SEROPREVALENCE OF HEPATITIS B, HEPATITIS C, SYPHILIS AND HIV IN PREGNANT WOMEN IN A TERTIARY CARE HOSPITAL, GUJARAT, INDIA

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ABSTRACT

BACKGROUND

This study was conducted to assess the extent of seropositivity of hepatitis B, hepatitis C, syphilis and HIV in pregnant women at tertiary care hospitals in Gujarat from December 2015 to June 2016 and to re-evaluate the need for routine antenatal care screening for these infections among obstetric patients.

MATERIALS AND METHODS

Patients were enrolled for study after taking informed consent. All samples were tested to detect HbsAg by Enzyme-Linked Immunosorbent Assay (ELISA), anti-HCV by ELISA, samples were also tested for antibodies to Treponema pallidum by Rapid Plasma Regain (RPR), samples were tested for antibodies to HIV by three different methods as per strategy III of the National AIDS Control Organisation by using different systems of testing to establish a diagnosis of HIV.

RESULTS

Total 1000 samples were tested. Out of this, seropositivity of hepatitis B was (0.6%), hepatitis C was (0.2%), syphilis was (0.0%) and HIV was 0.1%. Out of the 1000 samples, no coinfection was found between hepatitis B, hepatitis C, syphilis or HIV.

CONCLUSION

This study can help the health professionals to efficiently treat antenatal patients. Early diagnosis of disease in antenatal period is helpful for proper management and initiation of treatment to prevent transmission to newborn.

KEYWORDS

Antenatal Women, Hepatitis B, Hepatitis C, Syphilis, HIV Seroprevalence.

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BACKGROUND

Viral hepatitis during pregnancy is associated with a high risk of maternal complications, has a high rate of vertical transmission causing foetal and neonatal hepatitis and has been reported as a leading cause of maternal mortality (Ornoy and Tenenbaum, 2006).[1] Hepatitis B is the most important and common infectious diseases in the world. Three major routes spread of HBV-perinatal, horizontal and sexual transmission (Edmunds et al, 1996).[2] In developing countries, the main routes of transmission are- neonatal with HBV carrier mother. The significance of HBV infection during pregnancy derives through its potential to be transmitted vertically.

Ten percent of infants born to women with acute HBV infection during the first trimester of pregnancy are HbsAg positive at birth and 80 to 90% of neonates become HbsAg positive without prophylactic therapy, if acute maternal infection develops during the third trimester of pregnancy (Sweet et al, 1990).[3] According to Okada et al (1976),[4] 85% of neonatal HBV infections are caused due to intrapartum exposure to infectious blood and vaginal secretion and the remaining 15% are caused by haematogenous transplacental viral spread. Epidemiological data on HBV infection are important to program managers and health planners to plan vaccination and other preventive strategies.

HCV is gradually being recognised as a major health problem and common cause of post-transfusion non-A, non-B hepatitis in developing countries. The seroprevalence of HCV in apparently healthy people in India ranges from 1.5 to 4%. In antenatal women, vertical transmission occurs in 3-10%. WHO calculates that unsafe healthcare devices account for 2.3 million new HCV infections per year and 2,00,000 HCV-related premature deaths mostly in developing countries.

Syphilis is caused by Treponema pallidum. Transmission of T. pallidum from a syphilitic woman to her foetus through the placenta may occur at any stage of pregnancy, but the lesions of congenital syphilis generally have their onset after the fourth month of gestation when foetal immunologic

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competence begins to develop. This timing suggests that the pathogenesis of congenital syphilis depends on the immune response of the host rather than on a direct toxic effect of T. pallidum. The risk of infection of the foetus during untreated early maternal syphilis is estimated to be 75 to 95%, decreasing to approximately 35% for maternal syphilis of two years duration (Kasper et al, 2005).[5]

Human Immunodeficiency Virus (HIV) causes Acquired Immunodeficiency Syndrome (AIDS). It is predominantly a Sexually Transmitted Disease (STD). HIV infection can be transmitted from an infected mother to her foetus during pregnancy, during delivery or by breastfeeding. Transmission from mother to foetus occurs most commonly during perinatal period. This is extremely important form of transmission of HIV infection in developing countries where the proportion of infected women to infected men is 1:1. Virology analysis of aborted foetuses indicates that HIV can be transmitted to the foetus as early as the first and second trimesters of pregnancy (Kasper et al, 2005).[5]

United States and Europe have expert guidelines to screening of pregnant woman for HIV, HBV and HCV to help in appropriate management. Thus, the present study was undertaken to detect the current seroprevalence of HBV, HCV, syphilis and HIV in pregnant women in tertiary care hospital, Gujarat.

MATERIALS AND METHODS

This study was conducted to determine the prevalence of Hepatitis B Virus Surface Antigen (HbsAg), antibodies to hepatitis C virus, antibodies to Treponema pallidum and antibodies to HIV virus among patients attending the antenatal clinic at tertiary care hospital, Gujarat. Serum samples from 1000 cases were collected from December 2015 to March 2016. These samples were tested for Hepatitis B Surface Antigen (HbsAg) and antibody to hepatitis C by ELISA (enzyme-linked immunosorbent assay). The RPR syphilis screening test, which is a macroscopic non-treponemal flocculation card test for the detection and quantitation of anti-lipoidal antibodies in serum or plasma and HIV test was done as per strategy III of the National AIDS Control Organisation by using different test kit to establish diagnosis of HIV.

Five millilitre blood samples were collected using a sterile plain vacutainer and serum was separated by centrifugation into sterile vials. Needles were destroyed using a needle destroyer and discarded in 1% hypochlorite solution.

Laboratory Tests for HbsAg

The serum samples were tested for Hepatitis B Surface Antigen (HbsAg) using microscreen HbsAg ELISA, which is a direct non-competitive solid phase enzyme immunoassay in serum or plasma.

Laboratory Tests for HCV Antibodies

The serum samples were tested for IgG antibodies to HCV using Qualisa HCV test kit, a third generation ELISA in serum or plasma. Microwells were coated with HCV-specific recombinant antigen from the C-core (structural), E1 and E2 (envelop proteins), NS3, NS4 and NS5 (nonstructural) regions of the HCV genome.

Laboratory Tests for Syphilis

The serum samples were tested for the presence of treponemal antibodies using carbogen. The RPR screening test is a macroscopic nontreponema flocculation card test for the detection of anti-lipoidal antibodies present in serum or plasma.

Laboratory Tests for HIV

The serum samples were tested for the presence of antibodies to HIV by using dot immunoassay (Comb Aids HIV 1+2 ImmunoDOT test Kit) and positive results were confirmed by the test, which employs lateral flow Immunochromatographic type assay and HIV TRI-DOT test, which is a rapid, sensitive and accurate immunoassay for the detection of HIV-1 and HIV-2 antibodies (IgG) in human serum or plasma using HIV-1 and HIV-2 antigens immobilised on a porous immunofiltration membrane.

RESULTS

A total of 1000 samples were tested from antenatal patients for hepatitis B virus, hepatitis C virus, syphilis and HIV infections.

HBsAg positivity was found in 6 patients out of 1000 samples; so the prevalence for HbsAg was 0.6% as shown in table 1. Among the antenatal cases, prevalence of HbsAg was maximum in the 22-26 years of age group (50%) and the prevalence in the first trimester was the highest (50%), followed by the third (33.30%) and second trimester (16.60%) as shown in table 2.

Positivity for antibody against HCV was found in 2 patients, thus the overall prevalence for anti-HCV was 0.2% as shown in Table 1. Seroprevalence was highest in age group 17-21 years (50%) and 22-26 years (50%) shown in Table 2. Two samples seropositive for anti-HCV in which (50%) was in the first and (50%) was in the second trimester.

All samples were negative for anti-treponema antibody test out of 1000 samples, so overall prevalence was 0.0% shown in Table 1.

Out of 1000 samples, 1 sample positive for HIV, so the overall prevalence for HIV was 0.1% as shown in Table 1. Among these, highest prevalence was found in the age group of 27-31 years (100%), seroprevalence for HIV was highest in the second trimester (100%) as shown in Table 2.

Type of Infections	Results	Age Groups (Years)					Total
		17-21	22-26	27-31	32-36	>36	
HBsAg	Positive	1	3	2	0	0	6
	Negative	214	525	205	48	2	994
	Total	**215**	**528**	**207**	**48**	**2**	**1000**
HCV	Positive	1	1	0	0	0	2
	Negative	214	527	207	48	2	998
	Total	**215**	**528**	**207**	**48**	**2**	**1000**
Syphilis	Positive	0	0	0	0	0	0
	Negative	215	528	207	48	2	1000
	Total	**215**	**528**	**207**	**48**	**2**	**1000**
HIV	Positive	0	0	1	0	0	1
	Negative	215	528	206	48	2	999
	Total	**215**	**528**	**207**	**48**	**2**	**1000**

Table 1. Hepatitis B, Hepatitis C, Syphilis and HIV among Antenatal Cases in Various Age Groups

Type of Infections	Results	Trimesters			
		1st	2nd	3rd	Total
HbsAg	Positive	3	1	2	6
	Negative	120	205	669	994
	Total	**123**	**206**	**671**	**1000**
HCV	Positive	1	0	1	2
	Negative	122	206	670	998
	Total	**123**	**206**	**671**	**1000**
Syphilis	Positive	0	0	0	0
	Negative	123	206	671	1000
	Total	**123**	**206**	**671**	**1000**
HIV	Positive	0	1	0	1
	Negative	123	205	671	999
	Total	**123**	**206**	**671**	**1000**

Table 2. Hepatitis B, Hepatitis C, Syphilis and HIV among Antenatal Cases in Various Trimesters

DISCUSSION

As shown in our study, HbsAg prevalence rate was 0.6% among antenatal women, which is comparable with study like Seyed Reza et al (0.6%) (Seyed Reza et al, 2011).[6] This study result lower than the rates reported by N. Dinakaran et al (3.8%) (N. Dinakaran et al, 2014)[7]; Fisseha Walle et al (5.3%) (Fisseha Walle et al, 2008)[8] and Aba et al (3.9%) (Aba et al, 2016).[9]

India falls into the intermediate endemicity area as regards the prevalence of HBV infection, which is 3-4%.[10] Vertical and horizontal transmission in the perinatal period and early childhood are the major ways of propagation of this infection in India. To have control over these modes of transmission, we need to have proper idea of HBV infection in pregnancy.

Large scale studies on the estimates of the prevalence of HCV infection and risk behaviour of HCV infection in the Indian population are yet to be undertaken. Of the 1000 samples, only two samples were positive for anti-HCV antibodies (0.2%), which is low compared to the rates reported by Ashok Kumar et al (1.03%) (Kumar et al, 2007)[10] and Harshita et al (1.2%) (Harshita et al, 2015),[11] but similar to the rates reported by Nagababu et al (0.21%) (Nagababu et al, 2016)[12] and Seyed Reza et al (0.2%) (Seyed Reza, et al, 2011).[6]

In India, the prevalence of HCV is 1-2%. According to the National Centre for Disease Control (NCDC). HCV is a bloodborne pathogen; about 75-85% patients with HCV will develop chronic infection and about 10-15% develop liver cirrhosis. Mother to child transmission rate of HCV has been estimated around 5%. Complications of HCV during pregnancy associated with premature contractions, placental separation, preterm delivery, vaginal bleeding, gestational diabetes mellitus and mortality.[13-15],among pregnant women, hepatic dysfunction is a common problem caused by viral hepatitis. So, targeted screening is not sufficient and universal screening would cause cost constraints especially in resource-poor countries.

The prevalence rate of syphilis in our study (0.0%) was compared to the rate reported by Shazia Parveen et al (0.0%) (Shazia Parveen et al, 2015)[16] and lower than that study reported by Nidhi Nair et al (0.36%) (Nidhi Nair et al, 2013),[17] Harshita et al (1.05%) (Harshita et al, 2015)[11] and Gupta et al (1.47%) (Gupta et al, 2003).[18] In India, available information indicates that the prevalence of maternal syphilis has remained at around 1.5% between 2003 and 2007 (strategy of WHO, 2009).

Pregnant women with syphilis can transmit the infection to their foetus causing congenital syphilis. In addition, maternal syphilis can also lead to other serious adverse

outcomes of pregnancy such as stillbirth or spontaneous abortion, low birth weight babies or serious infections that are associated with an increased risk of perinatal death. According to the National Aids Control Organization (NACO), syphilis, which earlier used to affect about 8% of pregnant women has been reduced to less than 1%.[19] However, due to absence of active surveillance, an accurate assessment of the magnitude of syphilis in pregnancy has yet to be made.[19] Among the screened patients, the prevalence rate for HIV was 1 (0.1%), which is slightly lower than the cases between 2014 and 2015 (0.49%).[20] During the study period, out of 1000 pregnant women, seroprevalence of HIV was 0.1%. So, finding in our study is low compared to other study like G. S. Ashtagi et al shows prevalence of 0.70% (G. S. Ashtagi, 2011).[21] Shazia Parveen et al shows prevalence of (0.97%) (Shazia Parveen et al, 2015)[16] and Harshita et al shows prevalence of (5.17%) (Harshita et al, 2015).[11] The number of people living with HIV has been increasing in every region. India is categorised as a low prevalence nation for HIV with a seroprevalence rate of less than 1% among the adult population. Our study indicates a lower trend of HIV prevalence. Even though, our study population is not representative of whole India because of ours being a hospital-based study with limited sample size. The data show a HIV spread in pregnant mothers. This will directly transform into a high perinatal transmission and a reciprocal increase in paediatrics AIDS cases. Therefore, it may be recommended that even though the curative treatment for HIV is not available. At present, we can minimise, if not prevent, the paediatrics HIV infection by early screening of pregnant mothers for HIV followed by perinatal short-term chemotherapy, safe delivery practices and modified infant feeding.

CONCLUSION

So, increasing awareness of transmission and regular screening for HbsAg, HCV, syphilis and HIV among pregnant women is recommended. The findings of this study support the opinion that pregnant women should be screened for infection at the first antenatal clinic visit, so that adequate clinical management can be planned for them. Early diagnosis of disease in antenatal period is helpful for proper management and initiation of treatment to prevent transmission to newborn. This study can help the health professionals to efficiently treat antenatal patients.

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