Research Article

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An epidemic investigation of hepatitis E in Juna Sachivalay area of Gandhinagar city, Gujarat, India

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ABSTRACT

Background: Hepatitis E occurs around the world both as outbreaks and as sporadic cases. The objectives of the study were, to perform a detailed epidemiological investigation of an outbreak to determine the incidence of the disease, cause and source of the outbreak and to propose appropriate control and preventive measures.

Methods: An outbreak of jaundice had been reported from Juna Sachivalay area of Gandhinagar city to Gandhinagar Municipal Corporation during mid January 2016. Epidemic investigation was started by Rapid Response Team of GMERS Medical College, Gandhinagar in all blocks of Juna Sachivalay during 03/02/2016 to 03/03/2016. Total 4395 employees were surveyed and line listing of cases had been made. Water sample had been also collected from suspected 9 places to examine contamination and chlorination. Plasma samples from randomly selected 16 patients were screened for anti-HEV and HEA IgM antibodies using ELISA to confirm the diagnosis.

Results: Total 4395 employees were surveyed. Out of 4395 employees, 124 have a recent history of jaundice. Attack rate of Hepatitis E in our study was 2.82%. Out of these cases, 92 cases were contacted either by personal interview or telephonic interview. 16 patients were screened for anti-HEV and HEA IgM antibodies using ELISA to confirm the diagnosis and found positive for Hepatitis E. So, epidemic of Hepatitis E was confirmed. Age range of the patients was 20 years - 65 years. Out of 92 cases, majority (77, 83.7%) were male. Majority of the cases, (62 cases, 67.39%) were reported between 21-50 years age group. (Table 1) Water samples were collected from suspected 9 places to examine chlorination and contamination.

Conclusions: Water sources of 1st and 2nd floor Block-11, Block-12, 1st floor Block-1, in front Gujarat board office and Meenabazar, area nearby Sachivalay was found polluted and contaminated with fecal matter, human excreta or sewage was the reason of an epidemic of Hepatitis E.

Keywords: Outbreak, Epidemic, Hepatitis E, Jaundice, Polluted water

INTRODUCTION

Hepatitis E virus (HEV), a non enveloped, positive sense, single-stranded RNA virus, is recognized as the principal cause of enterically transmitted non-A, non- B hepatitis, which occurs worldwide although rarely in industrialized countries. HEV is transmitted via the fecal-oral route and rarely through person-to-person transmission. HEV is recognized as a common source of waterborne outbreaks, involving fecally contaminated water. Hepatitis E occurs around the world both as outbreaks and as sporadic cases.3 Outbreaks of this disease frequently occur in countries with limited access to essential water, sanitation, hygiene and health services, and may affect several hundred to several thousand persons. 4,5 An estimated 20 million infections and 3.3 million

symptomatic cases of hepatitis E occur annually worldwide with an estimated 56600 deaths.⁶

Cases and outbreaks of this disease often go undiagnosed or are mistaken for other forms of viral hepatitis because of the similarity of this disease with other forms of acute viral hepatitis, and limited availability and use of specific diagnostic tests for it. The lack of correct information, inadequate communication of key messages, and limited engagement and preparedness at the community level may lead to much concern in affected and at-risk populations. These may also result in costly emergency care and related services. Health promotion and prevention activities, and ensuring early, appropriate and equitable health-care services in response to hepatitis E outbreaks would improve public health outcomes, especially in resource-limited settings.

In Gandhinagar (Gujarat, India) suddenly 11 cases of jaundice were reported to Municipal Corporation on 12 January 2016 from Juna Sachivalay.

The objectives of our study were to:

- Perform a detailed epidemiological investigation to determine the incidence of the disease in the population,
- To confirm the cause of the outbreak,
- To identify the source of the infection and
- To propose appropriate control and preventive measures.

METHODS

In Gandhinagar 11 cases of jaundice were reported to Municipal Corporation on 12 January 2016 from Juna Sachivalay area of Gandhinagar city. Juna Sachivalay has 20 blocks of various Government offices. Immediately Gandhinagar Municipal Corporation had started their action to control the epidemic situation. A request letter from the office of Medical officer of Health, Gandhinagar Municipal corporation was received in Dean office of GMERS Medical College, Gandhinagar to form Rapid response Team (RRT) on Date 30/01/2016. Rapid response team by members from Department of Community Medicine, Medicine and Microbiology was formed on 1/02/2016. Investigation planning by RRT was done immediately on 1/02/2016 and investigation was started on 3/02/2016.

After primary investigation a detailed survey was carried out by a survey team of Asst. professor, Tutors and medical social workers of Community Medicine Department of GMERS Medical College and Hospital, Gandhinagar in all blocks of Juna Sachivalay during 03/02/2016 to 03/03/2016. Information on the total numbers of employees in all blocks, positive cases, affected members in the household, age, sex and drinking water source was obtained using a semi-structured questionnaire. Details of any jaundice in the household in

the last 6 months (June– December) were also collected. Duration of illness and complications, if present, were recorded. Total 4395 employees were surveyed. Water sample has been also collected from suspected 9 places to examine contamination and chlorination. Plasma samples from 16 patients were screened for anti-HEV and HEA IgM antibodies using ELISA to confirm the diagnosis.

RESULTS

Total 4395 employees were surveyed. Out of 4395 employees, 124 have a recent history of jaundice. Out of these cases, 92 cases were contacted either by personal interview or telephonic interview, so detailed analysis was available of 92 cases. 16 patients were screened for anti-HEV and HEA IgM antibodies using ELISA to confirm the diagnosis. All 16 cases were found positive for Hepatitis E. So, epidemic of Hepatitis E was confirmed.

Age range of the patients was 20 years - 65 years. Out of 92 cases, majority (77, 83.7%) were male. Majority of the cases, (62 cases, 67.39%) were reported between 21-50 years age group (Table 1).

Table 1: Attack rate and diagnosis of the outbreak.

Total employee surveyed	4395
Total positive cases for Hepatitis	124
Attack rate/ 1000 populations	28.21
Diagnosis	Hepatitis E

Known first case of jaundice was occurred on 26 November 2015 and last case was reported on 15 February 2016. Name and address of the first case (Index case) was obtained and detailed history was taken. He informed that he attended marriage function at Dholka, a Taluka place of Ahmedabad district of Gujarat and 50 Km away from Gandhinagar 2 weeks before the onset of the symptoms. Incubation period of Hepatitis E is 2 to 9 weeks. So, the infection might have been introduced to old Sachivalay area by him. Maximum cases (39, 42.39%) occurred between 4 January to 18 January 2016 and during this period Gandhinagar Municipal Corporation came to know about the outbreak of Hepatitis E (Figure 1).

Out of 124 total cases, 73 cases (59%) were reported from Block No. 11 and 12. Maximum cases were reported from Block No. 11 followed by Block. No. 12 in Block 11 out of total 257 employees, 52 cases (20.23%) found positive. In Block 12 out of total 165 employees, 21 cases (12.72%) found positive for Hepatitis E (Figure 2).

Out of 92 cases, 39 cases (42.4%) had habit of taking snacks outside and out of them preferable place for taking snacks was Meenabazar, area nearby Sachivalay. Tea and Bajia was found frequently preferred food in Meenabazar

by them. Owners of these food and tea stall use water from water sources of Block 11 of old sachivalay.

Out of 92 cases, 66 (71.77%) had water cooler of office as a drinking water source. Water samples were collected from suspected 9 places to examine chlorination and contamination. Out of 9 places, water source from 4

places (1st and 2nd floor Block-11, Block-12, 1st floor Block-1) was found grossly polluted and growth of coli form bacteria was found. The presence of any coliform bacteria in chlorinated water indicates either a failure of chlorination process or contamination after chlorination. In other words these water sources found contaminated with fecal matter (human excreta/ sewage).

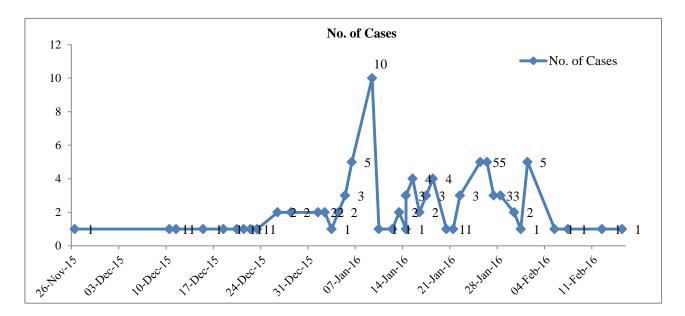


Figure 1: Epidemic curve distribution of 92 cases according to date of onset of symptoms.

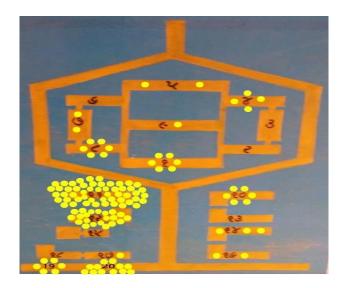


Figure 2: Spot map distribution of cases according to their work place. Yellow dot indicates the case in above map of Juna Sachivalay.

DISCUSSION

In our study out of total 4395 employees, 124 had history of Hepatitis E attack rate of Hepatitis E in our study was 2.82%. others studies like Kane et al, Naik et al, Khuroo

et al and Tsega et al reported attack rate from 1 to 15%. These outbreaks reported so far in India have been from the north region of India. The largest epidemic reported was in Kanpur in 1991, which affected an estimated 79 000 individuals. Many epidemiological features of this outbreak resemble previous hepatitis E epidemics. In our study age range of the patients was 20 years- 65 years. Out of 92 cases, majority (77, 83.7%) were male. Majority of the cases, (62 cases, 67.39%) were reported between 21-50 years age group. Our findings are comparable with the studies done by Naik et al and Tsega et al reported that men had higher attack rates than women, attack young adults showed high attack rates. It is still not known why men are at greater risk and children spared.

There were no cases of Hepatitis E reported in pregnant women in our survey. This is contrary to the studies done by Kumar et al and Patra et al. High incidence of Hepatitis E cases had been reported in their studies. A study by Rasheeda et al. on sporadic disease conducted in Chennai, south India showed a very low incidence in pregnant women. It has been proposed that a subgenotypic shift in the northern Indian strains may contribute to virulence, while the strains in the south might be stable and less virulent. In present study water sources of 1st and 2nd floor Block-11, Block-12, 1st floor

Block-1, in front Gujarat board office and Meenabazar, area nearby Sachivalay was found polluted and contaminated with fecal matter, human excreta or sewage was the reason of an epidemic of Hepatitis E. Similar findings were also obtained in the studies done by Kane et al and Khuroo et al.^{7,9} In a resource-limited setting, particularly when urban areas grow rapidly, provision for sewage and protected water supply is often neglected, with serious consequences for public health.¹⁴

CONCLUSION

Water sources of 1st and 2nd floor Block-11, Block-12, 1st floor Block-1, in front Gujarat board office and Meenabazar, area nearby Sachivalay was found polluted and contaminated with fecal matter, human excreta or sewage was the reason of an epidemic of Hepatitis E.

Recommendatios

- Immediately repair of any leakage in water and drainage system of old sachivalay.
- Water drainage system is too old and if requires complete replacement of the system after taking opinion of PWD engineers.
- RO system alone does not provide protection from viruses, so RO system with hollow fiber membrane technology should be used as it prevents the transmission of Hepatitis E virus.
- However chlorination in routine dose does not kill viruses, however chlorination protects from other bacterial conditions. Super chlorination kill the viruses but alter the taste so, people avoid drinking.
- Quality of the drinking water for fecal contamination should be periodically checked.
- If fecal contamination remain continue, there are chances of new cases as well as other water borne epidemic.

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