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Seroprevalence of Hepatitis C, Hepatitis B and HIV and Co-Infections among Pregnant Women: A Retrospective Study in 2006 at Malekan City, Iran

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Abstract: High prevalence rates of Hepatitis C Virus (HCV), Hepatitis B Virus (HBV) and HIV infections among people have been reported worldwide. However, less information on HCV (HBV) and HIV infections and risk factors among pregnant women in Iran is available. HIV co-infection with Hepatitis C Virus (HCV) or/and Hepatitis B Virus (HBV) is a growing public health concern. Also these viruses share the ways of transmission and many people are co-infected or even have the 3 infections. Thus, we conducted a research to identify the seroprevalence of HIV, HBV and HCV in pregnant women in Malekan city, Iran. A total of 680 blood samples of pregnant women in the first trimester were collected at the central clinical lab from March 2005 to February 2006. Blood samples were estimated for HBsAg, HBcAb, HCVAb and HIVAb by Enzyme Immunoassay (EIA). Prevalence rate of HBsAg was 2.5%; HBcAb 1.25% and HCV Ab 0.98 %, .None was positive for Anti-HIV,2. Co -infection for HBsAg-HCVAb were seen in three cases (0.49%). The authors recommend that all specimens should be treated as potentially infectious and all persons must be tested before marriage and pregnancy time for prevention of infections in the future.

Key words: HIV, HBV, HCV, pregnancy, co-infection, seroprevalence

INTRODUCTION

HCV, HBV and HIV infection are common, especially during recent decades. Co-infection between these 3 different diseases shows similar ways of transmission (Irene *et al*., 2006).

HIV infection has worldwide distribution especially in developing countries like Asia (Irene *et al*., 2006; Alavian *et al*., 2002) HIV Ab is the common test for primary diagnosis of disease. It is not performed in pregnancy for all of the people but it is serious recommended. In the mention of that these viruses are transmitted as STD diseases, it is possible that the pregnant women are affected with their husbands. Viral hepatitis is a major public health problem worldwide and hepatitis A, B, C, E and G induce viral infections of liver (Alter, 1991; Massarrat, 2002).

HBV infection is a serious health problem with 2 billion infected worldwide and about 1 million deaths per year caused by chronic hepatitis, liver cancer and cirrhosis (Malla *et al*., 2002). In developed countries, disease is rare and acquired in adults, but in developing countries like Asia and most Africa, HBV is common and usually acquired in neonates and Children by mother (Mohamad, 2004; Shamim *et al*., 2002). In previous studies it had been estimated that HBsAg carrier rate was about 3% in Iran. However, universal neonatal and children vaccination against HBV started in Iran in 1993 reduced HBV prevalence among children (Richard, 2000). According to the recent Iranian national health survey, the prevalence of HBV infection is 1.7% in the country. Also, world prevalence of HCV infection is 1%. Earlier studies in Iran shows HCV prevalence rate at about 0.3% (Nili *et al*., 2000). However, it seems that its prevalence is increasing in the country and in the newest study of us, this rate between women was 1.5%. Also, the prevalence rate of HCV infection has significant geographic variability. HCV infection rates are approximately 1-2% in the United States and Europe (Jahani *et al*., 2005; Qasmi *et al*., 2000). Some countries in South America, Africa and Asia have rates from 2.5-10%. Patients infected with HCV have an 80-85% chance that the HCV infection will persist and that they will go on to have a chronic HCV infection (Dray *et al*., 2005; Bhat *et al*., 2005).

Hepatitis A and E viruses are transmitted oral- fecal. Hepatitis B, C and G are transmitted parentally, due to injury with contaminated sharp instruments, sharing of needles or by sexual contact and also through prenatal transmission from mother to child.

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Co-infection with hepatitis among people with HIV is a serious problem. For people infected with HIV through needle exposure probably due to drug use, 40% or more may also have hepatitis C (Langar *et al*., 2005; Ahmed *et al*., 1998).

Hepatitis C is prevalent world wide. In the USA, nearly 150,000 cases occur yearly (Bisceglie *et al*., 1998; Hossein *et al*., 2002). The objectives of this study were to determine seroepidemiology of HBV, HIV and HCV and comparison with other similar studies. This study provides insight into the potential for future spread of these blood borne diseases in other parts of Iran and neighbor countries and sheds light on urgent programs for HIV and other sexual transmitted diseases prevention.

MATERIALS AND METHODS

This cross sectional study was done in Malekan city, located at a distance of 160 km from Tabriz (North-West of Iran) for 680 pregnant women in the first trimester from March 2005 to February 2006(In the mention of city population and p = 0.05). The age, blood transfusion record, life area (rural and urban), previous STI and phlebotomy of these subjects were recorded. Then, 10 mL of venous blood was taken from each case. Blood samples were centrifuged and did tests for HBsAg, HBcAb, HCVAb and HIVAb by Enzyme Immunoassay (EIA).The following materials were used in the study: The first Detection of HBV, HCV and HIV was done by Diaplus and the further confirmation test was performed by Diaporo. Instrument was provided by Awareness Company (USA). All testing was performed according to the protocols supplied by the manufacturers. All positive sera for HBsAg or HBcAb were tested again for these markers and also for HBeAg, HBeAb and HBsAb. Negative and positive controls were done for all tests and all of sera were rechecked. The histories of probable causes of infections were investigated.

The prevalence of HBV, HCV and HIV infections in pregnancy was determined. Also, these values were compared with the estimated prevalence of HBV, HCV and HIV infections in the normal population of Iran (1.7 % for HBV, 0.46 % for HCV and 0.0086 % for HIV infection).

Then, the results were analyzed by SPSS, version 13, software package and chi-square tests for categorical variables. p values less than 0.05 were considered statistically significant.

RESULTS AND DISCUSSION

The mean age (ranged from 17 to 45) of cases were 28.7 year (Table 1). Prevalence rate of Hepatitis B surface Antigen positive was 2.5%. That was about 1.5 times more frequent than other parts of Iran ($p<0.05$). Six persons were HCV Ab positive (0.98 %,). This prevalence rate was about two times more frequent than that in the general population ($p<0.05$). Eigth persons (1.25% of the pregnant Women population) had positive HBcAb (Table 1).

Table 1: Hepatitis B, C and HIV cases in different age groups

Age (year)	Population	HBV	HCV	HIV	HBcAB	HBV- HCV co-infection
15-19	51	1	0	0	0	0
20-24	69	2	0	0	1	0
25-29	320	8	4	0	4	2
30-34	145	2	1	0	2	1
35-39	70	2	1	0	0	0
≥40	25	1	0	0	1	0

Table 2: Hepatitis B, C and HIV cases

	HBsAg (680)	Anti-HCV (680)	Anti-HIV (680)	HBc Ab (680)
Positive cases	16	6	0	8
Percentage (%)	2.5	0.98	0	1.25

Table 3: Hepatitis B serologic markers

	HbsAb (16)	HBeAg (16)	HBeAb (16)	Anti-HBc (16)
Positive cases	0	4	12	8
Percentage	0	25	75	50

Eight persons had positive HBsAg but negative HBcAb. HBsAb was negative in all positive cases, because they had not vaccinated before. Six persons (0.98 %) were HCV Ab positive. HIV Ab was negative for all cases. Therefore, the prevalence of HIV infection among pregnant was less than ($p>0.05$) that in the general population (Table 2).

The maximum rate of HBV infection was seen at 25-29 age group (HBsAg: 8or 50%, HCV Ab: 4 or 67%). Co-infection for HBsAg-HCVAb was seen in three (0.49%) people (Table 1).

Four (25 %) Persons of HBsAg positive cases were HBeAg positive and twelve of them were HBeAb positive (75%), therefore they had not acute disease (Table 3).

About risk factors, there was no evidence of previous hepatic disease, Phlebotomy, the history of intravenous drug use or multiple sexual partnerships. But, all of positive cases had previous vaginal infections.

CONCLUSION

Prenatal exposure is a well established risk factor for Hepatitis C Virus (HCV), HBV and HIV infection (Alter, 1991; Ahmed *et al*., 1998). However, the role of the sexual route in the transmission of hepatitis C has remained controversial (Irene *et al*., 2006; Alavian *et al*., 2002). There are few studies carried out to evaluate these high risk groups in Iran. HIV, HBV and HCV share similar modes of transmission and are relatively frequent among certain high-risk groups. High risk factors for the

development of HIV, HBV and HCV infections include intravenous drug abuse, male homosexuality, sexual promiscuity, vagrancy, alcoholism and/or immigration from hyper endemic regions. In 2000, the reported HIV positive prevalence based on statistics of the Iranian Diseases Management Centre was 0.004% in Iran (Alavian *et al*., 2002; Massarrat, 2002).

HIV co-infection with Hepatitis C Virus (HCV) or/and Hepatitis B Virus (HBV) is a growing public health concern (Mohammad, 2004; Richard, 2000). Some studies showed high prevalence of HBV, HCV (Shamim *et al*., 2002; Dray *et al*., 2005). For example, Dray *et al*. (2005) demonstrated the presence of HBsAg in 934 patients (10.4%), antibodies to HCV in 21 patients (0.3%) and antibodies to HIV in 175(1.9%) patients.

In the recent years, chronic Hepatitis C Virus infection (HCV) is recognized as a major public health problem (Massarrat, 2002; Malla *et al*., 2002). Massarrat *et al*. (2002) determined the global prevalence of chronic HCV infection 0.46%. An Extremely low Anti-HCV prevalence 0.1% has been reported among the Blood donors in U.K and developed countries. Shamim *et al*. (2002) reported the highest prevalence rate of HCV (18%) in Egypt.

In this study, the prevalence rate of Hepatitis B surface Antigen positive was 2.5%. The maximum rate of HBV and HCV infection were seen at 25-29 age group (HBsAg: 8or 50%, HCV Ab: 4 or 67%) and also similar to Bhat SK Oman study, but there was no significant correlation ($p>0.05$) between prevalence rate and age or life area. None was positive for Anti-HIV1, 2. Until recently, Iran had been classified as a country with a low seroprevalence but high potential for a HIV epidemic (Alavian *et al*., 2002; Hossein *et al*., 2002). None of the persons remarked the history of previous diseases or using intravenous drugs. In the mention of results, they had past infection.

Remember that, in the basis of similar risk factors, HCV and HBV infections are present in a higher percentage of HIV- Infected patients than the population as a whole. For example, 300,000 people in the U.S. are HIV-HCV co-infected and, in some studies of HIV-Infected, urban populations, HCV co-infection were found in 40% of all patients and 90% of persons who had hemophilia or a history of intravenous drug use (Dray *et al*., 2005; Langar *et al*., 2005). While most HIV-HCV co-infected patients have Intravenous Drug Use (IDU) as a risk factor for HCV, other risk factors, including bloody fights, tattoo, unprotected anal or vaginal sex, also may have been the cause of HCV infection. There is even some evidence for salivary shedding of HCV, which allows for the possibility that oral contact is another method for non-parental transmission of HCV (Richard, 2002; Jahani *et al*., 2005). While HIV treatment is difficult for clinicians and patients, it may result in a significant improvement in the health of HIV/HCV/ or HBV co-infected patients. It is better that all persons must be tested before marriage and pregnancy time for prevention of infections in the future because this study suggests that conditions exist for a potential HIV and HCV outbreak to occur.

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