

THE SEROLOGICAL MARKERS OF HEPATITIS A AND B IN HEALTHY POPULATION IN NORTHERN PAKISTAN

Pages with reference to book, From 69 To 72

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Abstract

A total of 630 apparently healthy volunteers were studied for seromarkers of hepatitis A and B by Enzyme Linked Immunosorbent Assay (ELISA) and Radioimmunoassay (RIA) techniques. A carrier rate of 5.3% for hepatitis B surface antigen (HBsAg) was found in young medical students while 10.7% recruits were positive for HBsAg. The pregnant females had HBsAg carrier rate of 7.8%. About 96.6% of young medical students and 100% of recruits revealed evidence of past exposure to hepatitis A. The serological evidence of past exposure to hepatitis B was found in 12.2% of medical students and 33.2% of recruits and pregnant females. Generally, substandard hygienic conditions and poor sanitation contributed to the transmission of hepatitis A virus (HAV) in young population. The use of unsterilized syringes in mass inoculation and vaccination and lack of HBsAg testing of the donor's blood in most blood banks were largely responsible for the spread of hepatitis B virus (HBV) (JPMA 38: 69 , 1988).

INTRODUCTION

Viral hepatitis A and B are endemic in most of the developing countries¹. Pakistan, as a developing country also shares many of those problems which beset the countries of the third world. Most of the population in Pakistan is exposed to viral agents of hepatitis A and B at young age². The individuals who are infected with hepatitis A virus (HAY) and hepatitis B virus (HBV) develop overt symptoms of jaundice in only a small proportion of cases and the majority have subclinical infection and remain anicteric^{3,4}. In a given population the individuals who have been infected with HBV may form a reservoir of carriers of HBsAg with the possibility of spread of the disease to other persons¹. It is thus imperative to find out the overall pattern of the serological profile of viral hepatitis A and B in an apparently healthy population of a country. There have been several serological studies of viral hepatitis carried out in Pakistan involving different techniques like immunodiffusion, countercurrent immunoelectrophoresis (CIEP) and passive reverse haemagglutination⁵⁻⁷. The present study was planned to assess the serological profile of hepatitis A and B infection in the healthy population of Northern Pakistan nearly a decade after the previous published series from Pakistan by utilizing the RIA and the newly developed technique of ELISA.

MATERIALS AND METHODS

This study was conducted in the Pakistan US Laboratory for Seroepidemiology (PULSE), Army Medical College, Rawalpindi between 1984 to 1986. A total of 630 sera of healthy volunteers were studied for seromarkers of hepatitis A and B. Sixty of the volunteers were medical students; 365 were newly enlisted recruits mostly from rural and urban areas of Northern Pakistan and 205 sera were tested from pregnant females from the twin cities of Rawalpindi and Islamabad attending an antenatal clinic. In each volunteer, previous history of hepatitis and overt jaundice was ruled out and 5 ml of blood was drawn into vacutainers and serum separated by spinning in a centrifuge. These sera were tested for

seromarkers of hepatitis A and B for the past and recent infection with HAV and HBV by employing ELISA technique. The ELISA kits for hepatitis serology developed by Abbott Laboratories, North Chicago, Illinois, USA, were used; namely CORZYME (anti-HBc), AUSZYME (HBsAg), AUSAB (anti-HB5) and HAVAB (anti-HAV). The final results were read on QUANTUM II. The results of serological markers for hepatitis A and B carried out in the PULSE, Army Medical College Rawalpindi were reconfirmed by repeat testing in Virus Disease Department of the Walter Reed Army Institute of Research (WRAIR), Washington D.C. by Radio immunoassay (RIA) technique using Abbott Laboratories kits i.e. CORAB (anti-HBc) and AUSRIA (HBsAg).

RESULTS AND OBSERVATIONS

Medical Students:

Most of the medical students belonged to middle and upper middle strata of society (85%). Their ages ranged between 18 to 20 years. 97% of the medical students were males. About 96.6% were immune to hepatitis A (anti—HAV positive) while 4% had not been exposed to HAV infection. Recent hepatitis A infection (IgM anti—HAV) was not identified on serology in any student. The serological markers of HBV infection in the past were positive in 12.2% of medical students, out of which 5.3% were carriers of HBsAg (Figure 1).

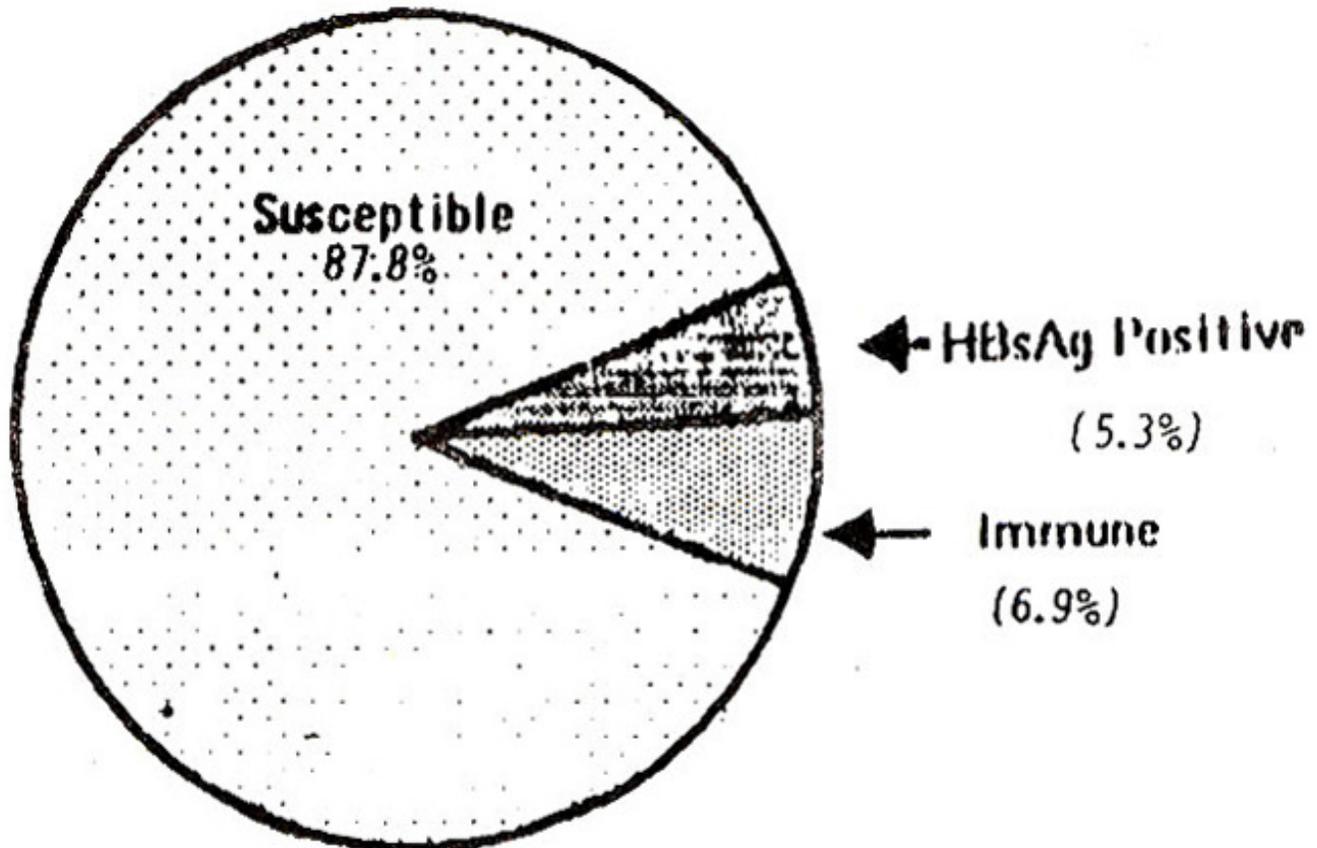


Figure 1. The Serological Markers of Hepatitis B in Medical students.

Recruits:

All the recruits were males drawn from low middle class and poor socioeconomic groups. Their ages

were between 16 to 18 years. All the recruits (100%) revealed evidence of past exposure to HAV infection (anti—HAV); 10.7% were HBsAg positive, 33.2% had anti-HEc (past exposure) in their sera while 22.5% were immune (anti-HBc and anti-HBs positive) to HAV infection (Figure 2).

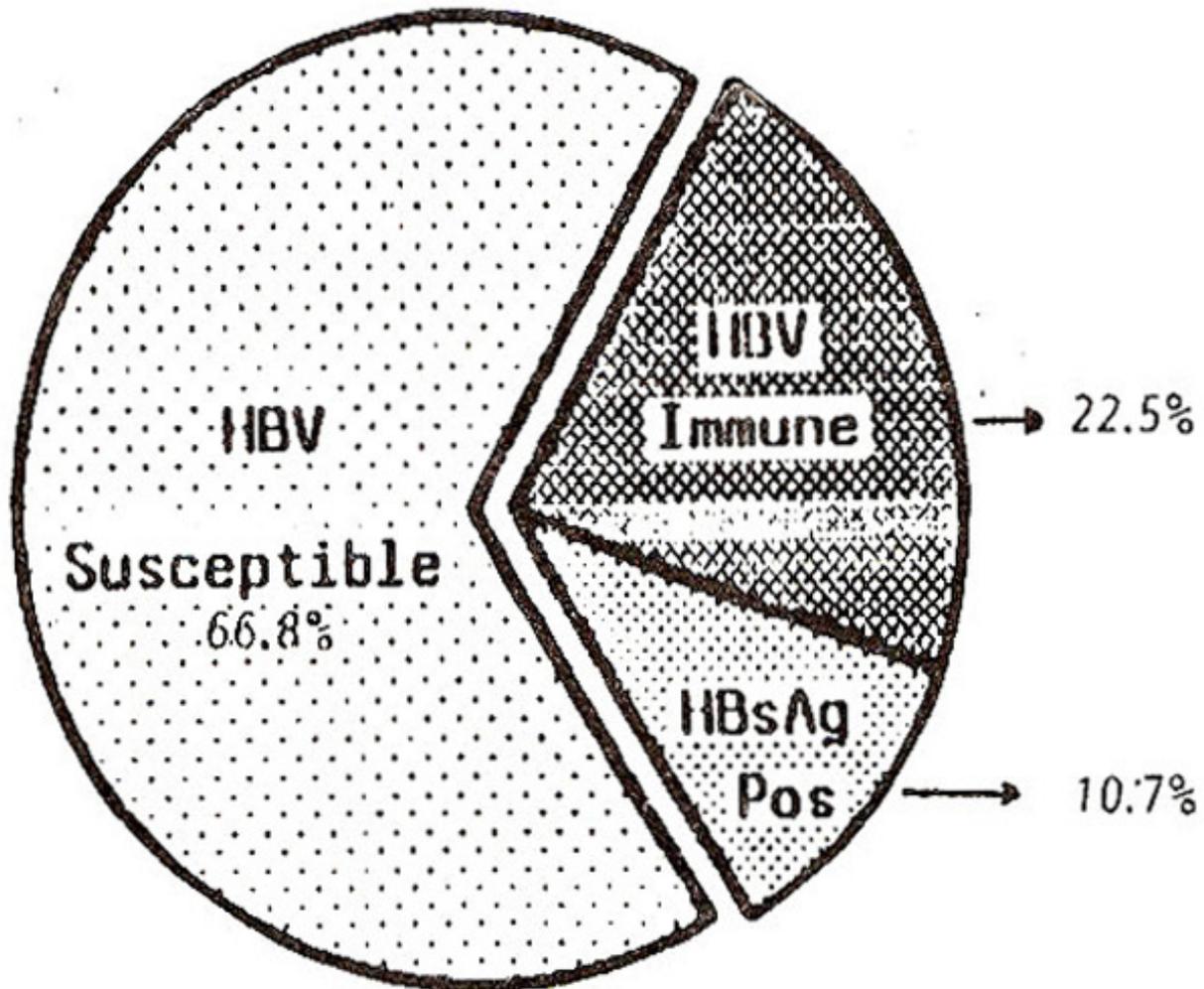


Figure 2. The pattern of Seromarkers of Hepatitis B in Recruits.

Pregnant Females:

Most of the pregnant women were in second and third trimester of pregnancy and had a mean age of 25 years. About 7.8% of them were found to be carriers of HBsAg while 33.2% of them revealed past exposure to HBV (anti-HBc) (Figure 3).

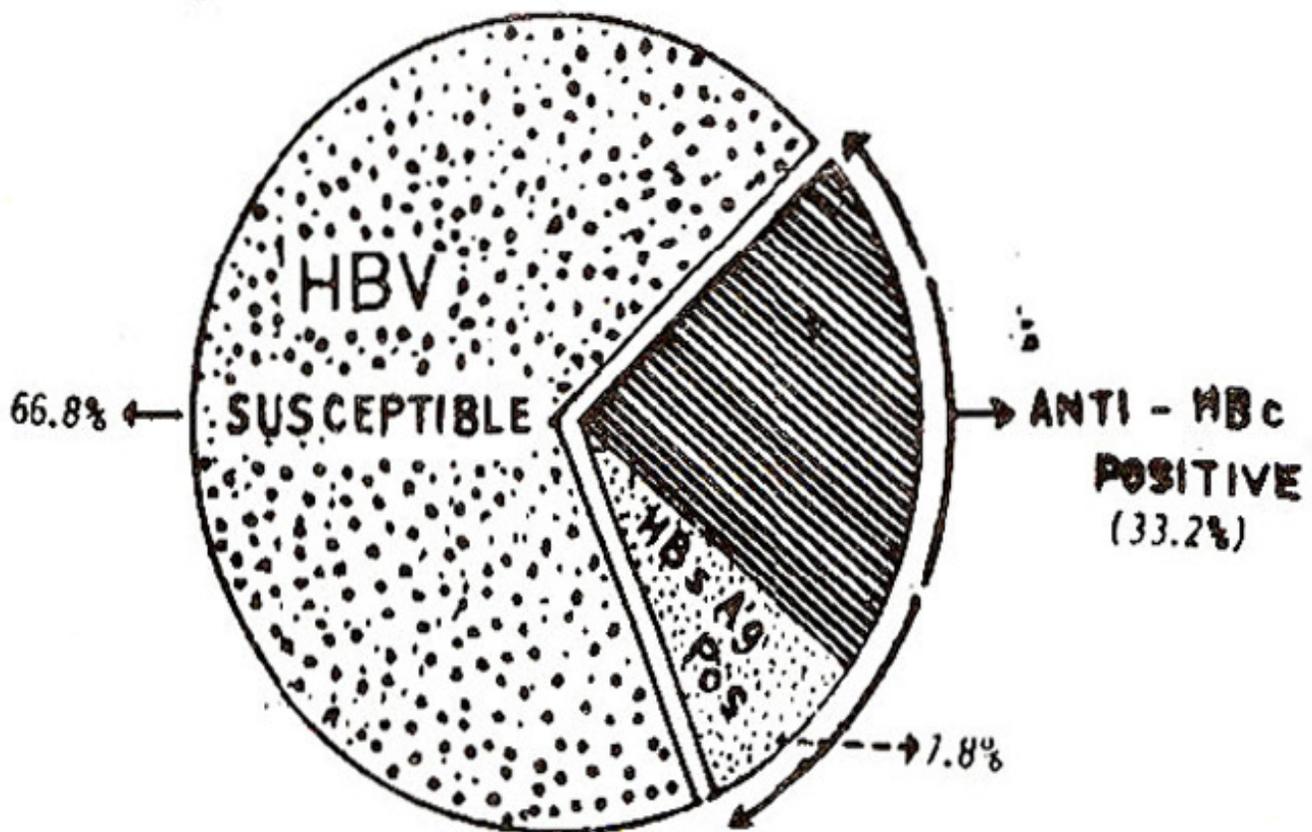


Figure 3. The Seromarkers of Hepatitis B in pregnant females.

DISCUSSION

The seroepidemiological pattern of hepatitis A in advanced countries differs from that of developing nations due to better hygienic conditions and high standards of sanitation⁸. In most of the developing countries due to bad hygiene, poverty, overcrowding and poor sanitation, the frequency of transmission of HAV is much higher, occurs early in life and results in high seroprevalence of anti-HAV^{9,10}. The majority of these HAV infections remain asymptomatic and anicteric³. The present study and other studies carried out in Karachi (Lodi and Zuberi - unpublished data) revealed that most of the population in Pakistan is exposed to HAV infection at very young age and 96.6 to 100% of the population of different socioeconomic groups becomes seropositive for antiHAV by the age of 20 years. Hilleman et al¹¹ reported that in Costa Rica 68% population was positive for anti-HAV while in USA only 27% of middle class workers and 33% of commercial blood donors showed the serological evidence of past exposure to HAV. Approximately 10 to 20% of Americans develop anti-HAV before reaching the age of 20 years and 50% by the age of 50 years¹². Seroepidemiological survey carried out in the United States of America indicates that risk of prior infection with HAV is related to age and socioeconomic status¹³ -The present study also brings out the fact that recruits which were drawn from lower socioeconomic groups showed a higher frequency (100%) of seroprevalence as compared to medical students (96%). With improvement of standards of living and better hygienic conditions, the pattern of age related seroprevalence of anti-HAV would change. The frequency of hepatitis B is also high in developing countries due to presence of factors which favour the spread of HBV infection in

general population¹⁴. In present study, 12.2% of medical students, 33.2% of recruits and pregnant females revealed the evidence of past exposure to HBV. Various workers from Pakistan have earlier reported HBsAg carrier rate of 1.4 to 4% in general population⁵, 4% in rural population of Northern Pakistan⁶ and 3.6% of army recruits⁷ while a frequency of 2.5% was reported from Karachi¹⁵. The HBsAg carrier rate is very low in USA and is only 0.2% in voluntary blood donors¹⁶. The factors like overcrowding, use of unsterilized glass syringes for injections and vaccination and lack of mandatory testing of HBsAg during blood transfusion contribute to the uninhibited transmission of HBV infection in most of the developing countries including Pakistan. The changing pattern of HBsAg carrier rate over a decade or so in our country may partly be due to improved detection by ELISA and RIA techniques but this is also a reflection of increased exposure of our population to HBV. However, in some other Asian countries like Taiwan and some of the African States, a carrier rate of HBsAg upto 20% has been reported¹⁴. The ratio of HBsAg positivity (10.7%) to total HBV infections (33.2%) in recruits strongly suggests an ongoing acquisition of HBV infection in army personnel. The serological data of pregnant females echoes the same observations in civilian population. The prevalence of HBsAg (7.8%) in pregnant females can only be explained by ongoing HBV acquisition and not on the basis of chronic disease secondary to perinatal HBV infection. However, the critical observation is that the risk of perinatal transmission of HBV in newborns in Pakistan is now significant. As anicteric and smouldering HBV infection along with perinatal acquisition of hepatitis B are associated with high rate of chronic active hepatitis, cirrhosis and hepatocellular carcinoma, the ultimate medical and economic impact of HBV disease in Pakistan are overwhelming. It is high time that all preventive measures are adopted to minimise the transmission of HBV infection in general population. The use of disposable syringes, careful handling of body samples of HBsAg positive individuals, immunotherapy of infants born to HBsAg positive mothers and mandatory testing of HBsAg in blood donors by highly sensitive diagnostic methods like ELISA and RIA will go a long way in checking the spread of HBV infection in general population and improving the health services of the country.

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