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**Original Articles**

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**ACUTE SPORADIC VIRAL HEPATITIS IN URBAN POPULATION OF A TRIBAL DISTRICT IN MADHYA PRADESH****Jagvir Singh, Charu Prakash, R. Panda\*, D. Bora, D.C. Jain and K.K. Datta**

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**Objective:** To estimate the incidence of acute sporadic viral hepatitis and describe its epidemiology in an urban population. **Design:** A retrospective community survey for jaundice cases. **Setting:** Headquarter town of a tribal district, Bastar, in Madhya Pradesh state, India. **Method:** Trained paramedics surveyed about 51,643 population to detect cases of jaundice which occurred in the past one year. Cases were examined to collect clinical and epidemiological data. Blood samples were drawn from all cases who had jaundice in the past 3 months for testing them for markers of viral hepatitis. **Results:** Study estimated the annual incidence of jaundice cases as 244 (95% CI 201-287) per 100,000 population. Almost 95% jaundice cases occurred in summer and monsoon months. People from all socio-economic strata were affected. The incidence of jaundice was found to be the highest in children below 15 years of age (3.7 per 1000) which declined significantly with the increase in age ( $p=0.0000$ ). The overall incidence in two sexes was not different statistically ( $p=0.7$ ). Of 57 cases who had jaundice in the past 3 months, 19 (33%) were confirmed as having viral hepatitis. Hepatitis A and E combined together contributed 68% (13/19) of acute sporadic cases of viral hepatitis, whereas hepatitis B, C and D accounted for the remaining 32% of the cases. **Conclusion:** The study found the annual incidence of laboratory supported cases of viral hepatitis to be 81 (95% CI 57-106) per 100,000 population, which suggests that it is an important public health problem in India. Hepatitis A was much more prevalent than hepatitis E. Etiology of almost two-thirds of jaundice cases could not be established which require further community studies.

**Key words:** Hepatitis, Jaundice

**H**EPATITIS B and non-A non-B (NANB) hepatitis, respectively are considered to contribute about one-third and more than half of the acute sporadic cases of viral hepatitis in India(1-3). These conclusions are however, based on cases treated in the health institutions(1-4). Com-

munity based data on viral hepatitis are scanty. Keeping this in view, we carried out a retrospective survey in an urban population in Madhya Pradesh to estimate the incidence of acute sporadic viral hepatitis and describe its epidemiology. The results are presented in this communication.

## Subjects and Methods

Jagdalpur is the headquarter town of a tribal district (Bastar) in Madhya Pradesh in India. Although more than two-third of the population in district Bastar is tribal, they constitute only 14% of the population in the Jagdalpur town. Of 31 wards in the town, 27 have piped water supply; the remaining 4 wards have hand pumps and/or wells as sources of water. About 60% population are having access to a sanitary latrine, whereas the remaining 40% population practice open field defecation.

The town has a population of 84,578 (1991 census) which is distributed in 31 wards. It was earlier decided that about 50 thousand population will be surveyed for this study. The trained paramedics went from house to house to enquire about any case of jaundice (defined by a local word for jaundice and yellow eyes and urine) which occurred in the last one year. They also collected data on age and sex of the family members. The cases such detected were further examined and interviewed by a medical epidemiologist (RP) to collect epidemiological and clinical data. The survey was carried out in September 1994 and covered a population of 51,643.

Blood samples were drawn from all cases who were reported as having jaundice in the past 3 months. Sera were separated in the local laboratories of National Institute of Communicable Diseases (NICD), and then transported in cold chain to main laboratories of NICD in Delhi. The sera were stored at  $-20^{\circ}$  C till tested for immunological markers of viral hepatitis.

In October-November 1994, the sera were tested by Macro ELISA (Bead ELISA) using kits of Abbott Laboratories, USA, for IgM anti-HAV, IgM anti-HBc, HBsAg, anti-HCV, anti-HDV, and anti-HEV. The samples were further tested for IgM anti-HEV

by ELISA kits of Genelabs Diagnostics, Singapore, in November 1996. Hepatitis A (HA), hepatitis B (HB) and hepatitis E (HE) were confirmed by presence of IgM anti-HAV, IgM anti-HBc and IgM anti-HEV, respectively. HBsAg carriers found positive for anti-HDV were taken as cases of hepatitis D (HD). Cases of jaundice who were negative for IgM anti-HAV, IgM anti-HBc, HBsAg and IgM anti-HEV but were positive for anti-HCV were considered suffering from hepatitis C (HC).

## Results

As shown in *Table I*, the community reported 126 cases of jaundice during the reference period of 1 year. This gave an annual incidence of jaundice as 244 (95% CI 201-287) per 100,000 population. The incidence was found to be the highest in children below 15 years of age (370 per 100,000). Thereafter, it declined progressively and significantly with the increase in age ( $p=0.0000$ ). The overall incidence in two sexes was not different statistically ( $p=0.7$ ). Almost 95% of the cases occurred during June-October months which are summer and monsoon seasons in this area.

*Table II* describes the jaundice cases by occupation; cases came from all the socio-economic strata. However, about 53% of the jaundice cases >10 years of age and 42% of the mothers of children below 10 years of age were illiterate or just literate. A few adult cases or mothers of pediatric cases (about 5%) were graduates.

Fifty seven cases had jaundice within 3 months previous to survey. They were examined for immunological markers of viral hepatitis. Of them, 19 (33%) patients were confirmed as having viral hepatitis; etiology of the remaining 38 (67%) patients could not be established (*Table III*). Enterically transmitted HAV and HEV combined together were responsible for 68% (13/19) of

**TABLE I**—Incidence (per 1000) of Jaundice in Jagdalpur Town, 1994

Age (yr)	Population surveyed	Jaundice cases in past 1 year	Age-and sex-specific annual incidence per 1000 persons		
			Male	Female	Total
0-4	5196	17	2.6	4.0	3.27
5-14	12899	50	2.84	4.99	3.88
15-44	26703	53	2.36	1.6	1.98
45+	6845	6	1.35	0.32	0.88
All	51643	126	2.37	2.52	2.44

**TABLE II**—Occupation of Patients  $\geq 15$  Years and Fathers of  $< 15$  Year Old Children Having Jaundice

Occupation	No. of cases $\geq 15$	%	No. of fathers of $< 15$	%
Dependent	18	30.5	0	0
Housewife	8	13.6	—	—
Land-owner	1	1.7	0	0
Business	6	10.2	21	31.3
Service	9	15.3	28	41.8
Retired	2	3.4	0	0
Labourer	14	23.7	14	20.9
Not known	1	1.7	4	6.0
All	59	100.0	67	100.0

**TABLE III**—Results of Serum Samples from Jaundice Cases for Viral Hepatitis Markers

Age	Samples tested	No. of cases of viral hepatitis					Negative for all markers	
		A	B	C	D	E		
0-4	6	2*	0	0	0	1*	4	
5-14	21	7**	0	0	1	3**	12	
15-44	26	1	3	2	0	2	18@	
45+	4	0	0	0	0	0	4#	
All	57	10***	3	2	1	6***	38	

\* One patient had both hepatitis A and E; \*\*2 patients had both hepatitis A and E; \*\*\*3 patients had both hepatitis A and E; @ 4 patients anti-HEV positive; # one patient anti-HEV positive.

acute sporadic cases of viral hepatitis, whereas parenterally transmitted HBV, HCV and HDV accounted for the remaining 32% of the cases. It may be mentioned

that 3 cases had dual acute infections; they were positive for both IgM HAV and IgM HEV. Most of hepatitis A and E cases were children (Table III).

On an average 77 (range: 60-92) cases of viral hepatitis were treated every year in the district hospital, Jagdalpur during 1992-95. These cases were not only from Jagdalpur town, but also from the other parts of the Bastar district (population of district: 2.27 million). About 8.5% of them died.

### Discussion

Routine surveillance system reports about 0.1 million cases of viral hepatitis in India which amounts to an annual incidence of about 10 per 100,000 population. On the other hand, in a retrospective community study in the urban population of Alwar (Rajasthan), incidence of laboratory confirmed viral hepatitis was estimated as 124 (95% CI 98-150) per 100,000 population; it was also found that HAV and HEV, especially the former, are responsible for the majority of acute sporadic cases(5). To confirm or refute these findings, we carried out the present study in Jagdalpur, the headquarter town of a remote tribal district.

The results estimated the annual incidence of jaundice as 244 (95% CI 201-287) per 100,000 population. Assuming that one-third of all the jaundice cases-including those who were not tested in the laboratory-(see below) were due to viral hepatitis A-E, the incidence of viral hepatitis was estimated as 81 (95% CI 57-106) per 100,000 population. These estimates are not statistically different from that observed in Alwar town. The study thus once again indicated that viral hepatitis is a major public health problem and that the reported incidence-probably based on institutional data-underestimates the problem in India.

Cases of jaundice were scattered in the entire town without any apparent epidemiological linkages. Of 31 wards surveyed, 28 were reported having jaundice cases in the

previous one year. In addition, viral hepatitis affected people from all socio-economic strata (*Table II*). These results and the hospital data are indicative of endemicity of viral hepatitis in Jagdalpur town. Nevertheless, the disease was significantly more prevalent in two wards having attack rates of 740 and 950 per 100,000 population respectively. Neither of them had piped water supply. Both wards were situated by the side of a big pond where the people go for defecation and use the contaminated water for various purposes.

Majority of the persons in areas with poor hygiene and environmental sanitation are exposed to feco-orally transmitted viruses early in life. High incidence of jaundice in children which declined significantly with the increase in age (*Table I*) and the occurrence of almost 95% of jaundice cases in summer and monsoon months are also consistent with the preponderance of feco-orally transmitted viral hepatitis in the study area. HAV and HEV both accounted for almost two-third of the laboratory confirmed viral hepatitis cases (*Table III*). Interestingly, hepatitis A was much more prevalent than hepatitis E, whereas the reverse has been described in the literature which is virtually based on the institutional data(1-4). Perhaps hepatitis A being comparatively mild than other infections especially in children-most of the HA cases were children below 15 years of age is under-represented in the institutional data. On the other hand, the practice of diagnosing NANB hepatitis (now considered HEV) by excluding HA and HB(1-4) might have inflated its proportion. Had we used the same criteria, we would have also diagnosed a large number of undiagnosed cases of jaundice as NANB hepatitis.

Parenterally transmitted viral hepatitis contributed almost one-third of laboratory confirmed cases. Since the number of cases

is small, it will not be appropriate to comment upon the relative contribution of HBV, HCV and HDV. Nevertheless, the study demonstrated the circulation of these viruses in study populations remote urban community.

Perhaps, the most intriguing finding is the absence of A-E viral hepatitis markers in almost two-third (38/57) of jaundice cases. Were they having jaundice at all since many of them were diagnosed on the basis of history alone? Perhaps they were. A medical epidemiologist (RP) interviewed them thoroughly and considered them having jaundice. Although we did not test the serum samples biochemically to save them for immunological markers, many of them had been tested by local physicians and hospital and found to have raised serum bilirubin levels. Were they all cases of viral hepatitis? At least 5 patients who had recovered from jaundice before the blood samples were drawn, were found positive for anti-HEV, but negative for IgM HEV. It is possible that some or all of them had HE recently. In addition, some of these cases may also be due to the recently discovered agents-for example, hepatitis G virus-which have been shown to circulate in India also(6). Nevertheless, some of these cases might be due to causes other than viral hepatitis; at least 2 cases were considered suffering from obstructive jaundice in the district hospital. Lastly, it is worth mentioning that 55% of jaundice cases remained undiagnosed in Alwar also(5). Clearly, further studies are necessary to settle these issues and to understand fully the natural history of viral hepatitis.

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