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Research Article

HIV infection among pregnant women attending an integrated counseling & testing centre at Agra: comparison with studies in other regions of India

Tahziba Hussain[1,2]*, K. K. Kulshreshtha[1], V. S. Yadav[3]

[1]HIV/AIDS Unit, National JALMA Institute for Leprosy and other Mycobacterial Diseases (ICMR), Tajganj, Agra 282001, India
[2]Regional Medical Research Centre (ICMR), Chandrasekharpur, Nandankanan Road, Bhubaneswar. Odisha. India
[3]Division of Biostatistics, National JALMA Institute for Leprosy and Other Mycobacterial Diseases (ICMR), Tajganj, Agra 282001, India

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***Correspondence:**
Dr. Tahziba Hussain,
E-mail: tahziba_hussain@hotmail.com

ABSTRACT

Background: HIV in pregnant women has become an important focus of HIV research because of its role in the spread of HIV infection, particularly, among children. The aim of this seven year (2005-2011) observational study was to determine the prevalence, trend and risk factors associated with HIV infections among pregnant women presenting to ICTC at Agra.
Methods: The socio-demographic data like age, marital status, literacy status, profession, locality of residence and index of gravity were analysed in the context of symptoms at the time testing.
Results: 433 pregnant women were screened for HIV and VDRL infections. 5.7% were HIV-positive and 14.3% were VDRL-reactive. HIV-positivity ranged between 2-5% whereas that of VDRL ranged from 8-12%. During 2011, there was a surge in HIV-positivity (11%) and VDRL reactivity (24%).
Conclusions: There is an urgent need to perform surveys of HIV and other co-infections like HBV, HCV and STD prevalence among pregnant women to assess the true extent of the problem. Cost-effective treatment regimens and HIV prevention programmes for low-risk group clients are urgently needed in most parts of the country.
This is the first review of HIV and other co-infections among pregnant women in different regions of the country.

Keywords: HIV, ICTC, Seroprevalence, Pregnant women, Agra, India

INTRODUCTION

HIV infection in women occur primarily during their reproductive years, hence, pregnancy provides an unique opportunity for implementing prevention strategies against HIV infection. Mother-to-child transmission (MTCT) of HIV is an important contributor to HIV transmission. In 2012, an estimated 2,60,000 children were newly infected with HIV, and an estimated 3.3 million children were living with HIV.[1] MTCT of HIV occurs when an HIV-positive woman passes the virus to the baby during pregnancy, labour and delivery, or after delivery through breastfeeding. Without prophylactic treatment, approximately 15-30% of infants born to HIV-positive women will become infected with HIV during gestation and delivery, with a further 5-15% becoming infected through breastfeeding.[2] HIV infection of infants creates a life-long chronic condition that potentially

shortens life expectancy and contributes to substantial human, social, and economic costs. Primary prevention of HIV, prevention of unintended pregnancies, effective access to testing, counselling, antiretroviral therapy (ART), safe delivery practices, and appropriate infant feeding practices (including access to antiretroviral drugs to prevent HIV transmission to infants) all contribute to prevention of mother-to-child transmission (PMTCT) and also reduce child mortality.[3] Syphilis is transmitted sexually and across the placenta during pregnancy. If the disease remains untreated, adverse pregnancy outcomes are frequent. Indeed, over half of women with active syphilis will have a stillbirth, perinatal death, pre-term or low-birth-weight infant, or serious neonatal infection.[4] This observational study was conducted among pregnant women attending the Integrated Counseling & Testing Centre (ICTC) during a 7 year period, 2005-2011 to determine the seroprevalence of HIV and Syphilis infections during pregnancy and monitor their trends over a period of time. This is the first review of HIV and other co-infections among pregnant women in different regions of the country.

METHODS

Sampling

Blood samples, 5 ml were collected aseptically by ante-cubital venipuncture from pregnant clients, after obtaining written consent in the NACO (National AIDS Control Organisation) format. The socio-demographic data like age, marital status, literacy status, profession, locality of residence and index of gravity were analysed in the context of symptoms at the time testing. Pre-test, post-test and follow-up counseling were provided to the clients attending the ICTC. The sera samples collected after centrifugation at 2500 g were stored at - 20 ◦C until the assays were performed.

HIV test

The sera samples from the pregnant clients were tested by 2 ERS (ELISA, rapid and simple) assays as is the strategy of NACO to assess the HIV status. ELISA was done using Genedia HIV-1/2 EIA kit (Greencross, Korea). Those found positive were confirmed by any 2 of the rapid and simple assays, namely HIV Capillus latex aggregation assay (Trinity Biotech PLC, Ireland) and/or Instachk HIV 1+2 (One Step Anti-HIV(1&2), Tri-Line Test (Intec Products, Inc. P.R.C., Transasia Bio-Medicals Ltd., Mumbai) and/or, Diagnos HIV Bi-dot (J. Mitra & Co. Pvt. Ltd., A 180-181, Okhla Indl. Area, Ph-1, New Delhi).

VDRL test

VDRL-CARBOGEN Rapid Plasma Reagin (RPR) card test / Carbon antigen was used for Syphilis Testing (Tulip Diagnostics(P)Ltd.,Goa, India). Positive VDRLs were confirmed by a Treponema specific test, INNO-LIA Syphilis (Innogenetics NV, Ghent, Belgium).[5]

Referral

HIV-positive pregnant clients were referred to PPTCT centre, in the S.N. Medical College, after post-test counseling, for further care and management.

Statistical analysis

The data were statistically analysed by the Pearson's Chi-square test, at 5% level of significance.

RESULTS

In all, 433 pregnant women were screened for HIV and VDRL infections. Table 1 depicts the HIV positivity and VDRL reactivity among pregnant women over a period of 7 years. Of these, 25 (5.7%) were HIV-positive and 62 (14.3%) were VDRL-reactive. HIV-positivity ranged between 2-5% whereas that of VDRL ranged from 8-12%. During 2011, there was a surge in HIV-positivity (11%) and VDRL reactivity (24%). This could be due to more number of the pregnant women getting referred for testing. Table 2 depicts the socio-demographic profile of pregnant women. Among these, about 37% (162) were primigravida and the rest 62% (271) were multigravida. 5% (9) from each of the primigravida and multigravida women (16) were HIV-positive. Some women were in first and second trimester of pregnancy when detected HIV-positive. 48% (210) women were in the age group 21-25 years and 29% (126) in 26-30 years, of these, 8% (6) in the age group 15-20 years and 7% (15) in the age group 21-25 years were HIV-positive. All of them were married. The proportion of literate women was less, i.e., 8% (35). While 17% (74) of them were illiterate, 41% (180) had studied upto primary school and 33% (144) upto high school. HIV-positivity of 8% (6) was observed among illiterate pregnant women. 5% each of those who have studied upto high school (9) and above (8) were HIV-positive. Most of them were having no specific jobs. 25% (109) were housewives and 74% (324) belonged to low socio-economic category. 5% (18) of laborers and 6% (7) of house wives were HIV-positive. 55% (242) of the pregnant women were residing in urban areas whereas 44% (191) were from rural areas. Of these, 6% (16) women from urban areas and 4% (9) from rural areas were HIV-positive. None of the above parameters were found to be statistically significant. The chief presenting symptoms among the pregnant women at the time of visit to the ICTC were genital warts, genital ulcers, cervical discharge and genital ulcers and cervical discharge. 1.2% (5) having genital ulcers, 0.5% (2) with cervical discharge and 0.7% (3) with genital warts were HIV-positive. The proportion of biological false positives was 12% (52). This suggests that STDs affect a large percentage of pregnant clinic attendees. The most common route of transmission of HIV infection in India is heterosexual.

Table 1: depicts the HIV - positivity among pregnant women from year 2005 - 2011.

Year	No. of pregnant women screened (n = 433)	HIV-positive [n = 25]	VDRL-reactive [n = 62]
2005	36	1 (2.77%)	3 (8.33%)
2006	45	2 (4.44%)	5 (11.11%)
2007	67	3 (4.47%)	8 (11.94%)
2008	112	4 (3.57%)	15 (13.39)
2009	56	5 (8.92%)	9 (16.07%)
2010	55	3 (5.45%)	7 (12.73%)
2011	62	7 (11.29%)	15 (24.19%)
Total	433	25 (5.77%)	62 (14.32%)
Statistics	χ^2 df (p value)	df (1) = 3.95, p = 0.047	df (1) = 4.973, p = 0.026

There is an increasing trend in HIV cases in pregnant women who attended ICTC (Chi-square with 1 DF = 3.95 and p = 0.047).

Likewise analysis was done for STD cases and it was found that there is increasing trend (Chi square with 1 DF = 4.973 and p = 0.026).

In this study, majority of HIV-positive women had acquired the infections from their spouses. 84% (21) of the spouses were found to be HIV-positive. About 16% (4) of the husbands of HIV-positive pregnant women did not turn up for screening. Few spouses were not having any symptoms or signs of infection. Therefore, they were unaware of the importance of attending the ICTC for HIV counseling and testing. All HIV-positive husbands were heterosexually promiscuous and few had contact with female sex workers (FSWs).

Table 2: Depicts the socio- demographic profile of pregnant women.

Parameters		No. of pregnant women [n = 433 (%)]	HIV - Positive [25 (5.77%)]	HIV – Negative [408, (94.23%)]	Statistics χ^2, p value
Index of parity / gravidas	Primi-gravida	162 (37.4%)	9 (5.55%)	153 (94.44%)	pearson χ^2 df (1) = 0.0226, Pr = 0.880
	Multi-gravida	271 (62.5%)	16 (5.90%)	255 (94.09%)	
Age (in years)	15 - 20	68 (15.7%)	6 (8.82%)	62 (91.17%)	pearson χ^2 df (3) = 5.2278, Pr = 0.156
	21 - 25	210 (48.4%)	15 (7.14%)	195 (92.85%)	
	26 - 30	126 (29.0%)	4 (3.17%)	122 (%)	
	31 - 35	29 (17.0%)	0 (0%)	29 (100%)	
Marital status	Married	433 (100%)	25 (5.77%)	408 (94.23%)	-
	Unmarried	0	0 (0%)	0 (0%)	
Literacy Status	Illiterate	74 (17.0%)	6 (8.10%)	68 (91.89%)	Pearson χ^2 df (3) = 0.9521 Pr = 0.813
	Primary school	180 (41.5%)	9 (5.0%)	171 (95.0%)	
	Secondary school	144 (33.2%)	8 (5.55%)	136 (94.44)	
	College & above	35 (8.0%)	2 (5.71%)	33 (94.28%)	
Occupation	Daily wages Laborer	324 (74.8%)	18 (5.55%)	306 (94.44%)	Pearson χ^2 df (1) = 0.1126 Pr = 0.737
	House wife	109 (25.1%)	7 (6.42%)	102 (93.57%)	
Residence	Urban	242 (55.8%)	16 (6.61%)	226 (93.38%)	-
	Rural	191 (44.1%)	9 (4.71%)	182 (95.28%)	

DISCUSSION

In this study, seroprevalence of HIV infection was 5.7% and that of VDRL was 14.3% among pregnant women. Although HIV-positivity among the primigravida and multigravida women was similar, it was highest in the age group 15-25 years, being the sexually active age group. Illiterate, laborers and pregnant house wives residing in both urban and rural areas were HIV-positive. Few HIV-positive women were having STDs which they had acquired from their spouses. The husbands of HIV-positive women did not turn up for HIV and/or VDRL screening due to the fact that they were neither having any symptoms of infection nor were aware of the importance of HIV counseling and testing. This emphasizes the need for contact screening. Genital ulcers and warts are very important since the risk of acquiring HIV infection associated with STDs increases in their presence. Both ulcerative and non-ulcerative STDs are known to enhance HIV transmission and have several implications. They establish asymptomatic persistent

infections with occasional sequelae causing significant morbidity and mortality. Many risk behaviors as well as the routes of transmission are identical to those for HIV and other STDs.[6-8] Early diagnosis and effective treatment of STDs, especially those which cause ulcers and blood-borne infections are an important strategy for prevention of HIV transmission.

In 2012, the World Health Organization announced a global plan for prevention of MTCT (PMTCT), which includes providing ARVs to mothers and infants during pregnancy, labor and the post-natal period, and offering life-long treatment to HIV-positive pregnant women regardless of their CD4 count. Government of India is committed to work towards achievement of global target of "Elimination of new HIV infections among children" by 2015.[9,10]

The Prevention of Parent to Child Transmission of HIV/AIDS (PPTCT) programme was launched in the country in the year 2002 following a feasibility study in 11 major hospitals in the five high HIV prevalence states.[11] The programme entails counselling and testing of pregnant women in the ICTCs and aims to prevent the perinatal transmission of HIV from an HIV infected pregnant mother to her newborn baby. The PPTCT services cover about 37% annual estimated pregnancies in the country. Six Indian states are considered to have high HIV/AIDS prevalence (>1%) Manipur, Nagaland, Andhra Pradesh Tamil nadu, Karnataka and Maharashtra. HIV seroprevalence of more than 1% in pregnancy is alarming for the health authorities, which indicates that more stress should be given on preventive measures. Maternal syphilis screening early in pregnancy and prompt treatment of seropositive mothers with intramuscular benzathine penicillin or another effective regimen cures syphilis in both mother and infant and prevents most complications associated with MTCT of syphilis.[12] Table 3 depicts the studies carried out among pregnant women in different regions of the country.[13-40] Although these periodic studies indicated that the rates of HIV- positivity are rapidly increasing among the low risk group clients. The comparative figures reveal that India continues to be in the category of low prevalence countries with overall HIV prevalence rates ranging from 0.2% to 6% and VDRL/Syphilis rates from 0.4 to 45%. Further, these emphasize that every antenatal woman should be screened for HIV and STDs after pre-test counseling and taking informed consent.

Table 3: Depicts a comparison of HIV - Seropositivity in pregnant women in India.

Author	Place of study	Year of study	No. of pregnant women	No. of HIV- positive cases (%)
1 Agarwal et al[13]	Department of Pathology & Microbiology, Rohilkhand Medical College & Hospital, Bareilly		30,162 patients attended antenatal OPD	20,699 - HIV - 12 (0.058%) …… 20,941 - HBsAg. - 37 (0.18%) -
2 Alvarez-Uria et al[14]	Rural Development Trust Hospital, Bathalapalli, Anantapur District. Andhra Pradesh	August 2007 - June 2011	17,690 pregnant women < 25 years	133 (0.75%) …… 1.22% - 2007, 0.94% - 2008, 0.86% - 2009, 0.72% -2010, 0.35% - 2011
3 Arora et al[15]	Department of Pathology & Microbiology, Pt.B.D.Sharma PGIMS, Rohtak	2000	31193	33 (0.11%)
4 Ashtagi et al[16]	Primary Health Centres namely Kinaye, Vantamuri and Hand iganur	2011	716 pregnant women residing in three Primary Health Centres and availing PPTCT services at KLE's Dr. Prabhakar Kore Hospital & MRC, Belgaum	5 (0.70%)
5 Dash et al[17]	Depatment of Microbiology; MKCG Medical College Berhampur, Odisha	November 2005 - April 2012	18,905 pregnant women counseled, 15,853 (83.85%) accepted for HIV testing. From the total 15,853 tested in six and half years,	0.66% women - HIV -
6 Dave et al[18]	Dept. of Obs. and Gynaecology, MGM Medical College, Indore	2002	500	33 (6.6%) STDs - 45.4%
7 Deo et al[19]	Department of Microbiology, Wanless Hospital, Miraj Medical	1995	811 pregnant women	37 (4.56%)

	Centre, Miraj, Dist Sangli Maharashtra			
8 Devi & Shyamala[20]	Kurnool Medical College, Kurnool	January2011 - December 2011	11671 pregnant women	53 (0.45%)
9 Giri et al[22]	Pravara Rural Hospital, Loni, Maharashtra	2008-2011	12171	50 (0.41%)
10 Gopalan et al[23]	Department of Medical Microbiology and Obstetrics & Gynaecology, Chandigarh,	1999	-	0.036%
11 Gupta et al[24]	All India Institute of Medical Sciences, New Delhi	January 2003 - December 2006	3529 pregnant women	31 (0.88%)
12 John et al[25]	Department of Microbiology, National AIDS Reference & Surveillance Centre, Vellore	October 1987 - June 1992	36,953	20
13 Joshi et al[40]	Department of Community Medicine, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat	2005 - June 2008	259622 pregnant women registered. 72.1% were counseled pre-test, 83.4% of them tested, 74.4% received post-test counseling	541 ANCs were detected HIV+ve
14 Kant et al[26]	Slums of Delhi	1998	1521	0
15 Kaur et al[27]	HIV Serosurveillance Centre, Department of Microbiology, Maulana Azad Medical College, New Delhi	1986-1995	7564	12 (0.83%)
16 Kulkarni et al[28]	Department of Preventive & Social Medicine, DR.S.C.G.M.C. Nanded, Maharashtra,	2008 - 2012	Out of 36072, pre-test counselling -27116 (75.17%) & HIV Testing - 15560 (43.13%)	119 (0.76%)
17 Kumar et al[29]		2005 - 2007 372 sites where both PPTCT and HSS were carried out.	In 2007, HIV test acceptance ranged from 8 -100% (average 76%) in 372 sites where both PPTCT and HSS were carried out.	HIV prevalence in PPTCT - 0.68% HSS - 0.61%
18 Kwatra et al[30]	ICTC, Maharashtra	2003-2009	12719	145 (1.38%)
19 Madhivanan et al[31]	[2]Public Health Research Institute of India, 89/B, 2nd Cross, 2nd Main, Yadavgiri, Mysore	April 1, 2011 - March 31, 2012,	418 pregnancies - in SCIL villages.	0.6% - SCIL clinic and 0.9% - SCIL+ clinic attendees
20 Narayanamurthy et al[32]	Dept. of Pathology, Basveshwara Medical College Hospital & research Center, Chitradurga, Karnataka	I year	1175	22 1.9%) - HIV 43 3.7%) - HBsAg 5 (0.4%) - Syphilis
21 Ravikumar et al[35]	Chennai	1999	-	0.4
22 Sinha et al[41]	Johns Hopkins University School of Medicine, Baltimore, MD, USA.	January - March 2006	400 recently pregnant women from rural Maharashtra Administered questionnaire regarding HIV awareness, risk, and history of antenatal HIV testing.	13 (3.3%) reported receiving antenatal HIV testing Despite measurable HIV prevalence, high antenatal care utilization, and STI symptom history, recently pregnant rural Indian women report low HIV testing. Barriers to HIV testing during

				pregnancy include lack of discussion by antenatal care providers and lack of awareness of existing testing services
23 Solomon et al, ASHA Foundation, PMTCT, Bangalore [37]	PMTCT program implemented in 23 charitable faith-based hospitals in four states in South India	January,2003 - 75 months	320 HIV-positive cases & 365 HIV-negative pregnant	
24 Suri et al[38]	Department of Microbiology, Dayanand Medical College and Hospital, Ludhiana, Punjab	June 2004 - July 2005	1200 antenatal women	HIV - 23 (1.9%) 16 (1.3%) - HBsAg 1 (0.083%) - positive for both HIV and HBsAg
25 Ukey et al[40]	Dept. of Microbiology, Govt. Medical College, Nagpur	September,2002 - August,2004	10683	147 (1.38%)
26 Present study, Hussain et al	Agra	2005 - 2011	433	HIV - 25 (5.77%) Syphilis - 62 (14.3%)

In India, HIV testing and counseling services are offered free of cost to the clients attending the ICTCs which serve as a hub to deliver integrated services to all clients under one roof. Currently, there are more than 15,000 ICTCs in the country, most of these in government hospitals, which offer PPTCT services to pregnant women. Of these ICTCs, nearly 550 are located in Obstetrics and Gynaecology Departments and in Maternity Homes where the client load is predominantly pregnant women. Although a number of ART centers are present in India, a large number of pregnant mothers in India are not diagnosed of HIV infection due to shame factor or fear of coming out for getting tested and mistreated by family members and rejection by society as a stigma.[41] It is important to monitor HIV incidence among women of reproductive age and syphilis seropositivity among pregnant women to gauge the effectiveness of primary prevention programmes. In addition, programmes should monitor follow-up care and treatment of infants born to HIV- or syphilis-seropositive women.[42]

Joshi et al conducted a study among 2,59,622 pregnant women (541 HIV-positive ANCs) to find out PPTCT service coverage, dropouts, intervention efficacy with other determinants. They suggested that PMTCT services should be provided to all ANCs. EDD-based tracking, institutional deliveries, postnatal counseling to be encouraged along with complete MB pair coverage, capacity building of concerned staff regarding delivery of HIV-positive ANCs and exposed children tracking.[43] Our study has some limitations. The study was performed in an ICTC, so the population of the study is biased towards people of a lower socio-economic status. However, this population with a lower socio-economic status is similar to the population attending other public hospitals in Agra

CONCLUSIONS

The studies included in this review indicate that there is an urgent need to perform surveys of HIV and other co-infections like HBsAg, HCV and STD prevalence among pregnant women to assess the true extent of the problem. Cost-effective treatment regimens and HIV prevention programmes for low-risk group clients are urgently needed in most parts of the country.

There is a need, therefore, to support an approach of targeted screening, integrate HIV and VDRL testing, counselling and referral services, for pregnant women into the existing health system for HIV prevention and/or treatment services.

We, therefore, feel that ICTCs should be located in hospitals, nursing homes, clinics, dispensaries, health centres and screening the pregnant clients, irrespective of their complaints and symptoms, for HIV and other co-infections would go a long way in early detection. The status of co-infections would guide the Clinicians in deciding the appropriate treatment regimens and comprehensive management of dually infected individuals. An early treatment, if initiated, would help in further spread of the infection.

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