



MAGNITUDE OF ANTIMICROBIAL RESISTANCE IN INDIA

Healthcare

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ABSTRACT

Antimicrobial resistance (AMR) is one of the major public health threats faced by India today. The high burden of infectious diseases, unfettered over the counter sale of antibiotics, increasing patients' needs and limited public health awareness has contributed to the rise of resistance. The country also has one of the highest burdens of bacterial diseases. Therefore, AMR is of interest in India due to its major role in reducing the mortality and morbidity in the country. Resistance patterns have also increased leading to use of wider and more expensive drugs in India. In April 2017, the government of India had finalized the National Action Plan on Antimicrobial Resistance which focuses on the need to increase strategically actions to reduce AMR including the ministries of health, environment, agriculture and food. A multi-country survey done by WHO in 2015 on the awareness of antibiotic usage and resistance showed alarming results for India. Almost 90% of participants reported to having consumed antibiotics on prescription from a doctor or nurse. Although 75% of the participants acknowledged that AMR is one of the pressing problems in the world, 72% believed that experts will solve the problem before it poses a serious threat.

This paper aims to highlight the drivers to antimicrobial resistance in India and the various initiatives that can be taken to control and prevent AMR.

KEYWORDS

Antimicrobial resistance (AMR), Antimicrobial Stewardship Program (ASP)

Introduction:

Antimicrobial resistance (AMR) is one of the major public health threats faced by India today. According to WHO, AMR is the ability of microorganism (like bacteria, viruses etc.) to stop an antimicrobial (such as antibiotics, antivirals etc.) from working against it which results in standard treatments become ineffective, infection persists and may spread to others. The high burden of infectious diseases, unfettered over the counter sale of antibiotics, increasing patients' needs and limited public health awareness has contributed to the rise of resistance. The country also has one of the highest burdens of bacterial diseases. Therefore, AMR is of interest in India due to its major role in reducing the mortality and morbidity in the country. Resistance patterns have also increased leading to use of wider and more expensive drugs in India. In April 2017, the government of India had finalized the National Action Plan on Antimicrobial Resistance which focuses on the need to increase strategic actions to reduce AMR including the ministries of health, environment, agriculture and food.¹ A multi-country survey done by WHO in 2015 on the awareness of antibiotic usage and resistance showed alarming results for India. Almost 90% of participants reported to having consumed antibiotics on prescription from a doctor or nurse. Although 75% of the participants acknowledged that AMR is one of the pressing problems in the world, 72% believed that experts will solve the problem before it poses a serious threat.²

Indian scenario:

In India, the resistance patterns of AMR are not only seen in older patients but in pediatric patients as well. Additionally, patterns are not only restricted to older and most commonly used drugs, but also to newer and expensive drugs such as carbapenems. This poses as a cause of major public health concern in India. The Indian Network for Surveillance of Antimicrobial Resistance (INSAR) has reported 41% prevalence of MRSA in India.³ Resistance patterns of drugs prevalent in India include ciprofloxacin, vancomycin, fluoroquinolone and ceftazidime. Over the last five years, there has been a significant rise of sale of antibiotics in India ranging between 40-60%.⁴ This rise in resistance has also caused an increase in hospital stay, a high morbidity and mortality rate and increased adverse effects due to the drugs. The fact that India has an unregulated approval of medicines, over the counter drugs, lack of awareness and a bias in the health system.⁵ Resistance patterns have also been seen in HIV, TB and malaria. The reason that AMR received global attention is because of the nomenclature controversy of the New Delhi Metallo-beta-lactamase (NDM-1), which has now become a matter of public health concern.⁶ Contributing factors to the emergence of AMR in the country include rising burden of infections, poor sanitation and lack of awareness. This problem not only affects healthcare settings but also the food and livestock market.

*The National Policy for Containment of Antimicrobial Resistance*⁷

The National Policy for Containment of Antimicrobial Resistance was introduced in the year 2011. This worked towards analyzing the situation in the country with respect to the spread of antimicrobial resistance and the factors influencing it, manufacturing of the drugs, its use and misuse, building a surveillance system, to provide a regulatory body for the supply of antimicrobial drugs and to suggest interventional measures for the rational use of antimicrobials in hospitals. *Chennai Declaration*⁸

The Clinical Infectious Disease Society (CIDSCON) in Chennai conducted a meeting to develop strategies to combat the challenges of antimicrobial resistance. This is considered as a major leap for implementing antibiotic stewardship policy in the country. The main goal was to articulate an evidence-based policy with the main objectives of regulation of the sale of drugs, monitoring their usage and to have an effective surveillance system in place.

Progress of Chennai Declaration initiatives: The Ministry of Health reviewed documents in detail pertaining to the progress of the initiative with the help of reputed international journal and conferences related to health policy. The Chennai Declaration also took efforts by dealing with the ministry and creating a public as well as professional awareness via. media and inspiring parliamentary discussions on the topic.

Indian Council of Medical Research (ICMR)⁹

The ICMR established a nation-wide surveillance network, the Antimicrobial Resistance Surveillance Research Network (AMRSN) consisting of AMR laboratories at various academic institutions that focused on microbes identified by WHO. This network has around six laboratories that focus on six pathogenic groups and are located in four medical institutions. Plans for increasing this number to 15 are underway. An online data system has also been developed which will help in data analysis of AMR with respect to the origin of the pathogen and demographic factors in real time.

Global response:

Around 2 million people are infected with antimicrobial-resistant pathogens in the USA every year which in turn results to 23000 deaths.⁵ The situation in EU is no different where close to 25000 deaths are recorded as an effect of multidrug-resistant bacterial infections. In developing countries, this situation is even worrisome due to its high burden of infectious disease and the cost of healthcare services.³ In 2006, the CDC released guidelines on the management of multidrug resistant pathogens specific to health care settings.¹⁰ In 2013, the key strategy identified by the CDC to combat AMR was the improvement of its use. Later in 2016, the CDC urged all the acute care hospitals to

implement the Antimicrobial Stewardship Programme (ASP).¹⁰

Antimicrobial Stewardship Program (ASP)

The Infectious Diseases Society of America in 2007 defined ASP as “a cluster of interventions targeted towards the improvement and monitoring of appropriate antimicrobial use by selecting the most optimal drug regimen including the type of drug used, the dose, the duration of therapy and the route of administration.”¹¹ The framework of this design should be based on the complete knowledge about the relationship between drug use and its resistance pattern. The team leading this program should consist of physicians, pharmacists, microbiologists and hospital administrators. The strategies involved in this program include training programs for prescribers on the usage of antimicrobials, capacity building and sensitization of healthcare workers, reviewing the antimicrobial prescription and regular auditing and feedback. This system if put into place at healthcare facilities will help curb the rise in resistance patterns.

WHO's Global Action Plan on AMR

In May 2015, the World Health Assembly put together the global action plan on AMR (GAP-AMR) to ensure safe and responsible usage of quality assured antimicrobials along with the following objectives:²

1. Improve awareness and understanding of AMR through effective communication, education and training;
2. Strengthen the knowledge and evidence base through surveillance and research;
3. Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures;
4. Optimize the use of antimicrobial medicines in human and animal health; and
5. Develop the economic case for sustainable investment that takes account of the needs of all countries and to increase investment in new medicines, diagnostic tools, vaccines and other interventions.

The Assembly also urged the Member States to come up with action plans for their respective countries on AMR that are in par with the GAP's objectives.

Conclusion:

Antimicrobial resistance poses a major threat to both human and animal life. Urgent measures have to be taken in order to prevent a rising catastrophe. An evidence-based policy is necessary in order to regulate the use of the drugs and also to prevent the emergence of any further resistant strains. In previous years, AMR has not received the focus it has today. Nevertheless, recent studies have shown the increasing nationwide interest to curb the issue. The National Action Plan framework provided by WHO can also significantly help in addressing the issue and reduce the numbers by large.

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