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Prevalence of HIV Infection in Pregnancy at a Referral Health Centre of India: 10 Years Data

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KEYWORDS

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A B S T R A C T

Mother to child transmission of HIV is an important mode of infection to the newborns. To eliminate this transmission and virtually control the spread of pediatric HIV, it is important to know the seroprevalence of HIV in pregnancy. Few studies are available from this part of northern India, which reflect the ongoing trends of HIV in pregnant mothers, hence we carried out this study to determine the seroprevalence of HIV among pregnant women visiting the antenatal clinic at a tertiary centre of north India. Pregnant women in the age group of 15-42 years, visiting antenatal clinic in the department of Obstetrics and Gynecology of Sarojini Naidu Medical College, Agra, Uttar Pradesh were registered, counseled and tested for HIV antibodies. Blood samples were collected from the antenatal women who consented and then were tested for HIV antibodies as per WHO guidelines, from October 2005 to April 2015. Of 30150 pregnant women counseled, 23464 (77.82%) accepted testing. Only 136 were HIV positive. The prevalence of HIV in antenatal women was found to be 0.58%. There was a decreasing trend of HIV prevalence in this population seen over 9.5 years. Most of the women belonged to the sexually active age group of 20-24 years (39%) followed by 25-34 years (36%). However, the overall prevalence is slightly higher than the national HIV prevalence, hence it rings a bell of concern as this part of India comes under the 'low prevalence state' category. The seroprevalence found in this region and populations were slightly higher than national projection for the country and state. However, it is consistent with the current national trend which shows a decline, concluding that there is a need to strengthen the prevention of mother to child transmission (PMTCT) services by the collaboration of the public and private sectors.

Introduction

HIV remains one of the greatest health challenges in the world. Approximately,

35million people were living with HIV infection globally in 2013[1]. India has the

world's third largest HIV epidemic [2]. In 2013, HIV prevalence in India was an estimated 0.3% which is less than the cut off of 1%, categorizing India as a low prevalence nation[2]. Overall, India's HIV epidemic is slowing down, with a 57% decline in new HIV infections between 2000 and 2011 [2]. Most HIV infection in India occur through sexual transmission (85.6%)[3]. Nearly,5% of infections are attributable to parent to child transmission (PTCT). The epidemic disproportionately affects women, who account for 40% of the total infections in the country [3]. Hence, it is mandatory to screen women who stand at a higher risk of getting infected. Also, pregnancy is a window period wherein pregnant women take hospital visits, so by integrating HIV counseling and testing (HTC) facilities to other health programs offered to pregnant women we can estimate the prevalence of HIV as well as educate women regarding transmission and risks to their newborns.

This would otherwise be difficult to calculate because in a developing country like India, women do not come out directly for HIV testing owing to various social stigmas, myths regarding HIV. As such the incidence of HIV is very difficult to measure, however the prevalence in pregnant women is an indirect reflection of the prevalence in children and also the trend in general population.[4][5]. Needless to say that the success of all the AIDS control programs can be brought about once we know the current trends and prevalence of the infection in a country, thereby knowing the fallacies of such programs and the need to strengthen them. All this makes it imperative to screen pregnant women early in pregnancy leading to timely counseling and therapy, thus reducing neonatal infection and strengthening prevention of mother to child transmission (PMTCT) programs.

Hence, we conducted this study to estimate the rate and trends of seroprevalence of HIV among pregnant women visiting a tertiary care teaching hospital of North India.

Subjects and Methods

Pregnant women visiting and registering at the antenatal clinic of the department of Obstetrics and Gynecology at Sarojini Naidu Medical College and Hospital, Agra, are routinely advised to undergo HIV screening after pretest counseling done by trained field workers and informed consent. The local pathological laboratory of our department caters these laboratory services to all such patients, and the tests are carried out as per the guidelines laid down by the National Aids Control Organization (NACO), India[6]. The results were collected from all pregnant women tested in this laboratory and no selection bias was observed.

The study period was of 9.5 years, from October 2005 to April 2015.

Ethical Consideration

Informed written consent was obtained from each participant after pretest counseling and the participants were free to withdraw from the test any time they wanted.

Ethical clearance was obtained for the study from the ethical committee of the institute.

Testing Procedure

If the participant agreed to the testing, she was referred to the laboratory technician who performed a rapid HIV test (SD BIOLINE HIV -1/2 3.0 Rapid Test Procedure; bio standard diagnostics pvt ltd, India). If the participant tested positive for HIV or had an indeterminate test result, the result was checked using the COMBAIDS – RS Advantage-ST HIV1 & 2

IMMUNODOT TEST KIT (Span Diagnostics Ltd. India). Rapid test kits were kept under optimal conditions and used before the expiry date. Results were read under good illumination test quality was ascertained by running regular negative and positive control tests. The results were obtained in 5-10 minutes after the first test and in about 20 minutes after the second. The first rapid test kit used was previously evaluated by Consortium of National Reference Laboratories(NRLs) of Govt. of India and was found to have high sensitivity($\geq 99.5\%$) and specificity ($\geq 98.0\%$); and the second test showed 100% sensitivity and specificity and intra and inter run precision. Samples giving positive results were re-analyzed using the COMBAIDS- RS Advantage-ST immunodot test kit. Standard biosafety, record keeping and client confidentiality procedures were observed.

Statistical Analysis

The data were analyzed using the Chi-square tests. The confidence interval for the prevalence and proportion estimates was calculated using STAT calculator & statistical software.

Results and Discussion

A total of 30,150 pregnant women visiting the antenatal clinic during the period of October 2005 to April 2015, were provided voluntary pretest counseling for HIV Testing, out of which 23464 (77.82%) consented for testing. The data was collected and analyzed from this set of women. About 22% pregnant women opted out from testing and hence we could not assess the seroreactivity in these women. (Table 1)

Table 2 shows year wise analysis which depicts that in 2006 only 582 pregnant

women were tested for HIV, however, after the guidelines in our institute were modified in sync with the mandatory national antenatal screening policy of the government, the number of pregnant women being tested gradually increased in the subsequent years. The HIV seroprevalence rates showed a decrease from 1.5% in the year 2006 to 0.74% in 2014 (fig.2). However, the overall prevalence remained 0.579% (CI 0.48% - 0.68%) (fig.1) calculated over a period of 9.5 years (from October 2005 to April 2015), which is quite higher than the national adult prevalence of HIV in antenatal women in India, of 0.4% [7].

The age of subjects ranged from 15 to 42 years with mean age of 26.10 years. Most of these women, (10839) 46.2% were in the age group of 25 - 34 years followed by 20-24 years, (10373) 44.2%, >35 years (5.1%), and least in 15-19 years (4.4%). (table 3) 136 out of 23464 women, i.e. (0.579%) tested seropositive for HIV antibodies in the double rapid tests. Amongst the seropositive women, the majority (38.9%) were aged 20-24 years with the proportion of this population being 0.23%, followed by the age group of 25-34 years (36%), the proportion being 0.20%, then > 35 years (18%) a proportion of 0.076%, and in the age group of 15-19 years (11.76%), the proportion of this category being the lowest of 0.06%. The mean age of the HIV positive women was found 26.29 years. (Fig 3 & 4)

Table 4 depicts Age specific prevalence, where a different trend in our study as compared to the national data was observed. The current study shows that HIV seropositivity was significantly higher at 1.55% (CI 0.8-2.3) in the younger pregnant females in the 15-19 years of age-group and 1.48% (CI 0.8 - 2.16) in >35 years of age as compared to 20-24 years age group 0.51%

(CI 0.37% - 0.65%) and 25 to 34 years of women 0.45% (CI 0.32–0.58). (fig 5)

The prevalence of HIV, amongst pregnant women, of 0.58%, that was obtained in this study is higher than the overall adult prevalence rate of HIV in India of 0.3% as in 2013[2] and the average HIV prevalence among pregnant women attending antenatal clinics in India, which is 0.4%[7]. Also, this value is quite higher than the prevalence of HIV in pregnant women in this part of north India i.e. Uttar Pradesh which is 0.21%[8] Analyzing the reason for this difference, between the NACO data and our results, we can state that it could be due to different methods or techniques of surveillance. Ours being a hospital based survey, over a period of 9.5 years while the NACO uses sentinel surveillance system. Also, ours being a tertiary health referral centre where most of the seroreactive HIV women are referred from various centers, hence our centre is attended by slightly higher number of seroreactive antenatal women. In a similar study conducted by Gupta et al from north India the prevalence of HIV was found to be 0.88%[9] while a study from south India by Giri et al revealed a prevalence of 0.41% in rural pregnant women [10]. A study by Ashatagi et al from south India reported a prevalence rate of 0.70% [11]. Sarkate et al reported a prevalence of 0.88% in their south India based study [12]. Not many studies are available from North India for comparison. However, our result is of significance because this part of north India comes under low prevalence region, and a prevalence of 0.58%, as against 0.21% for the state, rings a bell of concern as it could possibly be an indicator of increasing infectivity rates of HIV in the upcoming years or a rising trend of HIV transmission in general population of this region, in contrast to the claims of a contained epidemic of HIV in India by national agencies. Also, in view of our large

population pool of over one billion, a mere 0.1% increase in the prevalence rate will raise the number of persons living with HIV by over a half million[9]. Hence, this prevalence rate however shows a yearly decreasing trend, yet it indicates concern and suggests that it is high time we should show aggressive steps towards implementation and strengthening of PMTCT services in corner to corner of India. As maternal HIV is a proxy indicator of perinatal infection, therefore, screening of pregnant women at an early age of pregnancy may help in prompt counseling and therapy, thereby reducing the risk of transmission to the neonate.

Our study supports the fact which has already been documented that the distribution of HIV is high in the reproductive age group during which sexual activity is maximal. In our study, we found the overall prevalence of HIV amongst pregnant women to be 0.58%. The age wise distribution showed a higher predisposition of infection in young reproductive population, being maximum in age group of 20-24 years (0.23%) followed by 25 – 34 years (0.20%), >35 years (0.08%) and 15-19 years (0.06%). This observation seen in our study is consistent with the national data, where the prevalence of HIV in India among 20-24 years is 0.18% and that among 15-19 years old is 0.04%[13]. Similar age predisposition was found in study by Gupta et al [9]. However, on calculating the age specific prevalence, we found that a higher seropositivity was observed among age groups 15-19 years (1.55%), and the women aging > 35 years (1.48%) than younger women in age group of 20-24 years (0.51%) or 25-34 years (0.45%). This could be understood by the fact that the total number of candidates tested in this age group was less as compared to the total number of females screened in the age groups of 20-24 years or 25-34 years.

Table.1 Acceptance of Hiv Testing Among Pregnant Women Who Were Counseled

	N u m b e r										P e r c e n t a g e							
Total no. of pregnant women counseled	3	0	1	5	0	-												
Total no. of pregnant women tested for HIV	2	3	4	6	4	/	3	0	1	5	0	7	7	.	8	2	%	
Total no. of pregnant women refused testing	6	6	8	6	/	3	0	1	5	0	2	2	.	1	7	%		
Total no. of HIV seropositive pregnant women	1	3	6	/	2	3	4	6	4	0	.	5	7	9	%			
Total no. of HIV seronegative pregnant women	2	3	3	2	8	/	2	3	4	6	4	9	9	.	4	2	1	%

Table.2 Year Wise Prevalence of HIV in Pregnant Women at a Tertiary Care Centre in North India

	ANC COUNSELED		ANC TESTED		HIV POSITIVES		% POSITIVES (95% CI)										
2005 (from october)	2	5	5	2	4	0	2	8.3%	(-2.74%	to 19.34%)							
2 0 0 6 1 3 6 8 5 8 2 0	2	0	0	6	1	3	6	8	5	8	2	0	9	1.5%	(0.51%	to 2.49%)	
2 0 0 7 2 3 8 2 2 0 5 7 0	2	0	0	7	2	3	8	2	2	0	5	7	0	7	0.34%	(0.09%	to 0.59%)
2 0 0 8 3 4 7 5 2 9 8 7 1	2	0	0	8	3	4	7	5	2	9	8	7	1	5	0.50%	(0.25%	to 0.75%)
2 0 0 9 4 3 1 7 3 5 5 1 2	2	0	0	9	4	3	1	7	3	5	5	1	2	3	0.64%	(0.38%	to 0.9%)
2 0 1 0 3 9 4 7 3 4 5 7 1	2	0	1	0	3	9	4	7	3	4	5	7	1	4	0.40%	(0.2%	to 0.6%)
2 0 1 1 4 1 6 6 2 2 9 1 1	2	0	1	1	4	1	6	6	2	2	9	1	1	2	0.52%	(0.23%	to 0.81%)
2 0 1 2 3 8 4 3 2 4 8 4 1	2	0	1	2	3	8	4	3	2	4	8	4	1	1	0.44%	(0.18%	to 0.7%)
2 0 1 3 2 9 3 3 2 5 8 8 1	2	0	1	3	2	9	3	3	2	5	8	8	1	7	0.65%	(0.34%	to 0.96%)
2 0 1 4 2 6 9 9 2 6 8 2 2	2	0	1	4	2	6	9	9	2	6	8	2	2	0	0.74%	(0.42%	to 1.06%)
2015(till april)	7	6	5	7	6	1	0	6	0.78%	(0.15%	to 1.41%)						
T o t a l	3	0	1	5	0	2	3	4	6	4	1	3	6	0.579	(0.48%	to 0.68%)	

Table.3 Age Predisposition of HIV in Pregnant Women

Age (years)	Total population N=23464	% population	HIV positive n=136	% HIV positive	Age predisposition of HIV cases	9 5 % C I
				Cases/ total HIV positive(n)	Cases/ total population(N)	
1 5 - 1 9	1 0 3 4	4 . 4 1 %	1	6 1 1 . 7 6 %	0 . 0 7 %	0.04% - 0.1%
2 0 - 2 4	1 0 3 7 3	4 4 . 2 1 %	5	3 3 8 . 9 %	0 . 2 3 %	0.17% - 0.29%
2 5 - 3 5	1 0 8 3 9	4 6 . 1 9 %	4	9 3 6 %	0 . 2 1 %	0.15% - 0.27%
> 3 5	1 2 1 8	5 . 1 9 %	1	8 1 3 . 2 %	0 . 0 8 %	0.04% - 0.12%

Chi-square = 37.767 with 3 degrees of freedom; P < 0.001S

Table.4 Age Specific prevalence among Pregnant Women

Age group (Years)	Population distribution N=23464	HIV positive n=136	% positivity rate	95% CI
15 - 19	1034	6	1.55%	0.8% - 2.3%
20 - 24	10373	3	0.51%	0.37% - 0.65%
25 - 34	10839	9	0.45%	0.32% - 0.58%
> 35	1218	8	1.48%	0.8% - 2.16%

Figure.1 Prevalence of HIV Among Antenatal Women (0.58%)

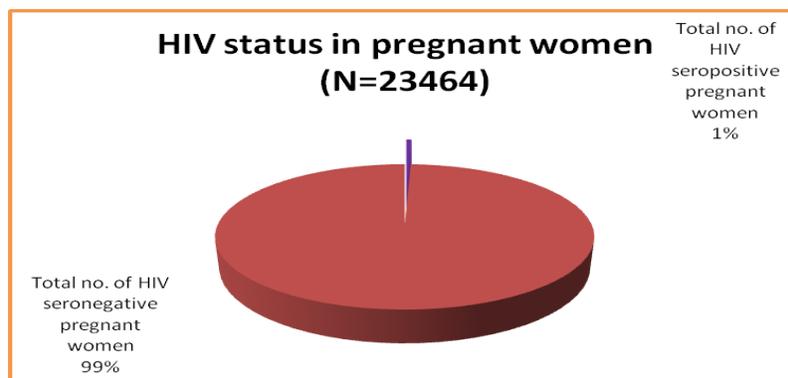


Figure.2 Showing Year Wise Prevalence of HIV among Pregnant Women. There is a Decreasing Trend of HIV Prevalence from the Initial Years

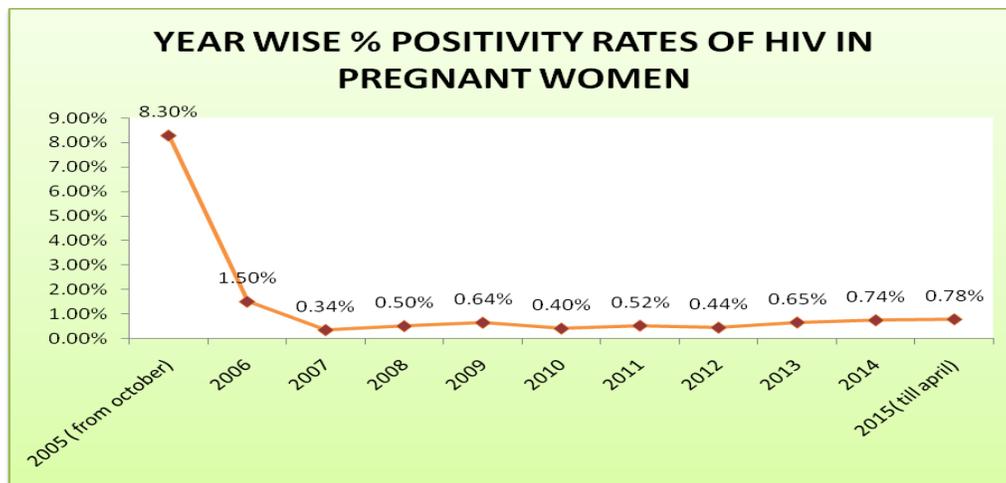


Figure.3 Shows Distribution of HIV Cases in Different Age Groups Expressed as Percentage. (Total no. of Cases in that Age Group/ Total no. of HIV Cases

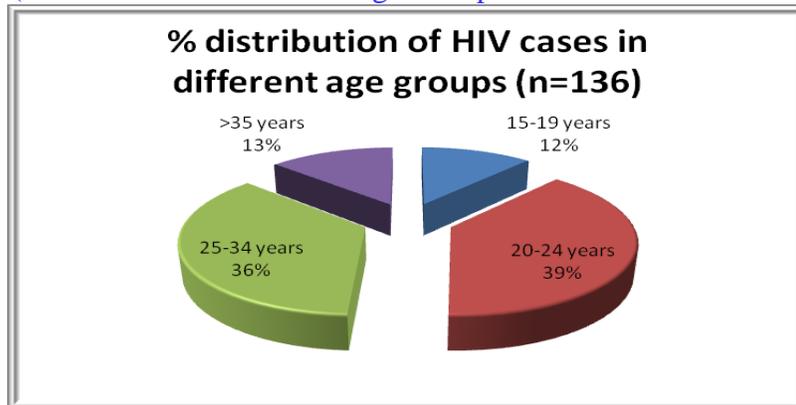


Figure.4 Shows the Proportionate Contribution of each Age Group Towards the Total Prevalence of HIV in Pregnant Women. It was Calculated using Total No. of HIV cases in a Particular Age Group/ Total No. of Pregnant Women Screened

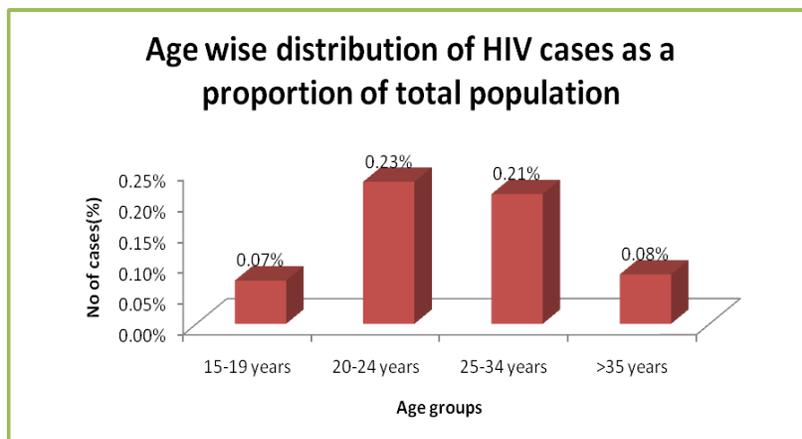
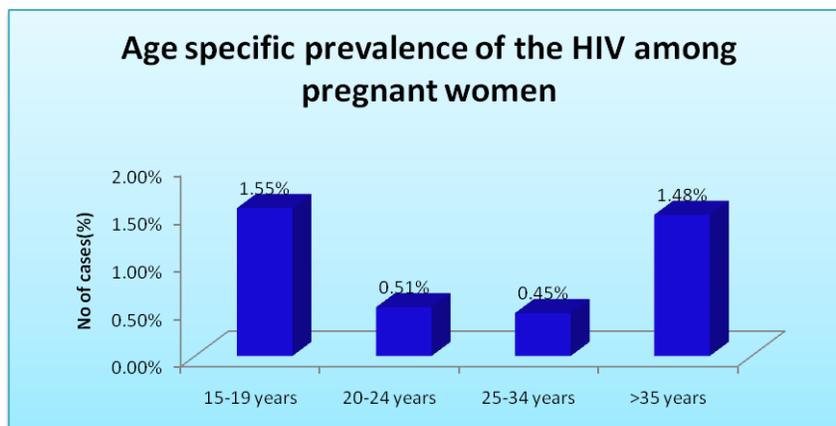


Figure.5 Shows Age Specific Prevalence of HIV in Pregnant Women. This Trend However, was found Different from the National Data as well as the Predicted Trends



This can be attributed to the fact that the minimum age at marriage and first conception has been increased with females being more educated, employed and aware. Hence, total number of pregnant females tested at our centre mostly fell in the age group between 20-35 years and fewer in 15-19 years or 35 years. This also suggests that there was a higher HIV awareness among north Indian married women belonging to a younger age group between 15-24 years as compared to older women. Intervention programs such as HIV awareness and safe sex education are usually focused on young adults and our study witnessed a favorable impact of such programs. However, there is a need to address the problem of HIV epidemic in India with a more vigorous attitude. Integrating public and private sectors to work for the realization and strengthening of AIDS control programs is the need of the hour.

Conclusion

Our study indicates a decreasing trend of HIV prevalence in northern India. However, ours being a hospital based study with limited sample size so this study population is not representative of whole India. Yet, the trend give us an idea of the drop out in availing PMTCT services, the prevalence and the age wise predisposition of HIV in this part of north India. Thereby giving an idea of the need for the implementation of mandatory counseling and testing of HIV by the joint efforts of the private and public sectors reducing the maternal and child transmission of HIV by early detection of seroprevalence and prompt institution of Anti Retroviral therapy for long term survival of the mother and the prevention of transmission to the neonate.

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