

A cross-sectional study of demographic and clinical profile of HIV patients at ART center of tertiary care hospital



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ABSTRACT

Background: India has the third largest number of people living with HIV/Acquired immunodeficiency syndrome (AIDS). It is important to understand the presentation of HIV disease in the local context and culture. **Aims and Objectives:** The present study is aimed at identifying the socio-demographic characteristics, clinical presentations of HIV/AIDS patients, opportunistic infections (OI), and the possible risk factors for acquiring HIV infection. **Materials and Methods:** A descriptive cross-sectional study was conducted on HIV patients from September 2021 to December 2021. The HIV-positive patients of all age groups and all categories were included in the study. However, the clinical staging was done according to the World Health Organization (WHO) classification of HIV/AIDS. Data were expressed as mean and percentage proportion with chi square test for measuring statistically significance. **Results:** Among 140 HIV patients 88 (62.9%) were males. More than half were 101 (72.1%) in the reproductive age group 18–40 years with mean age 35 ± 11.5 years. The commonest mode of HIV transmission was heterosexual 114 (81.4%). Maximum belonged to social Class IV 51 (36.4%) and Class III 47 (33.6%) of socioeconomic status. Fever 92 (65.7%), weight loss 82 (58.7%), and cough 68 (48.6%) were the common presenting. Pulmonary tuberculosis and diarrhea were the most predominant secondary OI accounting for 46 (32.9%) and 35 (25.0%), respectively. More than half 82 (58.6%) of patients were in the WHO clinical Stage II of HIV disease. CD4 counts of the patients were significantly inversely correlated with the number of symptoms and the number of OI. **Conclusion:** There was a high frequency of behavioral risk factors, together with unawareness among HIV patients, socio-demographic, and clinical profile of study participants reflects an impact of early case detection and timely institution of highly active antiretroviral therapy.

Key words: HIV patients; Demographic profile; Clinical profile opportunistic infection; Antiretroviral therapy; Anti-retroviral therapy center

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INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) is a chronic, potentially life-threatening endemic disease caused by the human immunodeficiency virus. According to the Joint United Nations Program on HIV/AIDS and World Health Organization (WHO) Report 2020, around 38 million people are living with HIV/AIDS worldwide, some 1.7 million people were newly infected with the virus, and 690 thousand people died of HIV related

illness in 2019.¹ India has the third-highest burden of HIV in the world. It is estimated by the annual report 2018–2019 published by the Department of Health and Family Welfare, Government of India, that the total number of People Living with HIV (PLHIV) in India is 21.40 Lakhs. An estimated 87 thousand new HIV infections (OI) and 69.11 thousand people died of AIDS-related causes nationally in 2017.² National adult HIV prevalence in India is estimated at 0.22% (0.16–0.30%) with range of 0.25% among males and

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0.19% among females. HIV/AIDS is no longer just a public health issue in India but become one of the most serious socioeconomic and developmental concerns, because maximum no of reported cases is occurring in sexually active and economically productive age group (15–44 years). Most infections occur through heterosexual transmission.² The World Bank has categorized India as a low-income country. Approximately 70.0% of its people live in rural areas. The critical factors responsible for the disease's spread are ignorance about the disease, fear of discrimination, and consequent avoidance for testing and treatment. Females do not seek medical care in fear of eviction, making them more vulnerable to the disease. The most common occupation group infected with HIV is the Unskilled/labor group, including the skilled and semi-skilled workers. The clinical and socio-demographic profile of patients attending the anti-retroviral therapy (ART) center would be helpful in AIDS management.³ India launched its free national ART program in April 2004, which is the cornerstone of managing patients with HIV/AIDS infection. OI are becoming a predominant cause of morbidity even with ART's widespread use and prophylaxis to these infections. Tuberculosis (TB) is the most reported OI among HIV-infected patients in India. Oral candidiasis, diarrhea, pneumocystis Jiroveci Pneumonia, herpes simplex, herpes zoster, respiratory and skin bacterial infections, cryptococcal meningitis, cytomegalovirus retinitis are other commonly reported OIs.⁴ There is regional variation in the demographic and clinical presentation of HIV disease and the spectrum of OI of HIV patients. Under this background, we studied the socio-demographic and clinical profile of HIV patients. This socio-demographic and clinical feature often gives information on the flow rate of disease in a region and statistically evaluates the depth of the disease in a population.⁵ There is a need to study the profile of patients who come to ART centers and link their clinical and socio-demographic variables in the management. Moreover, it is important to understand the presentation of HIV disease in the local context and culture.

Aims and objectives

The present study is aimed at identifying the socio-demographic characteristics, clinical presentations of HIV/AIDS patients, OI, and the possible risk factors for acquiring HIV infection.

MATERIALS AND METHODS

Study design

Hospital Based A descriptive cross-sectional study was conducted at ART center of J.A. Group of Hospitals, Gwalior from July 2021 to December 2021. ART center

has facilities for first-line ART, alternate first line, second line, third line ART, and drugs for managing all OI along with trained staff for counseling and management of HIV patients.

Inclusion and exclusion criteria

The HIV-positive patients of above 18 years age groups and all categories were included in the study. Those with missing data have seriously ill and debilitated patients and not willing to give consent were excluded from the study.

Ethical considerations

Ethical endorsement was taken from Institutional Ethical Committee of Gajra Raja Medical College, Gwalior (M.P.) before starting the investigation by the approval certificate no 15/IEC-GRMC/2020 and also granted permission by Madhya Pradesh State AIDS control unit vide letter no.F-7/AIDS/Admin/Eth.com/20.

Demographic, socio-economic status and clinical staging of the patients

Enrolled HIV patients were studied for demographic details including age, sex, residence, education level, occupation, socio-economic status, marital status, HIV status of spouse, mode of transmission, and for clinical profile including presenting symptoms, WHO clinical stage, CD4 count, OI at the time of presentation, and ART regimen. The Socio-economic status was assessed by the Agarwal AK social classification-based consumer price index.⁶ It applies to both urban and rural populations. It is based on per capita monthly income and categorized as Upper class (Class I) whose per capita income was >10000, Upper middle (Class II) 5000–10000 per capita/Month, Lower middle (Social class III) 2000–5000 and poor {Lower} (Class IV) <2000 per capita/month. Clinical staging of the patients was done according to the WHO classification of HIV/AIDS.⁷ HAART therapy was given to the patients by the doctor of ART center, depending on eligibility as per National AIDS control organization (NACO) guidelines. The patients were given ART regardless of their CD4 count under the new ART guidelines.⁷

Drug treatment protocol according to NACO

As per NACO guidelines, all eligible patients were given ART, which included a standard first-line regimen: (i) Tenofovir (TDF 300 mg)+Lamivudine (3TC 300 mg) + Efavirenz (EFV 600 mg) (TLE) as fixed dose combination in a single pill once a day or Zidovudine (ZDV 300 mg) +Lamivudine (3TC 150 mg)+Nevirapine (NVP 200 mg)/Efavirenz (EFV 600 mg). The zidovudine-based regimen was given to those patients who were initiated earlier in the program or Abacavir+Lamivudine+Efavirenz/ Abacavir+Lamivudine+Nevirapine, mainly given in pediatric patients. (ii) Trimethoprim-Sulfamethoxazole

prophylaxis was given to prevent *Pneumocystis Carinii* pneumonia in all patients with a CD4 lymphocyte count of <350 cells/μl. Isoniazid prophylaxis was given to all new patients till 2–3 weeks of ART. In the case of patients who developed resistance to these first-line regimens (clinical failure, immunological failure, or virological failure) were switched to second-line ART, containing boosted protease inhibitors (PI), for example, Atazanavir/Ritonavir or Lopinavir/Ritonavir combination. Tuberculosis, oral candidiasis, and encephalitis found a significant inverse correlation (P<0.05) with baseline CD4 count. *Pneumocystis pneumonia*, *Toxoplasmosis*, and malignancies develop late in the illness, so not having a positive correlation (P<0.05) with baseline CD4 count.⁸

Statistical analysis

The descriptive statistics of quantitative data were expressed as mean and percentage proportion. The baseline CD4 count was divided into three categories: Baseline level less than 200/μl, baseline level between 201–500/μl, and baseline level greater than 500/μl. The associations of baseline CD4 categories with OI were analyzed. Statistical significance was tested with Chi-square tests at a 5% level of significance (α=0.5).

RESULTS

A total of 140 patients were enrolled in this study with a mean age of 33±15 years. More than half 88 (62.9%) of participants were males, married 107 (76.4), and middle school education 77 (55.0). Maximum patients, that is, 96 (68.6%) were residing in rural area while 44 (31.4%) in urban area. According to Agarwal social classification Score, the majority of patients were belonged to lower (poor) 51 (36.4%) and lower middle 47 (33.6) socio-economic classes. Heterosexual mode of HIV/AIDS transmission was prominent among 114 (81.4%) of the studied sample and no definite route could be ascertained in 08 (5.7%) patients (Table 1). The leading age group affected with HIV/AIDS was from the reproductive age group that was 31–40 years 49 (35.0%) followed with 18–30 years 52 (37.1%). Among 107 (76.4%) married HIV patients, spouses of 86 (61.4%) were found HIV positive. Considering the occupation of HIV patients, the highest percent was among the housewives 38 (27.1%), non-skilled (laborer) 33 (23.6%), and skilled workers 27 (19.3%), respectively. Habits of substance used, for example, smoking, alcohol, and chewing tobacco were present in 62 (44.2%) patients (Table 1).

Clinical profile of HIV/AIDS patients shows Clinically 104 (74.3%) patients were symptomatic. majority of patients 71 (50.7%) were having CD4 count in between 201

Table 1: Demographic characteristics of patients with HIV/AIDS (n=140)

| Variables | No (%) |
|--|------------|
| Sex | |
| Male | 88 (62.9) |
| Female | 52 (39.1) |
| Age Group | |
| 18–30 | 52 (37.1) |
| 31–40 | 49 (35.0) |
| 41–50 | 29 (20.7) |
| >50 | 10 (7.1) |
| Residence | |
| Urban | 44 (31.4) |
| Rural | 96 (68.6) |
| Caste | |
| UR | 57 (40.7) |
| SC | 20 (14.3) |
| ST | 10 (7.1) |
| OBC | 53 (37.9) |
| Educational status | |
| Illiterate | 42 (30.0) |
| Middle | 77 (55.0) |
| Secondary | 16 (11.4) |
| ≥Graduate | 3 (2.1) |
| Marital Status | |
| Married | 107 (76.4) |
| Unmarried | 18 (12.9) |
| Widowed/Divorced/Separated | 15 (10.7) |
| HIV status of spouse | |
| Positive | 86 (61.4) |
| Negative | 54 (38.6) |
| Family Type | |
| Nuclear | 107 (76.4) |
| Joint | 33 (23.6) |
| Occupation | |
| Skilled/ | 27 (19.3) |
| Not Skilled | 33 (23.6) |
| Shopkeeper/Farmer | 25 (17.8) |
| Unemployed | 17 (12.1) |
| Housewives | 38 (27.1) |
| Socio Economic Status (According to per capita income) | |
| Upper [Class I] | 07 (5.0) |
| Upper Middle [Class II] | 35 (25.0) |
| Lower [Middle Class III] | 47 (33.6) |
| Poor [Class IV] | 51 (36.4) |
| Substances used (n=62 (44.2%)) | |
| Smoking | 34 (24.3) |
| Tobacco use | 39 (27.9) |
| Alcohol intake | 36 (25.7) |
| Injection drug user | 9 (6.4) |
| Not used | 78 (55.7) |
| Mode of transmission/Risk factors | |
| Heterosexual | 114 (81.4) |
| Homosexual | 08 (5.7) |
| Intravenous Drug Use | 9 (6.4) |
| Not specified | 08 (5.7) |
| Blood transfusion | 1 (0.7) |

and 500. Most of the patients belonged to the WHO clinical Stage II 86 (61.4%) and majority of patients 82 (58.6%) were having lower weight (BMI<18.5) than normal. More than half of patients 75 (53.6%) were reported poor and very poor health status. Out of the 140 patients,

62 (60.78%) were on ZDV+LMV+NVP combination and 17 (16.7%) were on ZDV+LMV+EFV. During treatment majority of patients 121 (86.4) were regular for taking prescribed treatment (Table 2).

The most frequent presenting symptoms were fever, weight loss, cough, and generalized weakness, which accounted for 92 (65.7%), 82 (58.7%), 68 (48.6%), and 46 (32.9%) respectively, as shown in Table 3.

Table 2: Clinical characteristics of patients with HIV/AIDS (n=140)

| Variables | No (%) |
|------------------------------------|------------|
| Disease Status (HIV sero - status) | |
| Asymptomatic | 36 (25.7) |
| Symptomatic | 104 (74.3) |
| CD4 count | |
| <200 | 44 (31.4) |
| 201–500 | 71 (50.7) |
| >500 | 25 (17.9) |
| BMI (kg/m ²)* | |
| <18.50 (Underweight) | 82 (58.6) |
| 18.50–24.99 (Normal Range) | 55 (39.3) |
| >25.00 (Overweight/Obese) | 03 (2.1) |
| WHO clinical stage | |
| Stage I | 31 (22.1) |
| Stage II | 86 (61.4) |
| Stage III | 13 (9.3) |
| Stage IV | 10 (7.1) |
| Self-reported Health status | |
| Very poor | 33 (23.6) |
| Poor | 42 (30.0) |
| Neither poor nor good | 41 (29.3) |
| Good | 24 (17.1) |
| Regimens initiated* | |
| ZDV+LMV+NVP | 62 (60.8) |
| ZDV+LMV+EFV | 17 (16.66) |
| STV+LMV+NVP | 16 (15.7) |
| STV+LMV+EFV | 7 (6.9) |
| ART adherence | |
| Regular | 121 (86.4) |
| Intermittent | 19 (13.6) |

*ZDV+LMV+NVP=Zidovudine+Lamivudine+Nevirapine, ZDV+LMV+EFV=Zidovudin e+Lamivudine+Efavirenz, STV+LMV+NVP = Stavudine + Lamivudine+Nevirapine, ST V+LMV+EFV=Stavudine+Lamivudine+Efavirenz

Table 3: Distribution of presenting symptoms in HIV patients

| Symptoms | No (%)** |
|----------------------|-----------|
| Fever | 92 (65.7) |
| Weight loss | 82 (58.7) |
| Cough | 68 (48.6) |
| Generalized weakness | 46 (32.9) |
| Anorexia | 44 (31.4) |
| Diarrhea | 35 (23.6) |
| Others* | 32 (22.9) |
| Lymphadenopathy | 25 (17.9) |
| Oral ulceration | 13 (9.3) |
| Fungal Infection | 11 (7.9) |
| Bacterial Infection | 9 (6.4) |
| Multiple Infection | 8 (5.7) |

*Other include Myalgia, Headache, Pain in abdomen, Jaundice, Encephalopathy,
 **HIV positive patient was having more than one presenting symptoms

Furthermore, HIV/AIDS patients also reported having secondary OI at the time of presentation (n=82, 58.6%), among which pulmonary tuberculosis and diarrhea were more predominant, accounting for 46 (32.9%) and 35 (25.0%), respectively shown in Table 4. Other presentations such as Oral candidiasis skin infections, bacterial pneumonia, and toxoplasmosis were also noted (Table 4). As the number of CD4 count decreased, incidence and the number of OI per patient increased significantly (Table 5).

DISCUSSION

In our study, the mean age of HIV patients was 35±11.5 years, with male predominance 88 (62.9%). These findings are like the study conducted at Sawai Man Singh (SMS) Hospital, Jaipur,⁹ in which the mean age of HIV patients was 36±13 years, with a male population (59.16%) outnumbered in the study. Male preponderance was also observed in the study conducted by Ahmad et al.,¹⁰ and Singh et al.¹¹ Another study was done at Sardar Valabhbai Patel Hospital, Meerut in western UP¹² found the results at par with our study. In our study, 101 (72.1%) of patients were in the reproductive age group (19–40), while the study conducted at the SMS hospital,⁹ Jaipur, and Institute of Medical Sciences, Banaras Hindu University, Varanasi¹³ found that 51.0% and 78.0 % of patients were in this age group, respectively.

The heterosexual route was the most common mode of transmission of HIV infection. These findings were remarkably similar to most previous studies conducted on the socio-demographic profile of HIV patients.⁸⁻¹² Emphasizing that if specific measures are applied like encouraging people to adopt and maintain risk reduction strategies, including condom use, adherence to HIV treatment, and sterile injection practices, it can decrease HIV transmission as per cited on HIV.gov.¹⁴ A female spouse was found more vulnerable to HIV infection than a male spouse from their partner. Similar findings seen in the study

Table 4: Frequency distribution of opportunistic infection in HIV patients

| Opportunistic Infections | No (%)* of total 140 |
|-----------------------------|----------------------|
| Present (n=82, 58.6%) | |
| Tuberculosis | 46 (32.9) |
| Diarrhea | 35 (25.0) |
| Oral/Esophageal candidiasis | 18 (12.8) |
| Skin Infections | 10 (7.1) |
| Bacterial Pneumonia | 16 (11.4) |
| Encephalitis | 5 (3.6) |
| Toxoplasmosis | 5 (3.6) |
| Malignancies | 4 (2.8) |
| Absent | 38 (41.4) |

*Patient were having more than one opportunistic infection

Table 5: Correlation, between CD4 cell count and OI

| CD4 cell count | Patients with opportunistic infection (n=82) n(%) | Patients without opportunistic infection (n=58) n(%) | Total (n=140) n(%) | Chi-square (X ²) test result |
|----------------|---|--|--------------------|--|
| <200 | 41 (50.0) | 3 (5.2) | 44 (31.4) | P=0.001 Highly Significant |
| 201–500 | 32 (39.0) | 39 (67.2) | 71 (50.7) | |
| >500 | 9 (11.0) | 16 (27.6) | 25 (17.9) | |

conducted in a rural tertiary care hospital in Maharashtra¹⁵ and SMS Jaipur, wherein the spouse positivity was higher among females. These observations could be because in females, a larger surface is exposed, and semen contains a higher concentration of HIV than vaginal or cervical fluids. The focus now is on reaching “95–95–95” (or, 95% of PLHIV knowing their HIV status; 95% of people who know their HIV positive status on treatment; and 95% of people on treatment with suppressed viral loads) interim targets have also been set for 2025, which place a greater emphasis on societal aspects and social services to address the inequalities of HIV.¹⁶ In the present study, out of 140 patients, 42 (30.0%) were illiterate and among literate maximum number of patients, that is, 77 (55.0%) were educated up to only primary school. These findings were more or less similar to study conducted by Nayak et al.,¹⁷ Joshi et al.,¹⁸ and Joge et al.¹⁹ Therefore, it is inferred that the education level should be raised adequately to obtain knowledge for HIV protection. Maximum patients, that is, 96 (68.6%) were residing in rural area while 33 (32.35%) in urban area. Similar findings were reported by Joardar et al.,²⁰ and Joge et al.¹⁹ Low education status and less awareness regarding safe sex can be the reason for high prevalence among the people of rural areas and this result was similar to study of Weissman et al.²¹ Within the study sample, more cases were found in indigenous caste (Reserved Caste e.g., SC, ST, OBC) than the high-caste (UR) population because of was found to have the less knowledge of the means by which HIV is prevented and transmitted. These results were similar to study of Atteraya et al.²² Majority of cases belonged to married class. There are several reasons why being married may increase the risk of HIV infection, women to be particularly vulnerable to transmission from their husbands especially women living in rural areas are marginalized and disempowered and face geographical barriers in terms of accessing HIV knowledge and other HIV services.²³ There were significantly more cases were found in nuclear/single families. Similarly approached by Inda et al.,²⁴ that the effects of distorted early healthy development in single family can be long lasting and manifest themselves in due course in disturbed personality, thus resulting in a trans generational negative effect. Unless we adopt a family-oriented approach, we will not be in a position to interrupt perfectly the cycle of infection. The outcome variable, the HIV status of spouse, is hereby defined as a couple where one or both partners were HIV

positive. An individual was classified as living as part of an HIV infected couple or HIV positive couple relationship if he or she was positive or the partner was positive status, obtained by linking individuals in a couple who were either in an HIV discordant relationship or HIV concordant relationship. In our study, there was found higher positive cases by HIV status of spouse. Nabukenya et al.,²³ suggested that the higher the prevalence of HIV status in the community, the higher the chances that one marries an HIV positive partner or gets infected when involved in extra-marital sex. Collectively, these findings suggest that massive sensitization on HIV awareness in communities is still necessary to attract residents to test, seek treatment and prevention services. Occupation wise house wives constituted the maximum of 38 [27.1%] patients, followed with unskilled workers 33 (23.6%). Jayant et al.,¹⁵ explained reason for a greater number of housewives can be gaining of infection by unsafe sex from their HIV positive husband or any other sexual partner and unskilled worker were illiterate and not aware about the HIV transmission. In our study majority of patients belonged to Poor social Class IV 51 (36.4%) and lower middle class 47 (33.6%). However, they were similar to the study conducted at rural tertiary care hospital Maharashtra,¹⁵ in which most patients belonged to social Class III & IV (modified B.G Prasad’s social classification), contradictory to the study carried at SMS Jaipur⁹ where majority of patients belonged to social class I.

The present study shows that 104 (74.3%) of our patients were diagnosed through clinical symptoms, while 36 (25.7%) of patients were asymptomatic at the time of presentation and were diagnosed during routine scanning or came for testing due to high-risk behavior. Most of the patients were in the WHO clinical Stage II 86 (61.4%) and Stage I 31 (22.1%), which means most patients in the study were at a relatively good immune status and in the early stage of the disease. This shows an impact of early case detection and timely institution of highly active antiretroviral therapy (HAART). These findings are similar to the study done in SMS Jaipur,⁹ Lok Nayak hospital in New Delhi²⁵ but contradictory to the study done in the rural tertiary care hospital in Maharashtra state,¹⁵ where 42.5% of patients were in Stage III. In our study, sample 82 (58.6%) HIV patients were suffering from underweight (BMI<18.5). The previous studies also showed that person with HIV who used substances and were not regular adherence to ART had a significantly lower BMI and

were at higher risk of developing AIDS-related wasting.²⁶ CD4 count is one of most reliable investigation for clinical staging of patients and used to make decision on treatment initiation along with OI. The prolonged course of HIV infection is marked by a decrease in the number of circulating CD4+T helper cells and persistent viral replication, resulting in immunologic decline and death from OI and neoplasms.²⁰ Majority of patients presented with an initial CD4 count of less than 500 cells/ μ l consistent to previous study.^{15,27} The overall health status reported by more than half of patients was poor or very poor because of developing more than one opportunistic infection by decreasing of CD4 count among them. Substances used 62 (44.2%) also provoked to deteriorate their health status. Using substances in different forms affects your brain, alters your judgment, and lowers your inhibitions. You may be more likely to make poor decisions about their health.²⁸

In the present study, ZDV+LMV+NVP and ZDV+LMV+EFV combinations were prescribed to 62 (60.78%) and 17 (16.66%) patients, respectively. In a study by Deshpande et al.,¹⁵ ZDV+3TC+NVP and d4T+3TC+NVP combination was prescribed to 47.3% and 31.5% patients respectively while in a study by Bachani et al.,²⁹ 22.71% of patients were started on d4T+3TC+NVP and ZDV+3TC+NVP was prescribed to 28% of the patients. Though, ART does not cure HIV/AIDS, but effective ART regimens inhibit the efficient replication of the HIV virus, and reduce viremia. Because HIV requires lifelong treatment, it is important for people to regular Treatment adherence that includes starting HIV treatment, keeping all medical appointments, and taking HIV medicines every day and exactly as prescribed. In our study, majority of patients 121 (86.4%) were adhere to ART reflecting potency of health resources and service administration. Poor adherence to ART is associated with less effective viral suppression, which risks the immediate health of the patient, but also risks creating permanent treatment resistance to that particular agent or group of agents within a given combination therapy regimen. This may have downstream effects on treatment costs as well as therapeutic options.³⁰ The major manifestations of HIV/AIDS, reported in this study, namely: Chronic fever, weight loss, and cough are comparable with previous reports.³¹ Although, numerous other studies have reported about some other complaints such as problem in conception, fertility,³² and neurological disorders.³³ The overall spectrum of opportunistic infection in our study is similar to the previous studies done at the Institute of Medical Sciences, Banaras Hindu University, Varanasi,¹³ SMS Jaipur,⁹ and at Gauhati Medical College.³¹ However, the percentage of the patients with candidiasis, and other infections were lesser when compared to above mentioned studies. Nevertheless, tuberculosis was the most common opportunistic infection

in the present study, which matches with studies done in other parts of India.⁹⁻¹⁴ In our developing country, where tuberculosis is endemic, the immune system breaks down, as in HIV, tuberculosis becomes active. Severe or recurrent skin infections such as warts, dermatophytosis, pruritic dermatitis, and herpes zoster or shingles presenting with localized pain and burning sensation followed by vesicle eruption, oropharyngeal candidiasis, or oral thrush (caused by a common yeast fungus, presents with soreness and redness with a white plaque on the tongue, back of the mouth or on throat), chronic diarrhea and severe weight loss were another OI in our study. As the number of CD4 cells decreased, incidence and the number of OI per patient increased and a highly significant inverse correlation has been observed between the two variables ($P < 0.001$). Similar results were seen in study done by Chakravarty et al.,¹³ and Nayak et al.¹⁷ Our study's limitation was that it was conducted at a single tertiary care center with limited sample size. Therefore, caution needs to be taken to generalize the findings. Moreover, as this is a cross-sectional study, associations have been established among variables but not the casual inferences. A gap still exists between those detected as and those who report on ART center.

Limitations of the study

Study limitations are the constraints placed on the ability to generalize from the results.

CONCLUSION

Most of the patients were from reproductive age group which increases the economic burden and affects the overall development of the family, community, and country. Housewives and unskilled workers which was the most common occupation found to be affected acts as a link population between high-risk groups to general population and between urban and rural areas. Heterosexual route was the most common mode of transmission. Our study also found that the majority of the patients were in the WHO clinical Stages I and II at the time of presentation with a lesser number of patients were affect with an opportunistic infection this reflects an impact of early case detection and timely institution of HAART. The study recommends the importance of accurate information about disease prevention, especially among spouses of affected patients and people with high-risk behavior.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical endorsement was taken from Institutional Ethical Committee of Gajra Raja Medical College, Gwalior (M.P.) before starting the investigation by the approval certificate no 15/IEC-GRMC/2020 and also granted permission by Madhya Pradesh State AIDS control unit vide letter no.F-7/AIDS/Admin/Eth.com/20. Every patient was included in the study after taking written consent.

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AKA- Concept and design of the study, prepared first draft of manuscript; **AK-** Interpreted the results; reviewed the literature and manuscript preparation; **PV, RMM, and RV-** Concept, coordination, statistical analysis and interpretation, preparation of manuscript, and revision of the manuscript.

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