

## Screening for HBV, HCV, HIV, HSV and Syphilis in reproductive age group women attending a tertiary care hospital in South India

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### Abstract

**Introduction:** Reproductive tract infections (RTI) and Sexually transmitted infections (STI) are the major contributing illnesses among the women of reproductive age group in a developing country like India. Even though preventive measures has been implemented at all health care levels and treatment seeking behavior has increased to a achievable level, still there is a lack of exact epidemiological data about RTI and STI.

**Aims and Objectives:** To estimate the proportion of HBV, HCV, HIV, HSV and syphilis positive cases by serological methods and to correlate the significance of age with positivity.

**Materials and Methods:** A prospective study conducted among 110 women over a period of one year who presented with symptoms and signs of RTI. Screening for HBV, HCV and HSV done by Enzyme Linked Immuno Sorbent Assay (ELISA). Screening for HIV was done by rapid methods according to NACO guidelines. Screening for syphilis was done by Rapid Plasma Reagin (RPR) test and then positive cases was confirmed by Treponema Pallidum Haemagglutination Assay (TPHA).

**Results:** 25.45% of the samples showed positivity for HSV-2 IgG antibodies. 1.89% of the samples were positive for HbsAg antigen detection. 0.91% showed positivity for Treponema pallidum infection. None of the samples were positive for HIV or HCV infection.

**Conclusion:** As there is an increased chance of acquiring STI in genital tract infections, screening for sexually transmitted infections by serological methods should be made mandatory in women with symptoms and signs of genital tract infections at all health care centres.

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### Introduction

In a developing nation like India, Reproductive tract infections (RTI) and Sexually transmitted infections (STI) are the most common problem, which causes distress among the women of reproductive age group that in turn affects the family and society. The response of Government and society to RTI and STI is more influenced by the stigma towards sexual behavior than the degree of distress caused by the illness. Individuals suffering from RTI have significantly increased chance of acquiring and transmitting Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Herpes Simplex virus (HSV) and Treponema pallidum. Even though the advent of penicillin therapy has significantly reduced the incidence of syphilis, it still remains as a global health problem. Each year, there are estimated 357 million new infections with 1 of 4 STIs: Chlamydia (131 million), gonorrhoea (78 million), syphilis (5.6 million) and trichomoniasis (143 million). More than

500 million people are living with genital HSV (herpes) infection.<sup>(1)</sup> In pregnant women, the transmission to child leads to mid trimester abortion, still born and baby born with birth defects. Studies estimated that 15 to 40% of syphilitic patients develop late complication, if left untreated.<sup>(2)</sup>

India accounts for 10 to 15% of the HBV carriers all over the world. India has more than 37 million HBV carriers and contributes a large proportion of this HBV burden.<sup>(3)</sup> The mode of transmission for Hepatitis B and Hepatitis C infections are sexual, blood transfusion and through needle sticks injuries. Both HBV and HCV have significant association with the causality of hepatocellular carcinoma that appears years after infection. Screening for HBV and HCV infections are mandatory during blood transfusion, during surgeries, during pregnancy and if the person is diagnosed with any of the sexually transmitted disease. Exposure to HSV through oral or genital sexual contact permits the entry of the virus through the skin abrasions or minor trauma. Pregnant women with genital herpes lead to preterm delivery, neonate with HSV meningitis and septicemia. Therefore screening for HIV, HBV, HCV, HSV and Syphilis is mandatory for all cases with complaints suggestive of RTI/STI.<sup>(4)</sup> Hence this study is aimed at estimating the proportion of HIV, HBV, HCV, HSV and Syphilis positive cases by using serological methods.

## Materials and Methods

A prospective study was conducted on 110 women attending Gynecology OPD at a tertiary care teaching hospital over a period of one year (June 2014 to May 2015). The inclusion criteria were age group 18-45 years, women with history of vaginal discharge, lower abdominal pain, itching and burning micturition. The exclusion criteria were unmarried women, pregnancy, women on menstruation, women who have undergone hysterectomy, women on antimicrobial therapy and who is on chronic illness. After getting informed consent, brief history was obtained and about 5ml of blood sample was collected from each patient. The serum was separated and used for serological evaluation.

Screening for *Treponema pallidum* was performed by Rapid Plasma Reagin (RPR) kit (Span Diagnostics Limited) and further confirmation done by IMMUTREP® TPHA (Omega diagnostics Ltd.). Detection of HbsAg was done by Microwell ELISA test for the detection of Hepatitis b surface antigen – HEPALISA. Detection of HCV was done by Microwell ELISA test for the detection of antibodies to Hepatitis C Virus – MICROLISA. DS-EIA-ANTI-HSV-2-G-FAST (DSI S.r.l. Italy) was used for determination of IgG antibodies to Herpes Simplex Virus type 2 in serum. Screening for HIV done by rapid diagnostic kits and interpreted according to NACO guidelines of Strategy III (To detect HIV infection in asymptomatic individuals in VCTC and PPTCT clinics). The kits used were HIV-TRIDOT (J.Mitra & Co. Pvt Ltd), HIV-1/2 Triline Card test (SD Biotec) and CombAids RS advantage (Span diagnostics Ltd). The report for HIV testing was collected from ICTC with consent and strict confidentiality. All the serological tests were done as per the instructions supplied by the kit provider with appropriate quality check.

## Statistical Analysis

Data was formulated in terms of frequency distribution for different variables. The data was analyzed using Epi-Info software (7.1.0.6 version; Center for disease control, USA) and Microsoft Excel 2010.

## Results

A total of 110 samples were collected over a period of one year, were processed and the results are shown

as follows. Age wise distributions of the subjects were analyzed (Table 1). The range of age was 20 to 43 years. The median age was 26. The majority (43.63%) of the study population was in the age group of 21 to 25 years, followed by the age group of 26 to 30 years (33.64%).

Discharge per vaginum (82, 74.55%) was the major presenting complaint, followed by abdomen pain (56.36%), itching (23.64%) and then burning micturition (17.21%). Among the 110 subjects, 40% had Discharge per vaginum, 37.27% had no clinical sign, and 14.55% had multiple signs like redness, erosions and nodule. All the study subjects who presented with symptoms of discharge per vaginum were not presented with the clinical sign as discharge per vaginum.

The analysis of the results of the serological tests and the correlation with the age group is depicted in Table 2 and Table 3 respectively. 25.45% of the samples showed positivity for HSV-2 IgG antibodies. 1.89% of the samples were positive for HbsAg antigen detection. 0.91% showed positivity for *Treponema pallidum* infection. None of the samples showed positivity for HCV and HIV infection by antibody testing.

**Table 1: Distribution of age group among the study population**

Age (years)	No. of patients	Percentage (%)
18-20	4	3.64
21-25	48	43.64
26-30	37	33.64
31-35	11	10
36-40	8	7.27
41-45	2	1.81
Total	110	100

**Table 2: Percentage of positivity of STI among the study population**

Serological test	No. of positives (N= 110)	Percentage (%)
Syphilis	1	0.91
HBV	2	1.89
HCV	0	0
HIV	0	0
HSV – 2	28	25.45

**Table 3: Correlation of Age and Sexually transmitted infections**

Age Vs Number of Combined Co infections	1	2	3	Nil	Total	%	P value Fishers Exact Test
≤ 20 years	3	0	0	1	4	3.64	0.0665
21-30 years	17	3	0	65	85	77.27	0.2078
31-40 years	4	0	0	13	17	15.45	> 0.9999
> 40 years	1	2	0	1	4	3.93	> 0.9999
Total	25	5	0	80	110	100	

## Discussion

On analyzing the samples subjected to serological testing, HSV 2 was the predominant infectious agent (25.45%). The positivity for HBV (1.89%), Syphilis (0.91%) was noted in our study group (Table 2). This differs from other research studies like Devinder et al., (82.9% HSV 2 infection) and Madhivannan et al., (11.3% HSV 2 infection).<sup>(5,6)</sup> This variation in the data is supported by a global review narrated by Smith and Robinson who suggested that HSV-2 prevalence depends upon residence, population subgroup, age and sex.<sup>(7)</sup> The major problem with HSV II infections are unidentified carrier state which acts as a source of threat by silent transmission of infection. The frequent reactivation of the latent stage of the virus from the genital tract led to continuous spread of virus throughout the world.

In our study group, there was nil clinical sign (i.e., Chancre) suggestive of primary syphilis. Serological screening for syphilis revealed 0.91% positivity in the study population as detected by RPR, which was further confirmed by TPHA. This finding is corroborative with 1.5% of syphilis cases identified by Prasad *et al.*,<sup>(8)</sup> In pregnant women, the transmission to child leads to mid trimester abortion, still born and baby born with birth defects. It is important to screen for syphilis for those who present with respective symptoms and signs to avoid the consequences of spread to partner.

Women of childbearing age have a risk of transmission of HBV to their offspring and hence it is a must to screen all the women for HBV infection and carrier state. 1.89% of our study group were positive for HBV. This is an underestimate when compared with other studies that range from 9.51%- 14.07%, which is mainly due to lesser sample size.<sup>(9,10)</sup> Vertical transmission of HBV to fetus causes low birth weight, prematurity and chronic complications. In women with acute hepatitis, the transmission rate is around 90%, whereas the chronic carrier state without immunoprophylaxis, the rate ranges from 10 to 20%. The useful detection methods are ELISA for HBV antigens and antibodies and PCR for the viral DNA analysis. The sensitivity of HEPALISA used in India is around 99%.<sup>(9)</sup> Rapid card test based on immunochromatography principle is also widely used but the sensitivity differs based on the manufacturer. Hence it is advisory to do appropriate laboratory method for the screening and diagnosis of HBV.

As the sample size was less in our study, HCV and HIV were negative among the group. This correlates with other studies, which estimates that HCV infection in pregnant women is 0.5%.<sup>(16)</sup> In a meta-analysis, the pooled transmission rate of vertical transmission of HCV to neonate was 5.8%, whereas the carriers with HIV co-infection, the rate is 10.8%.<sup>(16)</sup>

A number of studies have been conducted to demonstrate the prevalence of HBV, HSV, HIV and

syphilis among reproductive age group women.<sup>(11,12,13)</sup> Many studies have postulated a strong association between HSV-2 positivity and HIV/Syphilis infections.<sup>(14,15)</sup> However, no such association was made in our study due to different set of population involved in various studies. The vulnerability of women to acquire HSV, HBV, HIV, HCV and syphilis is due to lack of knowledge about the infection rates, insufficient access to prevention, inability to adopt safer sex due to male dominance and lack of easy availability of female condoms. Hence targeted interventions should be aimed at prevention strategies through information and health education.

## Conclusion

A complex interplay of factors like sexual promiscuity, unprotected sexual behavior, stigma towards the sexually transmitted infections and non-availability of screening modalities at all the levels of health centres contributes to increased occurrence of genital tract infections in our country. Hence, screening for sexually transmitted infections by serological methods are mandatory in women with symptoms and signs of genital tract infections at all health care centres.

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