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Rising trends in Anti Microbial Resistance

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KEYWORDS: Anti Microbial Resistance, Antibiotics, MRSAAntibiotics were assumed to have won the battle over microbes when they were initially developed in the 1900s. That victory was short-lived because, soon it came to notice any of the medications administered might cause the microorganisms to acquire resistance. Most pathogenic bacteria, it appears, are capable of acquiring resistance to at least some antimicrobial agents. Antimicrobial resistance (AMR) is defined as bacteria' capacity to live and thrive in the presence of antimicrobial agents. Antimicrobial resistance has the ability to harm people at any age, as well as the healthcare, veterinary, and agricultural sectors. [1]

According WHO, One of the top ten worldwide public health challenges confronting humanity is antimicrobial resistance (AMR) which jeopardizes efficient prevention and treatment of a growing number of illnesses caused by bacteria, parasites, viruses, and fungi. [2]

AMR is a major global public health concern, killing at least 1.27 million people and causing over 5 million deaths according to the latest report by Global burden of bacterial antimicrobial resistance in 2019 [3, 4]

The severity of the AMR problem in low/middle income countries like India is very difficult to determine due to the lack of appropriate surveillance systems, while considerable progress has been made in recent years since the start of the WHO Global Antimicrobial Resistance and Use Surveillance System (GLASS) initiative in 2015. [5]

The extensive and frequently inappropriate use of antibiotics in humans is the primary driver of AMR. In India insufficient access to proper healthcare facilities and a lack of 'uniform Antibiotic stewardship of antimicrobial agents' allow AMR spread easier and quicker [6]

In all WHO areas, very high rates of resistance have been documented in bacteria that cause common health-care related and community-acquired diseases (e.g., urinary tract infection, pneumonia).

COVID-19 pandemic made AMR situation 'from Bad to Worst' in many forms. It generated concerns about secondary infections since treatment options were limited, and empiric antibiotic therapy was a routine which has a high risk of exacerbating antimicrobial resistance (AMR).

Antimicrobial residues may have polluted the environment as a consequence of the pandemic's increased manufacture of antimicrobials warrants urgent revision of antimicrobial and environmental policies in India requires to curb the upcoming outbreak of antimicrobial resistance. [7]

Many new antibacterial medications were created up to the 1970s, to which most common diseases were originally entirely sensitive, but the final wholly new classes of antibacterial agents were identified in the 1980s. Although multidrug-resistant tuberculosis is an emerging concern, it is under reported, undermining control efforts. Artemisinin resistance foci in malaria have been detected in a few countries. The expansion or establishment of artemisinin-resistant variants in other regions might undermine major recent accomplishments in malaria control. Patients initiating antiretroviral therapy have shown an increase in transferred anti-HIV medication resistance is of grave concern. Therefore, it is critical to retain the efficacy of existing medications by limiting the development and spread of resistance to them while efforts to find new treatment alternatives continue. [8]

The continuous cycle for novel antibacterial medications development is now nearly empty since last two decade, particularly for the treatment of Gram-negative enteric bacteria, and research into therapies to replace antibacterial agents is still in its early phases. In 2019, WHO identified 32 antibiotics in clinical development that address the WHO priority pathogen list, only six of which were designated as novel. Bacteria that are resistant to the majority, if not all, existing antibacterial medications are increasingly causing severe diseases that were previously manageable. This indicates that contemporary medicine's progress, which is dependent on the supply of effective antibacterial medications, is now jeopardized. [9, 10]

The accelerated global spread of multi- and pan-resistant bacteria (sometimes known as "super bugs") that cause diseases that are not curable with conventional antimicrobial medications such as antibiotics is deeply worrying [11]

A super bug may infect anybody, but certain people are more vulnerable to infection because they have been exposed to super bugs in a hospital setting or have a weaker immune system due to a chronic condition. It's possible to carry a super bug without having symptoms (carrier state), which more dangerous. Personal hygiene and protection is the mainstay of preventive measure. [12]

The cost of AMR to national economies and health systems is enormous because it reduces the productivity of patients and caregivers by requiring longer hospital stays and more expensive and intense treatment. [13]

During the 12th five-year plan (2012-2017), the Government of India started a "National Programme on AMR Containment," which is being supervised by NCDC. The lab network is being phased-in and now comprises 35 state medical college laboratories in 26 states/UTs. [14]

The NARS-Net was built as part of the initiative to assess the scope and trends of AMR across the country. NARS-Net network labs must report AMR monitoring data for seven priority bacterial pathogens of public health importance: Klebsiella spp., Escherichia coli, Staphylococcus aureus, and Enterococcus spp., Pseudomonas spp., Acinetobacter spp., and Salmonella enterica serotypes Typhi and Paratyphi. [15]

According latest NARS-Net report 2022, 59% of the Staphylococcus isolates were Methicillin Resistant Staph aureus (MRSA), while 1% were Linezolid resistant. Linezolid resistance was reported to be 8.4% in Enterococcus spp. isolated from blood cultures. ESBL was found in 76% of E. coli isolates and 81% of Klebsiella spp. isolates from blood samples. In terms of Carbapenem Resistant Enterobacterales (CRE) in blood, E. coli showed 33% resistance while Klebsiella spp. showed 50% resistance. Ciprofloxacin resistance was found in 34% of Salmonella Typhi isolates from blood cultures.Acinetobacter spp. blood isolates showed 56% resistance to Imipenem. Carbapenem resistance was found in 26% of Pseudomonas spp. isolated from blood. Resistance to colistin was found in 1% of gram-negative bacterial isolates. [15]

Surveillance has substantial gaps, as well as a lack of norms for methodology, data exchange, and coordination. Many low-income countries have significant data gaps, stressing the need to develop microbiological capacity and data collection methods to better understand this critical public health problem. It is a comprehensive responsibility of the government, hospitals, and by the health care workers in lowering the AMR.

India is particularly at risk from an AMR outbreak, and emerging nations like India require a holistic approach that addresses all facets of society and the government. A new policy should be developed with emphasizing on the significance of antimicrobial stewardship programmes, with a primary focus on assisting in the best selection of empiric therapy and quick deescalation based on culture results for all common diseases. The major goal is to train health care workers to battle AMR in their regular clinical practice to at least slow down the trend.If not taken care of, AMR will be a major public threat than any pandemic in near future, where humanity may not be able to develop any remedy soon, before it hits with its full potential to the extinction of mankind.

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