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# The Prevalence of Sexually Transmitted Infections and Related Factors Among People Living with HIV in Turkey

## Türkiye'de HIV ile Yaşayan Bireylerde Cinsel Yolla Bulaşan Enfeksiyonların Sıklığı ve Risk Faktörleri

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## Abstract

**Introduction:** People living with HIV (PLWH) have a higher incidence of sexually transmitted infections (STIs) than the general population due to the mode of transmission. Through this study, we analyzed the prevalence of STIs among PLWH, and identified the sociodemographic, clinical, and behavioral risk factors associated with the occurrence of infections. By this, we can design preventive strategies and raise awareness among clinicians and PLWH.

**Materials and Methods:** We included PLWH aged ≥18 years and were admitted to an infectious diseases clinic between 2018 and 2020 in this prospective descriptive study. Data was obtained from participants using an epidemiological questionnaire including their sociodemographic, clinical, and behavioral characteristics. Furthermore, they were tested for *Treponema pallidum*, hepatitis B virus, and hepatitis C virus using ELISA, and for *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), *Trichomonas vaginalis* (TV) and *Mycoplasma genitalium* (MG) using multiplex PCR. We recruited 200 PLWH amongst whom 106 (53%) were men having sex with men (MSM) and 69 (34.5%) were heterosexual men.

**Results:** We noted that 25.5% of the participants had at least one STI. These include syphilis (19.5%), infection with MG (3.5%), infection with TV (2%), gonorrhea (1%), and infection with CT (1%). The prevalence of syphillis was significantly higher among MSM ($p<0.05$). Factors associated with having syphilis were inconsistent condom use, being single, having a history of STIs, and having multiple partners ($p<0.05$). Factors associated with having the other four STIs (CT, NG, MG, and TV) were low education level and being MSM. The rate of STIs among PLWH was higher in MSM subgroup. Furthermore, those who had a history of STI were at a higher risk of acquiring new STIs.

**Conclusion:** Strategic preventive and screening programs against STIs should be organized among PLWH to curb the rising prevalence of STI in Turkey.

**Keywords:** People living with HIV, sexually transmitted diseases, syphilis

## Öz

**Giriş:** HIV ile yaşayan bireyler (HİYB), bulaşma yolu nedeniyle genel popülasyondan daha yüksek cinsel yolla bulaşan enfeksiyon (CYBE) insidansına sahiptir. Bu çalışmanın amacı, HİYB'de CYBE prevalansını saptamak, önleyici stratejileri desteklemek, hekimler ile HİYB arasında farkındalık yaratmak ve bu enfeksiyonlarla ilişkili sosyodemografik, klinik ve davranışsal risk faktörlerini belirlemektir.

**Gereç ve Yöntem:** Bu prospektif tanımlayıcı çalışma, 2018-2020 yılları arasında enfeksiyon hastalıkları kliniğine başvuran 18 yaş ve üzerindeki HİYB'yi kapsamaktadır. Katılımcılar sosyodemografik, klinik ve davranışsal özelliklerini içeren yapılandırılmış bir epidemiyolojik anketi yanıtladılar. ELISA ile *Treponema pallidum*, hepatit B virüs, and hepatit C virüs ve multipleks PCR ile *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), *Trichomonas vaginalis* (TV), *Mycoplasma genitalium* (MG) için test edildiler. Yüz altısı (%53) erkeklerle seks yapan erkek (ESE) ve 69'u (%34,5) heteroseksüel erkek olmak üzere toplam 200 HİYB çalışmaya dahil edildi.

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## Öz

**Bulgular:** Katılımcıların %25,5'inde en az bir CYBE saptandı. HIV ile yaşayan bireylerde tespit edilen CYBE'ler şu şekildeydi: Sifiliz %19,5, MG %3,5, TV %2, bel soğukluğu %1 ve CT %1. Sifiliz prevalansı ESE'lerde daha yüksek saptandı (p<0,05). Sifiliz ile ilişkili faktörler; kondomun uygun kullanılmaması, bekar olmak, ESE, CYBE öyküsü ve birden fazla partnere sahip olmaktı (p<0,05). Diğer dört CYBE (CT, NG, MG ve TV) ile ilişkili faktörler; düşük eğitim düzeyi ve ESE olarak saptandı. HIV ile yaşayan bireylerde CYBE oranı ESE'lerde daha yüksekti. Ayrıca, daha önce CYBE öyküsü olan HİYB'nin yeni CYBE edinme riski daha yüksek olarak bulundu.
**Sonuç:** Özellikle HİYB'ye yönelik kapsamlı CYBE önleme programları başlatılmalı ve bölgesel verilere göre CYBE'ler düzenli olarak taranmalıdır.
**Anahtar Kelimeler:** HIV ile yaşayan kişiler, cinsel yolla bulaşan hastalıklar, sifiliz

## Introduction

Despite the declining rates of new HIV infections worldwide because of improved preventive measures, Eastern Europe, Central Asia, and Turkey remain endemic to HIV[1]. The estimated incidence of HIV infections has increased by 43% between 2010 and 2020[1]. This increase is mainly among people who inject drugs, sex workers, and men having sex with men (MSM). Moreover, serious legal and political obstacles have caused the situation to thrive, thereby diverting minimum attention away from people who inject drugs and MSM[1]. In Turkey, the prevalence of HIV infection almost doubled between 2016 and 2019[2]. Despite the delay in access to healthcare during the Coronavirus disease-2019 pandemic, 2074 people living with HIV (PLWH) were detected in 2021[2].

People living with HIV are at a higher risk of acquiring sexually transmitted infections (STIs) compared to the general population, and they should be specially targeted[3,4]. New sexual behavior (social applications and group parties), HIV serosorting, serodiscrimination, stigmatization, multiple partners, one-day relationships, lack of access to efficient means of protection, and injecting drug use are factors associated to this increased risk[3]. Global estimates reveal that 357.4 million cases of the most common curable STIs occur annually: *Chlamydia trachomatis* (CT) (130.9 million), *Neisseria gonorrhoeae* (NG) (78.3 million), *Treponema pallidum* (TP) (5.6 million), and *Trichomonas vaginalis* (TV) (142.6 million)[5]. In Turkey, 530 CT, 73 NG, and 2177 TP new cases were reported in 2020[2]. These low rates indicate poor diagnosis and monitoring. In addition, data on the prevalence of STIs among the PLWH are sparse in Turkey as compared to other countries[6-8].

The World Health Organization has highlighted the need for comprehensive preventive interventions against HIV and other STIs[9]. Therefore, it is necessary to have updated epidemiological data in order to develop specific preventive strategies regarding sexual health[10]. Thus, we aimed at determining the prevalence of STIs among PLWH and identifying associated sociodemographic, clinical, and behavioral risk factors, thereby facilitating the formulation of specific preventive measures and raising awareness among clinicians and PLWH.

## Materials and Methods

We conducted this prospective descriptive study from August 2018 to February 2020. We included 200 PLWH aged ≥18 years recently diagnosed, as well as those previously diagnosed between 2000 and 2018, and were admitted to the outpatient Infectious Disease and Clinical Microbiology polyclinic of our hospital for control purposes during the study period. Participants gave their written informed consent and answered a structured epidemiological questionnaire inquiring about their sociodemographic, clinical, and behavioral characteristics: sex, age, sexual behavior, previous history of STIs, condom use, STI symptoms, number of sexual partners last year/2 months, and alcohol/tobacco/intravenous drug use. The questionnaires were filled *in situ* during usual clinical practice. Serologic tests including rapid plasma reagin/TP hemagglutination assay, anti-HAV IgG, HBsAg, anti-HBc total, anti-HBs, and anti-HCV were performed. The multiplex PCR panel test was used to analyze urine for NG, CT, *Mycoplasma genitalium*, TV, *Mycoplasma hominis* (MH), and *Ureaplasma urealyticum* (UU). Participants tested positive for any STI were informed and treated according to recent guidelines[3]. Inconsistent condom use was defined as "occasional/no condom use".

The study protocol was approved by the Ankara Training and Research Hospital Local Ethics Committee (no: 2138/2018, date: 09.08.2018). Confidentiality/privacy was ensured, and written informed consent was obtained prior to data collection.

### Statistical Analysis

Qualitative variables were presented with their frequency distribution. Quantitative variables were presented as mean±standard deviation if normally distributed or as median minimum-maximum (min-max) if not-normally distributed. The association between qualitative variables and the presence of an STI was assessed using the chi-square test or Fisher's exact test. A logistic regression model was adjusted to identify factors that

are independently associated with the presence of an STI. Any p<0.05 was considered statistically significant. Data processing and analyses were performed using IBM Statistical Package for the Social Sciences version 25.0.

## Results

We recruited 200 patients who presented to our clinic between January 2018 and February 2020 with HIV infection. Among these participants, 87.5% were (n=175) men and 12.5% were (n=25) women, and 53% were (n=106) MSM. The rate of MSM was significantly higher in the recently diagnosed group (p=0.04) and in patients younger than 40 years (60.2%) (p=0.04). The sociodemographic, clinical, and behavioral characteristics of the participants are presented in Table 1. The mean age was 39.7±12.9 years and 54% of the participants were younger than 40. Educational level, employment status, and smoking were significantly higher in men than in women (p<0.022, p<0.00, p<0.00, respectively). The rate of being married was lower, the level of education was higher, and alcohol/drug use was higher in cases younger than 40 (p<0.00, p<0.00, p<0.002, p=0.022). Anti-HAV IgG positivity was significantly lower in recently diagnosed cases compared to follow -up cases. (72.1% vs. 86.3%; p=0.016). HBsAg, anti-HBc IgG, and anti-HAV IgG positivity were higher in PLWH ≥40 years.

The number of recently diagnosed PLWH during the study period was 61 (30.5%). The number of follow-up patients was 139 (69.5%) and the median follow-up period was 4 years (min-max: 1-19). The number of MSM were higher in recently diagnosed patients than in the follow-up group (p=0.04).

Ninety-eight percent (n=196) of the patients had a history of unprotected sexual intercourse. Those having a minimum of two partners within the last two months and in the previous year were 16.5% (n=33) and 39% (n=78) of the group, respectively. Multiple partners were higher in men, recently diagnosed PLWH, and those aged ≤40 years (p<0.05).

Among PLWH, 51 patients (25.5%) were diagnosed with an STI at the time of consultation. Moreover, 45 had one STI, while six had two concomitant infections. The prevalence of STIs was: 19.5% syphilis, 3.5% infection with MG, 2% TV, 1% infection with CT, and 1% gonorrhea. The prevalence of syphilis was significantly higher among MSM than in heterosexual (HTX) men (p=0.001). Among those diagnosed with syphilis, 5.1% (n=2) were in the secondary phase, 94.9% (n=37) in the late latent phase, and 12.8% (n=5) had neurosyphilis. Control VDRL titers of the syphilitic patients decreased significantly and no treatment failure was detected. Syphilis was detected at a higher rate in single patients (p=0.029). Among them, 71.8% (n=28) had a history of STIs (p=0.000), and 92.3% (n=36) were asymptomatic. Multiple partners in the last two/twelve months were higher (33.3%; 59%/p=0.002, p=0.004, respectively) in patients with syphilis. Multivariate analysis revealed no independent risk factor for contracting syphilis.

Multiplex PCR for STIs was positive in 18.5% (n=37). Positivity was 36% (n=9/25) in women and 16% (n=28/175) in men (p=0.025). Sexually transmitted infection distribution is shown in Table 2. There was no sign/symptom in 22 patients with UU/MH. Therefore, these agents were considered as colonies rather than causative of infection. The presence of four other STIs (CT, NG, MG, and TV) was associated with low educational level (p=0.002) and being MSM (p=0.045).

## Discussion

In Turkey, HIV prevalence has been increasing especially in the young and in MSM[11]. This is similar to that in developing countries where insufficient comprehensive sexuality education and HIV prevention programs have been noted. In addition, according to the Modeling tool of the European Center for Disease Control Software, in a large HIV cohort in Istanbul, Turkey, the 90-90-90 targets were determined as 74-92-70.2[12]. In another study, while there is no clear data on these targets, Turkey is close to the other two last targets[11]. Here, the prevalence, and risk factors of syphilis, hepatitis, and four other STIs were analyzed. The study included 200 PLWH, of whom 25.5% of them had at least one STI, as well as 27.4% of the men and 12% of the women. Erbelding et al.[13] reported that the prevalence of STIs in PLWH was 13.9% in men and 11.9% in women. Compared to the literature, STI prevalence in women in the present study was similar, but was higher in men. This can be explained by the increase in the rates of STIs and sexual risk behaviors in MSM over the years.

A high frequency of STIs was observed in MSM. The Centers for Disease Control and Prevention reported syphilis as one of the most prevalent bacterial STIs in MSM, consistent with findings in our study[14]. The prevalence of syphilis was 19.5%, and 93% of them were asymptomatic, compared to 12.5% and 60% reported previously (2.8 times higher in young MSM)[15]. Similar to the literature, being MSM/single, having unprotected sexual practice, history of STIs, and having two/more partners in the last two months/one year were significant risk factors for contracting syphilis in this study[13,16]. Syphilis was seen 140 times higher in MSM than in HTX men, the prevalence of syphilis in MSM was 23%, and more than 70% of those diagnosed with syphilis were MSM[17]. Similarly, in our study, syphilis prevalence was 24.5% and 18.8% in MSM and HTX men, respectively. More than half of the cases with syphillis (66.7%) were MSM. This reveals the need for efforts to plan/implement programs and

**Table 1. Description of the sociodemographic, clinical, and behavioral characteristics of the people with HIV according to sexual orientation (n=200)**

| n (%) | | | | |
|---|---|---|---|---|
| **Variables** | **MSM 106 (53)** | **HTX men 69 (34.5)** | **WSM 25 (12.5)** | **Total 200 (100)** |
| Age (mean±SD*) min-max | 38.4±13 (18-74) | 41.5±13.4 (21-77) | 40.9±10.6 (18-58) | 39.7±12.9 (18-77) |
| Marital status | | | | |
| Married | 33 (33.1) | 49 (71) | 16 (64) | 98 (49) |
| Single | 73 (68.9) | 20 (29) | 9 (36) | 102 (51) |
| Education level | | | | |
| Secondary school or less | 37 (34.9) | 46 (66.7) | 18 (72) | 101 (50.5) |
| High school or more | 69 (65.1) | 23 (33.3) | 7 (28) | 99 (49.5) |
| Occupation | | | | |
| Employed | 84 (79.2) | 59 (85.5) | 7 (28) | 150 (75) |
| Unemployed | 22 (20.8) | 10 (14.5) | 18 (72) | 50 (25) |
| Substance use | | | | |
| Tobacco | 86 (81.1) | 58 (84.1) | 8 (32) | 152 (76) |
| Alcohol | 44 (41.5) | 23 (33.3) | 6 (24) | 73 (36.5) |
| Intravenous drug use | 10 (9.4) | 3 (4.3) | - | 13 (6.5) |
| Consistent condom use | | | | |
| Yes | 4 (3.8) | 5 (7.2) | - | 9 (4.5) |
| No | 102 (96.2) | 64 (92.8) | - | 166 (84) |
| Number of sexual partners last 2 months | | | | |
| <2 | 78 (73.6) | 64 (92.8) | 25 (100) | 167 (83,5) |
| ≥2 | 28 (26.4) | 5 (7.2) | - | 33 (16.5) |
| Number of sexual partners the last year | | | | |
| <2 | 42 (39.6) | 56 (81.2) | 24 (96) | 122 (61) |
| ≥2 | 64 (60.4) | 13 (18.8) | 1 (4) | 78 (39) |
| History of STIs | | | | |
| Yes | 34 (32.1) | 25 (36.2) | 1 (4) | 60 (30) |
| No | 72 (67.9) | 44 (63.8) | 24 (96) | 140 (70) |
| STI symptoms | | | | |
| Yes | 5 (4.7) | 3 (4.3) | 6 (24) | 14 (7) |
| No | 101 (95.3) | 66 (95.7) | 19 (76) | 186 (93) |
| Diagnosed STIs | 32 (30.2) | 16 (23.2) | 3 (12) | 51 (25.5) |
| Syphilis | 26 (25.5) | 13 (20.3) | - | 39 (19.5) |
| *Chlamydia trachomatis* | 1 (0.9) | - | 1 (4) | 2 (1) |
| *Neisseria gonorrhea* | 1 (0.9) | - | 1 (4) | 2 (1) |
| *Mycoplasma genitalium* | 5 (4.7) | 2 (2.9) | - | 7 (3.5) |
| *Trichomonas vaginalis* | 1 (0.9) | 2 (2.9) | 1 (4) | 4 (2) |
| Serology of hepatitis | | | | |
| HBsAg (+) | 4 (3.8) | 5 (7.2) | 4 (16) | 13 (6.5) |
| Anti-HBs (+) | 53 (50) | 30 (43.5) | 10 (40) | 93 (46.5) |
| Anti-HBc IgG (+) | 21 (19.8) | 20 (29) | 8 (32) | 49 (24.5) |
| Anti-HAV IgG (+) | 84 (79.2) | 59 (85.5) | 21 (84) | 164 (82) |
| Anti-HCV (+) | - | - | - | - |

HTX: Heterosexual men, MSM: Men who have sex with men, WSM: Women who have sex with man, SD: Standard deviation, STIs: Sexually transmitted infections, min-max: Minimum-maximum

**Table 2. Distribution of sexually transmitted infection panel results**

| | n=200 | % |
|---|---|---|
| Any positivity with multiplex PCR for sexually transmitted infections | 37 | 18.5 |
| *Chlamydia trachomatis* | 2 | 1 |
| *Neisseria gonorrhea* | 2 | 1 |
| *Mycoplasma genitalium* | 7 | 3.5 |
| *Mycoplasma hominis* | 7 | 3.5 |
| *Ureaplasma urealyticum* | 24 | 12 |
| *Trichomonas vaginalis* | 4 | 2 |

policies to reduce the disease burden and improve the quality of life of MSM. Studies have shown that sexual intercourse frequency without a condom has increased in this group in recent years[18].

Four other STIs (CT, NG, MG, and TV) were significantly higher in those with low educational level (secondary school or less) and in MSM. More than one pathogen was detected in 18.9% of the STI panel with multiplex PCR, and UU was found in majority of cases. The prevalence of asymptomatic CT infection in PLWH was compatible with findings in the literature (0.5%)[19]. The factors showing the strongest correlation with NG/CT test were <40 years of age, female sex, and PLWH with more than four years of follow-up[20]. Perhaps, STI rates will increase as the number of tests increases. In addition, the low number of female participants could justify the lower rates in females. Moreover, NG/CT infection rates were lower in our study compared to that of others because the only urine samples were used to perform the tests, not exploiting the possibility of testing with pharyngeal and rectal samples.

Furthermore, 20% of non-gonococcal urethritis was due to MG, which was consistent with the literature[3]. UU was detected in 12% (n=24) of all cases and was the most common factor detected in the STI panel (64.8%). However, treatment is not required for patients found to be colonized with these organisms (UU and/or MH) without clinical disease[21]. TV was detected in 2% of all cases and constituted 10.8% of the STI panel results. While trichomonas transmission is reported in HTX men, it is generally absent in MSM[3]. However, in untreated cases, cervicitis, urethritis, and pelvic inflammatory disease develop and the likelihood of HIV transmission doubles[22]. In this study, two TV cases were reported in HTX men.

Anti-HAV IgG negativity was high in MSM in this study. Hepatitis A vaccination should be recommended and its importance should be emphasized for all PLWH with negative serology, especially in MSM individuals of whom it has the potential to be transmitted sexually as well. Determining the rate of anti-HAV IgG negativity in PLWH is significant and contributes to closing the gap in the literature.

### Study Limitations

First, this is a descriptive prospective study carried out in a single center in Turkey. Despite the heterogeneity of the PLWH analyzed, it is not suitable to infer our results to the general population. Secondly, few studies on STIs in PLWH have been conducted in Turkey. Moreover, the nucleic acid amplification test, which is used for STI screening, could not be used in pharyngeal and rectal samples due to validation problems and cost. Finally, a small number CT, NG, MG, and TV cases led to limited statistical power to investigate factors in relation with these infections and to show differences between MSM, HTX men, and women who have sex with man.

## Conclusion

Demonstrating that there is a high rate of asymptomatic STIs in PLWH is important. Although the rate of contracting syphilis was similar to that in the literature, NG, and CT rates were lower in PLWH in our study. We recorded a higher rate of syphilis in single participants, young participants, and in MSM in our study. Perhaps, the prevalence of syphilis may increase over time due to regular screening and an increase in the number of MSM. These findings encourage regular STI screening in line with risk factors in PLWH. Syphilis should be screened annually in PLWH, and screening should not be ignored due to high positivity, especially for MSM, singles, those having multiple partners, and the young. MG, CT, and NG screening should be performed especially in MSM. Hepatitis A vaccination should be considered in all PLWH with a negative anti-HAV test, especially in MSM. Therefore, strategic programs to promote the fight against STIs in PLWH should be implemented.

### Ethics

**Ethics Committee Approval:** The study was approved by the Ankara Training and Research Hospital Ethical Committee of a tertiary hospital (no: 2138/2018, date: 09.08.2018).

**Informed Consent:** It was obtained from the patients.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: E.T.Ş., Concept: E.T.Ş., A.B., H.B., Design: E.T.Ş., A.B., H.B., Data Collection or Processing: E.T.Ş., A.B., A.A., Analysis or Interpretation: E.T.Ş., A.B., H.B., Literature Search: E.T.Ş., A.B., Writing: E.T.Ş., A.B.

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