

Acute Encephalitis Syndrome: RSTV – In Depth

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What's in the news?

- Over the past few days, the number of child deaths in Bihar has turned the country's attention towards 'Acute Encephalitis Syndrome', occurring both sporadically and as an epidemic.
- 'Acute Encephalitis Syndrome' is marked by an acute onset of fever and a change in mental status, ranging from mental confusion, disorientation, delirium, seizures, or even coma.
- The disease most commonly affects children and young adults, damaging their central nervous system. Although the disease outbreak is usually reported during monsoons, i.e. between June to October, the incidence is also reported also during April to June as is the case in Bihar currently.
- In its latest outbreak in Bihar, the disease has claimed over 100 lives within a fortnight.
- This edition of 'In Depth' will understand what causes acute encephalitis syndrome, its symptoms and treatment. It will also look at the status of acute encephalitis syndrome in India and the efforts being undertaken to prevent the syndrome.

Analysis:

- AES was coined way back in 2008 by the World Health Organization to streamline the surveillance and research of AES in India.
- According to the National Vector-Borne Diseases Control Programme (NVBDCP), 355 people died in 2014 due to AES and two due to Japanese Encephalitis (JE).
- Recently, 'Acute Encephalitis Syndrome' has claimed the lives of more than a hundred children in Bihar. Nearly 300 children have been hospitalized in intensive care units of two hospitals in the worst affected Muzaffarpur district. According to official data, 83 children died at the Shri Krishna Medical College and Hospital, while 17 of them lost their lives in Kejriwal Hospital in the city.
- State government officials maintain that the majority of victims died due to hypoglycemia, which is a condition caused by a very low level of blood sugar and electrolyte imbalance.
- 'Acute Encephalitis Syndrome' is a neurological disorder that affects the brain and the limbic system when a specific strain of virus, or a bacteria attacks the body. It commonly affects children and young adults and can lead to considerable morbidity and mortality.
- In its latest outbreak, the disease has affected as many as 12 districts of Bihar. Multiple cases have been reported from Muzaffarpur, East Champaran, West Champaran, Sitamarhi, Sheohar, Vaishali, Samastipur, Begusarai and Jahanabad districts.
- A majority of the cases have been observed in the litchi producing districts of Bihar, and in particular, Muzaffarpur. The death toll has already crossed 100. Muzaffarpur alone accounts for as many as 83 deaths. Most of the casualties are between the age group of 1 to 10 years of age.
- In the wake of the rising fertilities, Bihar Chief Minister Nitish Kumar, has announced 4 lakh rupees each as ex-gratia to the next of the relatives of the deceased. He has also directed the health department officials, the district administration, as well as the doctors to take all possible measures to tackle the disease.
- Union Health Minister, Harsh Vardhan had recently visited the families of the children, suffering from suspected encephalitis syndrome. He assured them that the government will extend all possible help and measures to the State Government.
- The Health Minister also mooted the idea of a research institute to identify the reason behind the outbreak of the epidemic, colloquially known as "Chamki Bukhar", where "Chamki" refers to seizure.
- Attributing heat and humidity as possible reasons for the disease, the Minister said that the Ministry of Earth Sciences would formulate an action plan with the state government to deal with the situation. It is important to note that viruses are the main causes in 'Acute Encephalitis Syndrome'

cases, although other sources such as bacteria, fungus, parasites, chemicals, toxins and non-infectious agents have also been reported over the past few decades.

- Japanese Encephalitis (JE) virus has been found to be the major cause of AES in India. Besides, the Nipah virus, Zika virus, Herpes Simplex virus, Influenza- A virus, West Nile virus, Chandipura virus, Mumps, Measles, Dengue, etc. are the other causes of the 'Acute Encephalitis Syndrome' in sporadic and 'outbreak' forms in India.
- 'Acute Encephalitis Syndrome' or AES, is a viral infection. It is a bunch of diseases that include hypoglycemia, dyselectrolytemia, chicken pox and Japanese encephalitis. Encephalitis is an inflammation in the brain that can be caused by a virus, bacteria, or fungi.
- It usually affects people with weak immune systems. Since it infects vessels in the brain, it is also known as Brain fever. Viruses that cause encephalitis can be mosquito-borne, tick-borne, etc.
- General symptoms of encephalitis are fever, headache, poor appetite, and also a loss of energy.

Acute encephalitis syndrome (AES): A serious public health care problem in India

- Acute encephalitis syndrome (AES) is a serious public health problem in India. It is characterized as acute-onset of fever and a change in mental status (mental confusion, disorientation, delirium, or coma) and/or new-onset of seizures in a person of any age at any time of the year. The disease most commonly affects children and young adults and can lead to considerable morbidity and mortality.
- Viruses are the main causative agents in AES cases, although other sources such as bacteria, fungus, parasites, spirochetes, chemicals, toxins and noninfectious agents have also been reported over the past few decades.
- Japanese encephalitis virus (JEV) is the major cause of AES in India (ranging from 5%-35%). Herpes simplex virus, Influenza A virus, West Nile virus, Chandipura virus, mumps, measles, dengue, Parvovirus B4, enteroviruses, Epstein-Barr virus and scrub typhus, S.pneumoniae are the other causes of AES in sporadic and outbreak form in India. Nipah virus, Zika virus are also found as causative agents for AES. The etiology in a large number of AES cases still remains unidentified.
- AES due to JEV was clinically diagnosed in India for the first time in 1955 in the southern State of Madras, now Tamil Nadu. During 2018, 10485 AES cases and 632 deaths were reported from 17 states to the National Vector Borne Diseases Control Programme (NVBDCP) in India, with a case fatality rate around 6 per cent. AES cases were reported mainly from Assam, Bihar, Jharkhand, Karnataka, Manipur, Meghalaya, Tripura, Tamil Nadu, Uttar Pradesh.
- Spread by mosquitoes, Japanese Encephalitis (JE) is one of the most common types of diseases prevalent in India. Since the mosquitoes breed the most during the onset and the peak monsoon season, cases tend to rise around this time. India records a fatality rate of 6% in AES. But this fatality rate rises to 25% among children. The reason for this is lack of nourishment. Bihar, Assam, Jharkhand, Uttar Pradesh, Manipur, Meghalaya, Tamil Nadu, Karnataka, and Tripura are the worst affected. In the latest outbreak of the deadly disease, as many as 100 children have died in a month in Bihar's Muzaffarpur district.

Challenge Areas:

- AES and JE continue to pose problems due to the scarcity of doctors, slow progress in drinking water projects in encephalitis-affected areas and difficulties in the identification of the causes of the diseases.
- In recent research conducted in Gorakhpur and nearby districts, the most common cause identified for AES is scrub typhus infection. In 2018, out of 1,073 AES patients admitted to BRD Medical College, 52 percent cases were due to scrub typhus infection.
- A cause for worry is that in Uttar Pradesh and Bihar, despite successful vaccination missions, cases of Japanese encephalitis constitute 7 to 10 percent of the total encephalitis cases.
- The number of cases of disabilities due to scrub typhus have decreased, but cases of mental illness have increased. Rehabilitation programmes for such patients are not in a good condition in Uttar Pradesh and Bihar.

- **Encephalitis in children is directly related to malnutrition.** In Bihar and Uttar Pradesh, most patients hail from poor rural families. Many of them are children of labourers, including landless labourers, and some of them have left their villages and migrated to cities to earn a living.
- Malnutrition among children is more prevalent in districts affected by AES in these two states. The state governments, therefore, need to take urgent steps to tackle malnutrition.
- The inability to isolate an infectious aetiological agent in a majority of AES cases has been a challenge to effective prevention.
- Without adequate knowledge of the mode of transmission, strategies for prevention and management have been inadequate.
- AES surveillance in India is poor and the actual disease distribution is still not known.
- The clinical ambiguity is compounded as to whether the cases are of encephalitis or encephalopathy. The cause of acute encephalitis is generally unknown in most cases.

History of AES in India:

- The history of AES in India has paralleled with that of the Japanese encephalitis virus (JEV) since the first report in 1955 from Vellore, Tamil Nadu.
- The first outbreak of JEV was reported in Bankura district, West Bengal in 1973.
- Thereafter, sporadic cases of AES and outbreaks have been the leading cause of premature deaths due to the disease in India.
- Based on various surveillance reports and outbreak investigations, the history of AES in India can be classified into 3 phases:

(a) period before 1975 when a few cases with JE aetiology were identified;

(b) between 1975 and 1999 when more JEV cases were reported with frequent outbreaks that resulted in the development of JE endemic regions near the Gangetic plains and in parts of Deccan and Tamil Nadu;

(c) between 2000 and 2010, a dramatic change was observed in the AES scenario, which saw the rise in non-JE outbreaks mostly caused by viruses such as Chandipura virus (CHPV), Nipah virus (NiV), and other enteroviruses.

Concluding Remarks:

- Several government initiatives have been undertaken to educate and improve the hygiene of people living in the JE endemic zones.
- Government and non-government organizations have been instrumental in providing proper nutrition to the AES-affected population as most of the affected people belong to the lower economic strata of the society.
- There have been initiatives to help the people residing in the endemic zones for alternative professions such as giving up pig-rearing since pigs are the primary host for JE viruses.
- Special schools have been set up to help children challenged by clinical sequelae of JE infection.
- Vero cell-derived purified inactivated JE vaccine-JENVAC, was the first vaccine in India that received manufacturing and marketing approvals from the Drug Controller General of India.
- The vaccine was an outcome of public-private partnership mode between the Indian Council of Medical Research and Bharat Biotech.

