Introduction

"Women, Girls, HIV and AIDS" was the theme of the 2004 World AIDS day. A decade ago women seemed to be on the periphery of the AIDS epidemic. Today they are of central concern and are one of the fastest growing groups of new AIDS cases, accounting for close to half of the 37.2 million adults living with HIV worldwide in 2004; one woman is infected with HIV every 20 seconds throughout the world. In India, where nearly 40% of HIV-infected cases are women, they are quickly becoming the new face of AIDS. This region of the world is hardest hit by the disease and may herald the future of AIDS worldwide. In the current context of poverty, lower
levels of education, and limited access to resources, young women and girls of 15 to 24 years of age are at a higher risk of HIV infection than young men and boys.

Though many studies have been done on women either with high-risk behavior or in pregnancy, epidemiological studies or large-scale hospital-based studies conducted exclusively on women for HIV prevalence are very few. The same is true in India, where such studies are very sparse, particularly from the state of Andhra Pradesh, where the overall prevalence rate among antenatal women is about 2.1% (0.8–4%). Such studies are essential in order to understand the trend of the infection.

This retrospective study was undertaken at Nizam’s Institute of Medical Sciences with the aim of obtaining clinical information on women with HIV, the changing trends of HIV infection in various age groups and different occupations, and the differences in clinical manifestations in HIV-reactive women compared to men. A comparison was also made between the sentinel surveillance data of antenatal women and our hospital-based data of HIV-infected women.

Study population and methods

A retrospective study was conducted covering the 12-year period from 1993 to 2004, on a total of 10 797 HIV-reactive patients identified at Nizam’s Institute of Medical Sciences, a tertiary care hospital and university in Hyderabad, South India.

Data from all HIV-reactive patients have been maintained at our institute since 1993. These data have been obtained by a structured interview for both outpatient and inpatient cases, and additionally by reviewing the medical records of inpatients (as in the case of 11.6% of women in our study). To avoid any bias, only two people (authors) collected the study data. Anonymity and confidentiality were maintained and ethical clearance was obtained from the institute’s ethical committee. There is no dedicated retroviral diseases (RVD) ward in our hospital and these data represent HIV-reactive cases from all the units of the Institute.

All serum samples were evaluated by enzyme-linked immunosorbent assay for HIV antibodies: from 1993 to 1996 by using a 2nd generation assay, from 1996 to April 2003 by using 3rd generation ELISA kits, and from then onwards using 4th generation kits (Vironostika HIV Ag/Ab from BioMerieux). With the improvement in the sensitivity of diagnostic kits with each new generation, the detection of HIV-reactive cases has become more accurate in recent years. The WHO/UNAIDS strategy III for the diagnosis of the disease in patients has been followed since 1995 in order to decisively establish the presence of HIV infection. CD4 testing in our institute was commenced in August 1999 using the FACS Count (Becton & Dickinson) system, courtesy of the National AIDS Control Organization (NACO), Government of India.

Of the 2643 HIV-reactive women, available data from 2035 women were reviewed for demographic information including age, marital status, HIV status of the spouse, and occupation of self and that of the spouse. Data from 608 women with HIV infection were not available. Information concerning route of transmission, use of HIV therapy, and other clinical information were collected. For the comparison of systemic and opportunistic infections in HIV-reactive women with those of reactive men, data from 5817 HIV-reactive men were reviewed. Data were analyzed using Epi-info version 5, CDC and estimates of all the key variables and the indicators were calculated. Based on clinical signs and symptoms, the women with HIV infection were categorized into the four stages defined by the World Health Organization (WHO), and based on their CD4 cell counts they were categorized as per the Centers for Disease Control and Prevention (CDC) criteria.

Results

Of the 10 797 HIV-reactive cases at our institute, 2643 (24.5%) were women. There has been a considerable rise in the proportion of women among HIV reactives (Figures 1 and

![Figure 1](https://example.com/figure1.png)

**Figure 1** Comparison of the prevalence of HIV-reactive women from this study with the prevalence found by the State HIV sentinel surveillance study (1998–2004). NIMS, Nizam’s Institute of Medical Sciences.
2). The clinical symptoms and various systemic and opportunistic infections noted during different stages of HIV infection are shown in Figure 3. Of the infected women, 86% were housewives. Due to financial constraints CD4 testing was not performed on all HIV-reactive women. A total of 1985 women were screened for CD4 cell counts from 1999 onwards (the year when CD4 testing was started at our institute). Data from 1514 females were available and analyzed as per the CDC classification using the CD4 counts (Table 1). All these women were categorized into the four WHO stages of the disease based on their clinical history.

Of the HIV-reactive women, 307/2643 (11.6%) were admitted to our institute with various HIV or non-HIV related complications. Of these, 24.8% had required emergency

![Figure 2](image1.png)

**Figure 2** Yearly proportion of HIV-reactive women by age group (total reactive women = 2643).

![Figure 3](image2.png)

**Figure 3** Opportunistic and other associated infections with clinical symptoms in HIV-reactive individuals from the study (women = 2035, men = 5817).
infected women. This is due to a large population of one from the sharp increase in the yearly proportion of HIV-women is spreading at a prolific rate, which can be observed groups for HIV infection. In the Indian context, the epidemic in past 24 years since the AIDS epidemic was first detected.

Today, women are probably one of the most vulnerable risk workers, and a high prevalence of sexually transmitted dis-

services and 76.3% of these emergency cases were admitted due to HIV-related complications, commonly with unexplained fever, diarrhea, *Mycobacterium tuberculosis*, or with other opportunistic infections. A mortality rate of 13.4% (41/307) was recorded among the hospitalized HIV-infected women. The most common identifiable cause resulting in death was an acute illness with multi-organ failure. Since the introduction of highly active antiretroviral therapy (HAART) at our institute in 1999, 2054 women have been found to be HIV-reactive, and even though 23.8% of them were symptomatic, only 8.5% of them had received therapy.

### Table 1: Symptomatic classification of 1514 HIV-reactive women as per the CDC guidelines using CD4 counts and the WHO clinical staging system

<table>
<thead>
<tr>
<th>CD4 cell counts</th>
<th>Clinical categories</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Asymptomatic</td>
<td>2 Mild disease</td>
</tr>
<tr>
<td>A</td>
<td>&gt;500 cells/μL</td>
<td>A1 = 738</td>
</tr>
<tr>
<td>B</td>
<td>200–499 cells/μL</td>
<td>B1 = 342</td>
</tr>
<tr>
<td>C</td>
<td>&lt;200 cells/μL</td>
<td>C1 = 58</td>
</tr>
<tr>
<td>Total</td>
<td>1138 (75.2%)</td>
<td>45</td>
</tr>
</tbody>
</table>

### Discussion

A woman’s biologic, cultural, economic, and social status can affect her likelihood of becoming infected with HIV. According to the UNAIDS estimate, women now make up nearly half of the 37.2 million adults aged between 15 and 49 living with HIV worldwide. This percentage has risen dramatically over the past 24 years since the AIDS epidemic was first detected. Today, women are probably one of the most vulnerable risk groups for HIV infection. In the Indian context, the epidemic in women is spreading at a prolific rate, which can be observed from the sharp increase in the yearly proportion of HIV-infected women. This is due to a large population of one billion, large numbers of commercial sex workers, mobile male workers, and a high prevalence of sexually transmitted diseases (STDs). Based on cases reported to NACO, by the end of January 2005 a total of 70 075 men and 27 705 women in India were reported as having AIDS.

Even though our hospital does not have a gynecology unit, all the other units are represented, and the HIV prevalence rates were similar to those seen in the state HIV sentinel surveillance results (Figure 1). 24.5% of HIV-infected cases at our institute were women. A fluctuating prevalence was observed that ranged between 6.3% in 1993 and 28.9% in 2004 (Figure 2). The decreased prevalence rates in the years 1999, 2001, 2002, and 2003 as seen from both our data and those of the state surveillance, could be due to the successful implementation of antiretroviral therapy (ART) as well as the HIV prevention programs. But in 2004 the prevalence again increased, suggesting the possible establishment of drug-resistant mutants as well as of more virulent and transmissible HIV subtypes in this part of India.

In many developing countries, about 50–60% of all new HIV infections occur in the 15–24 years age group. However, unlike the population-based data, our hospital-based data showed a higher prevalence among the older age groups, when clinical symptoms start to set in and the infection begins to manifest itself. Of the HIV-infected women, 22.8% presented to the hospital with an HIV/AIDS-related illness. HIV in older women, who are at greater risk, is difficult to detect, and a possible infection will be missed unless routine testing alongside their spouse occurs.

Heterosexual behavior was determined to be the main route of transmission of HIV in our study, and was seen in 87.3% of our cases. Women are more likely to become infected than are men due to a substantial mucosal exposure to seminal fluids. Studies show that male-to-female transmission of HIV appears to be twice as efficient as female-to-male transmission. Our study also shows that men, especially spouses, have been the most common route of HIV transmission to women. Marriage provides no protection to women against HIV. It was observed from the interview that extra-marital relations among women were still uncommon even though that percentage has been seen to increase from 0.6% in 1993 to 8.6% in 2004. In fact, the primary risk factor for HIV in married women appears to be whether their spouses are engaged in extramarital or commercial sex. Many of the married women admitted to not using any barrier during sex as they had faith in their husbands, similar findings to those of a study in Brazil. Transmission of the infection by blood transfusion has seen a gradual reduction over the years, from 33.3% in 1993 to 4.1% in 2004, due to the successful implementation of donor screening in blood banks.

Only 22.8% of women were symptomatic, and fatigue, prolonged fever, cough, and oral ulcers were some of the common clinical features observed (Figure 3). Interestingly, physicians only suspected HIV infection in 11.4% (231/2035) of cases, showing how frequently they fail to recognize the early symptoms of HIV in women.

Of the common systemic infections found in HIV-infected women, TB and candidiasis were the most common opportunistic infections, followed by bacterial and genital fungal infections (Figure 3). The diagnoses of all these bacterial, viral, and fungal infections were based on the recommended radiological, serological, pathological, biochemical, and culture test results. Even though women suffer from the same clinical manifestations of HIV infection as men, our study has shown that women have more bacterial infections, respiratory infections (often pneumonia), and gender-specific manifestations such as recurrent vaginal candidal infections, severe pelvic inflammatory disease, herpes simplex infections, etc. The CDC currently recommends that every HIV-positive woman should have a complete gynecologic evaluation as part of her initial HIV evaluations.

As many Indian women are still less likely than men to be diagnosed early and to receive early treatment, 13.4% (41/307) of the admitted females could not survive the infection,
proving again that women experience a more rapid progression to AIDS and death than men at similar CD4 cell counts. All the clinical data from the 1514 HIV-reactive women, when categorized as per the WHO clinical HIV staging system, showed that most of the women (75.2%) were asymptomatic and had got their HIV test done on the recommendation of the physician due to the reactive status of the spouse. With the CD4 counts of these 1514 women categorized as per the CDC classification, 49.5% had CD4 counts of >500 cells/µL whereas 21.9% had <200 cells/µL (Table 1). Even though 24.8% of the women (376/1514) were symptomatic, only 27.4% of these symptomatic women (103/376) were on ARV treatment mainly due to lack of access and information. However, only 41% of those on ARV treatment had good levels of adherence and this may have affected their ability to deal with opportunistic infections, results similar to those of a study carried out in Pennsylvania. Women probably also reported late to the hospital and so could not receive adequate treatment at an appropriate time. Many women did not know much about the available health services and treatments, and further, due to complex economic and social reasons, fewer women had access to early AIDS care. The reasons for nonadherence to therapy were mostly poverty, ignorance, and adverse effects of drugs, similar to other reasons for nonadherence to therapy were mostly poverty, ignorance, and adverse effects of drugs, similar to other studies that have shown that women are more likely than men to experience several ARV-associated adverse effects.

Of the women included in the study, 86% were housewives. By occupation, their HIV-infected spouses were almost uniformly distributed across the various occupational categories. This again emphasizes the fact that, from what was once thought of as a problem of high-risk groups like commercial sex workers and migrant workers, the virus has entered the communities of businessmen, laborers, students, etc. (i.e., the general population), and is affecting the vulnerable housewife, who up until more recently was in the low-risk group.

The study reported here has confronted several limitations. Firstly, due to the unwillingness of the respondents, data from all the women could not be obtained. Secondly, the asking of questions concerning sexual beliefs and behaviors was restricted, and because of the nature of the questionnaire, the honesty of the individuals’ responses may be called into question.

Conclusion

Although HIV/AIDS affects both men and women, with the rapid increase in the rate of HIV cases in women, research in this area is particularly important. In India, women appear to be the most vulnerable group in the community for HIV infection. On many occasions doctors and healthcare providers have failed to recognize the early symptoms of HIV in women and should be alert to any abnormal clinical manifestations in them. Early diagnosis of HIV infection allows women to have early monitoring of CD4 counts and if needed to take full advantage of antiretroviral treatments and preventive medicines for opportunistic infections.

Our study has shown that there is good cause to be concerned about for the effects of HIV in women and stresses the importance of focusing targeted interventions on women in areas of high prevalence as we enter into the 25th year of the HIV pandemic. These data underscore the importance of more research on women and AIDS in settings where heterosexual contact is an important mode of HIV transmission.

Conflict of interest: No conflict of interest to declare.

References


