

A retrospective analysis of individuals living with HIV/AIDS

Epidemiological data of HIV patients

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Abstract

Aim: The objective of this study was to assess the general characteristics, transmission routes and sociodemographic, clinical, and laboratory data of individuals living with human immunodeficiency virus (HIV) infection during the course of their follow-up.

Material and Methods: The study population consisted of 80 individuals diagnosed with HIV/acquired immunodeficiency syndrome (AIDS) who were aged 18 or above. These individuals were followed up in the infectious diseases and clinical microbiology outpatient clinic. A retrospective analysis was conducted on the epidemiological data pertaining to the patients.

Results: Of the 80 patients, 72 were male, and the mean age was 44.98 ± 12.76 years (range: 18–71 years). In the majority of patients (57.5%), the diagnosis was established through the analysis of routine blood tests. The most prevalent mode of transmission was heterosexual intercourse, accounting for 75% of cases. In accordance with the criteria established by the Centers for Disease Control and Prevention (CDC), 66 cases were classified as stage A, one case was designated as stage B, and 13 cases were categorized as stage C. The most frequently utilized antiretroviral therapy (ART) regimens were tenofovir alafenamide + emtricitabine + cobicistat + elvitegravir in 28.75% of cases and tenofovir disoproxil fumarate + emtricitabine + dolutegravir in 21.25% of cases. The most prevalent opportunistic infections were oral candidiasis (6.25%) and tuberculosis (5%). Two cases of Kaposi's sarcoma and one case of non-Hodgkin's lymphoma were identified as AIDS-related malignancies.

Discussion: The global prevalence of HIV/AIDS remains a significant public health concern. It is therefore recommended that people living with HIV be followed up on a regular basis, with their sociodemographic characteristics analyzed and recorded.

Keywords

HIV/AIDS, Acquired Immunodeficiency Syndrome, Epidemiology

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Introduction

The human immunodeficiency virus (HIV) was initially identified in the United States of America (USA) in 1981 as a consequence of studies conducted in 1983 in response to an observed increase in the number of cases of *Pneumocystis jiroveci* pneumonia and Kaposi's sarcoma in young homosexual men. The virus has been demonstrated to induce acquired immunodeficiency syndrome (AIDS) [1, 2]. As reported by the World Health Organization (WHO), the number of individuals living with HIV is projected to reach 39 million by the end of 2022, with approximately 630,000 AIDS-related deaths reported for the same period [available at: <https://www.unaids.org/en/resources/documents/2023/global-aids-update-2023>]. The initial case documented in Turkey was reported in 1985 [3]. As of November 8, 2023, the Ministry of Health of the Republic of Turkey reports 39,437 individuals infected with HIV and 2,295 cases of AIDS in Turkey [available at: <https://hsgm.saglik.gov.tr/depo/birimler/bulasici-hastaliklar-ve-erken-uyari-db/Dokumanlar/Istatistikler/hiv-aids-2023.pdf>]. Although the global incidence of newly diagnosed HIV infections has declined over time, the situation in our country remains a cause for concern, with an ongoing increase in new cases [4]. The objective of antiretroviral therapy (ART) guidelines is to reduce the viral load, improve immune function, prevent the progression to AIDS, reduce HIV-related morbidity, prolong life expectancy, and enhance the quality of life in individuals infected with HIV [5]. The objective of this study was to examine the general characteristics, clinical data, and laboratory results of patients with HIV/AIDS who were under the care of our clinic. The objective is to contribute to the epidemiological data of our country.

Material and Methods

Study design and patient population

The present study, which included sociodemographic information, comprised 80 patients aged 18 years and older who were followed up in our outpatient clinic with a diagnosis of HIV/AIDS between January 1, 2003, and December 31, 2020. The sociodemographic data and laboratory findings of the patients were retrospectively obtained from the electronic record system and patient files. The anti-HIV test and Western blot confirmation test yielded positive results for all patients included in the study. HIV-RNA levels were determined by real-time PCR method from plasma samples obtained from patients (Bosphore HIV-1 Quantification kit, Montania 4896). Cases were classified in accordance with the HIV/AIDS case definition initially established by the Centers for Disease Control and Prevention (CDC) in 1993.

Statistical Analysis

The statistical analysis was conducted using the IBM Statistical Package for the Social Sciences (SPSS) version 15.0 (Chicago: SPSS Inc., 2006). The data are presented in accordance with the following conventions: as a number (n) and percentage (%), or as a median and interquartile range (IQR, 25th and 75th percentile).

Ethical Approval

The study was approved by the Recep Tayyip Erdoğan University, Faculty of Medicine Ethics Committee Commission on (Date: 2019-22-5, No: 2019/82).

Results

Sociodemographic characteristics of HIV/AIDS cases are presented in Table 1. A total of 72 patients (90%) were male,

Table 1. Sociodemographic characteristics and laboratory findings of HIV/AIDS cases

	HIV/AIDS patient (n = 80) n (%)
Gender	
Man	72 (90.0)
Woman	8 (10.0)
Education Status	
Primary School	37 (46.2)
Middle School	17 (21.2)
High School	14 (18)
University	12 (15)
Marital Status	
Married	49 (61.2)
Single	31 (38.75)
Smoking-Alcohol Use	
Smokers	65 (81.3)
Drinking alcohol	52 (65)
Possible Transmission Routes of Patients	
Heterosexual sexual intercourse	60 (75)
Homosexual sexual intercourse	9 (11.25)
Tatoouaj	2 (2.5)
Unknown	9 (11.25)
Occupational Status of Patients	
Construction Worker	11 (13.8)
Unemployed	9 (11.3)
Waiter	7 (8.8)
Seafarer	6 (7.5)
Housewife	5 (6.3)
Long-haul driver	4 (5)
Other*	38 (47.5)
Reasons for patients' initial diagnosis	
Routine screening	38 (47.5)
When investigating the etiology of upper respiratory tract infection	22 (27.5)
When investigating the etiology of skin lesions	10 (12.5)
Burnout syndrome	8 (10)
When investigating the etiology of diarrhea	2 (2.5)
Patients' nationalities	
Turkish	78 (97.5)
Georgian	1 (1.25)
Uzbek	1 (1.25)
ART Genotypic Drug Resistance	
No	70 (87.5)
Yes	10 (12.5)
Bone Densitometry	
T-scores of ≥ -1	56 (70)
T-scores between -1 and -2.5	20 (25)
T-scores of < -2.5	4 (5)
CD4+ T lymphocyte count	
< 200 cells/mm ³	25 (31.25)
≥ 200 cells/mm ³	55 (68.75)
HIV-RNA level	
$< 100,000$ IU/ml	30 (37.5)
$\geq 100,000$ IU/ml	50 (62.5)

*: Barber, self-employed, student, shopkeeper, teacher, police, farmer.

Table 2. Hepatitis, syphilis and TORCH serology rates of our patients

HIV/AIDS patient (n = 80) n (%)	
HBSAg positivity	6 (7.5)
Anti HCV positivity	2 (2.5)
Anti-HBc IgG positivity	22 (27.5)
TPHA positivity	18 (22.5)
RPR positivity	14 (17.5)
Toxoplasma IgG	41 (51.2)
CMV IgG	80 (100)
Rubella IgG	77 (96.3)

Table 3. Antiretroviral Therapy (ART) Combinations

ART Combinations	HIV/AIDS patient (n = 80) n (%)
TAF/FTC/Cobi/EVG	23 (28.75)
TDF/FTC + DTG	17 (21.25)
TDF/FTC+ EFV	13 (16.25)
TDF/FTC/Cobi/EVG	11 (13.75)
TDF/FTC+ LPV/r	6 (7.5)
TDF/FTC+ RAL	3 (3.75)
TAF/FTC/BIC	3 (3.75)
ZDV/3TC + NVP	1 (1.25)
ZDV/3TC + DTG	1 (1.25)
ZDV/3TC + LPV/r	1 (1.25)
ZDV/3TC + DRV/r	1 (1.25)

3TC: lamivudinlamivudine, ZDV: zidovudin zidovudine, r: ritonavir, LPV/r: ritonavir-boosted lopinavir, EFV: efavirenz, TDF: tenofovir disproksilidisoproxil fumaratfumarate, FTC: em-trisitabinemtricitabine, DRV/r: ritonavir-boosted darunavir, Cobi: kobisistatcobicistat, TAF: tenofovir alafenamidalafenamide, EVG: elvitegravir, DTG: dolutegravir, BIC: bicktegravir, NVP: nevirapinnevirapine

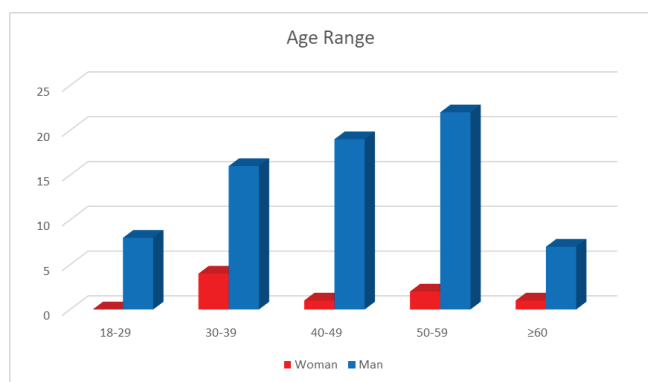


Figure 1. Age ranges of patients by gender

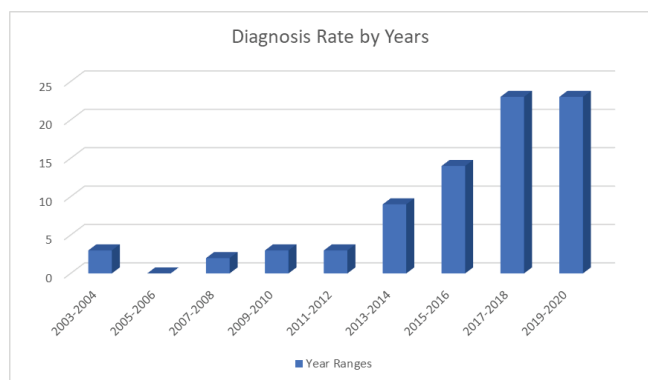


Figure 2. Diagnosis rates of patients according to years

while 8 patients (10%) were female. The mean age at the time of presentation was 44.98 ± 12.76 years. The age range of our patients according to gender is given in Figure 1, and the diagnosis rates of the patients according to years are given in Figure 2.

Thirty-eight (47.5%) of our patients were diagnosed during routine screening (Table 1). The serological results for hepatitis, syphilis, and TORCH are presented in Table 2. Bone densitometry was used to measure bone mineral density in our patients diagnosed with HIV. In 56 (70%) patients, the T score was ≥ -1 and normal; in 20 (25%) patients the T score was between -1 and -2.5 and osteopenic, in 2 (5%) patients T score was < -2.5 and osteoporotic (Table 1). At the time of initial presentation to our clinic, the absolute CD4+ T lymphocyte count was below 200 cells/mm³ in 25 (31.25%), below 100 cells/mm³ in 16 (20%), and below 50 cells/mm³ in 12 (15%) of the patients. The median HIV-RNA level of 80 patients, for whom HIV-RNA data were available at the time of diagnosis, was 149,646 (minimum-maximum, 0–507,800) IU/ml. The classification of cases according to the Centers for Disease Control and Prevention (CDC) HIV/AIDS case definition is presented in Figure 3. The ART combinations we gave to our patients are summarized in Table 3. A total of 24 patients (30%) underwent a revision of their initial treatment regimen. 14 patients underwent treatment revision due to the emergence of adverse effects. The adverse effects of the pharmaceutical agent included the development of osteopenia in four patients, renal failure in three patients, psychological disturbances in three patients, cutaneous eruptions in two patients, gastrointestinal intolerance in one patient, and dyslipidemia in one patient. The most prevalent opportunistic infection among our patient cohort was oral candidiasis, which was identified in five (6.25%) individuals. Other opportunistic infections included tuberculosis (TB) in four cases (5%), cytomegalovirus disease in three cases (3.75%), cryptococcal meningitis in two cases (2.5%), and cerebral toxoplasmosis in one case (1.25%). The prevalence of Kaposi's sarcoma and non-Hodgkin's lymphoma (NHL) was 2.5% and 1.25%, respectively, among the patient population under study. During the follow-up period, four patients (5%) died. All of the patients who had succumbed to their illnesses were classified as stage C3 according to the CDC criteria.

Discussion

The HIV/AIDS epidemic represents a significant public health challenge for our country, as it does for nations around the

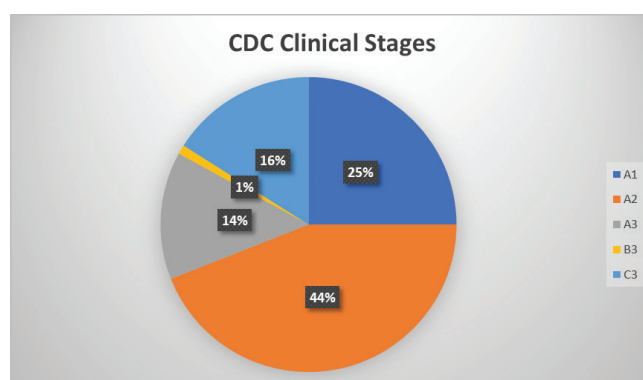


Figure 3. CDC clinical stages of patients at diagnosis

globe. As indicated by data from the WHO and the CDC, while the number of cases has decreased in the United States and Western Europe, the number of cases continues to increase in Turkey, Eastern Europe, the Middle East, and Asia [6]. Rize province is situated in a precarious position with regard to the prevalence of sexually transmitted diseases (STDs), which pose a significant threat to public health. Its proximity to neighboring countries, including Georgia, Russia, and Ukraine, renders it particularly vulnerable to the spread of STDs. As evidenced by data from the Ministry of Health, there has been an increase in the number of cases of HIV/AIDS in recent years [available at: <https://hsgm.saglik.gov.tr/depo/birimler/bulasici-hastaliklar-ve-erken-uyari-db/Dokumanlar/Istatistikler/hiv-aids-2023.pdf>]. In recent years, there has been a notable rise in the number of cases referred to our clinic for treatment. The reason for this increase is thought to be related to the increase in the number of positive people coming to our country for sex tourism from Eastern European countries and partly to the increase in the number of tests performed due to increased awareness of the disease. In our country, from 1985 to November 8, 2023, there were 39,437 individuals diagnosed with HIV and 2,295 cases of AIDS, confirmed through positive test results. In Turkey, 81.5% of cases are male, and the age range at which the disease is most commonly diagnosed is 25-29 and 30-34 years old, respectively [available at: <https://hsgm.saglik.gov.tr/depo/birimler/bulasici-hastaliklar-ve-erken-uyari-db/Dokumanlar/Istatistikler/hiv-aids-2023.pdf>]. In our study, 90% of the patients were male, and the most common age range was reported to be 40-59 years. The male prevalence rate among the patients observed at our clinic exceeded the national average. The disease is believed to be more prevalent among men due to the engagement in high-risk behaviors that facilitate disease transmission, such as contact with prostitutes and homosexuality. Similarly, in the global population, the disease is more prevalent among males [6]. As indicated by the data provided by the Ministry of Health of the Republic of Turkey, the most prevalent known transmission routes among patients diagnosed as of November 28, 2023, were identified as 28.83% heterosexual sexual contact and 13.24% homosexual sexual contact. In 56.95% of cases, the transmission route remained undetermined [available at: <https://hsgm.saglik.gov.tr/depo/birimler/bulasici-hastaliklar-ve-erken-uyari-db/Dokumanlar/Istatistikler/hiv-aids-2023.pdf>]. In the majority of cases, sexual contact was identified as the primary mode of transmission, accounting for 69 cases (86.25%) and predominantly involving heterosexual intercourse (60 cases, 75%). The rate of sexual transmission among the patients observed at our clinic was notably higher than the national data reported in Turkey. The discrepancy between the findings of our study and those of the Ministry of Health is believed to be attributable to the fact that patients may have concealed their sexual identity at the initial visit due to social pressure. A notification is provided to the Ministry of Health at the initial visit. Patients typically indicate that the mode of transmission is not typically sexual at this stage. Once a mutual trust relationship has been established between the patient and their physician, the patient is more likely to disclose their true sexual identity. The most significant risk factor for HIV/AIDS transmission to female patients in

studies conducted in our country is the presence of HIV/AIDS in their spouses [7]. A total of seven out of the eight female patients had a spouse or sexual partner who was HIV positive. A total of 46.2% of the patients included in the study had completed primary school. This finding aligns with the results of other studies conducted in our country, which have indicated that the disease is more prevalent among individuals with lower-middle levels of education [7]. In studies conducted in our country, the prevalence of AIDS diagnoses at the initial follow-up visit ranges from 35.9% to 85%, while the incidence of opportunistic infections falls between 32% and 82% [8]. A CD4+ T lymphocyte count below 200/ μ l was observed in 25 (31.25%) of the patients under observation, with an additional 8 (10%) meeting the criteria for AIDS diagnosis as defined by the CDC. In a study conducted by Çerçi and colleagues, the status of 237 patients was evaluated at the time of admission. The results indicated that 40.0% of the patients had a CD4+ cell count of less than 200/ mm^3 [9]. The CD4+ T lymphocyte counts of our patients were similar to the study conducted in our country.

Given the similarity of transmission routes, individuals living with HIV/AIDS should also be screened for other sexually transmitted diseases. The presence of HIV infection has been demonstrated to elevate the probability of chronicity, liver fibrosis, and malignancy in both hepatitis B virus (HBV) and hepatitis C virus (HCV) infections [10]. In a study conducted by İnci et al. in Turkey, the number of cases of hepatitis B virus (HBV) infection among 180 patients with human immunodeficiency virus (HIV) infection who were retrospectively analyzed was 8 (4.4%) [11]. In a study conducted in Nigeria, HBsAg positivity was reported in 3.5% of individuals living with HIV [12]. In a study conducted among 500 individuals living with HIV in Ghana, HIV/HBV seroprevalence was 8.4% and HIV/HCV seroprevalence was 0.2% [13]. In our study, 6 (7.5%) of our patients had hepatitis B and 2 (2.5%) had hepatitis C virus infection. In a separate study conducted in Şanlıurfa, the prevalence of syphilis in individuals living with HIV was found to be 17.5% [14]. Of the patients we followed up, 14 (17.5%) were RPR positive and 18 (22.5%) were TPHA positive. The hepatitis and syphilis seroprevalence rates of our patients were at similar levels compared to our country and the world.

Despite a decline in prevalence among HIV-positive individuals, *T. gondii* remains a significant opportunistic infectious agent. In studies investigating the prevalence of Toxo IgG antibodies in individuals living with HIV in Turkey, the rates were found to be 52% and 43.5% [15]. Similarly, Toxo IgG positivity was identified in 41 (51.2%) of the patients in our study cohort.

Both the disease itself and the ART used to treat it can cause bone metabolism disorders in patients. A higher incidence of hip fractures has been observed in individuals living with HIV compared to the general population [16]. A study conducted in our country involving 146 individuals living with HIV revealed a prevalence of osteopenia of 30% and osteoporosis in 6% of cases [17]. The prevalence of osteopenia and osteoporosis in our patient cohort was 25% and 5%, respectively.

It is recommended that all patients diagnosed with HIV undergo investigation for the presence of opportunistic infections [18]. In the medical literature, tuberculosis is the most frequently observed opportunistic pathogen in patients with AIDS, followed

by candidiasis [19]. In a study conducted by Kurtaran et al. in our country, the prevalence of HIV-TB coinfection was found to be 5.7% [20]. The most prevalent opportunistic infections among our patient population were oral candidiasis, occurring in 5 (6.25%) individuals, and tuberculosis, affecting 4 (5%) patients. The prevalence of tuberculosis as an opportunistic infection exhibited a comparable trend. In a review of AIDS patients in Africa, cytomegalovirus (CMV) was detected in 20-60% of those presenting with pulmonary symptoms and 0-14% of those exhibiting gastrointestinal symptoms [21]. CMV disease was present in 3 (3.75%) of our cases.

A descriptive epidemiologic study conducted at a tertiary hospital in Korea identified 48 episodes of malignancy in 47 patients. Of the total number of cancers, 20 (42%) were classified as AIDS-defining cancers, while 28 (58%) were identified as non-AIDS-defining cancers [22]. The most prevalent AIDS-defining cancers were those of the NHL and Kaposi's sarcoma, while the most common non-AIDS-defining cancer was lung cancer [23]. Two patients presented with Kaposi sarcoma, an AIDS-defining cancer, and one patient exhibited symptoms of NHL.

The optimal timing of ART initiation in human HIV/AIDS has been established in all international guidelines. These guidelines recommend that ART should be initiated as soon as a diagnosis is made [24]. The treatment regimens recommended as first-line treatment in the latest guidelines of the European AIDS Clinical Society (EACS) and available in our country are Tenofovir Alafenamide/ Emtricitabine/Bictegravir (TAF/FTC/B), Tenofovir disoproxil Fumarate/Emtricitabine/Dolutegravir (TDF/FTC/DTG), Abacavir/ Lamivudine/ Dolutegravir (ABC/3TC/DTG), or 3TC/DTG. In accordance with these guideline recommendations, the treatment regimens of our patients were modified as new treatments became available.

Conclusion

In conclusion, while the incidence of HIV/AIDS is decreasing in the world, it is increasing in our country. Therefore, it is very important to inform society more and to follow up with the patients regularly. During the follow-up period, it is essential to meticulously document the general characteristics of the patients, the transmission routes, and a comprehensive array of sociodemographic, clinical, and laboratory data. This approach will facilitate more efficient disease monitoring and enable the regular documentation of HIV/AIDS epidemiological data in our country.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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