

Epidemiological Investigation of the Jaundice Outbreak in Qurecian Mohalla, Sikar City (Rajasthan), India, 2011-12

Amita Kashyap*, **Monika Rathore****, **Priyanka Kapoor*****, **Priyanka Bharti******,
Chabbil Kumar*****

ABSTRACT :

Introduction : Jaundice secondary to hepatitis A, E and leptospirosis is a serious concern for public health authorities. The prevailing environmental conditions in India are conducive of its spread within no time in the community through feco-oral route. Prompt identification of the source and immediate control measures are needed for immediate benefit and investigation of pattern or epidemiological trends of outbreaks for long term benefits.

Methods : Data collected by house to house field survey, IDSP reports; laboratory and environmental investigation report were analysed for trends, attack rate and relative risk in exposed and unexposed population.

Observation And Conclusion : A total of 163 cases were reported during 2nd October 2011 to 15th January 2012, out of them 150 were from affected areas (ward No. 23, 24) and 13 cases were from area adjacent to affected area (ward 31). Maximum number of cases (127) were found in ward 24 (Attack rate was 39.53/1000. Seventeen out of 22 (77%) randomly selected blood samples for microbiological analysis were positive for the hepatitis E IgM antibody, 9.09% (2/22) for the hepatitis A IgM antibody. Male cases were significantly higher than

female cases. The commonest age group affected was 15-44 years. The probable reasons identified for current outbreaks were: breached waterline at several sites (done by residents of locality to get more water), interrupted water supply, overflowing drains, new sewer line in close proximity of waterline.

Majority of the patients were seeking treatment from private hospitals hence missed by Government System and could not be detected early; it is therefore recommended to take more private hospitals and laboratories in loop of IDSP reporting. Hepatitis E was the cause behind majority (72%) of cases but Hepatitis A was also detected in 10% of adult cases indicating, age shifting trend of Hepatitis A.

Key-words : Outbreak, Jaundice, Hepatitis E and A, Rajasthan, India.

INTRODUCTION :

Jaundice secondary to hepatitis A, E and leptospirosis is a serious concern for public health authorities in India. The prevailing environmental conditions are conducive of its spread within no time in the community through feco-oral route¹⁻⁵. Prompt identification of the source and immediate control measures are needed for immediate benefit and investigation of pattern or epidemiological trends of outbreaks for long term benefits.

*Professor, **Associate Professor, ***Resident, ****Resident, *****Resident
Department of Community Medicine, SMS Medical College, Jaipur

Corresponding Author :

Dr Monika Rathore, Professor,
Department of Community Medicine, SMS Medical College, Jaipur
Mob. : 829097157
Email : rathoremonika@rediffmail.com

Most of the jaundice outbreaks were caused by hepatitis E in previous years; hepatitis A usually does not cause outbreaks in adults and remains asymptomatic⁵. Pattern of incubation period and associated mortality are also slightly different in hepatitis A and E. Hepatitis A virus has relatively shorter incubation period (3-4 weeks versus 2-9 weeks) and lower mortality rate (0.1% versus 1%) than hepatitis E virus⁶. Recent exposures revealed a change in pattern of HAV from asymptomatic childhood infection to an increased incidence of disease in adults thus leading to a possibility of HAV outbreak in adult population too⁷⁻¹⁰. The recognition of early warning signals, timely investigation, and application of specific control measures can contain the outbreak and prevent death¹¹.

The current outbreak of jaundice occurred in Querecian Mohalla of Sikar city Rajasthan. District authorities came to know about it from local newspaper on 3rd Dec 2011. A team consisting of faculty of Community Medicine, Paediatric and Medicine of SMS Medical College Jaipur investigated this outbreak to identify the causative agent, the source of infection and to propose immediate and future actions.

Descriptive Epidemiology

A house to-house search for cases were started in Querecian Mohalla (ward no. 23, 24) and areas adjacent to it (Ward No. 31) by district rapid response team on 3rd Dec 2011, following news report. The IDSP case definition was used for survey – ‘a person of any age and sex, having fever, vomiting, abdominal pain, with yellow colour in eyes and urine’. Persons who developed these symptoms after September 2012 (at the beginning of August 2011 and onwards) were considered probable cases. The last case was detected on 15th January 2012 but the search was continued up to February 2012 to cover at least one incubation period after the last case detected. Information regarding the date of onset, age, sex, place of residence, was collected on structured format. Time place and person characteristics of cases

analysed using Microsoft excel 2007. The total population of affected area was 11882. The district IDSP report on acute viral hepatitis was referred to confirm the outbreak.

Laboratory Methods:

Seventy five blood samples were collected by District rapid response team and tested for Serum Bilirubin at private laboratory of the area. Blood samples of 22 randomly selected patients were tested for hepatitis A, B, C, and E antibodies at SMS Medical College laboratory. Four water samples were sent to PHED laboratory.

Environmental Investigation

Information regarding any public gathering and exposure to outside food during August to September 2011 was collected and available blueprint of the water supply pipelines and drains was examined by the state team in consultation with water works and municipal department.

Analytical Epidemiology

Similar information from areas (W.N. 31) adjoining to the affected areas were also collected for comparative analysis.

Observations

A total of 163 clinically positive cases were reported during 2nd October 2011 to 15th January 2012 from all three wards No. 23, 24 and 31. Out of them 150 cases were from affected area (ward 23, 24) and 13 cases were from area adjacent to affected area. Attack rate was higher among population of affected than non-affected areas ((20.4 vs 2.86/1000), relative risk being 7.1). ($\chi^2=60.693$ at df 1, $p < 0.01$). There was an initial cluster in the last week of October followed by a high peak from 6th Nov to 11 December 2011. The last case was reported on 15th January 2012 (Figure 1). 75 blood samples of probable cases from affected area were collected by district Rapid Response Team before state epidemiological team arrived. Majority (66 out of 75) of them showed raised serum bilirubin level. 22 samples were randomly

selected by state epidemiological team for microbiological analysis. 72.3% of these samples (17/22) turned to be positive for the hepatitis E IgM antibody, 9.09% (2/22) for the hepatitis A IgM antibody and 18% (3/22) were negative for both. Maximum cases (127) were detected from ward 24 (Quresian Mohalla) (attack rate 39.53/1000) (Table 1).

There was a significant difference in attack rate among male and female. More males (102) were affected than females (61), (Attack rate 16.3 vs 10.8/1000) (P<0.05). The disease affected all the age groups but 15-44 years of age group was affected most with an attack rate of 22.9/ 1000, (2=50.405 with 4 df, P=0.000) (Table 2). There was no death due to the disease and no pregnant women got affected. The past occurrence of viral hepatitis as per the IDSP data ranged from 0.0 to 1.8 per 1000 in the Sikar city during 2009.

The state team had observed that the main source of water supply in the area is municipal tap water for 1-2 hrs in the morning. Low pressure compelled locals to connect boosters in waterline illegally making it prone for leakage. Moreover, in the end of August 2011 water works changed supply from old to a new high pressure tank situated in opposite direction. Sewer line was laid down in the area last year. Waterlines were 50 years old and ill maintained. Blue prints of sewer line and water line showed close proximity of the two lines. There were overflowing drains in the area and complaints of foul smelling

water supply were received for last 3-4 months. Although residual chlorine was found in all water samples collected during outbreak investigation but it is probably because of immediate super chlorination by water works department after notification of the outbreak.

Other possible sources had been ruled out. The timing of getting contaminated water supply coincided with the probable time period during which the possible exposure took place.

IMMEDIATE CONTROL MEASURES

1. Case management-Teams of doctors, technician and health workers were relocated in the community to manage cases
2. Efforts were done to motivate people to use boiled water for drinking. Community was made aware through pamphlets and personal communication regarding food, water and hand hygiene. State team recommended use of chlorine tablets and alternative water supply through tankers till leakage is repaired.
3. Super chlorination of PHED water supply.
4. Regular daily rapid survey to identify new cases till two incubation period from the last case.

FOLLOW UP MEASURES:

5. Repairing of leakages of water supply.
6. Ensuring regular Chlorination of PHED water reservoirs.

Table-1: Sex wise and Area wise Attack Rate

WARD	Male cases/ total Male	AR/ 1000 Male	Female cases/total Female	AR/ 1000 female	Total Pop	Total No. of cases (%)	AR/1000
Affected Group W.N. 23	16 / 2188	7.3	7 / 2010	3.4	4130	23 (14.0)	5.6
Affected Group W.N. 24	76 / 1702	44.7	51 / 1546	33.0	3212	127 (77.4)	39.53
Non- affected Group W.N.31	10 / 2356	4.2	3 / 2080	1.4	4540	13 (08.5)	2.86
Total	102 / 6246	16.3	61 / 5636	10.8	11880	163 (100)	13.7

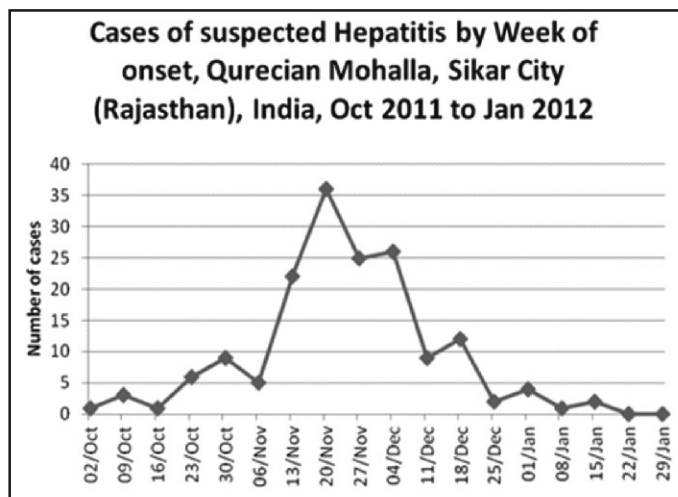
Z = 2.786, P<0.005) for sex, X²= 6.240 with 1 df p=0.01

Note : No case was reported from any other ward during this period

Table 2 : Age wise Attack Rate

Age groups	No. of cases (%)	Attack Rate/ 1000 Pop.
0-4 Yr. (n=356)	2 (1.22%)	5.6
5-9 Yr. (n=1426)	13 (8.54%)	9.1
10-14 Yr. (n=3326)	29 (17.68%)	8.7
15-44 Yr. (n=4755)	109 (66.46%)	22.9
44 above (2019)	10 (6.10%)	3.5
Total (11882)	163(100%)	13.8

Figure 1 : Time distribution of cases: point source outbreak



DISCUSSION CONCLUSIONS & RECOMMENDATIONS :

The load of cases was more than ten times of the usual occurrence. Adult population (15-45 years) was mostly affected similar to previous reported Jaundice outbreaks¹²⁻¹⁵. The attack rate and Relative risk of present outbreak (20.3 /1000 vs 10.9/1000 and 7.1 vs 2-3) are higher than Gujrat outbreak¹².

Overflowing drains, interrupted water supply, new sewer line in close proximity of waterline and habit of locals to take illegal water connections with use of booster might have resulted in intermixing of drinking water with sewer water somewhere in August, 2011

Outbreak was reported by news paper before system could notice it! Initial non specific symptoms

might have been overlooked by the system and patients might have consulted private doctors. None of the private hospitals catering to the community were in loop of IDS, hence missed the unusual occurrence of jaundice cases in time.

More emphasis should be given to IDSP, data needs to be collected timely, regularly, completely and analysed for timely action to avoid such outbreaks. Since majority of the patients were seeking treatment from private hospitals, it’s important to take more private hospitals and laboratories in loop of IDSP reporting. The presence of Hepatitis A in 10% of adult cases (though Hepatitis E was still the cause behind 72% of cases) indicates changing trend.

Acknowledgement : we acknowledge the support of district IDSP team, PHED Department and Microbiology department of S.M.S. Medical College, Jaipur.

REFERENCES :

1. Krugman S, Ward R, Giles JP. The natural history of infectious hepatitis. *Am J Med* 1962; 32 : 717-28.
2. Bean NH, Goulding JS, Lao C, Anulo FJ. Surveillance for food borne disease outbreaks-United States.1988-1992. *MMWR CDC Sueveill Summ* 1996; 45 : 1-66.)
3. Acharya SK, Madan K, Dattagupta S, Panda SK. Viral hepatitis in India. *Natl Med J India* 2006;19:203-17.
4. Somani SK, Aggarwal R, Naik SR, Srivastava S, Naik S. A serological study of intrafamilial spread from patients with sporadic hepatitis E virus infection. *J Viral Hepat* 2003;10:446-9.
5. <http://virology-online.com/viruses/Hepatitis E.htm>
6. L.P. Chobe & V.A. Arankalle: Investigation of a hepatitis A outbreak from Shimla, Himachal Pradesh. *Indian J Med Res* 130, August 2009, pp 179-184).
7. Gust ID. Epidemiological patterns of hepatitis A in different parts of the world. *Vaccine* 1992; 10: S56-62.
8. (Zahid Hussain, Syed A Husain, Fahad N Almajhdi and Premashis Kar: Immunological and molecular epidemiological characteristics of acute and fulminant viral hepatitis A. *Virology Journal* 2011, 8:254)
9. (WHO: The Global Prevalence of Hepatitis A Virus Infection and Susceptibility: A Systematic Review, Immunization, Vaccines and Biologicals

Epidemiological Investigation of the Jaundice Outbreak in Qurecian Mohalla, Sikar City (Rajasthan), India, 2011-12

- http://whqlibdoc.who.int/hq/2010/WHO_IVB_10.01_eng.pdf)
10. Dr Vidya A Arankalle, Hepatitis A Epidemiology: INDIA. <http://webcache.googleusercontent.com/search?q=cache:http://www.havmeeting.info/pdf/HAVMIAS5B4VidyaArankalle.pdf>
 11. WHO, Hepatitis E, WHO/CSR Web site. 2001. Available from: <http://www.who.int/emc>.
 12. Chauhan NT, Prajapati P, Trivedi AV, Bhagyalaxmi A. Epidemic investigation of the jaundice outbreak in Girdharnagar, Ahmedabad, Gujarat, India, 2008. Indian J Community Med [serial online] 2010 [cited 2011 Dec 8];35:294-7.
 13. Gurav YK, Kakade SV, Kakade RV, Kadam YR, Durgawale PM. A study of hepatitis E outbreak in rural area of Western Maharashtra. Indian J Community Med 2007;32:182-4.
 14. Bhagyalaxmi A, Gadhvi M, Bhavsar BS. Epidemiological investigation of an outbreak of infectious hepatitis in Dakor town. Indian J Community Med 2007;32:277-9
 15. Das P, Adhikary KK, Gupta PK. An Outbreak investigation of Viral Hepatitis E in South Dumdum Municipality of Kolkata. Indian J Community Med 2007;32:84-5.