

Sexually transmitted infections in pregnant women and their partners: A clinico-epidemiological study at a tertiary care center, Mumbai, Maharashtra

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Abstract

Background: Sexually transmitted infections (STIs) during pregnancy are associated with adverse fetal outcome. They should be aggressively sought and treated. We did an analytical study with the primary aim to know the occurrence of STIs in pregnant women and their spouses. **Materials and Methods:** An observational cross-sectional analytical study of pregnant women with STIs and their spouses was conducted at a tertiary care hospital. Demographic parameters and medical history were recorded. Clinical examination and necessary investigations were done in pregnant females and their spouses. History about sexual behavior and knowledge of STIs were obtained from the questionnaire. **Results:** The prevalence of STIs in pregnant women was 2.1% ($n = 61$) out of 2894 pregnant women who attended our institute during the study period with the highest prevalence of HIV (1.1%), and out of 54 examined spouses, 32 spouses were suffering from STIs. Overall, women had poor awareness, knowledge of STIs, and preventive measures compared to men. A significant association was seen between level of education and awareness about HIV/AIDS and other STIs, both in pregnant women and their spouses. **Conclusion:** Our study showed an overall low prevalence of STIs among pregnant women but showed higher HIV and syphilis prevalence as compared to national prevalence. The serodiscordancy rate was found to be high in HIV, syphilis, and hepatitis B.

Key words: Antiretroviral therapy, HIV, pregnant women, sexual behavior, syphilis

Introduction

Sexually transmitted infections (STIs) are major health problems in India and their epidemiology varies from one region to another region within the country. Studying the occurrence of STIs is important for implementation of strategies for their control. Even though STIs are less common in pregnancy, they should be detected early and treated to prevent parent-to-child transmission (PTCT).^[1,2]

There are more than 30 different sexually transmissible bacteria, viruses, and parasites. STIs that affect pregnant women and potentially affect fetus include syphilis, gonorrhoea, trichomoniasis, chlamydia, hepatitis B, HIV, and herpes simplex virus 1 and 2. However, little has been reported on the prevalence of these infections among pregnant women.

We did an analytical cross-sectional study with the primary aim to know the prevalence of STIs in pregnant women their sexual behavior and knowledge regarding HIV and other STIs. We have also studied the same in their spouses as part of partner management of STIs.

Materials and Methods

Study design

It was an observational cross-sectional descriptive study which was conducted at a tertiary care hospital in Mumbai for a period of 21 months from February 2020 to October 2021 after taking Institutional Ethics Committee approval.

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Inclusion criteria

All pregnant women (age >18 years) with STIs and their spouses who were willing to participate in the study were included.

Pregnant women with symptoms and signs suggestive of STI were investigated for the same. Testing for hepatitis B, hepatitis C, HIV, venereal disease research laboratory test (VDRL), and treponema pallidum hemagglutination test (TPHA) was done in all the pregnant women visiting our hospital (as per the National AIDS Control Programme-India). Genital warts and scabies were diagnosed only clinically. Syphilis was diagnosed by serological tests; both VDRL and TPHA tests were done. HIV was diagnosed by the enzyme-linked immunosorbent assay for HIV 1 and HIV 2. Hepatitis B was diagnosed by antigen testing. Gram stain and wet mount were done in pregnant women with vaginal discharge. Those with reproductive tract infections (RTI) such as vaginal candidiasis and bacterial vaginosis were not included. The spouses of pregnant women with STIs were examined and investigated for the same. History about sexual behavior, knowledge of STI, and preventive measures were obtained from both pregnant woman and her spouse with the help of questionnaire (questions were taken from the Centre for Disease Control, US website). Informed written consent was obtained from all the study participants.

Statistical analysis

The data were coded and entered in the Microsoft Excel Office 2019 and were analyzed using SPSS Version 10.0 SPSS Inc., Chicago, (11, USA). The categorical data were summarized as percentage and proportions while continuous variable as mean and standard deviation. Chi-square was performed to see the association between awareness of STIs and education. A significant level was accepted at $P < 0.05$.

Observations and Results

A total of 2894 pregnant women at various trimesters attended our institute during the study period, out of which 61 pregnant women were diagnosed with STIs. Spouses of 54 pregnant women were evaluated (2 spouses died and 5 refused examination).

Demographic details

The mean age of the women was 27.1 years with standard deviation of 5.05 and the mean age of spouses was 29.3 years with standard deviation of 4.9. The literacy rate among pregnant women was 85.25% and among spouses was 96.35%. Seventy percent of pregnant women were primigravida. Out of 61 pregnant women, 58 were married, 2 were widowed, and 1 was separated from her husband. Majority of them (86.6%) were homemakers.

Pattern of sexually transmitted infections

Of screened 2894 pregnant women, 61 had STIs accounting for the prevalence of 2.1% with highest of HIV, and out of 54 examined spouses, 32 had STIs. The prevalence of individual STIs among pregnant women is depicted in Table 1. The pattern of STIs among spouses is described in Table 2. Of 33 HIV-positive pregnant women, 17 were known to be HIV positive before the current pregnancy and were on antiretroviral therapy (ART). Most of the HIV-positive women (84.8%) were asymptomatic. Of 23 infants who underwent dried blood spot HIV-1-polymerase chain reaction (PCR) testing at 6 weeks postdelivery, none of the infants came

positive. All pregnant women with positive hepatitis-B surface antigen (HbsAg) status (0.3%) were asymptomatic and were diagnosed during routine screening. Infants born to hepatitis B-positive mothers were not tested for the same, as testing is to be done after 18 months, and we could not get that long a follow-up.

Fourteen pregnant women had positive TPHA and VDRL, all were asymptomatic with low titer of VDRL, and only two women had titer more than 1:8. Out of total 2894 pregnant women, 10 (0.34%) women had biological false-positive VDRL. Six spouses had reactive TPHA and VDRL, and all were asymptomatic. All mothers received injection benzathine penicillin 4 weeks before delivery except one who received 1 week before delivery. All infants and mothers were tested again postdelivery, and none of the infants showed four times higher VDRL titer than mothers and no infant had signs and symptoms suggestive of syphilis attributed to zero congenital syphilis cases [Figure 1]. In our study, we did not encounter any patient with concurrent STIs.

Sexual behavior and awareness of sexually transmitted infections

None of the participants admitted homosexual behavior. The prevalence of premarital/extramarital sexual contact among pregnant women was 18%. All the study participants (pregnant women and spouses) denied a history of intravenous drug usage and blood transfusion. The percentage of serodiscordancy (positive – pregnant woman; negative – spouses) in various STIs is depicted in Table 3. The percentage of condom awareness among pregnant women was 75.4%, whereas among spouses, it was 94.4%. Only 44% of spouses could explain proper method to use condom.

Overall women had less knowledge than men about HIV/AIDS and other STIs [Table 4].

In our study, the awareness of STIs was found to be significantly related to the educational qualification of study participants [Table 5].

The clinical photographs of the patients from our study are depicted in Figure 2a-d.

Table 1: Profile of prevalence of individual sexually transmitted infections in pregnant women (n=2894)

STIs in pregnant women	Number of pregnant women (%)
HIV	33 (1.1)
Syphilis	14 (0.5)
Hepatitis B	8 (0.3)
Scabies	3 (0.1)
Anogenital wart	3 (0.1)
Total	61 (2.1)

STIs=Sexually transmitted infections

Table 2: Profile of pattern of sexually transmitted infections in spouses (n=54)

STIs in spouses	Number of spouses (%)
HIV	18 (33.33)
Syphilis	6 (11.11)
Hepatitis B	3 (5.56)
Scabies	3 (5.56)
Anogenital wart	2 (3.70)
Total	32 (59.26)

STIs=Sexually transmitted infections

Table 3: Serodiscordancy rate among couples, female-positive and spouse-negative

STIs	Pregnant women-positive	Spouse status-positive	Spouse status-negative	Spouse status-unknown	Serodiscordancy rate (%)	Seroconcordancy rate (%)
HIV	33	18	14	1	43.7	56.4
Syphilis	14	6	6	2	50.0	50.0
Hepatitis B	8	3	1	4	25.0	75.0

STIs=Sexually transmitted infections

Table 4: Awareness of HIV/AIDS and other sexually transmitted infections among study participants

Awareness of HIV/AIDS and other sexually transmitted infections	In pregnant women (n=61) (%)	In spouses (n=54) (%)
Condom awareness (in terms of protection against STIs)	75.4	94.4
Heard of HIV/AIDS	91.8	94.4
Modes of transmission of HIV/AIDS	75.4	83.3
Modes of prevention of HIV/AIDS	60.7	66.7
Awareness regarding other STIs (in terms of symptoms <i>per se</i>)	45.9	51.9

STIs=Sexually transmitted infections

Table 5: Awareness of sexually transmitted infections and HIV/AIDS in relation to educational qualification among study participants (pregnant women and spouses)

Awareness	Illiterate	Level of education-primary and above	Total	χ^2	P
Condom	4	92	96	19.57	<0.05
Heard of HIV/AIDS	6	101	107	24.12	<0.05
Modes of transmission of HIV/AIDS	4	86	90	12.54	<0.05
Modes of prevention of HIV/AIDS	3	69	72	06.48	<0.05
Other STIs	1	54	55	07.31	<0.05

STIs=Sexually transmitted infections

Discussion

In our study, the prevalence of STIs in pregnant women was 2.1% which was low as compared to other studies in India. The National AIDS Control Organization (NACO), India, in a community-based survey has reported a 32.5% prevalence of STIs in pregnant women which included both RTIs and STIs.^[3] A study by Simon^[4] in their STI clinic-based 20-year retrospective analysis has reported a prevalence of 14.83% in pregnant women. Primigravida and younger females accounted for majority of the STIs, hence the young adult population is the target group in the STI control program.

In this study, the most common STI among pregnant women was found to be HIV. The prevalence of HIV in pregnant women in our study was 1.1% (33) which is higher than the national HIV prevalence. As per the NACO, the overall HIV prevalence among pregnant women in 2019 was 0.24% (95% confidence interval [CI]: 0.22%–0.26%).^[5] Shyamala *et al.*^[6] from South-West India observed a rising trend of HIV in pregnant women from 0.2% in 1997 to 1.4% in 2001, but this was before the introduction of ART in the national program.

Giri *et al.*^[7] in their study from Loni, Maharashtra, had reported a significant decline of prevalence rate of HIV in pregnant women from 0.75% (2008) to 0.22% (2011). Whereas, a study done by Sibia *et al.*^[8] and Kwatra *et al.*^[9] had reported a prevalence of HIV in pregnant women as

1.08% and 1.38%, respectively. These findings were congruent with the prevalence found in our study (1.1%). However, the national prevalence of HIV in pregnant women is less than the present study.

In the present study, 17 out of 33 HIV-positive pregnant women were known to be HIV positive before the current pregnancy and were already on ART while the remaining 16 were newly diagnosed cases. Most of the HIV-positive women were asymptomatic. Twenty-two (66.7%) HIV-positive pregnant women were prescribed tenofovir, lamivudine, and efavirenz regimen and the remaining were prescribed tenofovir, lamivudine, and dolutegravir regimen as per recent NACO guidelines of transition to dolutegravir. All of these women had a good (average –95%–100%) adherence to ART throughout the pregnancy. All the infants who were born during the study period underwent a dried blood spot HIV-1-PCR test with zero PTCT of HIV.

It was observed that the key factors for zero PTCT were early initiation of ART, adherence to ART by mothers during pregnancy which led to very low viral load, and nevirapine prophylaxis to all newborns. Early testing, diagnosis of HIV, and initiation and adherence to ART during pregnancy should be emphasized to combat the PTCT of HIV and prevalence of HIV/AIDS in children.

Our study showed a 0.5% (14) prevalence of syphilis among pregnant women. The overall syphilis seropositivity in pregnant women reported by NACO in 2019 was 0.10% (95% CI: 0.08%–0.11%).^[5] Studies by Apparao and Siddartha,^[10] Sethi *et al.*^[11] and Biswas *et al.*^[12] had reported prevalence of 0.22%, 0.86%, and 1.02%, respectively. All females in our study who had latent syphilis were positive for both VDRL and TPHA. However, none of them admitted a history of syphilis or treatment taken for the same. The reason for latent syphilis could be an unnoticed primary infection. Furthermore, due to frequent intake of antibiotics for unrelated conditions, there may be a partial or complete cure of syphilis and hence only serological syphilis is encountered (“happencance treatment”).^[13]

Factors associated with transmission of syphilis to fetus include

1. High VDRL titers at treatment and delivery^[14-17]
2. Earlier maternal stage of syphilis^[14-17]
3. Shorter interval between treatment and delivery
4. Delivery of infant <36 weeks' gestation.

Hence, latent syphilis in mothers with low VDRL titer and adequate treatment of mothers could be the reasons of zero congenital syphilis in the present study.

In the present study, the hepatitis B prevalence in pregnant women was 0.3%. All ($n = 8$) HbsAg-positive pregnant women were asymptomatic and were incidentally diagnosed during routine screening. Studies done by Sibia *et al.*^[8] and Apparao and Siddartha^[10] reported 1.11% and 0.17%, respectively, seroprevalence of hepatitis B in pregnant women, which were similar to the findings reported in our study.

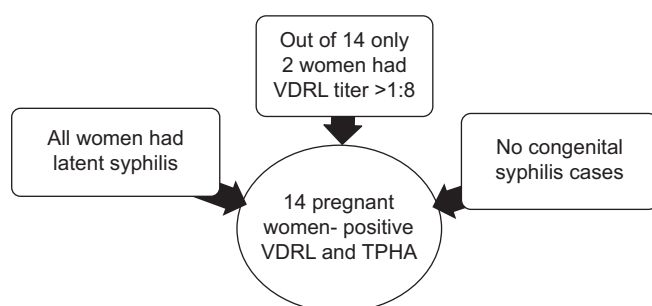


Figure 1: Syphilis in pregnant women. VDRL = Venereal disease research laboratory, TPHA = Treponema pallidum hemagglutination

In the present study, the prevalence of genital warts was 0.1% which was much lower than the 4.7% prevalence reported by Simon^[4] in their 20-year retrospective, STI clinic-based study. Of the 3 females with genital warts, spouses of 2 had penile warts on examination. No gonorrhoea, chlamydia, or herpes cases were reported. Pregnant women who may have had STIs such as gonorrhoea, which may be asymptomatic, may have been missed as they are not screened routinely in India.

Majority of STIs in pregnant women were asymptomatic and hence it is important to screen all the pregnant women for HIV, hepatitis B, hepatitis C, and syphilis in the first trimester itself. The WHO has also recommended that the first antenatal visit should be within 12 weeks of gestation, preferably, as soon as the pregnancy is suspected.

None of the participants admitted homosexual orientation and oral and anal sex were not reported by our patients. The percentage of oral sex in our study was 8.2%, similar to that reported in a study from North India (7%).^[18] Awareness of condom among pregnant women was 75.4% which is consistent with the data from national family health survey.^[19] Among the spouses, awareness of condom was 94.4%, though majority were aware about condom, only 44% could explain the proper method to use it. Although the National AIDS Control Programme promotes condom through Information, Education and Communication (IEC) activities, individual and sociocultural factors prevent its widespread acceptance. There is, therefore, a need for educating masses regarding proper condom usage. None of the women gave a history of using female condom, and very few had knowledge regarding it. The use of female condom should be popularized as a tool of women's empowerment. It helps them negotiate with their sexual partners and thus prevents the transmission of STIs. There was a high serodiscordancy rate in HIV, syphilis, and hepatitis B, hence adherence to treatment and safe sexual practices along with correct and consistent use of condom is very important to prevent transmission of incurable STIs, especially in married discordant couples. To eradicate HIV epidemic in India, acknowledgment of serodiscordancy issue is very important and necessary interventions need to be developed in government programs. Condom promotion, risk reduction counseling, voluntary counseling and testing, universal ART, and adherence to ART are effective strategies in the prevention of HIV infection to uninfected partners but are underutilized in India. Newer interventions such as preexposure prophylaxis (tenofovir and emtricitabine), male medical circumcision, and their acceptability in Indian population need to be evaluated.



Figure 2: (a) Penile warts - Multiple pink-colored verrucous papules which are coalescing at places on the glans and prepuce, (b) Perianal warts - Multiple skin-colored to grayish-white verrucous growths on the perianal area, (c) Scabies - Multiple skin-colored papulonodular lesions and few showing excoriated surface, (d) Vulval warts - Bulky labia majora with multiple pink to grayish-white warty growths on bilateral labia minora, labia majora, and vulval vestibule on shaft penis and scrotum

Overall women had less knowledge and awareness regarding STIs as compared to spouses. There was a significant association between education level of study participants and knowledge regarding HIV/AIDS and other STIs. Although majority of the study participants were aware of HIV/AIDS, there were still lacunae in their knowledge, and only 50% had knowledge regarding other STIs. Hence, IEC activities should be done to spread awareness. Sex education should be started from adolescence, so they can safeguard themselves from STIs and have a safe adulthood.

Conclusions

- Majority STIs in pregnancy are asymptomatic, hence its important to screen all ANC females as soon as pregnancy suspected.
- Our study showed overall low prevalence of STIs among pregnant women, but showed higher HIV and syphilis prevalence as compared to national prevalence.
- Early initiation ART, adherence to ART during ANC period and nevirapine prophylaxis to infant are very important to prevent mother to child transmission of HIV.

Recommendation by this study

All pregnant women should be screened for STI during their first trimester. We recommend repeat testing at the time of delivery irrespective of earlier results and treatment. This allows prophylactic treatment for the prevention of transmission of STIs to unborn children and early infant diagnosis.

Guideline from the study

As a part of planned parenthood, both parents should undergo STI screening before conceiving.

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Conflicts of interest

There are no conflicts of interest.

References

1. Shafer M, Mhwcb MA. Sexually Transmitted Infections. Canada Communicable Disease Report. Public health agency of Canada; 2006. p. 1-8.
2. Mullick S, Watson-Jones D, Beksinska M, Mabey D. Sexually transmitted infections in pregnancy: Prevalence, impact on pregnancy outcomes, and approach to treatment in developing countries. *Sex Transm Infect* 2005;81:294-302.
3. New Delhi, India. National AIDS Control Organization (NACO). Annual Report; 2001.
4. Sheena Ann Simon *et al.* Sexually transmitted infections in pregnancy: A 20-year retrospective clinic-epidemiological study from a tertiary care hospital, Kerala, South India. *J Med Sci Clin Res* 2020;08:[515-20] [doi: 10.18535/jmscr/v8i7.83].
5. National AIDS Control Organization. ANC HSS 2019: Technical Report. New Delhi: NACO, Ministry of Health and Family Welfare, Government of India; 2020.
6. Shyamala G, Kushtagi P, Madhushri VB. Seropositivity for Human Immunodeficiency virus in pregnancy in a tertiary care hospital in South West India. *Indian Pract* 2004;57:649-52.
7. Giri PA, Bangal VB, Phalke D. Prevalence of HIV among rural pregnant women attending antenatal clinics at Pravara Rural Hospital, Loni, Maharashtra, India. *Int J Health Allied Sci* 2012;1:13-5.
8. Sibia P, Mohi MK, Kumar A. Seroprevalence of human immunodeficiency virus among antenatal women in one of the institute of Northern India. *J Clin Diagn Res* 2016;10:C08-9.
9. Kwatra A, Bangal VB, Shinde K, Padaliya K. HIV seroprevalence among the pregnant population and utilisation of integrated counselling and training Centre facilities at a teaching hospital in Rural Maharashtra. *Australas Med J* 2011;4:566-70.
10. Apparao P, Siddartha P. Sero prevalence of sexually transmitted diseases among pregnant women in a tertiary care hospital. *Int J Med Res Prof* 2016;2:40-2.
11. Sethi S, Mewara A, Hallur V, Prasad A, Sharma K, Raj A. Rising trends of syphilis in a tertiary care center in North India. *Indian J Sex Transm Dis AIDS* 2015;36:140-3.
12. Biswas S, Ghosh P, Debnath F, Chakraborty D, Saha MK, Dutta S. Prevalence of syphilis infection and associated sociodemographic factors among antenatal-care attendees in Meghalaya, India: Revisiting HIV Sentinel surveillance data. *Int J STD AIDS* 2022;33:173-9.
13. Danehower WF, Schamberg IL. Effect of coincidental penicillin administration on the spread of syphilis: An attempt at quantitation. *Arch Dermatol* 1963;88:930-4.
14. Connor N, Roberts J, Nicoll A. Strategic options for antenatal screening for syphilis in the United Kingdom: A cost effectiveness analysis. *J Med Screen* 2000;7:7-13.
15. Alexander JM, Sheffield JS, Sanchez PJ, Mayfield J, Wendel GD Jr. Efficacy of treatment for syphilis in pregnancy. *Obstet Gynecol* 1999;93:5-8.
16. Sheffield JS, Sánchez PJ, Morris G, Maberry M, Zeray F, McIntire DD, *et al.* Congenital syphilis after maternal treatment for syphilis during pregnancy. *Am J Obstet Gynecol* 2002;186:569-73.
17. Walker GJ. Antibiotics for syphilis diagnosed during pregnancy. *Cochrane Database Syst Rev* 2001;2001:CD001143.
18. Avasthi A, Kaur R, Prakash O, Banerjee A, Kumar L, Kulhara P. Sexual behavior of married young women: A preliminary study from North India. *Indian J Community Med* 2008;33:163-7.
19. International Institute for Population Sciences (IIPS) and Macro International. 2007. National Family Health Survey (NFHS-3), 2005–06: India: Volume I. Mumbai: IIPS.