

## **Is Seasonal Wasting is responsible for the rising incidence of Acute Encephalitis Virus in Muzaffarpur Bihar, India**

Acute Encephalitis Virus (AEV) is defined as onset of acute fever and change in the mental state of an individual of any age at any time of the year showing symptoms not limited to confusion, coma, disorientation and inability to talk (Joshi et al., 2012) The locals generally called it “*chamki bukhar*” in India. In India, Japanese encephalitis is the major disease attributed to AEV, with almost 50,000 deaths attributed in India. Nearly 597,542,000 total cases of JE were reported in India till 2005 with an average incidence of 1500 to 4000 cases per year (Kabilan et al, 2004). Many studies in the past have only concerned of the possible reasons for the outbreak of the disease but still no specific cause and cure has been identified for the disease. Though through the initiatives from the Ministry of Health and Family Welfare, Ministry of Housing and Urban Poverty alleviation, Ministry of drinking Water and Sanitation , Ministry of Social Justice and Empowerment, Ministry of Women and Child development and Human Resource development the government tried to improve the alarming situation in the states, Assam, Uttar Pradesh, Bihar, Tamil Nadu, and West Bengal by strengthening the Infrastructure of the hospitals, empowering ASHA workers for the early referral of the cases, safe drinking water and proper sanitation facilities, and improving the nutritional status of children (Annual Report of the Department of Health and Family Welfare 2017-18). But despite the several important measures taken by the government, the recent cases of deaths in the district of Muzaffarpur exposed the situation of the state, in terms of Public health infrastructure, proper nutritional status of child and immunization awareness among the mothers and hospital. In Muzaffarpur till July 2019, more than 150 children died (Chowdhary, 2019) due to the disease (which is still not know).

### **Research Methodology**

The study focuses on the alarming situation of Encephalitis in Muzaffarpur, Bihar. The district was selected was to analyze the determinants associated with the high incidence of “Chamki Bukhaar” in the region. To analyze the determinants we have used the data from the round 4 of the National Family Health Survey which was conducted in 2015-2016.

### Demographic Profile of Muzaffarpur, Bihar

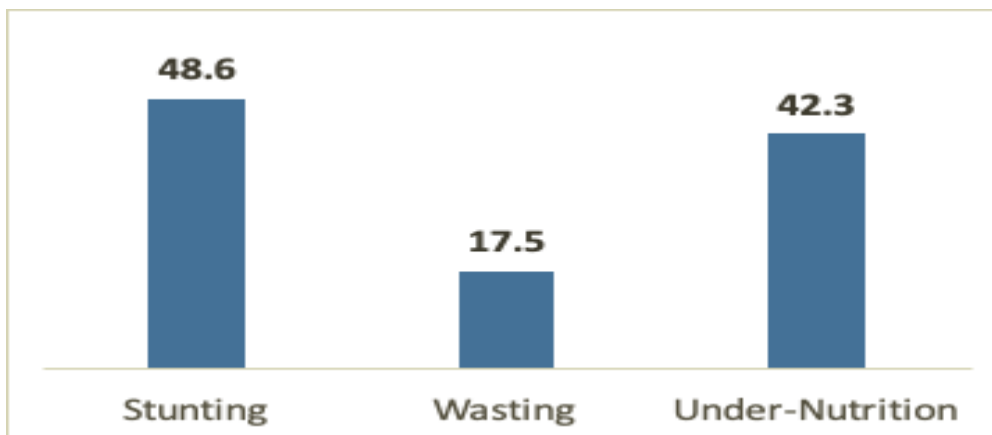
According to 2011 Census, the total population of the District is 37.47 lakhs with the sex ratio of 920 and the literacy rate of 48% .The Schedule Caste population in the district is 15.7%, while tribe constitute of 0.1% of the total population in the district

### Major Pathways for the outbreak of disease in Muzaffarpur

There could be multiple factors which are responsible for vulnerable situation these are incomplete immunization, nutrition condition , clustering of incomplete immunization and nutrition condition, poverty and health system paralysis.

Many Doctors in the district of Bihar concluded that not Litchi but malnutrition is one of the major causes behind the rising incidence rate of the unidentified disease (BBC, 2019; Chowdhary, 2019; Ray, 2019; Singh, 2019). We tried to get into the nutritional status and vaccination coverage in the district using the National Family Health Survey-4, 2015-2016. In Muzaffarpur, 49% of children were found to be stunted, while 18% were wasted, and 42% were under-nourished (Figure 1) and vaccination coverage among children aged 12-23 month shows that the coverage was lowest for polio: 69% of children did not receive polio vaccine by 12 months. In spite of free vaccination program still in Muzaffarpur, only 55 percent of children were fully vaccinated.

**Figure 1 : Nutritional Status among Children aged 6-59 months in Muzaffarpur district, Bihar, India, NFHS (2015-2016)**



**Table 1: Percentage Distribution of Immunization covered among Children aged 12-23 months in Muzaffarpur district, Bihar, India, NFHS (2015-2016).**

	<b>Immunization (12-23 months children) (%)</b>
<b>BCG</b>	90.11
<b>measles</b>	79.13
<b>Polio</b>	68.76
<b>DPT</b>	75.79
<b>Full vaccinated</b>	55.03

**Table 2: Bi-variate analysis of children aged 12-23 months who did not receive vaccination by type of nutritional status in Muzaffarpur district, Bihar, India, NFHS (2015-2016).**

	<b>Stunted (%)</b>	<b>Wasted(%)</b>	<b>Underweight(%)</b>
<b>No BCG</b>	15.1	8.3	13.5
<b>No measles</b>	22.0	21.2	15.8
<b>No Polio</b>	31.0	29.6	30.4
<b>No DPT</b>	29.0	21.1	28.3
<b>Not Fully vaccinated</b>	42.6	51.2	40.9

Table 2 shows that if we look at the situation of undernutrition and immunization status, finding shows that 42.6 percent children in Muzaffarpur districts in 12 to 23 months old were stunted and did not get full vaccination. In terms of specific vaccination three out of then stunted children did not receive polio and DPT. According to NFHS-4 districts wise estimate, the situation is even worse in case of wasting. More than half of the children were wasted and not fully vaccinated. Underweight situation is almost similar to stunting, where 41 percent of children were underweight and did not received proper vaccination.

The poorer section of the district was mostly affected by the disease and no child from the influential and middle class was affected by the disease. Mainly children from the “Mushar” caste was mostly affected as out of 725 cases 453 belongs to the Mushar caste (Chowdhary, 2019). According to Census 2011, approximately 76,425 individuals belongs to the Mushar caste in the district of Muzaffarpur and they are found to be dependent on agriculture for their livelihood as they belong to economically backward class and illiterate (Singh, 2016), which makes them more vulnerable to get acquainted with the disease. To further see the situation, we analysed the situation of clustering of under nutrition and not immunization in rural area of Muzaffarpur districts according to poor-non poor households. Situation of economically poor (poorer/poor) is even worse i.e. 45 percent stunted, 48 percent wasted and 43 percent underweight poor children are not fully vaccinated (table 3).

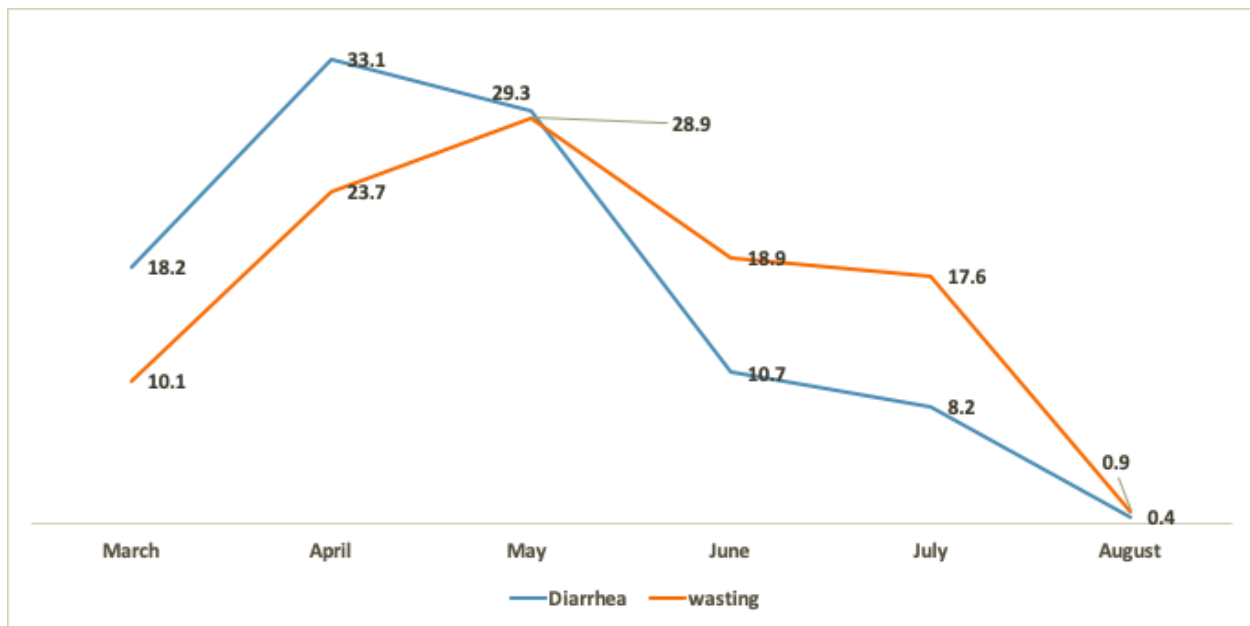
**Table 3: Bi-variate analysis of children aged 12-23 months who did not receive vaccination by wealth quintile and by nutritional status in Muzaffarpur district, Bihar, India, NFHS (2015-2016).**

<b>Rural</b>	<b>Stunted</b>		<b>Wasted</b>		<b>Underweight</b>	
	<b>Poor</b>	<b>Non-poor</b>	<b>Poor</b>	<b>Non-poor</b>	<b>Poor</b>	<b>Non-poor</b>
<b>No BCG</b>	17.8	0.0	10.3	0.0	16.8	0.0
<b>No measles</b>	26.0	0.0	21.4	32.0	19.7	0.0
<b>No Polio</b>	31.5	28.6	26.3	32.1	30.1	24.7
<b>No DPT</b>	31.7	14.4	26.2	0.0	32.7	12.4

<b>Not vaccinated</b>	<b>Full</b>						
		45.1	28.6	48.2	64.2	43.3	24.7

To get a better view on the season wise nutritional status as most of the children affected by the disease belong to the season of heat waves, we analyzed the wasting and incidence of diarrhea (in the last 15 days from the date of interview) in Rural Bihar using the NFHS-4 data. The data shows that Wasting among the children was high in the months from April to July, then it decreases rapidly from July to September. Also, the diarrhea incidence peaks during the months of heat waves.

**Figure 2 : Wasting and Diarrhea among Children aged 6-59 months in the months March to September , Rural Bihar, India, NFHS (2015-2016).**



### **Incompetence of Health System in Muzaffarpur**

The rising toll of the incidence rate of deaths due to the Encephalitis exposed the condition and infrastructure of the health facility in the district. According to the latest estimates by the Ministry of Health and family Welfare, only 630 Public health facilities are available in the district and around 79.5% of the 1719 villages in the district don't have the access to the Public health facilities (Sharma, 2019). Also in the available PHCs there are lack of trained doctors and lack of essential vaccination and facilities like bed, injections, staff (BBC,2019; Poercha,2019). According to the

ICU guidelines 2017, for every 5-6 patients one doctor is mandatory, but in the prevailing district only one doctor was available for approximately 50 patients ( Poercha, 2019), which made the situation worse in the district.

### **Conclusion and Suggestion**

The Muzaffarpur district is at the alarming stage. The situation of nutritional status as well as health facility in the district were found to be worse. Also, the situation of the vulnerable section of the society were found to be more worse than other sections, so Government should focus more on the section which is least attended by the health professionals. The data suggests that the wasting in the month of heat waves (April to June) were found to be comparatively higher than other months, diarrhea in the particular month can be attributed to the wasting, which makes the child more susceptible of acquiring the disease during the season. Also, the crop production during the summer season in Bihar was found to be less which can also be one of the reasons for alarming wasting situation in the state.

Government should make more initiatives to educate people about the importance of vaccination, clean and safe drinking water and use of proper sanitation facility in their living area. To implement this, government can launch a campaign similar to Dastak campaign which was launched by Uttar Pradesh government in 2018 fight against the Encephalitis in 2018 in which health workers were mobilised to reach the doorstep of each individual to provide information about the disease and also inform people about the importance of keeping the nearby area clean, importance of vaccination and using safe drinking water (<https://gorakhpur.nic.in/scheme/dastak-campaign/>). A proper system to monitor the growth of children is strongly recommended. The Anganwadi workers should be more empowered to educate the mother about the importance of healthy food and regular monitor checks in the Anganwadi centre is required. Also a strong surveillance system together should be implemented with a high quality of immunization program.

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