

## Seroprevalence of Hepatitis B and C Virus in Premarital Screening Program in and around Albaha Region of Saudi Arabia

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(Received: 21 July 2013; accepted: 01 September 2013)

This study was aimed to evaluate the prevalence of Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) infections in population of Albaha region Kingdom of Saudi Arabia. Enzyme linked immunosorbent assay (ELISA) was used to detect hepatitis B antigens and anti-hepatitis C virus antibodies in serum samples of 13424 males and females subjects in premarital screening program in Albaha region during the period of 2008 to 2011. Hepatitis B virus surface antigen was detected as 1.60%, 3.05%, 1.81% and 0.60% during the year 2008, 2009, 2010 and 2011 respectively. Hepatitis C virus (Anti-HCV) prevalence was recorded as 0.33%, 0.57%, 0.52% and 0.39% during the year 2008, 2009, 2010 and 2011 respectively. Male subjects suffered at higher rate both in case of HBV and HCV infections. The highest HBV and HCV prevalence was recorded in age group of 15-35 years both in male and female subjects. Highest prevalence of HBV and HCV was found in Tohama area of Albaha region. These results provide an important findings regarding prevalence of HBV and HCV in population group planning to marry. For better prevention and control of these infections comprehensive and detailed prevalence studies are required in different population groups.

**Key words:** Hepatitis B, Hepatitis C, Premarital screening program, Prevalence, ELISA.

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Hepatitis B and C virus infection is a global issue and represent a serious public health problem. According to an estimate currently 400 million people around the world carries hepatitis B virus infection and annually 500,000 to 700,000 individuals die from the infection. The prevalence of hepatitis B virus is common in different regions of world like Africa, South East Asia, Southern Europe, Middle East and Far East (Gluud and Gluud, 2009). Worldwide 130 to 170 million people carries

chronic hepatitis C virus infection (Chu and Lee 2008, Gluud and Gluud, 2009). HBV and HCV are causative agents of chronic hepatitis and these viruses are transmitted vertically from mother to child or horizontally by unsafe injections, through sexual relations and blood transfusions (Colin *et al.* 2006, Perzet *et al.* 2006).

HBV prevalence was considered higher in Kingdom of Saudi Arabia in previous decades and HBV infection was mainly acquired by horizontal transmission in early life as compared to the vertical transmission in Kingdom of Saudi Arabia (Al-Faleh 1988, Al-Faleh 2003, Al-Tawfiq and Anani 2008). An average annual incidence of HBV and HCV for a period from 2000 to 2007 in eastern, western and central regions of KSA was reported 0.104% and 0.078% and 20-30% decline in incidence was recorded during the surveillance period of 8 years (Memish *et al.* 2010). HBV and HCV infections are prevalent worldwide and

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relatively low incidence is reported in KSA. However these infectious agents can be transmitted from infected parents to newborns. These infections are not curable and lead to high morbidity and mortality rates and therefore initiation of premarital screening program is encouraged in different countries of the world. The mandatory program for premarital screening of HBV and HCV was initiated in 2008 in KSA. The average prevalence for HBV and HCV was reported 1.31% and 0.33% respectively (Alswaidi and Brien 2010). During 2009 and 2010 the prevalence of HBsAg (0.07%) and anti-HCV antibodies (0.22%) was reported in Jazan region of Saudi Arabia (Zaki et al 2012). In another study in Qassim region during 2008, 2009 and 2010, hepatitis B virus surface antigen were detected 0.7%, 1.5% and 2.04% respectively and antibodies to hepatitis C virus were detected 0.1%, 3% and 0.83% respectively (Ahmed 2012). In spite of regional differences in prevalence of HBV and HCV epidemiological studies are necessary for understanding of disease spread patterns in different areas and formulation of comprehensive prevention and control strategies.

Present study was conducted with the aim to estimate HBV and HCV prevalence in Albaha region in KSA in adult couples before marriage during the calendar years 2008 to 2011.

#### MATERIALS AND METHODS

The study included the 13424 males and females subjects applied for the pre-marriage screening tests from year 2008 to 2011 in and around Albaha region of KSA. Serum samples were collected in properly labeled sterile vials and kept frozen at -20 °C for further analysis for the screening of HBV and HCV infections. Commercially available ELISA Kit was used to determine hepatitis B antigens (Monolisa TM HBsAg ULTRA, Bio-Rad). Anti-hepatitis C virus antibodies were detected by ELISA Kit anti-

HCV version 4.0 (Bio-Rad Laboratories, USA).

#### RESULTS

In present study a total of 13424 individuals from different age groups and areas around Albaha were screened for HBV and HCV infections during 4 years period (2008-2011) for the premarital screening tests (Table 1). As shown in Table 1, there was a decrease in the prevalence of HBV infection from 2008-2011 (1.60%-0.60%). 1.12% male and 0.48% female subjects were found positive for HBV antigen in 2008 while in 2011 the percentage decreased to 0.39% male and 0.21% female (Fig 1). An overall decreasing trend was observed in incidence of HBV infections during the period 2008 to 2011.

As shown in Table 1, there was an increase in the prevalence of HCV infection from 2008-2011 (0.33%-0.39%). HCV screening test depicted 0.18% male and 0.15% female subjects were infected with HCV in 2008 while 0.21% male and 0.17% female subjects were found positive for HCV in 2011 (Fig 2). An increasing trend in HCV infection incidence pattern was noted during the study period. Cumulative prevalence of HBV and HCV in different areas around the Albaha region depicted decreasing trend during the study period (Fig 3).

Highest prevalence of HBV and HCV was recorded in the age group of 15-35 years both in male and female subjects during the study period in and around Albaha region (Fig 4)

#### DISCUSSION

HBV and HCV prevalence varies in different countries around the world. The geographical distribution of hepatitis B and C prevalence are categorized into high, moderate and low endemic areas. KSA is considered as a country with low incidence of HBV and HCV among the world community, However prevalence

**Table 1.** Prevalence of hepatitis B and C in Albaha region for the year 2008 to 2011

Year	No. of Samples	HBV+	% HBV+	HCV+	% HCV+	Total +	% Total +
2008	5452	87	1.60	18	0.33	105	1.93
2009	3150	96	3.05	18	0.57	114	3.62
2010	2490	45	1.81	13	0.52	58	2.33
2011	2332	14	0.60	9	0.39	23	0.99

of HBV and HCV varies in different regions of the country. A decrease in prevalence pattern in the country may be attributed to the comprehensive vaccination program, increased public awareness, adoption of preventive measures, screening program for blood donors and program for premarital blood screening for HBV and HCV. A

mandatory premarital screening program for HBV and HCV was introduced throughout the kingdom in 2008. Similar mandatory screening programs are also implemented in different countries like Brazil, China, Iran and Turkey (Adibiet *et al.* 2007; Alswaidi and O'Brien 2009). In present study decreasing trend was recorded for HBV infections while

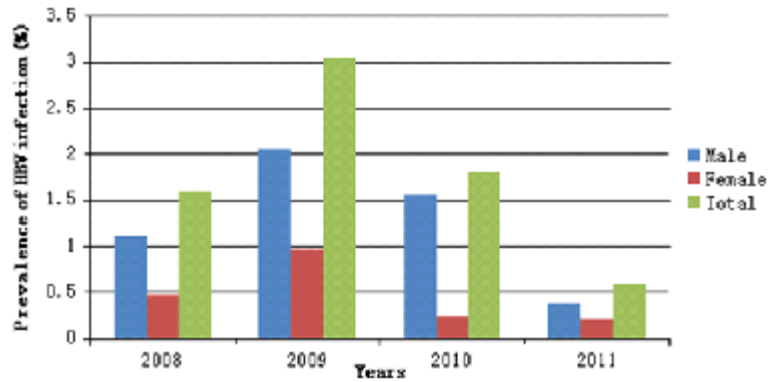


Fig. 1. Prevalence of hepatitis B in male and female subjects in Albaha region during the period of 2008 to 2011

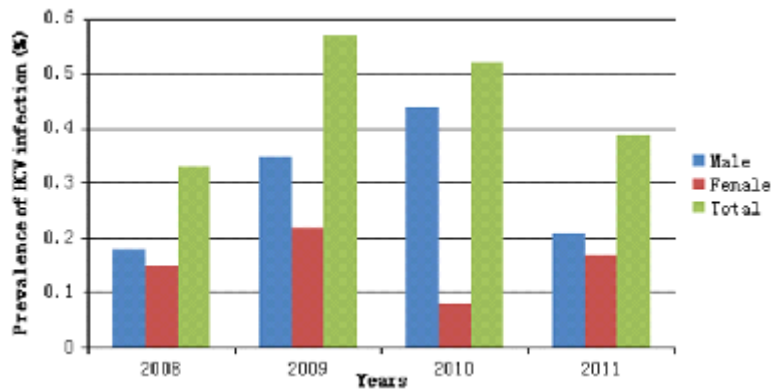


Fig. 2. Prevalence of hepatitis C in male and female subjects in Albaha region during the period of 2008 to 2011

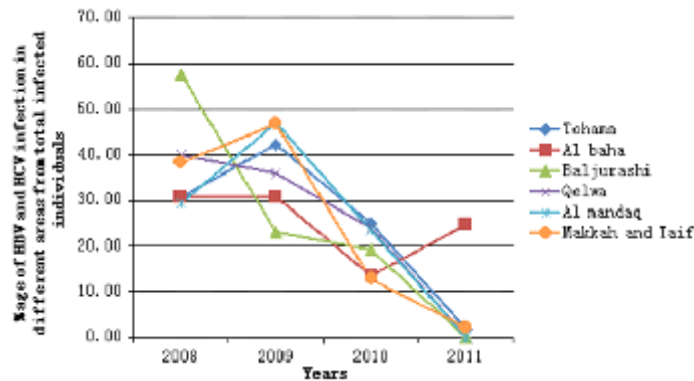


Fig. 3. Cumulative prevalence of hepatitis B and C in different areas of Albaha region during the period of 2008 to 2011

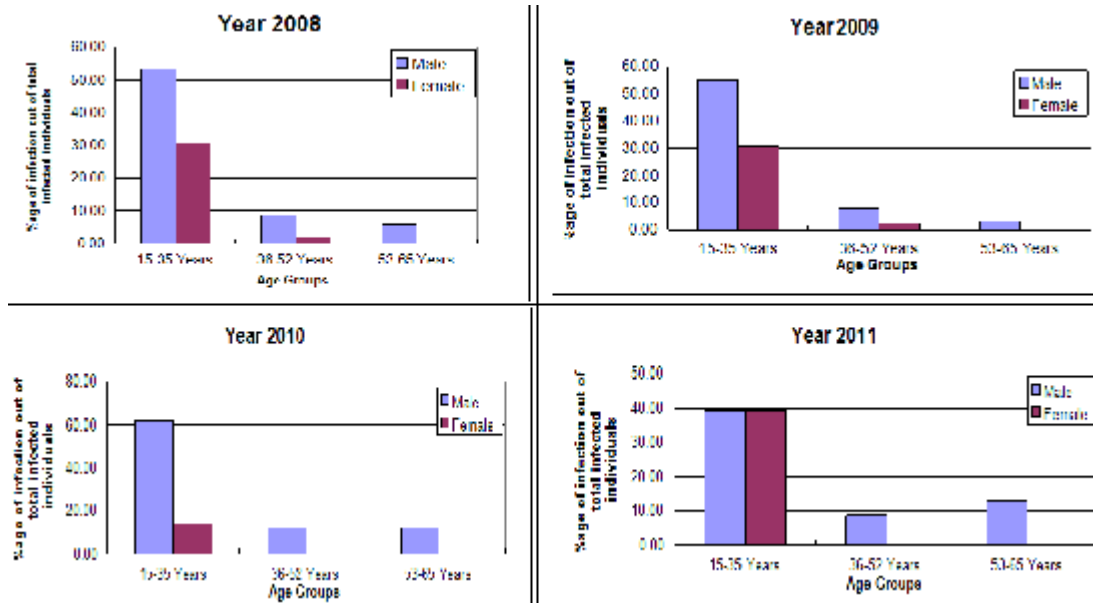


Fig. 4. Cumulative prevalence of hepatitis B and in male and female subjects in different age groups during the period of 2008 to 2011

increasing trend was noted for HCV infections in Albaha region (Fig1&2) during the period 2008-2011. These findings corroborate with the earlier reported HBV prevalence in South-western (5.4%), Eastern (9.8%) and central (1.5%) region (Fatahalla *et al.* 2000; Ayoola *et al.* 2003). Prevalence of HBV antigen in Albaha region of Saudi Arabia is lower as compared with the neighboring countries like Egypt (1.2%), Syria (3.8%) and Yemen (9.8%) (Darwish *et al.* 1993; Haider 2002; Othman and Monem 2002;). Our results related to the prevalence of HCV infections in Albaha region are comparable to the previously reported studies in kingdom indicated HCV prevalence in the range of 0.4-1.1% (Madani 2007). The HCV prevalence in current study is lower than the neighboring country like Egypt (16-18%) (Darwish *et al.* 2001). The highest HBV and HCV prevalence was recorded in age group of 15-35 years both in male and female subjects. Decrease in prevalence of HBV may be attributed to the comprehensive vaccination program in the country, increased awareness and better and healthy life style practices. HCV infections have the serious consequences especially due to the non-availability of vaccine. Although the Burden of HCV infections is low in kingdom but still it is a burden on country's health

care system. A comprehensive strategy is required for prevention and control of HBV and HCV infection coupled with continuous surveillance and monitoring system.

#### ACKNOWLEDGMENTS

We thank Scientific research deanship project No RGP-VPP-253 for funding this work and we thank also King Fahad hospital as well.

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