

EARLY DIAGNOSIS AND RISK GROUPS: COMORBIDITIES IN NEWLY DIAGNOSED ADULTS WITH HIV IN TURKEY

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SUMMARY

Objectives: This study aimed to identify factors contributing to the early diagnosis of HIV in Turkey, with a particular focus on high-risk populations, comorbid conditions, and temporal trends. It also evaluated whether initial clinical findings could inform the expansion of screening strategies.

Methods: A retrospective analysis was conducted on 1,703 individuals living with human immunodeficiency virus (HIV) who attended our clinic between 2004 and 2023. Patients were grouped into five-year intervals and assessed based on demographic characteristics, reasons for testing, and reported comorbidities.

Results: Among the participants, 90.3% were males, with a mean age of 36.6 years. Of those who disclosed their sexual orientation, 46.8% identified as heterosexual. Common comorbidities included anal region disorders, cardiovascular and pulmonary diseases, diabetes, and syphilis. HBsAg positivity was 5%, and anti-HCV positivity was 0.86%. Nearly half of the patients (48.6%) were asymptomatic at the time of diagnosis. Physician-initiated testing and routine screenings played a significant role in early detection.

Conclusion: Early diagnosis of HIV is essential for reducing transmission and improving patient outcomes. Screening programmes should be expanded to include not only high-risk groups but also sexually active individuals presenting with relevant clinical symptoms. Public health efforts must address stigma and improve access to HIV testing to optimize early detection and treatment.

Key words: human immunodeficiency virus, early diagnosis, HIV testing strategies, high-risk populations, comorbidities

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INTRODUCTION

In Turkey, human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) has been among the notifiable diseases since 1985, and surveillance has been ongoing since the detection of the first case. From the first reported case up to August 2025, a total of 51,469 individuals were confirmed to be “HIV positive” and 2,577 were reported as “AIDS cases” through confirmatory testing. Approximately 82% of these cases are males, and 15.6% are of foreign nationality. New cases are predominantly observed among individuals aged 25–29 and 30–34 years. Sexual transmission remains the dominant route of infection in the country (1).

The initial examination of an adult living with HIV is typically conducted at the outpatient clinic to which the individual is referred following confirmation of the diagnosis. If the initial diagnosis is established through screening tests, patients are directed to infectious diseases clinics. In individuals presenting to infectious diseases clinics due to symptoms, HIV is often detected during diagnostic investigations. In recent years, the prevalence of HIV in Turkey has been increasing, with a notable rise reported

in heterosexual transmission and cases among men who have sex with men (MSM) (2). The fact that approximately half of the patients are classified as “late presenters” underscores the critical importance of widespread screening tests among high-risk groups for early diagnosis (3).

Most physicians who monitor newly diagnosed adults with HIV prioritize identifying comorbid conditions due to concerns about adjusting the treatment plan. However, the common characteristics and comorbidities observed during the initial evaluation can aid in identifying high-risk groups with an elevated likelihood of HIV transmission, thereby increasing the chances of early diagnosis (4).

Early diagnosis enables public health interventions that improve the quality of life for people living with HIV (PLWH) and help control the epidemic. The timely initiation of antiretroviral therapy (ART) and effective management of comorbidities can reduce viral load to undetectable levels, enhance overall health outcomes, and lower the risk of HIV transmission to others. On the other hand, late diagnosis is associated with the presence of comorbidities, lower CD4 counts, and advanced stages of HIV. This highlights the importance of early diagnosis and comprehensive evaluation (5).

Focusing on managing HIV is crucial; however, the increase in comorbidities, changes in behaviours and disease rates among different populations, and the need to address social determinants of health and additional symptoms highlight the importance of a comprehensive approach. Screening tests play the critical role in early diagnosis. Beyond general health screenings and self-initiated testing, testing of high-risk groups is often the only way to identify asymptomatic individuals who test positive.

In this study, we aimed to focus on groups that could assist in early diagnosis and whether any differences emerged over the years. We documented the purposes for which the initial tests were conducted and the common characteristics of newly diagnosed individuals who presented to the same centre in a metropolitan area during different years. Secondly, we sought to explore whether the comorbidities, complaints, and findings identified during the initial evaluation could guide the expansion of screening groups.

MATERIALS AND METHODS

Follow-up records of individuals diagnosed with HIV at our clinic were reviewed. Patient data were extracted from these records. Data from individuals, who attended to the clinic between 2004–2023 and were registered in the follow-up system for people living with HIV, were reviewed by two researchers and compiled into a unified dataset.

Patients were categorized into five-year intervals based on age, educational level, marital status, self-reported sexual orientation, initial serological findings, reasons for testing, and presenting symptoms or comorbidities.

The data were assessed in relation to the total number of individuals living with HIV during the corresponding period. Mean age values were calculated and analysed.

This study was approved by the Clinical Research Ethics Committee of Bakırköy Dr. Sadi Konuk Training and Research Hospital (decision number 2018469).

RESULTS

During the study period, a total of 1,703 patients presented, 1,538 (90.3%) males and 165 (9.7%) females. The mean age was 36.6 years (± 11.8). The most common educational levels were primary education, undergraduate, and high school, respectively. While the frequency of undergraduate graduates increased after 2009, it showed a slight decline after 2019. A significant proportion of the patients (62.4%) were single, with no notable change in this proportion over the years (Table 1). There was no significant difference between single and married individuals in terms of the examinations performed.

Among the 1,566 patients who disclosed their sexual orientation, 733 (46.8%) identified as heterosexual, 547 (34.9%) as men who have sex with men (MSM), and 285 (18.2%) as bisexual. While the proportion of heterosexual individuals remained relatively stable over the years, an increase in MSM and a decrease in bisexual individuals were observed between 2009 and 2018.

Based on the results obtained during the initial evaluation, 74.68% of the patients showed immunity to hepatitis A, either

through previous infection or vaccination. However, vaccination history was not documented. Among those with anti-HAV IgG positivity, 89% were males. Among the patients with available hepatitis B serology, 5% were HBsAg positive, while 48.3% were immune to hepatitis B. All patients with HBsAg positivity were males. It was determined that 32% of newly diagnosed HIV patients had evidence of prior exposure to the hepatitis B virus (HBV) at the time of their initial presentation. Anti-HCV positivity was identified at a low rate of 0.86%. Eight of the 13 individuals (62%) with anti-HCV positivity were males. While no significant differences were observed between groups in hepatitis A and B serological findings, an increase in anti-HCV positivity was noted after 2019.

Among newly diagnosed individuals, 828 (48.6%) were asymptomatic at the time of diagnosis and were identified as anti-HIV reactive during screenings conducted for reasons such as marriage, blood donation, pregnancy, preoperative evaluations, or voluntary testing. No significant changes were observed in the frequency of these testing indications over the years. The distribution of screening test indications is presented in Table 2.

During the study period, a total of 20 pregnant women were followed. Of these, 4 (20%) were seen in the years 2014–2018, and 16 (80%) between 2019–2023. HIV positivity was identified in 8 (40%) of them during routine examinations.

Additionally, 379 individuals (22.3% of all people living with HIV) were found to be anti-HIV reactive following presentations to various outpatient clinics with complaints involving different systems, including fever, lymphadenopathy, cough, rash, abdominal pain, and urethral discharge.

Among 253 (14.8%) individuals presenting with suspected HIV-related conditions, such as weight loss, tuberculosis, chronic diarrhoea, anal human papillomavirus (HPV), and fungal infections, anti-HIV testing was performed due to clinical suspicion and yielded positive results. When symptomatic and HIV-related cases were evaluated together, the proportion increased from 19.2% in 2009–2013 to 35.9% in 2014–2018, and further to 40.6% in 2019–2023. Additionally, HIV was diagnosed in 97 individuals (5.7%) who reported testing positive following a suspected exposure.

The most frequently identified complaints and conditions during the initial evaluation were anal region problems (including fissures, haemorrhoids, and bleeding), coronary artery diseases, chronic obstructive or infectious pulmonary diseases, diabetes mellitus, and syphilis, respectively. These were followed by tuberculosis and hypertension (Table 3). Anal region problems were reported more frequently between 2014–2018, while gonorrhoea was more commonly observed during 2009–2013 compared to other periods. No significant differences were found in the distribution of other comorbid conditions across the years. Among the 36 patients who presented with anal region complaints, 16 (44%) identified as MSM, 8 as heterosexual, and 8 as bisexual; 3 were females. Of the 32 patients diagnosed with syphilis, 10 (31%) self-identified as bisexual, 9 as MSM, and 8 as heterosexual.

DISCUSSION

The majority of newly diagnosed HIV cases presenting to our centre were males. The mean age was consistent with findings

Table 1. Demographic characteristics of the groups, reasons for applying for testing and hepatitis serologies

Category	2004–2008 n (%)	2009–2013 n (%)	2014–2018 n (%)	2019–2023 n (%)	Total n (%)	Chi-square	p-value
Male	12 (80.0)	65 (83.3)	770 (91.0)	691 (90.4)	1,538 (90.3)	6.660	0.084
Female	3 (20.0)	13 (16.7)	76 (9.0)	73 (9.6)	165 (9.7)		
Mean age (SD)	42.5 (12.0)	37.9 (10.3)	35.5 (11.5)	37.3 (12.3)	36.6 (11.8)		
Illiterate	0 (0)	0 (0)	12 (1.6)	5 (0.8)	17 (1.1)	36.649	0.001*
Primary education	8 (61.5)	24 (34.8)	282 (37.0)	269 (42.0)	583 (39.3)		
High school	2 (15.4)	15 (21.7)	171 (22.4)	153 (23.9)	341 (23.0)		
Associate degree	1 (7.7)	0 (0)	8 (1.0)	25 (3.9)	34 (2.3)		
License	2 (15.4)	29 (42.0)	280 (36.7)	175 (27.3)	486 (32.7)		
Degree	0 (0)	1 (1.4)	9 (1.2)	13 (2.0)	23 (1.5)		
Single	6 (40.0)	44 (57.2)	521 (63.4)	473 (62.4)	1,044 (62.4)	4.453	0.216
Married	9 (60.0)	33 (42.9)	301 (36.6)	285 (37.6)	628 (37.6)		
Heterosexual	9 (69.2)	40 (54.0)	364 (45.16)	320 (47.61)	733 (46.83)	15.115	0.019*
Bisexual	3 (23.0)	11 (14.8)	132 (16.37)	139 (20.68)	285 (18.21)		
Men who have sex with men	1 (7.69)	23 (31.08)	310 (38.46)	213 (31.69)	547 (34.95)		
Unspecified	2	4	40	92	138		
Total	15	78	846	764	1,703		
Reason for test application							
Screening for various purposes	7 (46.66)	42 (53.84)	396 (46.8)	383 (50.13)	828 (48.62)	8.293	0.478
Investigation of fever/LAP	3 (20.0)	8 (10.25)	182 (21.51)	187 (24.47)	380 (22.31)		
HIV-related conditions	2 (13.33)	7 (8.97)	122 (14.42)	123 (16.09)	254 (14.91)		
Suspicious contact	0 (0)	4 (5.12)	51 (6.02)	43 (5.62)	98 (5.75)		
Unspecified	3 (20.0)	17 (21.79)	95 (11.22)	28 (3.66)	143 (8.39)		
Anti HAV IgG							
Reactive	12 (92.3)	55 (80.88)	556 (74.83)	380 (73.21)	1,003 (74.6)	4.116	0.391
Non-reactive	1 (7.7)	13 (9.1)	187 (25.16)	139 (26.78)	340 (25.4)		
No data	2	10	103	245	360		
HBs Ag							
Reactive	0	1	42 (5.019)	34 (5.019)	77 (5.019)	2.070	0.491
Non-reactive	12 (100.0)	74 (98.6)	759 (94.98)	612 (94.98)	1,457 (94.98)		
No data	3	3	45	27	169		
Anti HBc IgG							
Reactive	3 (27.27)	22 (28.83)	242 (33.19)	179 (30.7)	446 (32.08)	1.058	0.787
Non-reactive	8 (72.72)	45 (67.16)	487 (66.8)	404 (69.29)	944 (67.91)		
No data	4	11	117	181	313		
Anti HBs							
Reactive	5 (27.27)	31 (41.33)	373 (48.0)	330 (49.62)	739 (48.3)	2.456	0.483
Non-reactive	8 (72.72)	44 (58.66)	404 (51.99)	335 (50.37)	791 (51.69)		
No data	4	11	117	181	313		
Anti HCV							
Reactive	1 (7.7)	0	3 (0.38)	9 (0.14)	13 (0.86)	9.028	0.027*
Non-reactive	12 (92.3)	72 (100.0)	776 (99.61)	633 (98.59)	1,493 (99.13)		
No data	2	6	67	122	197		
Total	15	78	846	764	1,703		

*p < 0.05

Table 2. Distribution of screening test indications

Screening indication	n (%)
Preoperative	219 (26.5)
Routine screening	173 (20.9)
Spouse/partner anti-HIV (+)	126 (15.2)
Blood donation	115 (13.8)
Official reasons (employment, school, military, visa, prison, etc.)	77 (9.3)
Premarital screening	60 (7.3)
Pregnancy and family planning	23 (2.8)
Self-initiated testing	5 (0.6)
Other	30 (3.6)
Total	828 (100.0)

Table 3. Most common complaints and diseases detected in the first evaluation

Comorbidity	2004–2008 n (%)	2009–2013 n (%)	2014–2018 n (%)	2019–2023 n (%)	Total n (%)	p-value
Anal area problems (fissure, haemorrhoids, bleeding)	0 (0)	1 (1.3)	19 (2.2)	16 (2.1)	36 (2.1)	< 0.001*
Coronary artery disease	1 (0)	0 (0)	7 (0.8)	28 (3.7)	36 (2.1)	
COPD, pneumonia, asthma	1 (0)	0 (0)	14 (1.7)	21 (2.7)	36 (2.1)	
Diabetes mellitus	0 (0)	1 (1.3)	7 (0.8)	24 (3.1)	32 (1.9)	
Syphilis	0 (0)	1 (1.3)	13 (1.5)	18 (2.4)	32 (1.9)	
Tuberculosis (pulmonary/extrapulmonary)	0 (0)	1 (1.3)	9 (1.1)	21 (2.7)	31 (1.8)	
Hypertension	0 (0)	0 (0)	6 (0.7)	22 (2.9)	28 (1.6)	
Hepatitis B (chronic)	0 (0)	0 (0)	6 (0.7)	8 (1.0)	14 (0.8)	
Zona zoster	0 (0)	0 (0)	5 (0.6)	9 (1.2)	14 (0.8)	
Acute HBV	0 (0)	1 (1.3)	2 (0.2)	9 (1.2)	12 (0.7)	
Chronic HPV	0 (0)	1 (1.3)	6 (0.7)	2 (0.3)	9 (0.5)	
Gonorrhoea	0 (0)	2 (2.6)	5 (0.6)	1 (0.1)	8 (0.5)	
Osteoporosis/osteopenia	1 (0)	1 (1.3)	2 (0.2)	1 (0.1)	5 (0.3)	
Genital herpes	0 (0)	0 (0)	3 (0.4)	1 (0.1)	4 (0.2)	

COPD – chronic obstructive pulmonary disease; HBV – hepatitis B virus; HPV – human papillomavirus; *p < 0.05

from previous studies, and no significant changes in age distribution were observed over the years (6–8).

The increase in the proportion of individuals with undergraduate education suggests that the risk persists even among educated individuals, highlighting the importance of sustained prevention strategies.

According to national data, the number of people living with HIV increased between 2014 and 2018 (1). In our hospital, the number of admissions also increased during this period, coinciding with the establishment of a dedicated outpatient clinic for HIV patients in 2015.

Studies indicate that the initial diagnosis of people living with HIV frequently occurs incidentally during unrelated risk assessments. This finding emphasizes the need for utilizing routine healthcare visits for screening purposes.

The observed positivity rates are higher in screenings initiated upon physicians' requests. This suggests that individuals may either fail to recognize their sexual risk behaviours or that there is insufficient public knowledge among the population. Since a

diagnosis made after the onset of HIV-associated conditions is classified as a late diagnosis, the importance of screening opportunities becomes evident. Among the patients, 14.8% presented with HIV-related findings, while 22.3% presented with clinical findings of other diseases. The fact that a total of 37.1% of diagnoses were made in individuals with various infection symptoms highlights the necessity of expanding screening risk groups to enhance early diagnosis efforts.

Preoperative assessments and routine health screenings are primary drivers for HIV testing. Anti-HIV tests conducted to mitigate the risk of bloodborne transmission during surgical procedures, as well as routine health screenings, offer substantial benefits for early detection. In the absence of patient-initiated requests, the test should be proactively recommended by the physician. Comprehensive community-based health screening programmes have shown an HIV prevalence of 3%, demonstrating that such initiatives can effectively identify people living with HIV, providing opportunities for treatment and follow-up (9). Screening for the sexual partners of anti-HIV-positive in-

dividuals in high-risk groups should be actively encouraged in outpatient clinics.

In our review, the number of individuals identified as positive following blood donation is noteworthy. Implementing targeted screening strategies for at-risk populations could reduce the reliance on blood donation tests for this purpose. The low rates of individuals undergoing anti-HIV testing following suspected exposure or on their own initiative may be related to a lack of awareness about testing options or the underestimation of risks. Additionally, stigma and social repercussions linked to early-age HIV diagnosis may deter individuals from seeking early testing and treatment. Ongoing public health efforts are essential to address these barriers (10).

On the other hand, the requirement for HIV screening by certain official institutions, such as for prison entry, military service, or employment, has contributed to the identification of positive cases. Diagnoses following premarital testing and childbearing-related circumstances also follow this trend. Routine antenatal HIV testing has significantly reduced perinatal transmission, demonstrating the effectiveness of early diagnosis in pregnant women (11).

Infants and children exposed to HIV should undergo early testing to ensure timely initiation of treatment and care (12). The findings of our study indicate an increase in the number of pregnant women living with HIV in recent years. Therefore, we reiterate the importance of perinatal screening and the need to ensure that women of reproductive age living with HIV remain under continuous medical surveillance.

In some countries, routine HIV screening is recommended for all adolescents and adults aged 15 to 65, with additional emphasis on high-risk groups (11). Within this age group, every healthcare encounter presents an opportunity to inquire about potential exposure and offer testing.

Early HIV diagnosis is crucial for improving health outcomes and quality of life for individuals living with the virus. It facilitates timely access to treatment, slows progression to AIDS, increasing life expectancy, and enhancing overall health quality (13). Additionally, it reduces the risk of transmission (14), the likelihood of developing opportunistic infections, and HIV-related mortality rates (15). Moreover, it facilitates the early management of comorbidities commonly associated with people living with HIV, such as hepatitis B, hepatitis C, tuberculosis, and various cardiovascular diseases. It provides clinicians with the opportunity to implement more effective and individualized treatment strategies thereby reducing complications.

In the general population, anti-HAV IgG seropositivity rates vary by region, ranging between 25.5% and 40.3% (16). In Turkey, immunity rates have increased since the introduction of free childhood vaccination in 2012.

The estimated prevalence of HBV infection is approximately 4.57% (17–19). The HBsAg positivity rate observed in our study (5%) is slightly higher than that reported in the general population in Turkey. In a multicentre study conducted in Turkey, occult hepatitis B infection was detected in 1.4% of people living with HIV, with anti-HBc IgG positivity reported in 44.8% and anti-HBs positivity in 60.6% of cases (20). The anti-HBs positivity rates reported in PLWH are higher than those found in our study. This difference may be associated with the selection of HBsAg-negative individuals in the study sample. Additionally, our findings may

appear lower because they cover a broad time frame, including individuals born before the initiation of hepatitis B vaccination programmes. Considering the management of coinfections and the similarity in transmission routes, it is evident that individuals carrying HBsAg should routinely be screened.

In Turkey, the HCV positivity rate among people living with HIV is approximately 0.9%, which is consistent with our findings, and has been associated with a history of residence abroad and incarceration (21, 22).

Patients presenting with symptoms involving the anal region most commonly seek care in general surgery outpatient clinics. The frequent association between anal symptoms and anti-HIV positivity, along with the high prevalence of anal region problems and syphilis in MSM and bisexual individuals, underscores the importance of routine HIV testing and the need to strengthen early diagnosis strategies in these high-risk groups. Similarly, the increased predisposition to coronary artery disease and pulmonary infections, particularly at a young age, may also justify anti-HIV screening. Additionally, it is well-documented that other sexually transmitted infections (STIs) often co-occur in individuals living with HIV. Every patient with suspected STI should be tested for HIV, and the presence of coexisting STIs should be considered in treatment planning, adherence strategies, and efforts to reduce future sexual risks. Men who have sex with men represent a high-risk group and should undergo regular HIV testing (4).

Most patients diagnosed with HIV have comorbid conditions, and the prevalence of these comorbidities tends to increase with age (23, 24). Beyond sexually transmitted infections, other frequently reported comorbidities include kidney disease, hypertension (5), hyperlipidaemia (24), cardiovascular disease, mental health disorders, metabolic conditions (23, 25, 26), and hepatitis C (27). It has been emphasized that these comorbidities often necessitate additional medications, complicating ART regimens (28), and increasing the need for individualized treatment plans (29).

It should be kept in mind that some newly diagnosed people living with HIV may remain asymptomatic for comorbid conditions, resulting in underdiagnosis. This consideration is important as it may distort the perceived burden of comorbidities in certain populations.

Limitations

The data were obtained from patient files and reflect the self-reported information and documented findings at the time of the initial presentation. Unreported symptoms and undocumented information may exist, potentially affecting the completeness of the dataset. The number of people living with HIV in certain comorbidity groupings was low; therefore, analyses were conducted based on aggregate data rather than comparative subgroup analysis. Due to this normalization to the total number of PLWH, the frequency of certain conditions may appear underrepresented. Additionally, our findings are based on single-centre data, which may limit generalizability.

CONCLUSION

Efforts to promote HIV testing and early diagnosis in healthcare services are essential for preventing transmission, reducing

the burden of disease, and improving the quality of life for people living with HIV. Our findings emphasize the need for national strategies that facilitate access to anti-HIV testing without requiring individuals to actively seek it out. Moreover, beyond established high-risk groups, the results suggest that sexually active individuals presenting with anal region complaints, cardiovascular or pulmonary symptoms, or other signs of infection should be routinely screened for HIV. Strengthening targeted screening approaches and integrating HIV testing into broader clinical evaluations may contribute significantly to earlier diagnosis and better long-term outcomes.

Conflicts of Interest

None declared

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