

Seroprevalence and Related Risk factors of HBsAg, Anti—HCV and Anti—HIV Antibody Among Pregnant Women of Rural India

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BACKGROUND: Vertical transmission is also mode of transmission of HBV, HCV and HIV. Viral infections may cause abortion, ectopic pregnancies and HBV, HCV also causes hepatitis, cirrhosis. 'Janani Sureksha Yojana' (safe motherhood program) is a scheme in which pregnant women are benefited if they deliver in government medical facility. Antenatal screening for HBV, HCV and HIV should be done so as to provide appropriate antiviral therapy. The aim of study was to detect the frequency of HBsAg, HCV antibody, HIV antibody and their correlation with risk factors.

METHODS: Present study was conducted in central laboratory of Rural Institute of Medical Science and Research Safai, Etawah (Uttar Pradesh) on pregnant women from 1 January to 31 December 2014.

RESULTS: Out of 7867 women, 2.07% were positive for HBsAg, 0.43% and 0.13% for HCV antibody and HIV antibody, respectively. The age group with maximum seropositivity was in 21-30 year (76.44%) and parity with maximum seropositivity was 3-4 children (42.30%). Seropositivity was high among low socio economic status (77.40%). Among the associated risk factors Obstetric and Gynaecology surgeries (46.15%) and blood transfusion (20%) were prominent. These associated risk factors were found more among HBsAg seropositive females (86.66%) and (84.61%) respectively.

CONCLUSION: The prevalence of HBsAg positive (2.07%) was more. Obstetric and Gynaecology surgery, blood transfusion were major risk factors. So, screening for HBsAg, HCV antibody, HIV antibody should be mandatory for pregnant women to reduce mortality and morbidity.

KEY WORDS: Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Human Immuno-deficiency Virus (HIV), Pregnant women, Janani sureksha yojana (JSY)

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Introduction

The main infectious agents screened in the follow up of pregnancy are usually the TORCH (Toxoplasmosis, Rubella, Cytomegalovirus,

Herpes and other viruses and bacteria such as Syphilis) group. But there are also some viruses such as HBV, HCV and HIV which can be transmitted from infected mother to fetus vertically. However, these viral infections transmission risk increases among persons who are given un-sterilized therapeutic injections, sharing of infected needles among I.V. drug abusers, having unsafe sex, cosmetic alterations such as tattooing, body piercing done by infected needles, transfusion of contaminated blood, sharing of infected items like tooth brushes, razors or persons going to street barbers for haircut, face and arm pit shaving [1]. Maternal to fetal or infant vertical transmission may also occurs during pregnancy and childbirth. The risk of transmission ranges from 10% in first trimester to as high as 90% in 3rd trimester and it is specially high 90% from those mothers who are seropositive of HBsAg and HBeAg [2]. In endemic regions such as Africa & south east Asia, spread from an infected mother to neonates during birth is common (vertical). These infected neonate often lead to carrier state for life. The major complications of HCV infection are maternal which predominantly involves hepatitis, hepatic failure and hepato cellular carcinoma. Vertical transmission of HCV is uncommon, however, it causes complications when additive to either HBV or HIV which is increasing nowadays [3]. There is increased incidence of post-partum haemorrhage, hepatic coma and haemorrhagic manifestation. The effect of HIV on pregnancy are preterm delivery, fetal growth restriction, spontaneous abortion and ectopic pregnancies [4]. There are three major routes of transmission of HIV viz. sexual contact, parenteral inoculation and passage of the virus from infected mothers to their new born [5]. The possibility of vertical transmission of these viral infections highlights the importance of screening of HBV, HCV and HIV among pregnant women.

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Janani Sureksha Yojana (JSY) is central government scheme in which all pregnant women, irrespective of age, poverty status and number of birth are eligible for benefits under JSY if they deliver in government medical facility⁶. It has benefits making it possible to refer these infected women for antiviral therapy at appropriate time so as to prevent further complications of these viral infections and her baby.

Methods

This retrospective study was conducted in central laboratory of Rural Institute of Medical Science & Research, Saifai, Etawah (U.P.) on pregnant women who attended tertiary care hospital benefitted by Janani Sureksha Yojana. The study was carried out from 1st January 2014 to 31 December 2014. All relevant clinical detail was collected using a well defined proforma. HBV screening was done by testing for HBsAg. It is an in-vitro immuno chromatographic (rapid), one step assay designed for qualitative determination of HBsAg in human serum manufactured by SD bio standard diagnostic. The screening of HCV was done by SD Bioline HCV test kit. It is an immuno chromatographic (rapid) test for the qualitative detection of antibodies specific to HCV, in human serum, plasma or whole blood. HIV test was screened using Alere Trueline HIV- $\frac{1}{2}$ which is an immuno chromatographic (rapid) test for the qualitative detection of antibodies of

all isotypes specific to HIV-1 and HIV-2 simultaneously in human serum, plasma or whole blood.

Results

Out of the 7867 screened pregnant women 163 (2.07%) were found positive for HBsAg, 34 (0.43%) were found positive for HCV antibodies and 11 (0.13%) for HIV antibodies [Table 1].

Co-infection of HBV and HIV was found in 0.01%. Similarly, co-infection of HCV and HIV was found in 0.02%. The most common age group for blood borne viral pathology was 21-30 years (76.44%). Parity 3-4 was common for viral infections accounting for (42.30%) [Table 2]. Similarly, low social economic status was also common (77.40%) among all seropositive women [Table 3].

The associated major risk factors were obstetrics and Gynaecology surgery (46.15%), blood transfusion (20%) and nose/ear piercing (15.38%). History of these associated risk factors was found more in relation with HBsAg positive pregnant women. Obstetrics and Gynaecology surgeries (86.66%), blood transfusion (84.61%), nose, ear piercing and tattooing (80.00%), husband staying away from home for earning (66.66%), hepatitis (75%), dental procedure (100%) and multiple injection (100%) were found more associated with HBsAg infection [Table 4].

Table 1. Age distribution of pregnant women tested for HBsAg, HCV antibodies & HIV antibodies

Age group (Years)	Total Pregnant women tested	HBsAg positive	HCV antibodies positive	HIV antibodies positive	Total tests positive
10-20	825 (10.48%)	6 (3.68%)	1 (2.94%)	0	7 (3.36%)
21-30	5388 (68.48%)	126 (77.30%)	24 (70.58%)	9 (81.81%)	159 (76.44%)
31-40	1624 (20.64%)	30 (18.40%)	9 (26.47%)	2 (18.18%)	41 (19.71%)
41-50	30 (0.38%)	1 (0.61%)	0	0	1 (0.48%)
Total	7867	163 (2.07%)	34 (0.43%)	11 (0.13%)	208 (2.64%)

Table 2. Parity distribution of pregnant women tested for HBs Ag, HCV antibodies & HIV antibodies.

Parity	Total	HBs Ag positive	HCV antibodies positive	HIV antibodies positive	Total tests positive
Primi-parous	1580 (20.08%)	12 (7.361%)	4 (11.76%)	3 (27.27%)	19 (9.13%)
1-2 children	2025 (25.74%)	56 (34.35%)	15 (44.11%)	4 (36.36%)	75 (36.05%)
3-4 children	2351 (29.88%)	78 (47.85%)	8 (23.52%)	2 (18.18%)	88 (42.30%)
More than 4	1911 (24.29%)	17 (10.42%)	7 (20.58%)	2 (18.18%)	26 (12.5%)
Total	7867	163	34	11	208

Table 3. Socio-economic status of pregnant women tested for HBs Ag, HCV antibodies & HIV antibodies [According to Kuppuswamy Grading]

Socio-economic status	Total pregnant women tested	HBs Ag positive	HCV antibodies positive	HIV antibodies positive	Total tests positive
Low	5982 (76.03%)	129 (79.14%)	26 (76.47%)	6 (54.54%)	161 (77.40%)
Middle	1223 (15.54%)	28 (17.17%)	5 (14.70%)	3 (27.27%)	36 (17.30%)
High	662 (8.41%)	6 (3.68%)	3 (8.82%)	2 (18.18%)	11 (5.28%)
Total	7867	163	34	11	208

Table 4. Associated risk factors among pregnant women positive for HBsAg, HCV-antibodies and HIV-antibodies

Associated risk factors (H/O)	HBs Ag positive pregnant women	HCV positive pregnant women	HIV positive pregnant women	Total
Obstetrics and Gynaecology Surgeries	26 (86.66%)	3 (10.00%)	1 (3.33 %)	30 (46.15%)
Blood transfusion	11 (84.61%)	1 (7.69%)	1 (7.69%)	13 (20.00%)
Nose, ear piercing & Tattooing	08 (80.00%)	02 (20.00%)	00	10 (15.38%)
Husband living away	04 (66.66%)	01 (16.66%)	01 (16.66%)	06 (9.23%)
Hepatitis	03 (75.00%)	01 (25.00%)	00	04 (6.15%)
Dental procedure	01 (100%)	00	00	01(1.53%)
Multiple injections	01(100%)	00	00	01 (1.53%)
Total	54 (83.07%)	8 (12.30%)	3 (4.61%)	65

Discussion

Infections due to HBV, HCV and HIV are the major concern throughout the globe. Hepatitis B virus is a DNA virus of the family Hepadna viridae and causative agent of hepatitis B infection. The virus is transmitted by parenteral route, sexual contact, vertical transmission and through breast milk. If mother is positive for HBV infection then transmission of HBV to infant risk increases from 10% in first trimester to as high as 90% in third trimester of pregnancy. Approximately 10% of the infected patients will become chronic carriers of HBV [2]. They are at high risk of developing chronic active hepatitis, cirrhosis and hepatocellular carcinoma whereas in infected neonates causes chronic carriers and Approximately 25% of carrier neonates will die from cirrhosis or hepatic carcinoma between late childhood to early adulthood [2].

All screening tests among pregnant women HBsAg, HCV antibodies and HIV antibodies were done under Janani Sureksha Yojna (JSY), launched on 12 April 2005 in India. Aim is to reduce neonatal and maternal deaths happening in country by promoting institutional delivery of babies [6]. JSY literally means maternal protection scheme. JSY provide cash incentive to all women on birthing in health institution, cash incentive is intended to reduce financial burden to accessing

institutional care for delivery. All pregnant women, irrespective of age, poverty status and number of birth are eligible for benefits under JSY if they deliver in government medical facility. The frequency of HBsAg in present study was 2.07% which was much lower and comparable with 4.60% in study done by Taseer H. et. al. [7], 6% in study done by Oluboyo [8] and 3.2% in study done by YUcela [9]. The prevalence of hepatitis B infections among pregnant women varies in different parts of world and from one population to another even in country [8]. Due to geographic patterns of diseases and similar patterns of transmission, notably through I.V. drug abuse, blood transfusion and sexual activity, there are growing cases of co infection of HIV with hepatitis virus specially Hepatitis B and C virus [10]. It is therefore common to observe co infection involving HIV and HBV, HIV and HCV or even all three viruses in one patient alone [11, 12]. The effects of these hepatitis viruses on HIV disease progression remained controversial. Studies have revealed that the viruses may actually increase rate of progression to AIDS and AIDS related death, impaired immune reconstitution, elevate risk of hepato toxicity from HAART therapy and overall level of CD4 count, all symptoms which have been observed to account for a reduced rate of survival for co infection patients than for those with HIV mono infection [13]. While HIV infection may lead to more aggressive HBV or HCV infection and rapid

progression to cirrhosis and end stage liver disease [14].

In present study, coinfection of HBsAg and HIV was found in one pregnant women (0.01%) which was much lower than study done by Ajayi [15].

Hepatitis C virus is an RNA virus of the Flaviviridae family and appears to have humans and chimpanzees are the only species susceptible to its infection [16]. It is recognized as major cause of fulminant hepatitis, hepatic failure. The frequency of HCV antibodies in this study was 0.43% which was comparable with study done by Taseer HI [7] and Oluboyo BO [8] reported low prevalence which may be due to low prevalence of HCV antibodies among rural inhabitants. Reason behind that is most of rural inhabitants male are farmers and do not move outside for the earning so less chances of sexual transmission of the viruses and pregnant women in majority were house wives so are at more risk of transmission from husbands. The risk of perinatal transmission is much lower with hepatitis C (6% of birth from infected mothers) than with Hepatitis B (20-60%) of birth from infected mothers [17]. Increased risk of HCV transmission is associated with parallel HIV infection in at least 15% [18]. Coinfection of HCV and HIV was found among 2 (0.02%) pregnant women of 21- 30 years age group whereas Ajayi BB [15] found (0.2%) which was much higher.

Acquired immunodeficiency syndrome (AIDS) is caused by Human immune deficiency virus (HIV) which is a group of retrovirus HIV-1 and HIV-2. Exact timing of HIV transmission from mother to fetus or infant not known with certainty but some infected in uterus, late gestation or during delivery or via breast milk in lactating mothers. However, mostly occurs during child birth [2]. Preterm delivery, fetal growth restriction, spontaneous abortion and ectopic pregnancies are also reported more often and acquiring HIV during pregnancy is higher and may be due to hormonal influence or pregnancy related immune suppression [4]. Seropositivity of HIV was 0.13% much lower than study done Yucel A [9].

The majority of the seropositive cases of these viruses 159 (76.44%) were in the age group of 21-30 years [Table 1] which was consistent with study done by Taseer [7]. In present study, the seropositivity for HBsAg , HCV antibodies , HIV

antibodies were also related to parity. Parity 3-4 (42.3 %) showed maximum sero positivity [Table 2]. These findings related to parity are similar with finding done by Kumar A [19] who also found that multi parous have more chances of such viral infections . Supportive of this is that acquiring HIV during pregnancy is higher and may be due to hormonal influence or pregnancy related immune suppression [4].

Social economic status among these pregnant women was low in majority (76.03%) [Table 3]. The criteria applied were Kuppaswamy socioeconomic status scale which includes education, occupation and family income per month. It is used to measure socioeconomic status of families [20]. Sera positive pregnant women belonging to low socio economic status was 77.40%. Supporting this, hepatitis is more restricted to the ill nourished mothers, living in unhygienic environment [2]. Inadequate nutrition may increase risk of HIV transmission by influencing maternal and child factors transmission. Micronutrients reduced level prevalent in many HIV infected population and reported that they impair system immune response weaker epithelial integrity and of placenta, genital tract and associated with increased HIV disease process.

Obstetric and Gynaecological surgeries were major associated risk factor (46.15%). History of Obstetric and Gynecology surgeries were found more in HBs Ag sero positive women (86.66%), followed by HCV (10%) and HIV sero positivity (3.33%)[Table 4].Explanation is most of the surgeries was done by untrained dais under unhygienic conditions.

One who had received blood transfusion of HIV infected whole blood or components accounts for 1% of patients [5]. Similarly, Hepatitis B and C also spread via contaminated blood transfusion. Seropositivity among blood donors was 2.63% for HBsAg, 0.34 % for HCV antibodies and 0.19 % for HIV antibodies in Saifai, Etawah (U.P.) [21]. History of blood transfusion was found in 20.0 % among seropositive pregnant women. Maximum correlation was with HBsAg seropositivity (84.61%) followed with HCV antibody (7.69%) and HIV antibody (7.69%) sero positivity. Reason for transmission is improper screening of blood donor and positivity in window period.

The other remaining risk factors found were nose/ear piercing and tattooing, hepatitis, dental

procedure and multiple injections.

Conclusion

All the pregnant women can only be identified against HBV, HCV, HIV through screening during pregnancy. Prevention of these blood born viral infection in the pregnant women is a key element to reduce such infections. Janani Sureksha Yojana is highly beneficial scheme to

pregnant women specially in rural population among poor which provides free screening of these viral infections. So, such national scheme should be enhanced.

Conflict of Interest : None declared

Ethical clearance was taken from institutional ethical committee.

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