

Epidemiology of Japanese Encephalitis in Nepal

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¹Dr. Shushil Dev Pant, MBBS, MPH. Immunization Medical Officer, WHO/ Program for Immunization Preventable Diseases. Kathmandu, Nepal.

Address for Correspondence: Dr. Shushil Dev Pant, E-mail : PantS@searo.who.int

Introduction

Japanese Encephalitis is acute encephalitis that can progress to paralysis, seizures, coma and death. Japanese encephalitis is the leading cause of viral encephalitis in Asia, with 30,000–50,000 cases reported annually.¹ The Japanese encephalitis virus is a member from the family Flaviviridae.² Human, cattle and horses are dead-end hosts and disease manifests as fatal encephalitis. Domestic pigs and wild birds are reservoirs of the virus; transmission to humans may cause severe symptoms. The natural host of the Japanese encephalitis virus is bird, not human, and the virus will therefore never be completely eliminated.³ One of the most important vectors of this disease is the mosquito *Culex tritaeniorhynchus* (Picture 1) and *Culex gelidus*. *Culex tritaeniorhynchus* is active during dusk and dawn and it is during this part of the day that it bites and infects individuals with Japanese Encephalitis. The vector's presence has been confirmed in Nepal.

Epidemiology

Japanese Encephalitis was first confirmed in western part of Nepal in 1978.⁴ Since then, Japanese Encephalitis has been confirmed in 54 districts of Nepal. 1777 cases of Japanese Encephalitis has been serologically confirmed in Nepal from 2004-2007. It is important to remember that Japanese Encephalitis is an under reported disease. For every reported JE case,

there are approximately 300 asymptomatic cases.⁵ This means that upwards of 533, 100 people were infected with this disease during 2004-2007, mostly amongst residents of rural areas. Incubation period of Japanese encephalitis varies, but 5-15 days is typical.

Japanese Encephalitis has been confirmed in all age groups in Nepal. Almost 50 % of the cases are 15 year or younger in age. The highest incidence rate is in the age group of 5-15 years. Japanese encephalitis is more common in males than in females, probably due to greater exposure during the mosquitoes feeding hours.^{6,7} Almost 60% of the cases occur in males.

Japanese Encephalitis has been reported from all eco-regions of the country. The majority of JE cases occur in the Terai. Following mass immunization campaign in endemic districts of Terai in 2006, a decrease in number of reported cases in 2007 and 2008 speak of the quality of the mass immunization campaign. More cases are being reported from Hilly districts of Nepal from 2004. Expansion of surveillance network throughout the country has improved the sensitivity of the system. Mountainous region previously silent have been reporting at least two cases from 2005. Occurrence of Japanese Encephalitis now has been confirmed in 54 districts of the country. Details of the data can be seen in Table 1.

Fig. 1 : Showing *Culex tritaeniorhynchus*.

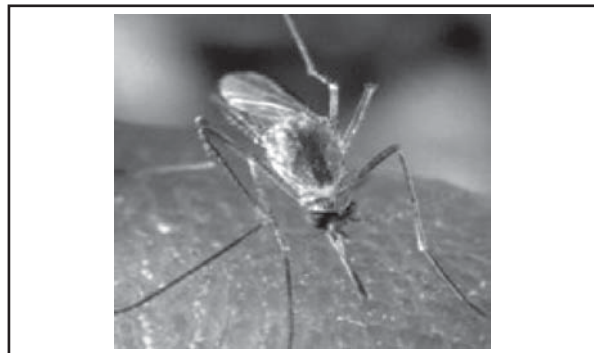


Fig. 2 : Showing JE Infected districts of Nepal

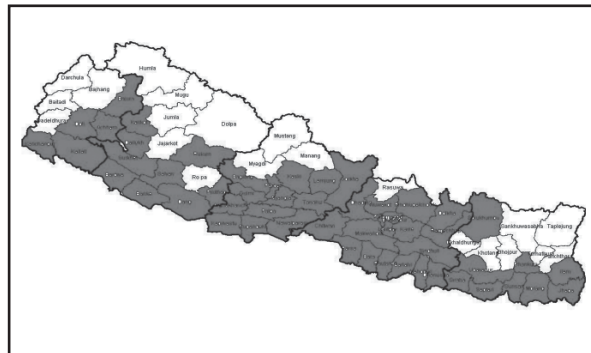


Table 1: Laboratory Confirmed Japanese Encephalitis Cases in Nepal

	Year	2004		2005		2006		2007	
Variables		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Cases		371	100	669	100	295	100	442	100
Age	< 1 years	9	2.4	11	1.6	4	1.4	28	6.3
	1-5 years	33	8.9	98	14.6	26	8.8	72	16.3
	5-<15 years	161	43.4	273	40.8	126	42.7	213	48.2
	>15 years	168	45.3	287	42.9	136	46.1	129	29.2
Sex	Male	214	57.7	384	57.4	187	63.4	261	59.0
	Female	157	42.3	285	42.6	105	35.6	181	41.0
Eco-region	Terai	328	88.4	591	88.3	214	72.5	285	64.5
	Hill	43	11.6	75	11.2	76	25.8	153	34.6
	Mountain	0	0.0	3	0.4	2	0.7	4	0.9

Japanese Encephalitis is not a year around disease in Nepal like in other countries of South Asia. Incidence of JE is highest between July to September each year. The outbreaks occur after monsoon and coincide with Acute Encephalitis Syndrome outbreaks. The outbreak peaks during August. Limited number of Japanese Encephalitis cases is then reported from November to March. This seasonal phenomenon is demonstrated in Figure 2.⁵

Japanese Encephalitis is a killer and a debilitating disease. The mortality rate from Japanese Encephalitis in Nepal is 13.2%⁶ and falls within the described range of 0.3% to 60% and depends on the population and on age. Out of the surviving, up to 30% may develop some type of permanent neurological debility and about 10% recover to pre infective status.⁸

Summary

Every person in Nepal is at risk against Japanese Encephalitis. High mortality and disability rate has made Japanese encephalitis a disease of public health priority. Government of Nepal has responded to the challenge by expanding the surveillance network and is working closely with district health system to improve the sensitivity of the surveillance system. Mass immunization campaign followed by introduction of the vaccine in routine immunization will significantly reduce the threats posed by the disease in Nepal. SA-14-14-2 is a very safe and effective vaccine, and at present it is the vaccine of choice for introduction into the National Immunization Program.

Fig. : Lab-Confirmed Japanese Encephalitis (JE) Cases by Month and Year Nepal May 2004 - Sep 2008

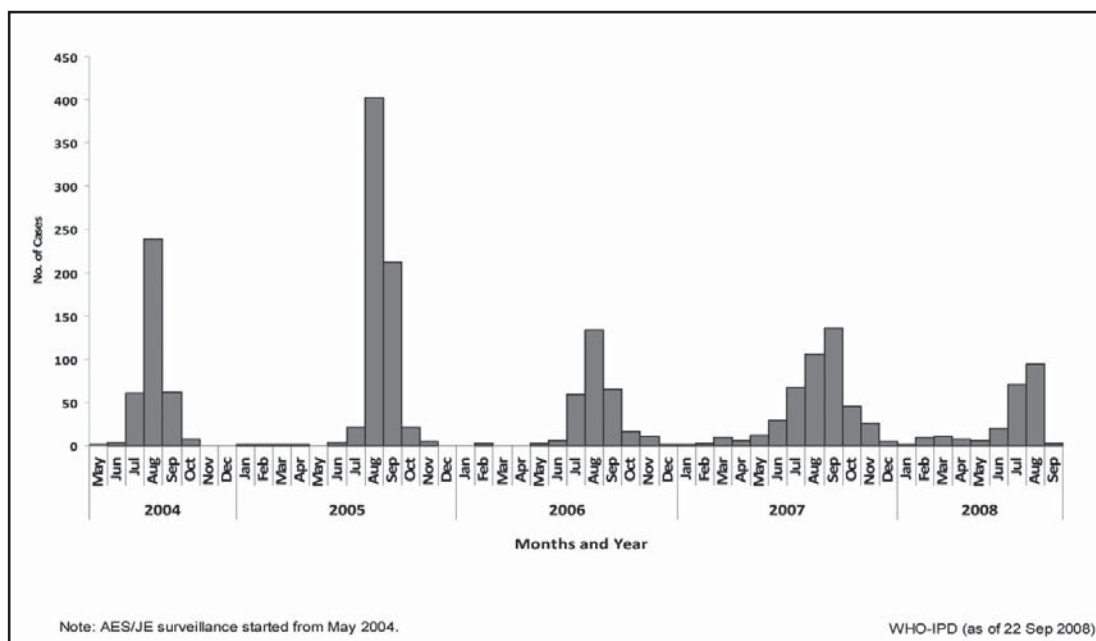


Fig 3: Showing the seasonal trend of Japanese Encephalitis.

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