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# Post-Earth Quake Assessment of HEV Prevalence among General Population

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**Abstract**

Hepatitis E virus (HEV) infection is a global disease causing acute hepatitis, transmitted by fecal contaminated water. In South East Asian countries like, Nepal Hepatitis E virus is a most common causative agent of sporadic viral hepatitis and outbreaks. The risk of viral hepatitis has escalated after April earth quake in Nepal. The study was done with the objective to find the prevalence of HEV specific IgM among the general population. Blood samples from 570 healthy populations were tested for HEV IgM by using the Wantai HEV-IgM ELISA, and 1.40% of the study population is found to be harboring the HEV IgM. The study fostered the low level exposure to virus with human reservoirs.

**Keywords:** Hepatitis E Virus; Anti-IgM prevalence; General population; Nepal

## Introduction

Hepatitis E virus (HEV) infection is a global disease with 20 million estimated infections and 70,000 deaths per year [1]. Hepatitis E virus causes acute hepatitis, transmitted by fecal contaminated water through fecal oral route [2]. It is usually self-limiting type of acute hepatitis; most of the cases are asymptomatic followed by spontaneous clearance of virus. The ratio of symptomatic to asymptomatic cases ranges from 1:2 to 1:13 in the developing world [3,4].

In South East Asian and African countries, sporadic HEV infection is most common form of viral hepatitis and major epidemics also occur in the period of 7 to 10 years; in Nepal mostly HEV outbreaks are observed as exacerbations of endemic infections [5-8]. Recently the outbreak was observed in 2014 in Eastern part of Nepal, Biratnagar, causing 1481 infections and 11 deaths [9]. From different studies, the prevalence of HEV specific IgG is found to be 16-38% among general population in Nepal [6,10].

Lack of proper sanitation, contamination in drinking water supplies poses high risk of HEV infection in dry season in developing countries [11,12]. Interestingly, the case fatality rate is very high projecting 16-38% among pregnant women as a result of, unexplainably high rate of fulminant hepatic failure, in comparison to general population curtailing to 1-3% [7]. The increasing reports of HEV being transmitted through blood transfusion also highlights the potential risk, this virus poses to blood supply safety [13,14]. However, screening for acute HEV infection serologically or HEV RNA is not routinely performed in Nepalese hospitals for any clinical procedures-blood transfusion or surgery.

During HEV infection, the first antibody to appear is immunoglobulin M (IgM) at week 4, followed by IgG. The usual length of IgM positivity is between 2 and 3 months while IgG may last for years. The finding of positive, HEV specific IgG is not useful for differential diagnosis of hepatitis. So, the detection of HEV specific IgM is preferred in the area of high prevalence [7]. However, there is scarce of data on the prevalence of anti HEV specific IgM among asymptomatic general population in Nepal.

The study was done with the objective to find the prevalence of HEV specific IgM among the general population without any symptoms of hepatitis and morbid conditions.

## Materials and Methods

A cross-sectional study was conducted between October 2015 and February 2016 to estimate the prevalence of anti HEV IgM among asymptomatic population. Blood samples were collected from total 570 people visiting National Public Health laboratory during six months. The verbal consent was taken from patients, and ethical clearance was obtained from institutional research committee. People going to have clinical procedures and blood donors who need to be tested for HIV, HBV and HCV were asked about the symptoms of hepatitis (vomiting, anorexia and jaundice) for last three months. Participants without any such complaints were enrolled in the study.

All samples were tested for HEV IgM by using the Wantai HEV-IgM ELISA (Beijing Wantai Biologic Pharmacy Enterprise Co., Ltd, Beijing, China) while Anti HIV antibody, HBsAg and Anti HCV antibody by using SD Bioline following the standard protocol. The positive results of anti HEV IgM were retested once and considered positive when signal to cut off value is greater than 1.1 (S/Co >1.1).

## Results

The study population comprised of 570 participants with 413 (72.4%) males and 158 (27.7%) females with age ranging from 5 to 70 years. The anti HEV IgM was observed among 1.40% of the study population. The higher occurrence of IgM was seen among male population with age groups 30-45 years (Table 1).

All the population in the study had reacted negative with HIV, HBV and HCV.

| Variables | Total population | HEV seropositive | HEV seronegative |
|---|---|---|---|
| Overall Seropositivity | 570 | 8 | 562 |
| Gender | | | |
| Male | 413 | 7 | 406 |
| Female | 158 | 1 | 157 |
| Age (Years) | | | |
| 1-15 | 29 | 0 | |
| 15-30 | 227 | 2 | 225 |
| 30-45 | 180 | 3 | 177 |
| 45-60 | 90 | 2 | 88 |
| >60 | 44 | 1 | 43 |

**Table 1:** Age and gender wise distribution of HEV seropositivity.

## Discussion

This study was conducted to identify the prevalence of anti HEV IgM to know subclinical infection among asymptomatic general population. The prevalence of anti HEV IgM was found to be 1.4% in our study. Our estimate of anti HEV IgM is similar to the studies performed at China, Iran [15-17]. The prevalence of anti HEV IgM can vary between the geographic regions, time of study and sensitivity of test methods as well [7,18]. Overall, the prevalence of HEV infection is higher in South East Asia worldwide [17]. Nepal is hyper endemic region and after the disastrous earth quake in April 2015 the risk of HEV outbreak along with other water borne diseases were anticipated. The outbreaks frequently follow natural calamities, which induce the favorable situation of mixing of human excreta with sources of drinking water. However, such outbreaks were not observed with the awareness campaign of safe drinking water. The study fostered the low level exposure to virus with human reservoirs.

There were few studies on seroprevalence of anti HEV IgG from Nepal too, however, presence of these antibodies would not imply presence of or increased risk of disease at this moment, so anti HEV IgM was taken into account in this study. Prevalence of anti HEV IgM can be indicator of public health and hygiene.

In similar study, the prevalence of anti IgM among asymptomatic healthy male donors was found to be 4.8% in India [19], considerably high compared to our study. The lower prevalence of anti HEV IgM has been reported by Guo et al. [20] and Scotto et al. from China and Italy [21]. The subclinical infections in addition to symptomatic infections are driven by the water contamination with sewage, standard of hygiene in developing countries like Nepal where genotype 1 is common [6,7]. Thus poor countries are more likely to have higher burden of HEV infection. The low prevalence of anti HEV IgM in this study, however, can be attributed to cold seasons too.

In concordance to other studies higher prevalence of HEV infection was observed in adult population in this study as well. Although, lower attack rates among children were explained because of higher proportion of asymptomatic infections in other studies, such asymptomatic infection among children was not found in this study. This created further room to study with larger sample size. Males outnumbered females with IgM positive in this study which may be due to their greater risk of exposure to HEV.

The presence of anti HEV IgM indicates the recent infection and overlaps closely with viremia. The serological evidence of recent HEV infection in this study signifies the risk of transmission of the disease through blood transfusion too [7].

The necessity of screening of HEV among blood donors need to be further studied with reference to infectious dose and effect of protective immunity. Also, the results cannot be directly generalized to special population groups such as immunocompromised host, HIV infected persons, patients with hemodialysis and/or persons with chronic viral hepatitis.

## Conclusion

There is low level of subclinical infection prevailing among general population.

## Conflict of interest Disclosure

The authors declare they have no competing interests.

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