

DECLINING HIV SEROPREVALENCE AMONG PREGNANT WOMEN IN SOUTH ODISHA, INDIA: A SIX AND HALF YEAR TERTIARY CARE HOSPITAL BASED STUDY

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Abstract

Background: Acquired Immune Deficiency Syndrome (AIDS) caused by Human Immunodeficiency Virus (HIV) has emerged as the greatest threat to human existence. Estimating the rate and trends of HIV seroprevalence among pregnant women provides essential information for an effective implementation of Prevention of Parent to Child Transmission of HIV (PPTCT) programme and for monitoring its spread within different parts of the country.

Objective: As few studies are available from India on HIV prevalence among the antenatal population, a study at a tertiary care hospital in southern Odisha was carried out to know the current trends of seroprevalence in this group.

Methods: Blood samples were collected from pregnant women attending antenatal clinic and Integrated Counselling and Testing Centre II (ICTC II) after pre test counselling and informed consent from November 2005 to April 2012. The samples were tested for HIV antibodies as per WHO and NACO guidelines.

Result: Among 18,905 pregnant women counseled, 15,853 (83.85%) were accepted for HIV testing. From the total 15,853 tested in six and half years, 0.66% women were found to be HIV seropositive. The mean age of HIV positive women was 24.31 years (SD \pm 3.9 yrs). The HIV seroprevalence rates showed a declining trend from 1.53% in 2006 to 0.34% in 2012. Among seropositive women majority (43.8%) were in the age group of 25-29 years.

Conclusion: Declining seroprevalence rate indicate prevention campaigns are working, condom usage and preventive sexual behavior has increased.

Keywords: HIV, Mother-to-child; Transmission; Pregnant Women; Seroprevalence.

1. Introduction

In recent years, Acquired Immune Deficiency Syndrome (AIDS) caused by Human Immunodeficiency virus (HIV) has emerged as greatest threat to human existence. Though India is categorized as low HIV prevalence nation, it has the third largest number of people living with HIV/AIDS.¹ There are an estimated 2.39 million people living with HIV/AIDS of which, 39% are females and 3.5% are children with an adult prevalence of 0.31% in 2009.¹ HIV infection among pregnant women poses particular risks to their family, offspring and health workers at the time of delivery. Potential mother-to-child transmission of HIV (vertical transmission) is a major concern, because of the attendant consequences of morbidity and mortality of this infection.² In India during 2010-11, 6.6 million out of total 27 million pregnant women were counseled and tested, 16,954 out of 43,000 estimated HIV positive pregnant women were identified.³ The predominant mode of HIV transmission is through heterosexual contact,

therefore, women are at high risk of getting the infection.⁴

The incidence of infections, especially in sexually active young people is the most sensitive marker to track the course of HIV epidemic. Unfortunately, incidence is hard to measure directly, but prevalence in young women is an indirect but useful tool.⁵ Accordingly, HIV data from antenatal women has been used to monitor trends in the general population and to predict the seroprevalence in young children.^{6, 7} UNAID (The Joint United Nations Programme on HIV/AIDS) reports reveal that mother-to-child transmission is the largest source of HIV infection among children below the age of 15 years. The parent-to-child transmission occurs in approximately 25 to 35% of HIV positive women, which accounts for 4% of the total HIV infection load in India.⁸ During National AIDS Control Programme (NACP) Phase III period(2007-2012), the prevention of parent-to-child transmission(PPTCT) has been given due importance. Therefore, screening of pregnant women at an early stage of pregnancy

may help in prompt counselling and appropriate therapy, thereby reducing the risk of transmission to the child.

To the best of our knowledge, only a few studies on HIV prevalence in antenatal women are available from India, and in fact none indicating the current trends in seroprevalence from this area. Hence, we undertook this study to determine the rate and trends of HIV seroprevalence among pregnant women attending antenatal clinic and Integrated Counselling and Testing Centre II (ICTC II) at a tertiary care hospital of south Odisha, India.

2. Materials and Methods

2.1 The study area and population: This study was carried out in the Department of Microbiology, in a tertiary care referral hospital of south Odisha, India. The sample population included 18,905 pregnant women registered and counseled at the antenatal clinics of this hospital. All the tests were done in accordance with the Medical College institutional ethical committee guidelines. The results were collected from all pregnant women and no selection bias was observed. The findings were analyzed over a period of six and half years from November 2005 to April 2012.

2.2 Sample collection and processing: Verbal informed consent was obtained from each pregnant woman prior to sample collection. Five ml venous blood sample was collected in a sterile plain container from all pregnant women who came for testing. Blood was allowed to clot for 30 minutes at room temperature (25–30°C) and serum was separated after centrifugation at low speed. The serum samples were then stored at 4°C and were tested within 48 hrs.

2.3 HIV serology: HIV antibodies were tested by the three Rapid tests protocol as per the guidelines laid down by the World Health Organization (WHO Testing strategy III) and Government of India.⁹ All positive test results were disclosed only after post test counselling of the patients. Antibodies to HIV (1&2) were tested initially with a SD BIOLINE HIV-1/2 3.0 Rapid Test [Standard Diagnostics, Inc. Korea]. The samples tested positive in the first method were subjected to tests with two different rapid tests i.e. PAREEKSHAK HIV 1/2 Triline Card Test [Bhat Bio-Tech India (P) Ltd.] and PAREEKSHAK HIV 1/2 Rapid Test Kit (TRISPOT) [Bhat Bio-Tech India (P) Ltd.]. The samples were considered as positive when found reactive by all three different methods. All tests

were done according to manufacturer's instructions.

2.4 Statistical analysis: The data were analyzed using the Chi-square tests. The confidence interval (CI) for the prevalence estimates and the P values were calculated using GraphPad InStat statistical software.

3. Result

Data were collected and analyzed from a total of 18,905 pregnant women who had registered and were counseled during the period of six and half years from November 2005 to April 2012. Out of which 15,853 (83.85%) accepted both counselling and HIV testing and the rest did not agree for the testing. Overall, 105 women were found to be seropositive for HIV-1 antibodies with a seroprevalence rate of 0.66% (CI 0.54-0.8) [Table 1]. No pregnant female was found to be seropositive for HIV-2 antibodies. Majority of women were married, primigravidae, Hindu by religion, from rural areas with low socioeconomic status, either illiterate or studied up to primary level, not used any contraceptives and were housewife by occupation. High risk behavior was not significantly noted among them. Most of the husbands of these women were migrant workers to other states and had multiple sexual partners [Table 2]. Majority of antenatal women (42.14%) were in the age group of 25-29 years followed by 20-24 yrs (41.62%), 15-19 yrs (9.65%), 35-39 yrs (1.07%) and least in the 40-44 yrs (0.13%). Amongst the seropositive women, the majority (43.8%) were aged 25-29 yrs, followed by 20-24 yrs (33.34%), while no women above 40 yrs was found positive [Table 3].

Among the age group of 15 –19 years, HIV seropositivity was highest 1.05 % (CI 0.62-1.74) in comparison to the older age group of 35 –39 years i.e., 0.60 % (CI 0.03-3.7). However, statistical analysis showed that the age specific prevalence was not significant (P value = 0.3445) [Table 3]. The mean age of HIV positive women was 24.31 yrs (CI 23.55 - 25.07 and SD ± 3.9 yrs). The youngest HIV positive pregnant female was aged 16 yrs while the oldest was 37 years.

A year wise analysis showed that in 2005, only 126 pregnant women were tested for HIV, because HIV testing was started in the month of November. The number of patients tested for HIV increased thereafter. The HIV seroprevalence rates showed an increase from 0.79% (CI 0.04-4.9) in 2005 to 1.53% (CI 0.94-2.51) in 2006, and from the year 2007 there has

been gradual decrease from 1.02% (CI 0.68-1.51) to 0.34% in 2012 (CI 0.11-0.93) [Table 4, Figure 1]. The year wise prevalence rates showed statistically significant values ($P = 0.0014$).

4. Discussion

HIV testing provides a woman with information about her HIV status. Offering testing and counselling to pregnant women provides an opportunity to know their HIV status and empower them to make own decisions to prevent mother-to-child transmission. It also helps to identify women who are HIV negative and educate them to remain negative. 'Opt-in' or 'opt-out' approaches have been used while offering HIV testing. In the opt-in approach, pregnant women are given pre-test counselling and are asked to undergo HIV testing. If they choose to get a test done, consent is taken, usually in writing. In the opt-out approach, women are told that HIV testing is a standard part of antenatal care, but they have the option to refuse the test. Center for Disease Control (CDC) recommends an opt-out approach as the testing rate is 85-98%.¹⁰ The WHO and UNAID introduced a routine opt-out approach in countries with high prevalence.¹¹ In the present study, the overall acceptance of the HIV testing with opt-out approach was 83.85% (15,853/18,905). The studies conducted by Joshi *et al.* and Sinha *et al.* the acceptance of HIV testing in the opt-out approach were 83% and 79% respectively, similar to our study.^{12, 13} But Parameshwari *et al.* and Chaudhari *et al.* reported HIV testing in 100% and 96% antenatal cases respectively.^{14, 15} This emphasizes there is need for good counseling skills by the counselor to achieve both counselling and HIV testing close to 100%.

We observed that, majority of seropositive pregnant women were married, primigravidae, residence of rural areas with low socioeconomic status, were either illiterate or studied up to primary level and not used any contraceptives. High risk behavior was not noticed in most of them. Greater access to secondary education could facilitate the spread of HIV awareness and increase use of barrier contraceptives.¹⁶ In our study, most of the husbands of these women were migrant workers to other cities outside the state and had multiple sexual partners. Migration into the other cities enhances casual and commercial contacts, because of spousal separation and weaker social control.¹⁷ Moreover; migration increases the size of the sexual

networks by linking networks from different locations.¹⁸

The overall, HIV seroprevalence found in our study was 0.66%. Similar seroprevalence of 0.56% were noted by Mandal *et al.* in 2010, 0.77% by Parmeshwari *et al.* in 2009 and 0.72% by Nagdeo *et al.* in 2007.^{19,14,20} In comparison, lower seroprevalence of 0.17% were observed by Chaudhari *et al.* in 2010, 0.35% by Joshi *et al.* in 2010 and 0.41% by Sinha *et al.* in 2008.^{15,12,13} There is higher overall seroprevalence rate may be due to the previous high prevalence of more than 1% among antenatal women (according to HIV sentinel surveillance data from 2004 to 2006) in this part of South Odisha, where our tertiary care hospital is situated.²¹

In the present study, a steady fall has been seen in the HIV seroprevalence from 1.53% in 2006 to 0.34 % in 2012(compiled data up to April 2012). Shyamala *et al.* from south west India compiled year wise detection of seropositive cases, and showed a rising trend in antenatal clinics from 0.2% in 1997 to 1.4% in 2001.²² On the other hand, a reduction of more than one third in HIV-1 prevalence during 2000-2004 in young women from south India had been reported.²³ Prevention of parent to child transmission (PPTCT) data suggested that there was gradual fall of seroprevalence in high prevalence states such as Andhra Pradesh from 2.08 to 0.93%, Maharashtra (1.51 to 0.51%), Tamil Nadu (0.45 to 0.35%), Karnataka (1.98 to 0.75%), Manipur (2.04 to 1.09%) and in Nagaland (1.66 to 1.19%) from the year 2005 to 2008.²⁴ There was also gradual decrease in low prevalence states like Gujarat, Haryana, Goa, Kerala, Madhya Pradesh and Mizoram from the year 2005 to 2008.²⁴ Declining Seropositivity among pregnant women were also been reported from African countries like in Lusaka, Zambia and Ethiopia where there was decrease of seroprevalence from 7.97% to 2.03% during 5 years period (2006-2010).^{25,26} The steady dip in prevalence rate could be a result of effective awareness programmes and education regarding HIV especially in young adults after implementation of National AIDS Control Programme (NACP-III, 2007-2012). The overall goal of NACP- III was to halt and reverse the epidemic in India over the five years by integrating programmes for prevention, care, support and treatment. Intervention programmes such as HIV awareness and safe sex education are usually focused on young adults and our data showed a favorable impact of such programmes.

In our study, the mean age of positive women was 24.31 ± 3.9 years. The HIV infection was highest in the age group of 25 to 29 years (41.86%) closely followed by 20 to 24 yrs (41.39%). Ukey *et al.* reported that HIV infection was highest in the age group of 19-24 years (46.94%) followed by 25-29 years (31.29%).²³ It may be because of the fact that 20 to 29 years is the most sexually active age group. High prevalence in this group can be considered as forecasting of financial burden as well as loss of youth for the nation.

Conclusion

From the study we can conclude that Prevention of Parent to Child Transmission of HIV/AIDS (PPTCT) programme is implemented through Integrated Counselling and Testing Centres II (ICTCs) located in Obstetrics and Gynaecology Departments and in Maternity Homes throughout India. It is comprehensive, family-centered clinical and supportive services that empower the pregnant woman to take her own decisions and prevent the transmission of HIV to her infant by continuous information, education and counselling. If the system is followed properly, 100% counselling and testing can be achieved. Declining seroprevalence rate indirectly indicates that prevention campaigns are working, condom usage and preventive sexual behavior has increased.

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Table – 1 Details of pregnant women counseled and tested at a tertiary care hospital in South Odisha, India for the period 2005-2012.

Total No. of Pregnant Women Registered and Counseled	Total No. of HIV Testing done	Total No. of HIV Positives	Percentage(%) of Seropositivity (95% CI)
18905	15853	105	0.66 (0.54-0.8)

Table – 2 Demographic characteristics of seropositive pregnant women at a tertiary care hospital in South Odisha, India (n=105)

Variables	No. of Seropositives	Percentage (95% CI)
1.Age	24.31±3.9	
2.Marital status	Married Unmarried	104 01 99.05 (94.05-99.95) 0.95 (0.05-5.9)
3.Parity	0 1 2 3 4 and above	45 33 19 07 01 42.86 (33.36-52.88) 31.42 (22.91-41.32) 18.1 (11.52-27.08) 6.67 (2.95-13.73) 0.95 (0.05-5.9)
4.Socio-economic status	Low Middle High	80 24 01 76.19 (66.7-83.73) 22.86 (15.47-32.28) 0.95 (0.05-5.9)
5.Residence	Rural Urban	77 28 73.33 (63.65-81.27) 26.67 (18.73-36.35)
6.Religion	Hindu Muslim others	101 02 02 96.2 (89.97-98.77) 1.9 (0.33-7.3) 1.9 (0.33-7.3)
7.Occupation	Housewife Labourer Service	92 13 0 87.61 (79.41-92.98) 12.39 (7.02-20.59) 0
8.Education	Illiterate Primary level Matric	27 66 11 25.71 (17.9-35.33) 62.86 (52.84-71.93) 10.48 (5.6-18.36)

	Inter or more	01	0.95 (0.05-5.9)
9.Contraceptives used	None	78	74.28 (64.67-82.1)
	Condom	13	12.38 (7.02-20.59)
	IUCD	08	7.62 (3.59-14.91)
	OC pills	06	5.72 (2.34-12.52)
10.High risk behavior	Single sex partner	102	97.14 (91.26-99.26)
	Multi sex partner	03	2.86 (0.74-8.74)
	IV drug user	0	
11.Occupation of husbands	Migrants	84	80 (70.83-86.92)
	Truck driver	13	12.38 (7.02-20.59)
	Others	08	7.62 (3.59-14.91)
12.Hign risk behavior of husbands	Single sex partner	13	12.38 (7.02-20.59)
	Multi sex partner	87	82.86 (73.99-89.26)
	IV drug user	05	4.76 (1.77-11.29)

Table – 3 Age distribution of HIV prevalence among pregnant women at a tertiary care hospital in South Odisha, India

Age Group (Yrs)	No. of Pregnant Women Tested (%)	No. of HIV Seronegatives	No. of HIV Seropositives (%)	% of Seropositivity (95% CI)
15-19	1529 (9.65)	1513	16 (15.24)	1.05 (0.62-1.74)
20-24	6597 (41.62)	6562	35 (33.34)	0.53 (0.37-0.75)
25-29	6682 (42.14)	6636	46 (43.8)	0.69 (0.51-0.93)
30-34	855 (5.39)	848	07 (6.67)	0.82 (0.36-1.76)
35-39	169 (1.07)	168	01 (0.95)	0.60 (0.03-3.70)
40-44	21 (0.13)	21	0	0
Total	15853 (100)	15748	105 (100)	

P Value of age groups = 0.3445, P< 0.05 significant.

Table – 4 Year wise prevalence rates of HIV in pregnant women at a tertiary care hospital in South Odisha, India

Year	Total tested	HIV positives	% positivity (95% CI)	P value
2005*	126	01	0.79(0.04-4.9)	Chi-Square (X ²) =23.482 P = 0.0014 (P < 0.05, Significant)
2006	1106	17	1.53(0.94-2.51)	
2007	2538	26	1.02(0.68-1.51)	
2008	2860	14	0.49(0.28-0.84)	
2009	2640	13	0.49(0.27-0.86)	
2010	2623	17	0.65(0.39-1.06)	
2011	2770	13	0.47(0.26-0.82)	
2012**	1190	04	0.34(0.11-0.93)	
Total	15853	105	0.66 (0.54-0.8)	

* Two months data ** Four months data

Figure-1 Trends of HIV Seropositivity over a period of Six and Half Years

