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MAINS QUESTIONS→ DAILY QUESTIONS & MODEL ANSWERS:

Q1. Even though India has made significant strides in lowering maternal and infant mortality, there is still more work to be done in the area of maternity and neonatal healthcare. Analyse critically.

- **Paper & Topic: GS II → Government Policies and Interventions**
- **Model Answer:**
- **Introduction:**

- Maternal and newborn health in India today is a complicated problem with both obstacles and advancements. The reduction of the Maternal Mortality Rate (MMR) in India during the past 20 years has been a success. India had a very high MMR in 1990, with 600 women dying during childbirth for every 100,000 live births. However, between 2018 and 2020, the MMR decreased to 97 fatalities per 100,000 live births. Similar improvements have been made in the infant mortality rate (IMR), which decreased from 35.2 deaths per 100,000 live births in 2019–2021 to 26.6 in 2023.

- **Maternal mortality in India has drastically decreased as a result of government measures like these:**

- Under the Reproductive, Maternal, Newborn, Child, and Adolescent Health Plus Nutrition (RMNCAH+N) plan, coordinated efforts have been conducted. As a result, India has successfully reached the significant milestone of lowering the Maternal Mortality Ratio (MMR) to under 100 per lakh live births by 2020, as stipulated in the National Health Policy 2017.

- The Pradhan Mantri Surakshit Matritva Abhiyan has contributed to an improvement in the scope and calibre of diagnostic and counselling services in addition to offering free, comprehensive, and high-quality antenatal care.
- The government's flagship effort to enhance nutritional outcomes, POSHAN Abhiyaan, has pregnant women as one of its primary target populations.
- In order to provide complete RMNCAH+N services, more than 25,000 "Delivery Points" throughout the nation have been improved in terms of infrastructure, tools, and trained personnel. As a result, institutional deliveries in India grew significantly from 79% in 2015–16 to 89% in 2019–20.
- The Pradhan Mantri Matru Vandana Yojana (PMMVY), a direct benefit transfer (DBT) programme under which monetary payments are immediately delivered to pregnant women in their bank accounts to satisfy increased nutritional demands, was established by the government to ensure a pregnancy free from financial worries.
- To reduce anaemia prevalence from both nutritional and non-nutritional causes using a lifetime approach, the Anaemia Mukt Bharat plan was introduced. According to estimates, the policy will benefit 450 million people, including 30 million expectant mothers.

- **The following activities have improved newborn healthcare:**

- For the care of unwell and small babies, First Referral Units (FRUs)/Community Health Centres (CHCs) have created New-born Stabilisation Units (NBSUs) and unwell Newborn Care Units (SNCUs) at the District Hospital and Medical College levels, respectively.
- In order to protect children from serious illnesses like tuberculosis, diphtheria, pertussis, polio, tetanus, hepatitis B, measles, rubella, pneumonia, and meningitis, the Universal Immunisation Programme (UIP) is being implemented.
- For the treatment and management of children with severe acute malnutrition (SAM), nutrition rehabilitation centres (NRCs) are established at public health facilities.
- To increase mother and child survival rates and health outcomes, several health care provider capacity-building initiatives are implemented.

- **However, despite significant progress, a number of issues still exist, including:**

- Access to healthcare: Basic healthcare facilities are sometimes lacking in rural and isolated locations, and even when they are present, they may not be manned by licenced

medical professionals. In addition, social and cultural barriers may make it difficult for women and children to get healthcare.

- Socio-economic variables: These variables are crucial for the outcomes of maternal and neonatal health. Women who hail from rural areas, low-income households, or marginalised populations are more at risk due to limited access to healthcare and financial resources.
- Regional variations: The availability of healthcare services varies significantly between the areas. As a result, maternal and neonatal care varies throughout states. For instance, Kerala has the lowest MMR of 19 per lakh live births, while Assam has the highest MMR of 195.
- Service calibre: There is a dearth of qualified healthcare professionals, proper infrastructure, and basic medical supplies in many areas of the nation, especially isolated ones.
- The health of the mother and child is further impacted by high levels of poverty, illiteracy, early marriage, and frequent pregnancies.

- **Moving ahead:**

- Ensuring universal access to a range of life-saving therapies, such as vaccination, contemporary family planning techniques, and the attendance of a trained professional at every birth. This will assist in bridging the gaps between the wealthy and the poor, as well as between ethnic groups and socioeconomic class.
- To assess the effectiveness of healthcare initiatives, in-depth analyses and surveys are also urgently needed.
- All healthcare facilities (including those in the public, nonprofit, for-profit, and corporate sectors) must conform to minimum quality standards that should be established as basic guidelines.
- To ensure high-quality neonatal care and follow safety requirements, healthcare workers must get regular training and continuing medical education.
- SDG 3 targets to lower neonatal death to 12 per 1,000 live births and the global maternal mortality ratio to less than 70 per 100,000 live births by 2030. A multisectoral strategy that includes governance, public awareness, policymaking, and strengthening the health sector at all levels of the public and private health delivery systems is required now more than ever to meet these goals.

Q2. What do you mean when you say "bacterophages"? Talk about the benefits and drawbacks of utilising bacteriophage to treat bacterial illnesses.

- **Paper & Topic: GS II → Biotechnology related issues**
- **Model Answer:**
- **Introduction:**

- Bacteriophages are also referred to as phages or beneficial viruses. They hunt down bacteria, adhere on the surface of the bacterial cell, and then inject viral DNA inside the cell to complete their work. The bacterial DNA replication machinery may occasionally be used to help the viral DNA reproduce inside the bacterium. When the bacterial cell has produced enough fresh viruses, it explodes and releases the fresh viral particles.

- **Benefits of treating bacterial infections with bacteriophages include:**

- Combating antibiotic resistance: The emergence of bacterial strains that are resistant to antibiotics is one of the biggest medical problems facing the world today. Since bacteriophages are effective against bacteria that have developed antibiotic resistance, this has raised interest in them.
- Minimal disturbance of the microbiome: Phages have little effect on the regular flora bacteria that safeguard our health because of their host specificity. Contrarily, a lot of chemical antibiotics, which usually have a wider range of activity, are prone to causing superinfections.
- Low toxicity: Phages are naturally harmless because they are mostly made of nucleic acids and proteins. Additionally, they are not harmful to the environment, plants, or animals.
- Phages are adaptable in nature and can be used in a variety of formulations, including the combination with certain antibiotics. They are suitable for the majority of administration routes and have a variety of application forms, including liquids, creams, impregnated solids, etc.

- Potential for a single dose: During treatment, phages multiply and grow in quantity on their own; as a result, just one dose may be required. By lowering the phage doses necessary to achieve efficacy, this might lower treatment costs.
- Phages are natural products; hence, the public's resistance to genetically modified organisms (GMOs) or pharmaceuticals made in a lab shouldn't also apply to naturally occurring phage products.
- Phages are regarded as a 'intelligent' substance. At the infection site, they grow until there are no longer any bacteria. They then expel them.

- **Using bacteriophages to treat bacterial infections has certain drawbacks:**

- There should be no standardisation in treatment; phage therapy needs to be specifically tailored to the microorganisms that infect patients. But the lack of therapeutic standardisation is a major issue.
- Data are scarce and occasionally contradictory or unfavourable about the use of bacteriophages to treat bacterial illness in humans.
- Administering phages is more challenging than administering antibiotics. To administer and utilise phages appropriately, a doctor needs particular training.
- Not all phages are useful as medicines; it may be challenging to locate the precise phage required to treat an infection. Additionally, there might not be sufficient variety among phages to treat all bacterial diseases.
- Emergence of bacterial resistance against bacteriophages is a risk that could materialise since bacteria already have or have the capacity to develop a number of defence mechanisms against viral infections.
- Immune system reaction worries: When injected into the bloodstream, phages are recognised by the human immune system. Some of them are immediately expelled, and the body eventually starts to generate antibodies to the phages. This suggests that a particular kind of phage can only be utilised intravenously once.
- Numerous characteristics of bacteriophages as antibacterial agents make them attractive substitutes for pharmaceutical antibiotics. By choosing the right phage, creating an effective formulation, and increasing clinician knowledge and comfort with product delivery, concerns about phage therapy can be resolved.