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Antibiotic Resistance Status: Review Article

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I. INTRODUCTION

A. Antibiotics

Over the past 70 years, antibiotics, also known as antimicrobial agents, have emerged as the mainstay for the treatment of infectious diseases and have played a major role in the remarkable advancement of global health. Currently, millions of people survive infections that were once fatal[1]. Antimicrobial agents' mechanism of antimicrobial activity can be divided into groups. Agents that depolarize the cell membrane (lipopeptides), inhibit protein synthesis (bind to 30S ribosomal subunit, aminoglycosides, tetracyclines, bind to 50S ribosomal subunit, chloramphenicol), inhibit nucleic acid synthesis (quinolones, fluoroquin-olones), and inhibit metabolic pathways in bacteria (sulfonamides, trimethoprim) are the main categories of agents that do these things. The significant resistance issue that has been discovered has been facilitated by antimicrobial agents. Antimicrobial drug consumption, both by humans and animals, has increased, and incorrect antimicrobial therapy prescriptions have also contributed to the growing problem of resistance. Physician overuse of many common antimicrobial agents may arise from the combination of low cost and low toxicity in drug selection. Antimicrobial medication prescription errors may also occur. For example, a broad-spectrum medication may be prescribed initially even though it is not needed or may later be discovered to be ineffective against the organism or organisms causing the infection. The risk lies in the fact that overuse of antibiotics by humans can cause resistant organisms to emerge. Furthermore, a patient's risk of infection with a drug-resistant organism increases with previous use of antimicrobial medications, and patients who have received the greatest antimicrobial exposure are typically those who have resistant bacterial infections [2].

Antibiotic resistance is increasing to dangerously high levels worldwide these days. Treatments for common infectious diseases are in danger of becoming less effective due to the emergence and global spread of new resistance mechanisms. As antibiotics lose their effectiveness, a growing number of infections, including gonorrhea, pneumonia, TB, blood poisoning, and food-borne illnesses, are getting harder and occasionally impossible to treat. The development and spread of antibiotic resistance are exacerbated in situations where antibiotics are freely purchased for use in humans or animals. Similar to this, in nations lacking established treatment protocols, medical professionals and veterinarians frequently overprescribe antibiotics, and the general public frequently uses them excessively. If immediate action is not taken, we are rapidly approaching a post-antibiotic era where common infections and minor injuries will once again be lethal3. Antibiotic residues stop bacterial growth as soon as they pass through passive diffusion and into bacterial cells in the environment. However, by stopping aminoacyl-tRNA molecules from attaching to the 30S ribosomal subunit, other antibiotics hinder the production of proteins in both Gram-positive and Gram-negative bacteria. There are two ways that bacteria become resistant to these antibiotics: (i) the multiantibiotic resistance pump, and (ii) bacterial resistance conferring[4].

Both the World Health Organization and the Centers for Disease Control and Prevention in the United States have released reports on antibiotic resistance, and reports on the topic have been generated globally. The WHO report "Overcoming Antimicrobial Resistance" issues a dire warning, stating that humanity faces a crisis that may prevent the world from discovering a cure for a number of common infectious diseases. In an attempt to control antibiotic resistance, WHO advises forming alliances involving all healthcare providers, including nations, governments, nongovernmental organizations, international organizations, and the public and private health care sectors. A Public Health Action Plan to Combat Antimicrobial Resistance, a draft document from the CDC, highlights that drug-resistant pathogens are becoming a greater threat to everyone, regardless of background, sex, or age.

Eleven priority items concerning surveillance, prevention and control, research, and new product development concerning agricultural and human issues are listed in the Action Plan[5].

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The environment and routine biological treatment procedures in waste water treatment plants, which are one of the sources of AR in South Africa, may lead to a selective rise in antibiotic-resistant bacteria and, consequently, a rise in the prevalence of multidrug-resistant organisms. Chlorination reduces the amount of microorganisms in drinking water, but some still make it through the treatment process and reach the distribution system[6].

II. CONTROL OF ANTIBIOTIC RESISTANCE

A broad application of a strategy is necessary to defeat AR. Boost public awareness, which is lacking even in developed nations and is particularly acute in low- and middle-income nations where the use of antibiotics without a prescription is common. Globally, numerous educational initiatives are required to improve people's awareness, knowledge, and usage of antibiotics [7].

Various governments and organizations have implemented strategies to control antibiotic resistance. The World Health Organization (WHO), for instance, responded to the crisis by adopting a global action plan on antibiotic resistance in May 2015 that has five goals: ~ to strengthen the knowledge and evidence base through research and surveillance to optimize the use of antimicrobial medicines in human and animal health to optimize the use of antimicrobial medicines in prevention of infection to reduce the incidence of infection through effective sanitation, hygiene, and training to improve awareness and understanding of antimicrobial resistance through effective communication, education, and training and to boost spending on novel medications, medical equipment, immunizations, and other treatments. This action plan emphasizes the necessity of a successful "one health" strategy that involves cooperation between many international sectors and players, such as the environment, finance, human and veterinary medicine, agriculture, and knowledgeable consumers. The action plan acknowledges and addresses the economic factors that deter the pharmaceutical industry from developing replacement products as well as the variable resources that nations have to combat antimicrobial resistance. It will take everything you have. WHO will collaborate with the UN to address political resistance to antibiotics. We will continue to work closely with FAO and OIE. The development of a framework for tracking and assessing national initiatives is underway. By the time of the 2017 World Health Assembly, national action plans spanning multiple sectors are expected to be in place. The issue of antimicrobial resistance needs to be handled immediately[8].

The monitoring and evaluation (M&E) framework of the global action plan on antimicrobial resistance was developed in consultation and collaboration with a variety of national and international partners and experts, including the WHO Strategic and Technical Advisory Group on antimicrobial resistance.

The plan included the Food and Agriculture Organization of the United Nations (FAO), the World Organization for Animal Health (OIE), and the World Health Organization (WHO). Experts in human and animal health from around the globe were gathered in June 2017 by the Tripartite (Food and Agriculture Organization of the United Nations, World Organization for Animal Health, and World Health Organization) to discuss possible indicators. The need of developing realistic indicators that can demonstrate progress for nations at different stages of their response to antimicrobial resistance (AMR) was emphasized by meeting participants. In order to reduce the need for extra monitoring and take advantage of the connections to the Sustainable Development Goals (SDGs), the global action plan M&E framework uses indicators that are derived from the SDG indicator set as well as other existing frameworks when applicable. For instance, the SDGs provide the indicators for water, sanitation, and hygiene, while core health data sets provide the indicators for immunization and medication access. But frequently, the AMR components of SDG indicators—like the poverty indicators, for example—are not specific enough to be useful for the global action plan M&E framework. A draft M&E strategy was released for public discussion with the larger international community after the June 2017 meeting. Ninety-five people responded to the consultation, including representatives of 63 different countries' governments, businesses, academic institutions, and civil society organizations. The M&E framework document was finalized by the Tripartite after considering the input from the consultation.

This ensured a fair and consistent approach that primarily uses data sources that were already in place. In order to evaluate the effectiveness of the GAP and support operational and strategic decision-making on AMR for the next five to ten years at the national and international levels, it is necessary to establish a manageable system that can make it easier to generate, collect, and analyze standardized data.

Increasing accountability at all levels, decreasing or consolidating the various data collection and reporting requirements, particularly in the human health sector, and improving the availability and quality of data are some of its other main goals. It will serve as the foundation for the upcoming global framework for AMR stewardship and development. The framework was created in consultation and cooperation with numerous national and international partners and experts, and it is based on experience and expertise from a variety of sectors [9].

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III. OBJECTIVES

This study aimed to focus on how world organizations interested in antibiotic resistance and measures should be implemented.

IV. RECOMMENDATION

The main suggested strategies include using antimicrobials rationally, regulating the availability of antibiotics over-the-counter, enhancing hand hygiene, and enhancing infection prevention and control. It is necessary to have a thorough understanding of resistance mechanisms and to innovate new medications and vaccines. To combat antimicrobial resistance, a collaborative, multidisciplinary, and regulatory approach is required [10]. The goal of infection prevention and control strategies in healthcare facilities is to lessen the spread of pathogens, including resistant ones, both inside the building and into the surrounding community. This can stop the spread of AMR and other infections. Suggested precautions against infection, particularly in healthcare settings where staff members are typically at a higher risk of contracting an infection and, consequently, have a higher chance of developing AR [11-15].

1) Forming an infection control and prevention committee (IPC).
2) Practicing good hand hygiene.
3) Accurate infection diagnosis and management.
4) Reasonable use of antibiotics.
5) Monitoring the use and resistance to antibiotics.
6) Enhancing the quality and supply chain of antimicrobials.
7) Proper Microbiological Procedures.

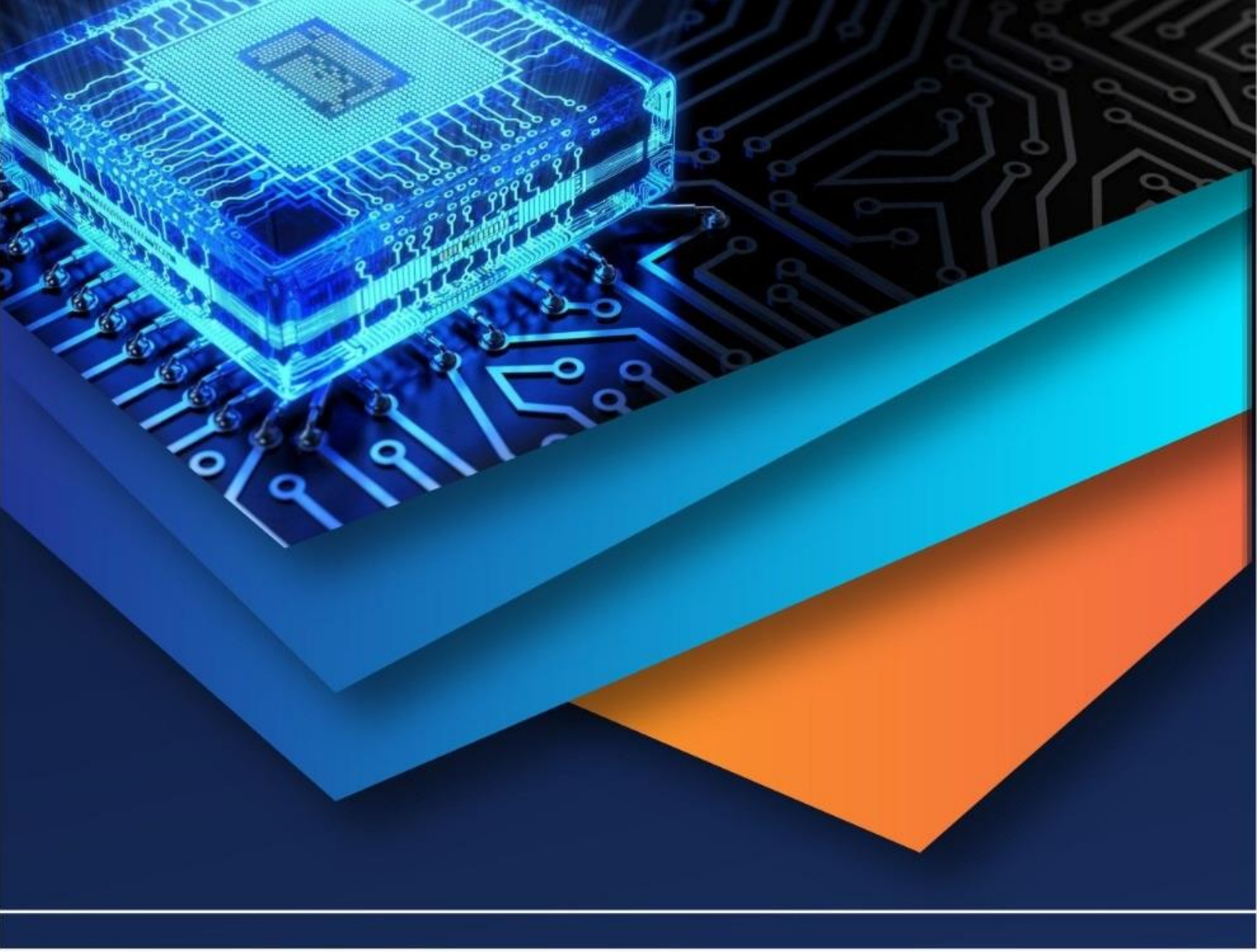
V. CONCLUSION

Antibiotics and related issues have received enough attention globally because they affect every aspect of human life, either directly or indirectly. In addition to adhering to rules and procedures, human resources should possess a high level of training. They should also educate the public about general health risks associated with drug use, including those that pose a threat to life.

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