

## Typhoid Conjugate Vaccine

**Mains: GS II - Issues Relating to Development and Management of Social Sector/Services relating to Health, Education, Human Resources**

### Why in News?

*Recently, Bangladesh became the eighth country in the world to introduce the Typhoid Conjugate Vaccine (TCV) and nearly 50 million children from 9 months to 15 years will receive the vaccine as part of a campaign, after which the vaccine will be integrated into their routine immunisation programme.*

### What is Typhoid conjugate vaccine?

- **A TCV (Typhoid Conjugate Vaccine)** - It is a type of vaccine that provides protection against typhoid fever.
- **Dose** - It is a single-dose injection that stimulates the body to produce antibodies against the *Salmonella Typhi* bacteria.
- **Efficacy** - They are particularly effective because they can be given to infants and young children, unlike older typhoid vaccines that have age restrictions.

*India's neighbours, including Nepal, Pakistan and Bangladesh, have already begun inoculating their children with the typhoid vaccine.*

- **Status in India** - Despite the fact that India produces this vaccine and carries half the world's burden of the disease, it is yet to become part of the country's routine childhood vaccinations
- **Typhbar TCV** - It is one of the first Typhoid Conjugate Vaccines to be prequalified by WHO in 2017.
- It was manufactured by *Bharat Biotech* which had started manufacturing it in 2013.
- India is the major vaccine supplier for this drive, but is not one of the eight countries to have the typhoid vaccine in its routine immunisation schedule.

### What is the epidemiology of Typhoid?

- **Causative agent** - The bacterium *Salmonella typhi* is the primary cause of typhoid fever.
- **Transmission** - It is transmitted between humans directly from faecal and/or urinary contamination of food and water or via vectors such as flies.
- It survives easily in milk without an alteration in taste, and also in ice.

- Untreated, asymptomatic humans can also carry and shed the pathogen in their faeces for two months up to several years.
- **Symptoms & Effects** - Fever in typhoid can last for several weeks.
- Severe complications such as intestinal perforation can lead to death.
- Children are disproportionately affected, leading to loss of schooling and activity days.
- **Burden** - The World Health Organization (WHO) estimates *9-12 million people* being affected by typhoid annually and over 100,000 deaths, with India, Bangladesh and Pakistan as hotspots.
- Travel to and from endemic countries takes it to places.
- The disease is under control in some countries with better sanitation, better diagnostics and surveillance, stringent prescription practices and travel vaccination.

### What does the data on India reveal?

- **Effect on children** - Extensive SEFI (Surveillance for Enteric Fever in India) study was done between 2017-2020 in 10 urban and rural sites.
- The incidence per 1,00,000 child-years ranged from 576 to 1,173 cases with higher numbers in poorer urban areas, compared to rural areas.
- **Migrational hazards** - However, extensive labor migration between urban and rural areas allows easy to and fro transport of the pathogen.
- **Mortality** - Geostatistical modeling using these findings and national health survey data estimates 4.5 million cases annually with 8,930 deaths.
- This clearly shows that India contributes to half the global burden of typhoid fever.
- **Future forecasts** - If no action is taken, projections estimate 4.6 crore cases and 89,300 deaths annually in almost all age groups in urban areas, and in young adults in rural areas.

### What are the issues and challenges in combating typhoid?

- **Diagnostic gaps** - Typhoid can mimic dengue, scrub typhus, malaria, COVID-19 and other febrile conditions.
- Hence, besides good clinical acumen, robust and accessible diagnostic support is important.
- The recommended test to detect the pathogen is a blood culture, but this is not easily available everywhere.
- Facilities to perform reliable antimicrobial susceptibility testing are also lacking.
- WIDAL, an unreliable blood antibody test, is still around and is extensively misused.
- Unregulated irrational therapy of febrile illnesses complicates the picture.
- **Antibiotic resistance** - From the 1950s onwards, the bacteria has shown increasing resistance to common antibiotics.
- Treatment of typhoid fever now is usually with azithromycin and ceftriaxone.
- However, ceftriaxone resistance and reduced response to azithromycin has been found as recently as in 2021-2024.
- These drugs are commonly abused both in rural and urban India.
- With the presence of extensively drug resistant (XDR) typhoid strains already in Pakistan, the threat is imminent in India.
- Rising drug resistance means lesser options to treat the illness and also increase in

treatment costs.

- **Sub-optimal sanitation** - Despite progress under the Swachh Bharat Mission and Jal Jeevan Mission, issues related to safe water persist.
- While access to water is steadily increasing, water quality remains questionable.
- Only 6% of urban households across 302 districts have safe water supply and in rural areas, the situation is worse.
- Periodic environmental surveillance is also limited and dissatisfactory.

### What needs to be done?

- **Vaccine introduction** - In its position paper in 2018, the WHO had strongly recommended typhoid vaccination, particularly the typhoid conjugate vaccine (TCV).
- TCV is available in the private sector for around Rupees,2,000, this high cost leaves out many who are most likely to be affected by the infection.
- Hence, it is imperative to include it in the Universal Immunisation Programme (UIP), to ensure health equity
- **Combination of measures** - Introducing the Typhoid vaccine alone is not important.
- The vaccine should be accompanied by:
  - Environmental and disease surveillance,
  - WASH (Water, Sanitation and Hygiene) measures,
  - Improving diagnostics including resistance mapping,
  - Regulation of prescriptions
  - Post-vaccination efficacy studies should all take place as well.

### What are the backings for the vaccine?

- **Cost effective** - TCV is one of the newer vaccines, and has shown better results while also being cost effective.
- **More efficient** - It can be given as a single shot and has been found to be effective for 3-10 years.
- **Safety** - This vaccine can also be safely co-administered with other routine childhood vaccines from the age of six months.

***TCV by Serum Institute of India and one by Zydus Lifesciences, yet again asserting India's position as the vaccine hub of the world.***

- **Promising results of field trials** - In 2018, field trials in Navi Mumbai supported the credibility of the TCV vaccine.
- Over 1 lakh doses were administered and the cost calculation worked out to USD1.87/dose, which is considerably lower than the cost of contracting the disease.
- **Experts support** - The National Technical Advisory Group on Immunisation (NTAGI) has been mulling over this for nearly a decade now.
- Back at the 12th NTAGI meeting, in 2016, it was recommended that typhoid surveillance be improved for future discussions and for recommendations on typhoid vaccine use in India.
- Subsequent meetings of NTAGI have repeatedly brought up typhoid vaccination but

there has been no progress with regard to its being included in the UIP.

- **International collaboration** - In 2023, *the vaccine alliance GAVI*, entered a strategic three-year partnership of \$250 million with the government of India.
- It was to help introduce TCV into the UIP, along with support for other vaccination initiatives.

***GAVI** is the Vaccine Alliance, a public-private partnership that provides vaccines to children in the world's poorest countries to protect them from deadly diseases.*

- Two years into the partnership however, there has been no action on the typhoid vaccine.

### **What lies ahead?**

- The silence towards typhoid is baffling. India's neighbors, Pakistan, Nepal, Bangladesh have already surged ahead.
- India with more than half the global burden of enteric illness, must join them and other countries responsibly, sooner than later.
- Typhoid, a preventable disease, has haunted people in India for centuries.
- Every year, due to ambiguous diagnosis, inadequate treatment, drug resistance and slow progress in sanitation, countless lives, especially of children, are lost and many are pushed into poverty.
- We have the vaccine innovation skills, but inclusion is lacking.
- The time is long overdue and the ground uber-fertile now, for the introduction of the typhoid vaccine into the country's routine immunisation programme.

### **Reference**

[The Hindu| Typhoid Conjugate Vaccine](#)