The Challenge of Antimicrobial Resistance

Why in news?

The Global Research on Antimicrobial Resistance (GRAM) report was published in the Lancet recently providing the most comprehensive estimate of the global impact of AMR.

What is AMR?

- Antimicrobial resistance (AMR) is the ability of a microbe to resist the effects of medication previously used to treat them.
- Resistant microbes are more difficult to treat, requiring alternative medications or higher doses, both of which may be more expensive or more toxic.
- Microbes resistant to multiple antimicrobials are called **Multi Drug Resistant (MDR)** or sometimes **Superbugs.**

What are the causes?

- **Usage-** There is an increasing use of antibiotics for human and veterinary purposes in the recent period.
- There is irrational consumption(over usage) of broad spectrum antibiotics.
- **Regulation**- India and China are the largest producers of antibiotics.
- In India, effluents generated from these industries are treated as per the pharmaceutical wastewater discharge guidelines as prescribed by the Central Pollution Control Board.
- But the current standards do not include antibiotic residues, and they are not monitored in the pharmaceutical industry effluents.
- The existing good manufacturing practices (GMP) under the WHO (2016) framework is restricted to drug safety alone and does not recognise the environmental risk with pharmaceuticals products.
- **Waste Discharge-** The uncontrolled discharge of untreated urban waste is another major source for AMR in many low and middle income countries.

What did the GRAM report find?

- GRAM is led out of the University of Oxford Big Data Institute – IHME Strategic Partnership.
- As per the report, as many as 4.95 million deaths may be associated with bacterial AMR in 2019.
- Estimates show that AMR is a leading cause of death globally, higher than HIV/AIDS or malaria.
- The death rate was the highest in Western sub-Saharan Africa, at 27.3 deaths per 100,000 and lowest in Australasia, at 6.5 deaths per 100,000.
- Lower respiratory-tract infections accounted for more than 1.5 million deaths associated with resistance in 2019.
- The six leading pathogens for deaths associated with resistance were

1. *Escherichia coli*
2. *Staphylococcus aureus*
3. *Klebsiella pneumoniae*
4. *Streptococcus pneumoniae*
5. *Acinetobacter baumannii*
6. *Pseudomonas aeruginosa*

- The pathogen–drug combination, **meticillin-resistant S aureus**, caused more than 1 lakh deaths attributable to AMR in 2019.

What are the implications of this study?

- **Common infections**- Common infections are now killing thousands of people every year. This includes
  - lower respiratory tract infections
  - bloodstream infections
  - intra-abdominal infections
  - pneumonia
  - foodborne ailments
- **Effect on children-** In 2019, one in five global deaths attributable to AMR occurred in children under the age of five.
- **Effect on treatment-** AMR is threatening the ability of hospitals to keep patients safe from infections.
- It is undermining the ability of doctors to carry out essential medical practice safely, including surgery, childbirth and cancer treatment since infection is a risk following these procedures.
- **Effect on research**- Between 2000 and 2018, just 15 antibiotics were approved.
- Out of the seven deadliest drug-resistant bacteria, vaccines are only available for two (*Streptococcus pneumoniae and Mycobacterium tuberculosis*).
- Only these two have been a focus of major global health intervention programmes through pneumococcal vaccination and other programmes.

What steps have been taken so far to address the issue of AMR?

- **Tackling the overuse of antibiotics by human beings**- India classified important antibiotics under **Schedule H1** of the **Drugs and Cosmetics Rules** 1945.
- The drugs specified under Schedule H and Schedule X are required to be sold by retail on the prescription of a Registered Medical Practitioner only.
- **Tackling the overuse in the veterinary sector-** India's 2017 National Action Plan on Antimicrobial Resistance did talk about restricting antibiotic use as growth promoters.
- In 2015, a **Global Action Plan on AMR** was developed by the WHO, the Food and Agricultural Organization and the World Organization for Animal Health.

What is the way forward?

- Greater action is needed to monitor and control infections, globally, nationally and within individual hospitals.
- Access to vaccines, clean water and sanitation needs to be expanded.
- The use of antibiotics in food and animal production must be optimised.
- Minimising the use of antibiotics where they are not necessary and acting according to World Health Organisations recommendations is the need of the hour.

- There is a need for increased funding for developing new antimicrobials and targeting priority pathogens and ensuring that they are affordable to accessible to most of the world.

Reference

1. https://www.thehindu.com/sci-tech/health/explained-the-challenge-of-antimicrobial-resistance/article38297630.ece?homepage=true

