CHAPTER 1

INTRODUCTION

Viral hepatitis continues to be a major global health problem. The last three decades have witnessed an explosion in knowledge of viral hepatitis; a major public health problem throughout the world affecting several hundreds of millions of people. Viral hepatitis is a cause of considerable morbidity and mortality in human population from acute infection and chronic sequelae which include chronic active hepatitis, cirrhosis, and primary liver cancer. Hepatocellular carcinoma is one of the 10 most common cancers worldwide.

The history of viral hepatitis can be traced back thousands of years and it is fascinating. When the human being has suffered for the first time the invasion of your system by such agents, began a natural cycle and repetitive capable of infecting billions of human beings, decimate and sequelar thousands of life. There are reports of outbreaks of jaundice epidemic in China for more than 5000 years and in Babylon, for over 2500 years. The catastrophic history of epidemics or pandemics jaundiced is known and is usually associated with the great wars. In the war of the American Secession, 40,1000 cases occurred between the Union's military. In 1885, a catarrhal jaundice outbreak involved 191 employees of the shipyard of Bremen (Germany) after vaccination against smallpox. In 1942, 28585 soldiers contracted hepatitis after inoculation the vaccine against yellow fever. The number of cases of hepatitis during the Second World War was estimated at 16 million. Only in the twentieth century, have been identified the main causative agents of viral hepatitis. Hepatitis B was the first to be discovered.

Hepatitis B virus (HBV) and Hepatitis C virus (HCV) are frequent causes of acute and chronic hepatitis worldwide and create a significant burden to healthcare systems due to the high morbidity and mortality and costs of treatment. Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus. It is a global health problem. It can cause chronic liver disease and chronic infection and puts people at high risk of death from cirrhosis of the liver and liver cancer. More than 240 million people have chronic (long term) liver infections. More than 780000
people die every year due to complication of hepatitis B including cirrhosis and liver cancer. HBV is distributed worldwide, but its prevalence varies significantly between different populations of the world. Based on the prevalence of HBV surface antigen (HBsAg) carrier rate in the general population, Sub-Saharan African, East Asian and Alaskan populations are classified as having high HBV endemcity (HBsAg carriage > 8%), while the populations of southern parts of Eastern and central Europe, the Amazon basin, the Middle East and the Indian subcontinent are classified as intermediate HBV endemcity (HBsAg carriage 2-7%), and the populations in western and northern Europe, North America, and Australia are classified as low endemic (HBsAg carriage < 2%) regions.

HBV belongs to the family of DNA viruses that preferentially infect hepatocytes and are referred to as hepadnaviridae. Each complete virion consists of an inner core (nucleocapsid or hepatitis core antigen, HBcAg) surrounded by an outer protein coat or envelope (the hepatitis B surface antigen, HBsAg). The HBV genome is a circular, partially double-stranded DNA of approximately 3,000 base pairs. There are four overlapping open reading frames (ORF), which encode for the envelope, precore/core, polymerase, and X proteins. The envelope ORF encodes for the large middle and small surface glycoprotein’s of HBsAg. The precore/core ORF is translated into a precore polypeptide, which is secreted as hepatitis B ’e’ antigen, which is detectable in the blood as HBeAg and HBcAg, which is only detected in the liver. Of all the viral hepatitis, HBV is the most complicated infection with respect to interpretation of serologic tests. Both acute and chronic HBV infections are characterized by the presence of hepatitis B surface antigen (HBsAg) and the absence of antibodies to HBsAg (anti-HBs).

Transmission of HBV is predominantly via parenteral means, even though this infection is also transmitted by sexual contact and acupuncture. Mother –to – child transmission and occupational transmission from HBV infected patients to health care workers are also major modes of transmission. One of the major distinctive features of HBV infection is that risk of developing chronic liver disease varies greatly with age of acquiring the infection. For neonates and infants who acquire HBV, the risk of chronicity is almost 90%, while it decreases to 30% for children 1-5yr, and up to 2% for older children and adults.
According to the WHO report on prevention of HBV in India, HBsAg prevalence among general population ranges from 0.1% to 11.7%, being between 2% to 8% in most studies. HBsAg prevalence rate among blood donors ranged from 1% to 4.7%. Considering, on an average, HBsAg carrier rate of 5%, the total number of HBV carriers in the country was estimated to be about 50 million that forms nearly 15% of the entire pool of HBV carriers in the world and is the second largest pool of chronic HBV infections in the world.

Hepatitis C is a global health problem affecting a significant portion of the world’s population. Hepatitis C was first detected in 1989 using molecular biology techniques after extensive testing of serum from experimentally infected animals. It is an RNA virus that belongs to the Flaviviridae family and genus Hepacivirus. Hepatitis C is a contagious liver disease that results from infection with the hepatitis C virus. It can range in severity from a mild illness lasting a few weeks to a serious, lifelong illness. Every year, 3-4 million people are infected with the hepatitis C virus. About 150 million people are chronically infected and at risk of developing liver cirrhosis and/or liver cancer. More than 350,000 people die from hepatitis C related liver diseases every year. HCV is one of the silent killer diseases which are spreading undetected.

Based on data in blood donors from varying regions of the world, the infectivity rates range from 0.3% to 14.5%. The prevalence of HCV antibodies is relatively low in the United States, northern Europe and Australia, ranging from 0.3% to 1.2% of the population. An increased prevalence of HCV ranging from 1.5% - 9% has been reported in south east Asia and the Indian subcontinent, with the highest rates of HCV (2% - 14%) present in northern and central Africa, the eastern Mediterranean, and the Ukraine.

Hepatitis C is an emerging infection in India and is already responsible for a significant proportion of liver disease in various states. However, the prevalence appears to be highly variable (patchy), according to the geographical site or the population group analyzed (0.09 – 7.89%). Most of the studies of prevalence have been conducted in blood banks. Blood donor groups are usually young adults and majority are males, hence seroprevalence in other age groups like children, aged and in females cannot be estimated.
India’s blood-banking system has serious shortcomings. Professional blood donation continues to flourish despite a law condoning this. Another malaise in our health system is the reuse of improperly sterilized needles. Both these factors are potential sources for the spread of hepatitis C in India\textsuperscript{11}. Hepatitis C can present as acute or chronic hepatitis. Most of the cases of acute hepatitis C are asymptomatic with patients unaware of the underlying infection. Symptomatic acute hepatitis with jaundice is seen in only 25\% of patients and this virus usually does not cause fulminant hepatitis in immunocompetent individuals. The only acute life threatening illness caused by hepatitis C is a variant called fibrosing cholestatic hepatitis which is seen in liver transplant recipients\textsuperscript{12}. Approximately a fifth of the patients with chronic hepatitis C progress to cirrhosis over a time spanning nearly a decade\textsuperscript{13}.

There is paucity of large population based studies studying the prevalence of hepatitis C in the general population. These studies give an accurate index of the health burden of hepatitis C in the country. Community based seroprevalence studies are difficult to conduct in a developing country because of socioeconomic hurdles and logistic difficulties. In India most of the studies of prevalence of hepatitis C have been based in blood banks with the assumption that the blood donors are a surrogate for the population at large. However with the advent of professional donors this assumption may be a fallacy\textsuperscript{11}. Also blood donor groups are usually young adults, hence seroprevalence in other age groups like children and aged cannot be estimated. A tertiary care hospital catering to the needs of a large population represents an important centre for serological survey.

Genotype should be determined in all HCV-infected persons prior to treatment in order to determine the necessary duration of therapy and likelihood of response\textsuperscript{14, 15}. Patients with genotypes 1 and 4 generally exhibit a poorer response to IFN-based therapy than those with genotypes 2 and 3. HCV genotype 5 appears to be an easily treatable virus, with response rates compatible with those of genotypes 2 and 3 after a 48-week course of therapy\textsuperscript{16, 17}. Treatment response in genotype 6 HCV patients may be at an intermediate level between that observed in genotype 1 and genotypes 2, 3. The optimum duration of treatment (24 vs. 48 weeks) for HCV genotype 6 is unclear and currently under investigation\textsuperscript{16, 17}. Knowledge of the distribution of HCV genotypes has important clinical implications since the efficacy of current and new
therapies differ by genotype. In India, Lole et al.\textsuperscript{18} showed that the infection with genotype 3 was predominant in North, West and East Indian population, while genotype 1 was shown to be the predominant genotype in South India.

It was against the above backdrop that the present study was carried out to study prevalence of HBV & HCV as well as HCV genotypes among patients & voluntary blood donors in tertiary care hospital, in western Maharashtra.