Early Cancer Detection in India and CRC Tumour Breakthroughs

For Prelims: Ayushman Bharat Health and Wellness Centres**,** NITI Aayog**,** Non-communicable Diseases, Hypertension**,** National Cancer Grid, Colorectal Cancer

For Mains: Gaps in cancer screening, India's public health system, Government Policies & Interventions

Source: TH

Why in News?

Recently, a **NITI Aayog (National Institution for Transforming India)** report highlighted critical gaps in **cancer detection** in India, posing public health risks.

- Meanwhile, researchers in the United States discovered a **distinct subtype of *Fusobacterium nucleatum* in colorectal cancer (CRC) tumours,** potentially improving early detection and targeted treatment.

What are the Key Highlights of the NITI Aayog Report on Early Cancer Detection in India?

- The report found a "huge gap" in cancer screening at the **Ayushman Bharat Health and Wellness Centres (HWCs)**, which were meant to offer annual screening for **oral, breast, and** cervical cancer **for those aged 30 and above.**
  - Less than **10% of the visited HWCs had completed even a single round of screening for** non-communicable diseases**,** including cancer.
- While **screening for breast cancer was being done through self-examination**, the provision for **screening for cervical cancer was yet to be operationalised and** screening for **oral cancer was performed on a case-by-case basis,** depending on visible symptoms.
- The report found that the infrastructure and availability of basic devices, medicines, and diagnostic tests at the visited HWCs were by the operational guidelines.
- The report attributed the gaps in cancer screening to **"low levels of awareness" and "lack of capacities"** among the HWC staff.
  - The report noted that the required intensive training and careful monitoring of **Auxiliary Nurses and Midwives (ANMs)** on the three screening methods (oral visual examination, visual inspection with acetic acid, and clinical breast examination) had not happened to the desired extent.
  - The HWC staff **also had limited or no knowledge about the need for annual screening for** hypertension **and** diabetes.

What is an Early Cancer Detection?

- **Cancer is a disease** in which some of the **body's cells grow uncontrollably** and spread to

other parts of the body. **Cancer is the second leading cause of death globally,** accounting for **1 in 6 deaths, in 2018.**

- Early cancer detection has two components: **screening and early diagnosis.**
- **Screening:**
    - Refers to testing healthy individuals to **identify those with cancers before any symptoms appear.**
    - **Examples**: mammography or **clinical breast exam for breast cancer.**
- **Early Diagnosis:**
    - Early diagnosis programs focus on **detecting symptomatic patients** as early as possible.
        - This involves increasing awareness of first signs of cancer among healthcare providers and the general public, improving accessibility, affordability, and quality of diagnosis and treatment services are crucial.
    - **Difference Between Early Diagnosis and Screening**: Early diagnosis is relevant for all types of cancer and focuses on symptomatic patients.
    - Screening is relevant only for a subset of cancers (cervical, breast, colorectal) and targets asymptomatic individuals.
- **Challenges and Limitations:**
    - Screening can have **undesirable effects like false-positive results, false-negative reassurance**, and overdiagnosis/overtreatment.
    - The **World Health Organization (WHO)** does not recommend **mammography screening for women under 50** and systematic prostate-specific antigen (PSA) screening for prostate cancer due to **high harm/benefit ratio.**

What are India's Initiatives Related to Cancer?

- **National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke**
- **National Cancer Grid**
- **National Cancer Awareness Day**
- **HPV Vaccine**
- **Ayushman Bharat- Health & Wellness Centres (AB-HWCs)**

What are the Key Highlights of the Study Regarding Colorectal Cancer?

- Researchers isolated Fusobacterium nucleatum bacteria from 130 human CRC tumours and mapped their genetic composition.
    - They found that the **subspecies Fusobacterium nucleatum animalis (Fna)** was significantly associated with CRC tumors.
    - Fna is composed of two distinct evolutionary lineages or clades, named **Fna C1 and Fna C2.**
        - The Fna C2 clade was significantly associated with CRC tumours and possessed **additional genetic factors that facilitate cancer association.**
- Physically, Fna C2 bacteria are longer and thinner than Fna C1, which may **aid in evading the** immune system **and colonising host tissues.**
    - Genetically, Fna C2 has genes that allow it to metabolise compounds like ethanolamine and 1,2-propanediol present in the **human gut.**
    - Fna C2 can survive in more acidic conditions, enabling it to descend from the mouth to the gut, which is unusual for bacteria.
        - This challenges the previous belief that Fusobacterium reaches the gut only through bloodstream infections.
- The findings could lead to **early CRC diagnostic tests.** Targeted treatments may be developed from Fna C2 characteristics.
- Selectively targeting Fna C2 without affecting other gut bacteria is a significant challenge.

Colorectal Cancer (CRC)

- **Global Burden:** Colorectal cancer, also known as **colon cancer, rectal cancer,** or bowel cancer, is a common type of cancer that affects the colon or rectum.
  - Colorectal cancer is the **third most common cancer worldwide,** accounting for approximately 10% of all cancer cases.
    - It is the **second leading cause of cancer-related deaths globally.**
  - By 2040, the burden of colorectal cancer is projected to increase by 63% in new cases and 73% in deaths.
- **CRC and India:** CRC is the **seventh most common type of cancer in India,** where the number of cases rose by **20% from 2004 to 2014.**
- **Risk Factors and Prevention:** Risk factors include family history, personal history of colorectal cancer or polyps, and lifestyle factors like an unhealthy diet, lack of physical activity, obesity, smoking, and excessive alcohol consumption.
  - Adopting a healthy lifestyle and regular screening can help prevent colorectal cancer.
- **Symptoms:** Colorectal cancer often has no symptoms in the early stages, highlighting the importance of regular screening.
  - Common symptoms include bowel habit changes, rectal bleeding, abdominal pain and anaemia.
- **Treatment**: Options include **surgery, radiotherapy, chemotherapy, targeted therapy,** and immunotherapy.
  - Treatment plans are tailored based on the specific type and stage of cancer, as well as the patient's medical background.

Drishti Mains Question:

Q. Discuss the significance of early detection and screening in cancer control strategies and evaluate the effectiveness of India's current cancer control policies in addressing the growing burden of the disease.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. With reference to the treatment of cancerous tumours, a tool called cyberknife has been making the news. In this context, which one of the following statements is not correct? (2010)

(a) It is a robotic image guided system

(b) It delivers an extremely precise dose of radiation

(c) It has the capability of achieving sub-millimetre accuracy

(d) It can map the spread of tumour in the body

Ans: (d)

Q. 'RNA interference (RNAi)' technology has gained popularity in the last few years. Why? (2019)

1. It is used in developing gene-silencing therapies.
2. It can be used in developing therapies for the treatment of cancer.
3. It can be used to develop hormone replacement therapies.
4. It can be used to produce crop plants that are resistant to viral pathogens.

Select the correct answer using the code given below.

(a) 1, 2 and 4

(b) 2 and 3

(c) 1 and 3

(d) 1 and 4 only

Ans: (a)

Mains:

Q.1 What are the research and developmental achievements in applied biotechnology? How will these achievements help to uplift the poorer sections of the society? **(2021)**

Q.2 What do you understand by nanotechnology and how is it helping in the health sector? **(2020)**

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