was "Preventing AMR Together". Go Blue for AMR on 24 November. The slogan was "Antimicrobials: Handle with Care".[5-8]

CONCLUSION

As the importance of the One Health approach becomes increasingly evident, collective action can meet up the challenges successfully. Working together creates Safe Hospitals. Everyone should be a partner in the prevention of AMR. Get united and control infections.

Ethical approval

Institutional Review Board approval is not required.

Declaration of patient consent

Patient's consent is not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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