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Original Article

A study of Hepatitis A and E virus seropositivity profile amongst young healthy adults in India

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ABSTRACT

Background: Various Serosurveys and studies provide ample evidence of differing perspectives regarding epidemiology of HAV and HEV in India. This study was conducted to assess the seroprevalence of HAV and HEV and its associated factors with an aim to provide inputs to planners regarding requirement of HAV vaccine.

Methods: A multi-centric cross sectional survey amongst 4175 healthy trainees (young adults) was carried out in training centres, selected by multistage random sampling, giving equal representation to all regions of India. Sample size was calculated by taking prevalence of HAV seropositivity amongst adults as 60% and alpha 0.05.

Results: Seroprevalence for HAV and HEV was 92.68% (95% CI 91.82, 93.47) and 17.05% (15.90, 18.26), respectively. Logistic regression showed that hand washing without soap, regular close contact with domestic animals, consumption of unpasteurized milk and regular consumption of food outside home were risk factors for HAV ($p < 0.05$). For HEV, irregular hand washing, consumption of unpasteurized milk and irregular consumption of freshly prepared food were risk factors ($p < 0.05$).

Conclusion: High level of immunity against HAV among the healthy young adults clearly demonstrates that vaccination against HAV is not required at present in our country. The

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large proportion being susceptible to HEV points towards the requirement of preventive strategies in the form of safe drinking water supply, hygiene, sanitation, increasing awareness and behaviour change with respect to personal hygiene especially hand and food hygiene.

Introduction

Faeco-oral route is one of the leading routes of transmission of infectious diseases and contributes to 4.62 million episodes of diarrhoeal illness worldwide with 1.27 million in SEAR alone.[1] 1562 DALYs per 100,000 are lost in India due to these infections. Amongst the faeco-orally transmitted pathogens, Hepatitis A and Hepatitis E viruses are responsible for acute viral hepatitis and more than 300 million people worldwide suffer from viral hepatitis annually. Nearly 300 deaths per year are attributed to fulminating acute disease and about 15,000 people succumb each year to chronic liver disease. The disease has an enormous impact on health and national economy of many countries including India.[2] Worldwide, Hepatitis A virus (HAV) infection accounts for 1.4 million cases annually with number of cases of HAV in Asian countries ranging from 10 to 30 per 100,000 per year.[3] Exact incidence of Hepatitis E virus (HEV) is unknown with outbreaks of HEV common in parts of world with hot climates and rare in temperate climates.[4]

HAV infection largely depends on sanitary and hygiene conditions of populations. HAV infection in children is generally self-limiting but it causes significant morbidity in adults. Seroprevalence of HAV differs significantly in different socioeconomic groups at 85.3% and 64.5% in upper and lower socioeconomic groups, respectively in an Indian study[5] and 68.8% and 79.7% in Bangladesh.[6] A study conducted in Delhi has shown seroprevalence of HAV as 57% in individuals less than 35 yrs and 92% in more than 35 yrs with no socioeconomic disparity.[7] Lowest seropositivity rates have been reported in Kerala (10.3%) amongst children below 5 yrs of age.[8] The available data show heterogeneity among population regarding endemicity of HAV. Epidemics of HAV, mainly affecting young adults have occurred in different parts of the country, e.g. in Delhi,[9] Kerala,[10,11] Shimla.[12]

HEV is also self limiting and clinically indistinguishable from other hepatitis infections. Disease affects mainly young adults between 15 and 45 yrs with increased mortality among pregnant women.[13] Ratio of clinical to subclinical infection has not yet been determined. Seroprevalence of HEV has been reported to be lower as compared to HAV. Hospital based study among jaundiced patients in a tertiary care hospital in Manipur reported 18% cases due to HEV,[14] while a similar study in Pakistan reported the proportion as 5.3%.[15] Various epidemics have occurred due to HEV e.g. in Kashmir valley,[16] Kanpur[17] and Satara district of Maharashtra.[18]

Armed forces have been no exception to viral hepatitis as it accounted for 4.11% and 3.78% of total hospital admissions during 2005 and 2006 respectively. Average duration of hospital stay was 34.04 and 40.25 days respectively in 2005 and 2006. HAV contributed 0.24 per 1000 hospital admissions while other unspecified viral hepatitis including HEV to 3.37 per 1000 hospital admissions in the year 2006.[19] In an Armed Forces study, conducted in a tertiary care hospital with study individuals mainly being army trainees, HAV and HEV have been found to be responsible for 33% and 45.4% cases respectively amongst hepatitis patients.[20]

Outbreaks as well as sporadic cases of HAV and HEV not only lead to loss of man days but also have a direct effect on fighting efficiency of the troops. Outbreaks of HEV have been reported sporadically from various parts of the country.[21,22] Vaccine against HAV is available worldwide to immunize susceptibles and a vaccine against HEV has shown promising results in phase II and III trials.[23]

Indian Armed forces comprise of men from all regions and socioeconomic status and data on seroprevalence of HAV from the whole country suggests heterogeneity regarding age, socioeconomic status and region while no data are available on HEV in our country so far. Since, no exhaustive study has been carried out either in the armed forces or in the country, this study was conducted to assess the current seroprevalence of Hepatitis A and E infection among young healthy adults joining the Armed Forces, with a view to guide the policy decision on vaccination.

Material and methods

A multi-centric cross sectional survey was conducted in years 2010 and 2011 amongst healthy young adults of eleven (11) training centres, selected by multistage random sampling, giving equal representation to all regions of India.

The purpose and methodology of the study was explained to all study participants and informed consent was obtained. Pretested questionnaire was used to collect data on demographic profile and various risk factors associated with Hepatitis A and E infection. . The participants were asked to answer regarding their practices before joining the training centre. The filled questionnaire and the blood sample of each study participant was coded to relate the results of ELISA later for data entry and analysis.

Briefly, 5 ml of blood was collected under aseptic precautions in red top vacutainer from the cubital vein. The serum was separated and stored in sterile cryovials which was transported to the testing lab in storage boxes, each with capacity of 64 vials. Cold chain was maintained. ELISA for detection of anti-HAV IgG and anti-HEV IgG antibodies was carried out on each of the samples following protocols as per