A Study of the Demography, Etiological Profile and Risk Factors of Acute Viral Hepatitis in an Urban Setting

Varsha R Bhatt[1], Ramdas B Barure[2]

Author's Affiliation:
[1]Professor; [2]Assistant Professor, Dept of Medicine, Dr. D.Y. Patil Medical College, Pune

Correspondence
Dr. Varsha R. Bhatt
drvrbhatt@gmail.com

ABSTRACT

Background: Acute Viral Hepatitis (AVH) is a major public health problem in India. The objectives of this study were to elucidate the demography, etiological profile, risk factors and comparative clinical spectrum of AVH transmitted faeco-orally and parenterally in an urban setting in Western India.

Methodology: 100 patients more than 12 years of age having jaundice with raised alanine transaminase and serology positive for acute markers of hepatitis viruses A,E,B,D and C were included in this study over a period of eighteen months.The data was analyzed using SPSS (2015 version).

Results: 73% patients were in the under 30 year age group. 70% were males. 53% had Hepatitis E, 34% had Hepatitis A, 11% had Hepatitis B and 2% had Hepatitis C .79% had one or other risk factors such as close personal contact, travel, mass gathering, eating roadside food, blood transfusion, injection use and high risk behaviour. Clinical severity and the serum bilirubin levels were statistically higher in the faeco-orally transmitted hepatitis than the parenterally transmitted one. The mean duration of illness was 17.1+ 6.8 days and the mean numbers of days lost from work were 22.2 + 5.6 days.

Conclusion: In this study, younger male population seemed more affected. Most patients had preventable risk factors. Results suggested a heavy socioeconomic burden of the disease.

Key words: Acute viral hepatitis, risk factors, faeco-oral, parenterally transmitted

INTRODUCTION

Acute viral hepatitis (AVH) is still a major public health problem in India in spite of the fact that sanitation has improved, more and more people are aware of the disease and the standard of living has increased. Several studies have shown that Hepatitis E is the commonest cause of acute hepatitis in adults and hepatitis A is the commonest cause in paediatric age group.[1-5]

There has been a rise in Hepatitis A amongst adults in north India as well in recent years.[6] Hepatitis E is also the major cause of sporadic adult acute viral hepatitis and fulminant hepatic failure, especially in pregnant women. Also, India has intermediate Hepatitis B endemicity, with a carrier frequency of 2%-4%.[7]In the western state of Maharashtra, the incidence of Hepatitis E is increasing over years. National Institute of Virology, Pune found an alarming increase in prevalence of Hepatitis A and E virus in Mutha River, Pune, over the last eight years .[8]Risk factors for AVH may be contaminated water and food, recent travel, mass gatherings, tattooing, dental treatment, blood transfusion, high risk sexual behavior etc. Hepatitis A and E is transmitted mainly by faeco-oral route while Hepatitis B ,C,D are the major causes of parenterally transmitted hepatitis and continue to be a major cause of chronic liver disease throughout the world.[9]Hepatitis affects the quality of life in acute

course. Acute hepatitis has a long duration of sickness and hospitalisation, and accounts for many days lost from work in the most productive age groups. If we know the demography and risk factors of AVH, the target population can be identified and suitable primary prevention measures can be put in place. From a comparison of clinical spectrum of the two categories of AVH, one can pick up from the presentation, the etiology of the AVH. The aim of this study was to elucidate the demographic and etiological profile of patients of AVH in an urban setting , to discuss in detail the risk factors leading to hepatitis, and to assess the comparative clinical spectrum of faeco-oral and parenterally transmitted hepatitis. Also, the mean duration of illness and days lost from work were determined, which can give an idea about the socioeconomic impact of this illness.

MATERIALS AND METHODS

This was a cross sectional observational study. Patients more than 12 years old with clinical history of recent onset yellowish discoloration of sclera and/or urine or with other prodromal symptoms with laboratory evidence of raised alanine transaminase (ALT) >40IU/L were subjected to serological examination. According to literature, the cases of AVH peaked during summer and monsoon seasons and the average prevalence was 60%.[10]From a representative population of 15000 adults, with this prevalence, and with a margin of error 10% and 95% confidence interval, sample size was calculated to be 96. To account for dropouts,100 consecutive patients with a positive serology for either of IgM anti HAV, HBsAg with IgM Anti HBc, anti HCV, anti HDV, IgM anti HEV who presented to outpatient department and medical ward of a tertiary care centre in Western India over a period of eighteen months were included in this study. Patients with underlying chronic liver disease, alcoholic hepatitis, biliary obstruction seen on ultrasound, drug induced hepatitis , pregnancy , hepatitis due to metabolic disease ,hepatitis due to multisystem failure and those who had serology positive for IgG Anti HBc were excluded from this study.

All patients were subjected to a detailed questionnaire about risk factors such as recent and past history of any injections, blood transfusion, high risk behaviour, vaccination, surgery, water source, history of eating outside food, travel to village or place with untreated water, mass gatherings such as religious events or weddings. These histories were considered significant if present in a time frame of up to 3 months preceding the appearance of symptoms. All patients were asked about fever, malaise, loss of appetite, jaundice and duration,

presence of rash, itching, joint pains and clay or light coloured faeces. Past history of jaundice and any other major illness was also asked for. Physical examination was done to see the icterus, lymphadenopathy, pallor and vital signs. Signs of liver cell failure were looked for. Abdominal examination was done to examine for hepatosplenomegaly and ascites. Laboratory evaluation consisted of hemogram, blood indices, detailed liver function tests including bilirubin, alanine and aspartate transaminases (ALT and AST), alkaline phosphatase (ALP),serum proteins, prothrombin time, blood sugars, renal function testsand ultrasound. IgM anti HAV, HBsAg with IgM Anti HBc, anti HCV, anti HDV, IgM anti HEV were done by ELISA at the time of inclusion of patients. The data was analyzed using SPSS (2015 version). Descriptive statistical analysis was carried out. Results on continuous measurements were presented as Mean ± SD (Min-Max) and results on categorical measurements were presented in Number (%). Chi square test was used for significance wherever applicable and odds ratio with 95% confidence interval was calculated by univariate and multivariate logistic regression. A p value < 0.05 was considered as significant.

RESULTS

Out of a 100 patients,53 (53%) were in age group 21-30 years while 20 (20%) were in under 20 year group. 70 males (70%) and 30 (30%) females were affected. Maximum patients, 53 (53%) had Hepatitis E, followed by 34 (34%) with Hepatitis A, 11(11%) with Hepatitis B and 2 (2%) with Hepatitis C. Out of 34 patients of Hepatitis A, 14(41.2%) were in the <20 year age group, 15(44.1%) were in the 21-30 year group, 5(14.7%) were in the 31-40 year age group. Out of 53 patients of Hepatitis E, 6(11.3%) were in <20 year group,28(52.8%) in the 21-30 year group, 8(15.1%) in the 31-40 and 41-50 year group and 3(5.7%) in the above 51 year group. Among 11 patients of Hepatitis B, 10 (90.1%) were aged 21-30 years and 1 was in the 31-40 year group. Among 2 patients of Hepatitis C, both were in the 31-50 year group. (Table 1) Among the 100 patients, 79(79%) had one or other risk factors. The rest answered in the negative. 15 patients (15%) said they had close personal contact with a patient of hepatitis, or he/she was a member of their family. 16 (16%) had a history of travel to a village or trekking or a long train journey, 14 (14%) had a history of eating outside/ roadside food, 16 (16%) had a history of being at a mass gathering such as weddings or religious events, 4 (4%) had a history of blood transfusion, 11 (11%) said they had frequent injections, 1 of whom was a confessed addict, 3(3%) gave a history of high risk sexual be-

haviour.21 (21%) patients answered in the negative and appeared to have no risk factors on history.

Among 34 patients diagnosed with Hepatitis A, 10(29.4%) gave a history of close personal contact, 5(14.7%) of travel to place with untreated water or trek or a long journey, 6 (17.6%) of eating at roadside or out of home and 10 (29.4%) of attending mass gatherings.3 (8.8%) patients did not give a preceding history. Out of 53 patients diagnosed as Hepatitis E, 5(9.4%) gave a history of close contact, 11 (20.8%) of travel, 8 (15.1%) of eating out and 6 (11.3%) of attending mass gatherings. 5(9.4%) gave a history of both close contact and eating roadside food. 18(34%) people could not remember a preceding history. Out of 11 patients of Hepatitis B, 3(27.3%) gave a history of blood transfusion (BT) in remote village areas and simultaneously 3(54.5%) gave a history of frequent injection use, 3 (54.5%)

gave both histories of BT and injection use, 2 (18.2%) also gave a history of high risk sexual behaviour. Out of the 2 patients of Hepatitis C, 1 had a history of blood transfusion in remote village areas, 1 gave a history of injectable drug abuse and also had a high risk sexual behaviour. (Table 2)

Fever and malaise was present in 70 cases (70%) respectively. Anorexia was present in 68 (68%) cases, nausea in 48 (48%) cases, vomiting in 45 (45%) cases, and generalized weakness in 65 (65%) cases. Other symptom included clay coloured stool, weight loss, pain in abdomen, seen in 10 (10%) patients each, headache, joint pain and distaste to smoking seen in 3 (3%) patients each and itching seen in 10 (10%) patients. Icterus was seen in 83 (83%) cases.5 (5%) had abdominal distension found to be ascites and 3(3%) had asterixis with altered sensorium in course of disease.

Table 1: Age and diagnosis wise distribution of cases study group

Age (Yrs)	Hepatitis A (n=34)	Hepatitis B (n=11)	Hepatitis C (n=2)	Hepatitis E (n=53)	Total (n=100)
≤20	14(41.2)	0	0	6(11.3)	20
21 – 30	15(44.1)	10(90.9)	0	28(52.8)	53
31 – 40	5(14.7)	1(9.1)	1(50)	8(15.1)	15
41 – 50	0	0	1(50)	8(15.1)	9
>51	0	0	0	3(5.7)	3

Figure in parenthesis indicate percentage.

Table 2: Relation of risk factors of acute viral hepatitis with etiology

Risk Factor	Hep A(n=34)	Hep B(n=11)	Hep C(n=2)	Hep E(n=53)	Total(n=100)
Close/family contact	10(29.4)	5(9.4)	-	-	15
Travel/trek	5(14.7)	11(20.6)	-	-	16
Eating out/roadside	6(17.6)	8(15.1)	-	-	14
Mass gathering	10(29.4)	6(11.3)	-	-	16
Both 1 and 3.	-	5(9.4)	-	-	5
Blood transfusion	-	-	3(27.3)	1(50)	4
Injection use	-	-	3(27.3)	-	3
Both 6.and 7	-	-	3(27.3)	-	3
High-risk sexual behaviour	-	-	2(18.2)	-	2
Both injection use and high risk behaviour	-	-	-	1(50)	1
No history	3(8.8)	18(34)	-	-	21

Figure in parenthesis indicate percentage.

Table 3: ALT and diagnosis wise distribution of cases in study group

ALT (mg/dl)	Hepatitis A (n=34)	Hepatitis B (n=11)	Hepatitis C (n=2)	Hepatitis E (n=53)	Total (n=100)
<100	3(8.8)	4(36.4)	1(50)	2(3.8)	10
100 – 300	3(8.8)	6(54.5)	1(50)	2(3.8)	12
300 – 600	8(23.5)	0	0	12(22.6)	20
600 – 1000	8(23.5)	0	0	10(18.9)	18
>1000	12(35.3)	1(9.1)	0	27(50.9)	40

Figure in parenthesis indicate percentage.

Table 4: Comparison of symptoms in hepatitis A+E and hepatitis B+C group

Symptom	Hepatitis AE (n=87) (%)	Hepatitis BC (n=13) (%)	P value	OR (95%CI)
Fever	70(80.5)	5 (38.46)	0.0028	6.58 (1.91 to 22.69)
Malaise	75(86.2)	3 (23.08)	<0.0001	20.83 (5.00 to 86.78)
Icterus	84(96.6)	5 (38.46)	<0.0001	44.80 (9.00 to 222.92)
Vomiting	49(56.3)	1 (7.69)	0.0100	15.47 (1.92 to 124.30)
Nausea	49(56.3)	3 (23.08)	0.0353	4.29 (1.10 to 16.71)

Table 5: Comparison of liver function test in hepatitis A+E and hepatitis B+C

Sr. Bilirubin	Hep A and E Mean ± SD(n=87)	Hep B and C Mean ± SD (n=13)	P Value
Total	8.94 ± 8.72	2.06 ± 0.91	<0.05
Direct	5.48 ± 4.90	1.18 ± 0.88	<0.01

Many patients had more than one clinical feature. 5 patients developed signs of liver cell failure with coagulopathy, ascitis and grade 1 hepatic encephalopathy; 3 having grade 2. All recovered well. Direct hyperbilirubinemia was seen in 95% of patients and liver enzymes were elevated in all the patients. 10 (10%) patients had evidence of biochemical cholestasis. Transaminases were remarkably raised (above 1000mg/dl) in hepatitis A and E.40 patients (40%) had an ALT of > 1000 mg/dl. Out of them, 27 (67.5%) had Hepatitis E, 12 (30%) had Hepatitis A and 1(2.5%) had Hepatitis B. 18 (18%) patients had an ALT of 600-1000 mg/dl. Out of these 10 had Hepatitis E and 8 had Hepatitis A. Out of 20 (20%) patients having an ALT of 300-600 mg/dl, 12 had Hepatitis E and 8 had Hepatitis A. Out of 12 patients (12%) having ALT of 100-300 mg/dl, 6 had Hepatitis B, and 3,1 and 2 patients had Hepatitis A,C and E respectively. 10 patients (10%) had ALT of <100 mg/dl. 4 of them had Hepatitis B, 3 had Hepatitis A, 1 had Hepatitis C and 2 had Hepatitis E. (Table 3)

When clinical spectrum was compared between faeco orally and parenterally transmitted hepatitis, it was seen that fever(P = 0.0028,OR =6.58; 95%CI: 1.91 to 22.69) , malaise (P< 0.0001, OR=20.83; 95%CI: 5.00 to 86.78), icterus (P< 0.0001, OR=44.80; 95%CI: 9.00 to 222.92), vomiting (P = 0.01, OR =15.47; 95%CI: 1.92 to 124.30) and nausea (P = 0.0353, OR=4.29; 95%CI: 1.10 to 16.71) were significantly more in faeco orally transmitted hepatitis , that is A and E ,than in parenterally transmitted hepatitis, that is B and C (Table 4)

Mean serum bilirubin total was 8.94 (±8.72) mg/dl in faeco orally transmitted hepatitis (hepatitis A and E) and 2.06 (±0.91) mg/dl in parenterally transmitted hepatitis (hepatitis B and C). Mean serum bilirubin (direct) was 5.48 (±4.90) mg/dl in hepatitis A and E and 1.18 (±0.88) mg/dl in hep B and C. This difference was analyzed and found to be statistically significant. (p<0.05) (Table 5)

The mean duration of illness was 17.1+ 6.8 days and the mean numbers of days lost from work (including school) were 22.2+ 5.6. They were maximum in acute Hepatitis E and A.

DISCUSSION

Acute viral hepatitis is a grave public health prob-lem in India which affects younger, socioeconomically productive population. It is a relatively prolonged illness and leads to several days lost from work and school.[11] Even today, hygiene is very poor in many urban and rural parts of this state which is the reason for feco-orally transmitted hepatitis. In remote areas, blood banks may still be unaware of complete screening practices and there is rampant injection use mainly for medical purpose, posing a danger for parenterally transmitted hepatitis.[7,12] Sood et al. in a study from Ludhiana in 2012 screened 5258 subjects and the seroprevalence of anti-HCV positivity was noted in 5.2%, with highest prevalence being noted in the age group of 41–60 years, mostly due to injection use.[13]

In the present study, maximum numbers of patients were in age group of under 30 yrs (73%). A study conducted by Irshad M also found higher incidence in young adults.[14] Males were more affected compared to females in this study .In a study done by TN Chau, acute viral hepatitis occurred more commonly in males than females with the ratio ranging from 5.3:1.[15] In present study, 53% patients had Hepatitis E, followed by 34% with Hepatitis A, 11% with Hepatitis B and 2% with Hepatitis C. In a study done by Nandi B et al, Hepatitis E was the commonest cause seen in 102 (45.5%), followed by hepatitis A in 74 (33%) and hepatitis B in 28(12.5%) cases. There were only two cases of acute hepatitis C.[16] In the present study, in the under 20 year age group, Hepatitis A was the commonest (70%) and in the 21 – 30 year age group, Hepatitis E was commonest (52.8%). Hepatitis E is the commonest hepatitis in all the older age groups as well.In a study done by Nandi B et al, Hepatitis A constituted 41.2% of all cases in the age group 11-20 years, followed by hepatitis E (35.3%). In the older age group, 21-30 years, hepatitis E was the commonest (52%) infection, followed by hepatitis A (31.3%).[16]

Among 34 patients diagnosed with Hepatitis A, 29.4% gave a history of close personal contact, 14.7% of travel to place with untreated water or trek or a long journey, 17.6% of eating at roadside or out of home and 29.4%of attending mass gatherings. 8.8% patients did not give a preceding history. Out of 53 patients diagnosed as Hepatitis E, 9.4% gave a history of close contact, 20.8% of travel, 15.1% of eating out and 11.3%of attending mass gatherings. 37.7%people could not remember a preceding history. Out of 11 patients of Hepatitis B, 27.3% gave a history of blood transfusion in remote village areas and simultaneously 90.9% gave a history of frequent injection use. 18.2% also gave a history of high risk sexual behaviour. Out of the 2 patients of Hepatitis C, 50% had a history of blood transfusion in remote village areas, 50% gave a history of injectable drug abuse and also had a high

risk sexual behaviour. In a study done by Chau et al, acute hepatitis A had a recent history of intake of shellfish (57%) or had travelled to endemic areas such as southern China and Thailand (14%), or to both (7%). In hepatitis C, two were intravenous drug users, one had a history of blood transfusion two months before illness began, and one had had high risk behaviour. Among 50 patients of Hepatitis E, half had risk factors; 28% of recently eating shellfish and 18% of travel.[15]

Fever, malaise, generalised weakness and yellow discoloration of eyes were common symptoms of hepatitis in the present study group. Icterus was the commonest sign on examination. In a study by Zhang et al, the most common clinical symptoms were jaundice (85.7%), fatigue (70.5%) and anorexia (64.8%).[17]Transaminases were very high (above 1000mg/dl) in hepatitis A and E. 40 patients (40%) had an ALT of > 1000 mg/dl. Out of them, 27 (67.5%) had Hepatitis E, 12 (30%) had Hepatitis A and 1(2.5%) had Hepatitis B. In a study done by Nandi B et al, 114 (50.9%) cases had serum ALT in the range of 1000-2000 IU/L on admission. [16]Acute symptoms were more severe in feco-orally transmitted (A+E) as compared to parenterally transmitted (B+C) hepatitis .Also, the mean serum and conjugated bilirubin was more at presentation for faeco-orally transmitted hepatitis than parenteral hepatitis. Both findings were statistically significant. This means that on basis of the clinical features, even without serology, one may be able to predict the basic type of hepatitis. According to a study in Iran by Salehi M et al which compared hepatitis A with parenterally transmitted hepatitis, patients with hepatitis A were more likely to have certain acute symptoms than the other group.[18]

In present study, the mean number of days lost from work were 22.2 +5.6, mostly in acute Hepatitis E and A. In a study done by Clark KL et al, participants were sick and bedridden for a median of 22 and 10 days, respectively. The median healthy days lost per individual was 35 which is very high.[11]

CONCLUSION

Young, male, productive population was affected, many of whom gave a history of avoidable or controllable risk factors. Whether the AVH is faecooral (A+E) or parenterally transmitted (B+C) could be evaluated just by the clinical spectrum. A significant number of days were lost from work. This suggested that AVH has a severe socioeconomic burden on families and that by simple measures, it can be totally prevented.

REFERENCES

1. Acharya SK, Batra Y, Bhatkal B. Sero epidemiology of hepatitis A virus infection among school children in Delhi; implications for HAV vaccination. J Gastroenterol Hepatol 2003; 18:822-7.

2. Chadha MS, Walimbe AM, Chobe LP, Arankalle VA. Comparison of etiology of sporadic acute and fulminant viral hepatitis in hospitalised patients in Pune, India during 1978-81 and 1994-97. Indian J Gastroenterol 2003; 22: 11-5.

3. Mall ML, Rae RR, Phillip M. Seroepidemiology of hepatitis A in India. Ind J Gastroenterol 2001;20:130-2.

4. Chandra NS, Ojha D, Chatterjee S, Chattopadhyay C. Prevalence of hepatitis E virus infection in West Bengal, India: a hospital-based study.Journal of Medical Microbiology 2014; 63:975–980

5. Kaur M, Sidhu SK, Singh K, Devi P, Kaur M, Singh N. Hepatitis E virus: A leading cause of waterborne viral hepatitis in Northwest Districts of Punjab, India. J Lab Physicians. 2017;9(2):121-124.

6. Jain, P., Prakash, S., Gupta, S., Singh, K. P., Shrivastava, S., Singh,D. D., et al. Prevalence of hepatitis A virus,hepatitis B virus, hepatitis C virus, hepatitis D virus and hepatitis Evirus as causes of acute viral hepatitis in north India: a hospital basedstudy. Indian J Med Microbiol 2013;31: 261–265

7. Acharya SK, Madan K, Dattagupta S, Panda SK. Viral hepatitis in India. Natl Med J India. 2006 Jul-Aug;19(4):203-17

8. Viral hepatitis. [Online] Available from: http://www. mahttp://www.mahaarogya.gov.in/diseasesinfo/viralhep atitis/default, [Accessed 20 Oct 2013].

9. Krayiannis P. Enterically transmitted viral hepatitis. Sherlock's diseases of Liver and Biliary system. 12th ed. Wiley-Blackwel. 2011;17: 355-56.

10. Kotwal A, Singh H , VermaA.K., GuptaR.M. Jain S, Sinha S. A study of Hepatitis A and E virus seropositivity profile amongst young healthy adults inIndia. MJAFI 2014 ;70:225-229

11. Clark KL, Howell RM, Scott RM, Vaughn DW, Shrestha MP, Longer CF, Innis BL. The socioeconomic impact of hepatitis E in Nepal. Am J Trop Med Hyg. 1999 Sep;61(3):505-10.

12. Meena M., Jindal T., Hazarika A. Prevalence of Hepatitis B virus and Hepatitis C virus among blood donors at a tertiary care hospital in India: a five-year study. Transfusion. 2011;51(1):198–202

13. Sood A., Sarin S.K., Midha V. Prevalence of Hepatitis C virus in a selected geographical area of northern India: a population based survey. Indian J Gastroenterol. 2012;31(5):232–236.

14. Irshad M,SinghS,Ansari MA,Joshi Y. Viral Hepatitis in India: A Report from Delhi. Global Journal of Health Science2010; 2(2) :96-103

15. TN Chau, ST Lai, JY Lai, H Yuen.Acute viral hepatitis in Hong Kong: a study of recent incidences . HKMJ 1997;3:261-6.

16. B Nandi,P Hadimani, R Arunachalam, RK Ganjoo. Spectrum of Acute Viral Hepatitis in Southern India. MJAFI 2009; 65 : 7-9

17. Zhang S, Wang J, Yuan Q, Ge S, Zhang J, Xia N ,et al. Clinical characteristics and risk factors of sporadic Hepatitis E in central China. Virol J. 2011; 8: 152

18. Salehi M. Izadi N. Bazzaz N. et al. Acute Viral Hepatitis In South-Eastern Of Iran: A Serological Analysis Of 263 Cases Acta Medica Iranica .2008; 46: 417-42