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INCIDENCE OF HIV-1 IN ADOLESCENTS AND ADULTS TESTED AT VCTC OF GOVERNMENT GENERAL HOSPITAL, GUNTUR, ANDHRA PRADESH, INDIA

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ABSTRACT

The present communication deals with the objective of revealing seroprevalence, family history, socio-demographic characteristics, and the mode of transmission of HIV in adults and adolescents tested at VCTC (Voluntary Counseling and Testing Center) of Govt. General Hospital, Guntur, Andhra Pradesh, India. It is a retrospective cross – sectional record based study from April 2014 to October 2016. A total of 589 HIV positive adolescents and adult people from different villages belonging to the selected five mandals of Guntur district were recruited for the study. Out of 589 attendees of VCTC, 296 (50.25%) were male and 293 (49.75%) were female subjects belonging to the age group of 11-75 years. Out of 589 study subjects, 565 (96%) subjects became HIV positive through heterosexual partner and 24 (4%) subjects their HIV positive mothers at the time of their births i.e., through mother to child transmission (MTCT). Among 589 HIV-1 positive subjects, 143 (24%) subjects of both genders were died during the course of study period and remaining 446 (76%) subjects were alive taking antiretroviral therapy. Majority of the study subjects were labourers with low income but 94% of the subjects were literate.

KEYWORDS: *HIV incidence, mode of transmission, family history, siblings' status*, *mortality*,

INTRODUCTION

Three decades into the global HIV pandemic there is evidence that the advances in science are beginning to make an impact. In order to push the agenda towards the ultimate goal – an AIDS-free generation – the research agenda should focus on a number of critical activities. HIV has incessantly provided challenges to the medical and public health communities over the 30+ years of our response to this global pandemic.

According to UNAIDS GLOBAL STATISTICS Fact sheet - 2015, 36.7 million [34.0 million–39.8 million] people globally were living with HIV. 2.1 million [1.8 million - 2.4 million] people became newly infected with HIV. 1.1 million [940 000 -1.3 million] people died from AIDS-related illnesses. 78 million [69.5 million - 87.6 million] people have become infected with HIV since the start of the epidemic. 17 million people were accessing antiretroviral therapy. 35 million [29.6 million–40.8 million] people have died from AIDS-related illnesses since the start of the epidemic.

As of December 2015, 17 million people living with HIV were accessing antiretroviral therapy, up from 15.8 million in June 2015 and 7.5 million in 2010. 46% [43–50%] of all adults living with HIV were accessing treatment in 2015, up from 23% [21–25%] in 2010. 49% [42–55%] of all children living with HIV were accessing treatment in 2015, up from 21% [18–23%] in 2010. 77% [69–86%] of pregnant women living with HIV had access to antiretroviral medicines to prevent transmission of HIV to their babies in 2015.[1]

According to NACO, 2015 adult HIV prevalence is estimated at 0.30% among males and at 0.22% among females. Among the states/UTs, in 2015, Manipur has shown the highest estimated adult HIV prevalence of 1.15%, followed by Mizoram (0.80%), Nagaland (0.78%), Andhra Pradesh & Telangana (0.66%), Karnataka (0.45%), Gujarat (0.42%) and Goa (0.40%). HIV prevalence are sustained in all of the high prevalence States (Andhra Besides these States, Maharashtra, Chandigarh, Tripura and Tamil Nadu have shown estimated adult HIV prevalence greater than the national prevalence (0.26%), while Odisha, Bihar, Sikkim, Delhi, Rajasthan and West Bengal have shown an estimated adult HIV prevalence in the range of 0.21–0.25%.

New HIV infections have fallen by 6% since 2010. Worldwide, 2.1 million [1.8 million–2.4 million] people became newly infected with HIV in 2015, down from 2.2 million [2 million–2.5 million] in 2010. New HIV infections among children have declined by 50% since

2010. Worldwide, 150 000 [110 000–190 000] children became newly infected with HIV in 2015, down from 290 000 [250 000–350 000] in 2010.[1]

Based on HIV Sentinel Surveillance 2008-09, it is estimated that India has an adult prevalence of 0.31 percent with 23.9 lakh people infected with HIV, of which, 39 percent are female and 3.5% are children.[2] In Andhra Pradesh, the Mean HIV prevalence among Antenatal clients (ANC) is >1% in six districts i.e., East Godavari, Guntur and Krishna of coastal Andhra region Kadapa, Karimnagar and Mahbubnagar from other region. The ANC mean positivity in urban and rural areas is 1.09% and 0.70% respectively; out of overall positivity i.e., 0.77% of Andhra Pradesh.[3]
However, the HIV positivity showed a declining trend for all the ICTC attendees. In 2012, parent to child transmission of HIV accounted for 3.11% of all the HIV infection in the district. However, the proportion of transmission through heterosexual route remains high 96.17%.[4]

Hence, the present investigation was undertaken to know the HIV prevalence, mode of transmission of HIV, family history, siblings' status and socio-demography in adolscents and adults who attended ART centre and VCTC (voluntary counseling and testing centre) of Govt. General Hospital located at Guntur district, Andhra Pradesh.

MATERIALS AND METHODS

The present study was conducted at VCTC of Govt. General Hospital, Guntur district is situated in coastal Andhra Pradesh. The Guntur district is located at 16°18′ N latitude and 80°27′ E longitude. To investigate the study, the prior permission from the DMHO of Guntur district was obtained to collect the information on HIV infected people and the blood samples of the required patients belonging to the five selected mandals (i.e., Amaravathi, Thullur, Phirangipuram, Pedakakani and Pedanandipadu) of the Guntur district. For the above investigation, a total of HIV infected 589 attendees of VCTC from April, 2014 to 2016 were recruited, who were suggested for regular checkup either by volunteers or referred from other institutions.

Information pertaining to the attendees of VCTC was obtained from the records of the hospital regarding variables like age, gender, family status, siblings' status and mode of transmission. Graphs were drawn and data was analyzed using MS Excel 2007'.

RESULTS

During the study period from April, 2014 to October, 2016; a total of 589 adolescents and adult people from different villages belonging to the selected five mandals of Guntur district were recruited for the study. The subjects recruited for the present study reside in different villages of the five mandals i.e., Amaravathi, Thullur, Pedakakani, Phirangipuram and Pedanandipadu of Guntur district, Andhra Pradesh, India where the HIV prevalence is high. These subjects were tested for HIV incidence at VCTC, Govt. General Hospital at district headquarters of Guntur who were either volunteers or referred from other institutions. And these subjects were found to be infected with HIV-1 type which is the most prevalent in India. Among 589 HIV-1 positive subjects, 296 subjects (50.25%) were male and 293 subjects (49.75%) were female (Figure 1).

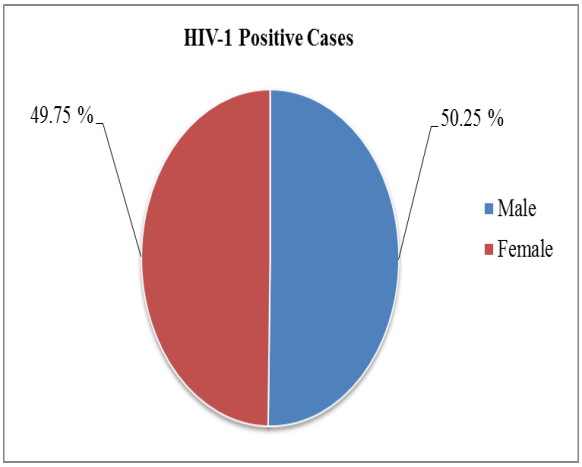

Figure 1: Gender wise distribution of HIV-1 infected adolescents and adults recruited for the study from April, 2014 to October, 2016

Among 589 HIV-1 positive adolescent and adult subjects, 24 (4.0%) subjects were in the age group of 11-20 years and 155 (26.0%) subjects were in the age group of 21-30 years. High incidence of HIV was found in 211 (36.0%) subjects in the age group of 31-40 years, 126 (21.0%) subjects were in the age group of 41-50 years, 56 (10.0%) subjects were in the age group of 51-60 years and 17 (3.0%) subjects in age group of 61-75 years (Table 1).

Table 1: Distribution of HIV-1 positivity according to age and gender of the adolescents and adults recruited for the study from April, 2014 to October, 2016

Age (years)	Male		Female		Total	
	No.	%	No.	%	No.	%
11-20	5	2	19	7	24	4
21-30	56	19	99	34	155	26
31-40	**113**	**38**	**98**	**33**	**211**	**36**
41-50	70	23	56	19	126	21
51-60	41	14	15	5	56	10
61-75	11	4	6	2	17	3
Total	296	100	293	100	589	100

After taking the consent from caretakers of adolescents and independent adults; the subjects revealed the mode of transmission of HIV. Out of 296 male subjects; 291 (98%) males had transmission from their heterosexual partner and 5 (2%) males had transmission from the mothers during birth (MTCT). Of the total 293 female subjects; 274 (94%) females had transmission from their heterosexual partner i.e., through the husband, 19 (6%) females had transmission from the mother during birth (MTCT) (Table 2). Thus, out of total 589 adolescent and adult subjects, 565 (96%) subjects became HIV positive through heterosexual partner and 24 (4%) subjects became HIV positive through their HIV positive mothers at the time of their birth i.e., through mother to child transmission (MTCT) (Figure 2).

Table 2: Mode of transmission of HIV-1 in adolescents and adults recruited for the study from April, 2014 to October, 2016

Risk Factor	HIV-1 Positive adolescents and adults					
	Male		Female		Total	
	No.	%	No.	%	No.	%
Heterosexual Partner	291	98	274	94	**565**	**96**
Mother To Child Transmission	5	2	19	6	24	4
Total	296	100	293	100	589	100

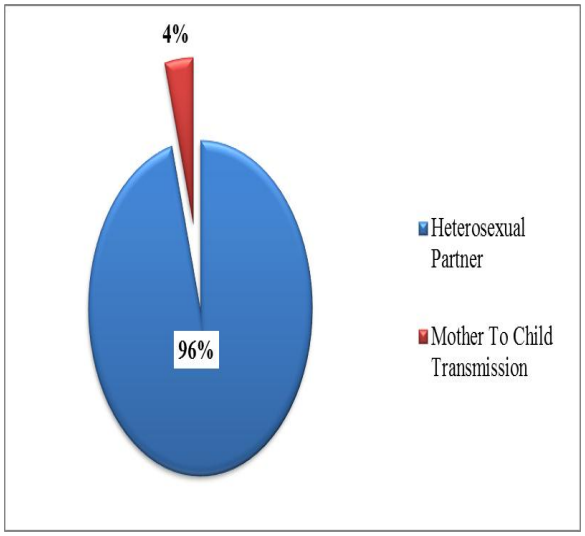

Figure 2: Mode of transmission (%) of HIV-1 in study subjects of adolescents and adults recruited for the study from April, 2014 to October, 2016

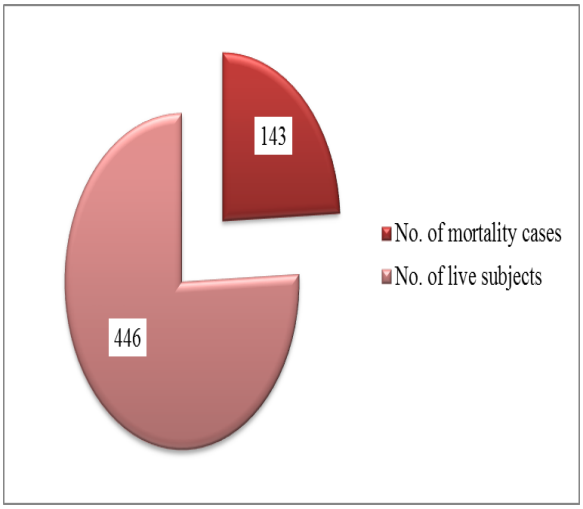

Figure 3: Incidence of Mortality cases in HIV infected adolescents and adults (n = 589) recruited for the study from April, 2014 to October, 2016

Among 589 HIV-1 positive subjects, 143 (24%) subjects of both genders were unfortunately and pathetically died during the course of study period and remaining 446 (76%) subjects were live (Figure 3) taking antiretroviral therapy.

Table 3: Distribution of study subjects according to the living status recruited for the study from April, 2014 to October, 2016

Patient Status	Male		Female		Total	
	No.	%	No.	%	No.	%
Alive	244	82	202	69	446	76
Dead	52	18	91	31	**143**	**24**
Total	296	100	293	100	589	100

In the present study, out of 143 mortality cases; 52 (18%) were male subjects and 91 (31%) were female subjects. Out of 446 live subjects; 244 (82%) were male subjects and 202 (69%) were female subjects taking ART regularly (Table 3). Thus, in the present study high mortality was observed in female subjects.

The longevity of the live subjects in the present study is due to the great achievement of antiretroviral therapy (ART) and also depended on their own immunity. Due to this therapy now a days HIV/AIDS became chronic and manageable disease like cancer and diabetes.

In the present study, out of 446 live study subjects, 24 subjects of both genders have acquired HIV from their mothers during their births (MTCT). Out of these 24 subjects, 11 (46%) subjects have HIV positive parents who were already died, 6 (25%) subjects have HIV positive parents who are still living, 4 (17%) subjects have HIV positive father who has died and 3 (12%) subjects have HIV positive mother who is still living (Table 4). Adolescent's subjects parents who are still living and some subjects mother positive alive which has happened in the case of husband abandoned families, mothers longevity expanded due to ART therapy. From out of these 24 subjects of both genders; 17 (71%) subjects were having no siblings and 7 (29%) subjects having HIV +ve siblings who are still living and (Table 5).

Out of 446 live study subjects, 422 subjects of both genders acquired HIV by heterosexual route. The family status of these subjects, whether their marital partners are alive or dead and their sero-status is given in the Table 6. Among 422 subjects; for 201 (47%) subjects of both genders - both the couple are alive being HIV positive, for 84 (20%) female subjects - husbands are live being HIV positive, for 7 (2%) female subjects - husbands are alive being HIV negative (this is the condition in husband abandoned families), for 97 (23%) male subjects - wives are alive being HIV positive and for 33 (8%) male subjects - wives are alive being HIV negative (the couples are said to be sero-discordant couples) (Table 6).

Table 4: Family history of HIV-1 positive adolescents and adults (transmitted HIV though MTCT) recruited for the study from April, 2014 to October, 2016

Parental HIV Status	Male		Female		Total	
	No.	%	No.	%	No.	%
Both Parents +ve & Died	1	20	10	53	**11**	**46**
Both Parents +ve & Alive	2	40	4	21	6	25
Father +ve & Died	1	20	3	16	4	17
Mother +ve & Alive	1	20	2	10	3	12
Total	5	100	19	100	24	100

Table 5: Siblings' HIV status of the study subjects (transmitted HIV though MTCT) recruited from April, 2014 to October, 2016

Siblings' HIV Status	Male		Female		Total	
	No.	%	No.	%	No.	%
Having no siblings	2	60	15	79	**17**	**71**
Having HIV +ve siblings	3	40	4	21	7	29
Having HIV –ve siblings	0	0	0	0	0	0
Total	5	100	19	100	24	100

Table 6: Family history of HIV-1 positive study subjects (transmitted HIV through Heterosexual route) recruited for the study from April, 2014 to October, 2016

Sero-discordant couple HIV Status	Male		Female		Total	
	No.	%	No.	%	No.	%
Both couple +ve & Alive	109	46	92	50	**201**	**47**
Husband +ve & Died	0	0	0	0	0	0
Wife +ve & Died	0	0	0	0	0	0
Husband +ve & Alive	0	0	84	46	84	20
Husband -ve & Alive	0	0	7	4	7	2
Wife +ve & Alive	97	40	0	0	97	23
Wife -ve & Alive	33	14	0	0	33	8
Total	239	100	183	100	422	100

Sero-discordant Couples mean one person is HIV-positive and one is HIV-negative sometimes refers to be mixed serostatus". "Sero-" refers to blood serum. "Sero-status" refers to whether someone has HIV infection or not. The current investigation towards employment status of these study patients (n = 446) showed that 67% of the HIV victims were labourers, 17% of the HIV victims were truck drivers, 1% of the HIV victims were auto drivers, 4% of the HIV victims were farmers, 6% of the HIV victims were house wives and 5% of the HIV victims were students (Table 7).

Table 7: Employment status of HIV-1 positive adolescents and adults recruited for the study from April, 2014 to October, 2016

S. No.	Occupation	Number of Subjects	Percentage (%)
1	Labourers	**300**	**67**
2	Truck Drivers	75	17
3	Auto Drivers	6	1
4	Farmers	16	4
5	House Wives	25	6
6	Students	24	5
Total		446	100

In the current investigation towards annual income of these study patients (n = 446) showed that 67% of the HIV victims being labourers earn annual income between Rs. 1,000 to Rs. 3,000, 4% of the HIV victims being truck drivers earn annual income between Rs. 3,000 to Rs. 4,000, 18% of the HIV victims being auto drivers, farmers, workers in road construction and building construction earn annual income between Rs. 4,000 to Rs. 8,000 and 11% victims being house wives and students earn no income (Table 8).

Due to frequent recurrence of opportunistic infections (OIs) and hospitalization the study subjects stopped working and have no income. In the present study, it is revealed that most of the victims have an income of Rs. 1,000/- to Rs. 3,000/- that makes them difficult to get the treatment done with this meager amount. Many of them earned the amount by selling vegetables and handicraft items.

Table 8: Annual income of HIV-1 positive adolescents and adults recruited for the study from April, 2014 to October, 2016

Annual Income (Rs.)	Number of Subjects	Percentage (%)
1,000/- to 3,000/-	300	67
3,000/- to 4,000/-	16	4
4,000/- to 8,000/-	81	18
No Income	49	11
Total	446	100

In the present investigation out of 446 study subjects; 90% of the HIV victims were educated just to read and write and also were capable of understanding what the Government inculcates to the public in prevention of HIV infection and route of transmission, 4% of the HIV victims have completed high school education and 6% of the subjects were illiterate (Figure 9).

Table 9: Educational status of HIV-1 positive adolescents and adults recruited for the study from April, 2014 to October, 2016

Education	Number of Subjects	Percentage (%)
Primary Education	**401**	**90**
High School Education	18	4
Illiterate	27	6
Total	446	100

In the present study, HIV infected people living in and around selected five mandals of Guntur district was good at education but their mental urge made them victimized to HIV infection. Even though they have better knowledge in HIV transmission modalities, the subjects have not taken proper precautionary measures during sex with unknown partners or they are mentally self–effacing shy to purchase the condom from the available sources.

Thus the present investigation on HIV infected population revealed that the subjects were mentally instable and living with the fear of future and death. This situation definitely spoils our country's productivity and economy.

DISCUSSION

The present investigation reveals the status of incidence of HIV in the general population attending VCTC and ART centre of Govt. General Hospital, Guntur, Andhra Pradesh during April 2014 to October 2016. The male: female ratio in the present study was 1.01:1 and the percentage was 50.25 (male) and 49.75 (female). The present study shows high HIV incidence of 83% in the age group 21-50 years of both sexes.

According to the study of Amirali *et al.*[5] out of 601 patients men were 325 (54%) and women 276 (46%) and male: female ratio was 1.2:1 which is in consistent with our study. The mean age for men was 36.2 years (SD = 10.35) and for women it was 31.4 years (SD = 9.21) and

majority of HIV positive patients were seen below the age of 45 years in both sexes which correlates with our study.

In a large Indian studies Ghate *et al.*[6] reported M:F ratio as 2.22:1 and Kumarasamy *et al.* (2003)[7] reported M:F ratio as 2.6:1 which is which is slightly more when compared to our study. The study at VCTC, Darjeeling reported 92.4% patients belonging to the age group 15-49 years[8] and a study at VCTC, Udupi reported 88.7% patients belonging to the age group of 15-49 years[9] are in corroboration with our finding that 83% patients belong to the age group of 21-50 years of both the sexes.

In the present study, 96% of the subjects infected with HIV by heterosexual mode and 4% infected through mother to child transmission (MTCT). This is supported by Chakravarty *et al.*[10] that heterosexual contact was the commonest mode of transmission. Hira *et al.*[11] also reported 88.7% of their study patients got infected through heterosexual mode of transmission. Similarly, in an Indian study by Kumarasamy *et al.*[7] reported 93% acquired HIV by heterosexual mode, 4.6% by blood transfusion and 2.4% through infected needles/syringes.

But in contrast to this, according to the study of Alrajhi *et al.*[12] in Saudi Arabia, the patients have shown only 46% of heterosexual transmission, blood transfusion in 26%, perinatal transmission in 12%, MSM in 5%, IDU in 2%, Others 1% and unknown in 8%. Hence, Alrajhi *et al.*[12] reported lower percent of heterosexual transmission in comparison with our study.

In the present study, the main source of infection is the heterosexual partner in both men and women. Only few of the subjects acquired HIV through their infected mothers during their birth. Our results of the study strongly supported by NACO Annual Report 2010-11 that unprotected sex (87.4% heterosexual and 1.3% homosexual) is the major route of HIV transmission, followed by transmission from parent to child (PTCT) (5.4%) and use of infected blood and blood products (1.0%), while injecting drug use is the predominant route of transmission in north eastern states, it accounts for 1.6% of HIV infections.

In the present study, 143 (24%) were died out of 589 study patients recruited for the study. Among 143 mortality cases 52 were male subjects and 91 were female subjects. These subjects have suffered mainly with TB co-infection. This is supported by the study of Reid et al. (2006)[13] and Antonucci et al.[14] that, TB is the leading cause of death among HIV infected persons and may accelerate the course of HIV infection, increasing the HIV load in some patients. With the advent of new medication, HIV has become a chronic illness. Long before death and dying becomes an issue, there are issues of chronic sorrow.[15] Having a chronic yet fatal illness puts stress on a family that results in physical fatigue and health problems as well as ongoing social and financial stressors.

In the present study, out of 446 (74%) live subjects; for 11 subjects both the parents were HIV positive and died, 17 subjects do not have siblings, and for 201 subjects both the couple are HIV +ve and alive. Some of the subjects felt sorrowful that who will care for them if all the family members die and about their own health. However, it is the pervasive threat of death and fear of being left alone that constitutes chronic trauma for adolescent and adult survivors of HIV infection.[16]

The present study revealed the socio-economic status of the study patients. According to the present study; 67 % were labourers, 17% were Truck drivers, 1% auto drivers, 4% farmers, 6% house wives and remaining 5% were students. 67% of the study subjects earn income only from Rs. 1,000 to Rs. 3,000 per annum 90% of the subjects have only primary education. Thus, the study subjects have weak socio-economic background without considerable income and education and the lead a poor life. This is supported by the study of Lalit *et al.*[17] that among occupations, the highest association of HIV with sex work and begging among both men and women is not surprising. Transport – related occupation among men was also associated with higher risk of HIV, which too is a known association. The significantly higher risk of HIV among women who were unskilled labourers or had other occupations associated with regular mobility, but not among men (except for transport related mobility), suggests the particular vulnerability of men in these occupations to high – risk sex practices, which needs focus in HIV prevention efforts in India.

In another study reported by Rakhi *et al.*[18]; women struggling with illiteracy, lower social status and less economic opportunities have a relatively higher representation among sex workers in Andhra Pradesh, making them more vulnerable to HIV. The above studies correlate with the present findings that occupation, marital status and annual income increases the risk of HIV.

CONCLUSION

In conclusion, heterosexual transmission is the main mode of acquiring HIV-1 among the patients of Guntur district, Andhra Pradesh, India. Incidence of HIV in both men women is almost of same percent. Majority of the couples are HIV positive. Women acquire the virus from their spouses, whereas men acquired it from extramural sex. Thus the study highlights the incidence of HIV-1 through heterosexual route, hence emphasis the need to continually expand efforts to prevent heterosexual mode of transmission. The Government should inculcate the righteous decision to access the testing of every individual and create awareness, if found HIV positive should provide antiretroviral therapy without any barriers.

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