https://doi.org/10.31067/acusaglik.1269980

ORIGINAL ARTICLE / KLİNİK ARAŞTIRMA

Infectious Diseases /İnfeksiyon Hastalıkları

The Disease Of All Times: A Retrospective Study Of 272 Syphilis Cases

Tülay Ünver Ulusoy[1], Aslı Haykır Solay[2], Hacer Demirköse[3], Semanur Kuzi[4], Can Hüseyin Hekimoğlu[5], İrfan Şencan[6]

[1]Ankara Etlik City Hospital, Department of Infectious Diseases and Clinical Microbiology, Ankara-Turkey

[2]Ankara Etlik City Hospital, Department of Infectious Diseases and Clinical Microbiology, Ankara-Turkey

[3]Pursaklar District Health Directorate, Department of Public Health, Sun Street, Ankara-Turkey

[4]Ankara Etlik City Hospital, Department of Infectious Diseases and Clinical Microbiology, Ankara-Turkey

[5]General Directorate of Public Health, Department of Infection Disease, Division of Healthcare-associated Infectıons, Ankara-Turkey

[6]Health Sciences University Diskapi Yildirim Beyazit Training and Research Hospital, Department of Infectious Diseases and Clinical Microbiology, Ankara-Turkey

Tülay Ünver Ulusoy
0000-0002-0172-2326
Aslı Haykır Solay
0000-0002-1326-9776
Hacer Demirköse
0000-0003-4564-0792
Semanur Kuzi
0000-0001-6496-1773
Can Hüseyin Hekimoğlu
0000-0002-2156-4636
İrfan Şencan
0000-0003-0465-5090

Correspondence:
Tülay Ünver Ulusoy
Ankara Etlik City Hospital, Department of Infectious Diseases and Clinical Microbiology,
Phone: +90 312 797 00 00
Fax: +90 312 587 37 75
E-mail: tulayunver55@gmail.com
tulay.unverulusoy@saglik.gov.tr

Received: 23 March 2023
Accepted: 07 October 2023

Abstract

Background/Purpose: This study aimed to investigate the changes in syphilis cases over the years, their demographic and clinical characteristics, and their laboratory findings.

Methods: The study included patients diagnosed with syphilis between 2018 and 2022 at a tertiary hospital's Dermatology and Infectious Diseases (ID) outpatient clinics. Patients'; demographic, clinical, and laboratory data were evaluated at the time of diagnosis. The Statistical Package for the Social Sciences (SPSS) 20.0 program was used to analyze the data.

Results: A total of 272 syphilis cases were included in the study. Among these cases, 82.4% were male, and 39.6% were 41–60 years old. In total, 7.4% were anti-HIV, and 2.9% were positive for HBsAg. The rates of the cases diagnosed at primary and secondary stages were 74.4%. Syphilis cases were detected more in 2018 than in other years (except 2020) and fewer in 2022 than in other years ($p< 0.001$). Anti-HIV positive cases were diagnosed more frequently at ID outpatient clinics, and cases with clinical findings were diagnosed more at dermatology outpatient clinics ($p< 0.001$). The rate of sexual partners not tested for syphilis was significantly higher in males than in females ($p= 0.027$). The rates of syphilis cases in the study and Turkiye as a whole were similar in 2018 and 2019 but significantly different in 2020,2021 and 2022 ($p< 0.001$).

Conclusion: Reporting syphilis is essential to identify the at-risk population, prevent complications, and reduce transmission. **Monitoring the profile of syphilis cases admitted to the hospital can increase the early detection rate of syphilis cases.**

Keywords: syphilis, sexually transmitted diseases, HIV, detection rate

Registration number and date of registration: E-2023-06, 01.02.2023

Özet

Amaç: Sifiliz olgularının yıllar içindeki değişiminin, demografik ve klinik özelliklerinin, laboratuvar bulgularının incelenmesi amaçlanmıştır.

Metod: Çalışmaya, üçüncü basamak bir hastanenin dermatoloji ve enfeksiyon hastalıkları (EH) polikliniklerinde, 2018–2022 tarihlerinde sifiliz tanısı konulmuş hastalar dahil edilmiştir. Hastaların tanı anındaki demografik, klinik ve laboratuvar verileri değerlendirilmiştir. Verilerin istatistiksel çözümlemesi için SPSS (Statistical Package for the Social Sciences) 20.0 paket programı kullanılmıştır.

Bulgular: Çalışmaya toplam 272 sifiliz olgusu dahil edilmiştir. Olguların %82,4'ü erkek ve %39,6'sı 41-60 yaş grubundadır. Olguların % 7,4'ü Anti-HIV ve %2,9'u HBsAg pozitiftir, %74,4'ü primer ve sekonder evrelerde tanı almıştır. 2018'de tüm yıllardan (2020 hariç) daha fazla ve 2022'de tüm yıllardan daha az sifiliz olgusu tespit edilmiştir ($p <0,001$). Anti-HIV pozitif olgulara daha çok EH polikliniklerinde, klinik bulgusu olan olgulara ise daha çok dermatoloji polikliniklerinde tanı konulmuştur ($p< 0,001$). Erkeklerde cinsel partnerin sifiliz açısından test edilmeme oranı, kadınlardan anlamlı yüksektir ($p= 0,027$). Çalışmanın ve Türkiye geneli sifiliz olgularının oranları 2018-2019 yıllarında benzer iken 2020-2021-2022 yıllarında çalışmadaki sifiliz olgularının oranları anlamlı düzeyde düşük bulunmuştur ($p<0,001$).

Sonuç: Risk altındaki popülasyonu belirlemek, komplikasyonları önlemek ve bulaşmayı azaltmak için sifilizin bildirilmesi esastır. Hastaneye başvuran sifiliz olgularının profilinin izlenmesi, olguların erken tespit edilme oranını arttırabilir.

Anahtar kelimeler: Sifiliz, cinsel yolla bulaşıcı hastalık, HIV, tanı oranı

Kayıt numarası ve kayıt tarihi: E-2023-06, 01.02.2023

Introduction

Syphilis is an infection caused by the Treponema pallidum subspecies pallidum of the spirochete group. The clinical manifestations depend upon the stage of the disease. Syphilis may cause severe complications if untreated and tends to become chronic (1). Although transplacental transmission or blood transfusions are also the modes of transmission, most cases occur through contact with infected lesions during sex (2). **The World Health Organisation (WHO) reported that there were 19.9 million people 15-49 years of age diagnosed with syphilis, of whom 6.3 million were new cases in 2016 (3)**. The United States Centre for Disease Control and Prevention (CDC) estimates that 133945 people were diagnosed with syphilis in 2020. The Republic of Turkiye Ministry of Health, General Directorate of Public Health reported that there were 3533 new syphilis cases in 2022. The number of cases has increased over the years (2,4).

Syphilis is a notifiable infectious disease reported by hospital surveillance units to Turkiye's provincial and district health directorates (4). Reporting syphilis cases is essential in terms of identifying the risk population, providing appropriate treatment, preventing complications, and reducing transmission. In this study, we aimed to investigate the changes in our syphilis cases over the years, demographic and clinical characteristics, and laboratory findings.

The study included patients aged 18 years and older who were diagnosed with syphilis in the dermatology and infectious diseases outpatient clinics of Health Sciences University Dışkapı Yıldırım Beyazıt Training and Research Hospital between 2018 and 2022.

Patients with serological tests positive for both nontreponemal (VDRL (Venereal Diseases Research Laboratory)/ RPR (Rapid Plasma Reagin)) and treponemal (TPHA (Treponema pallidum Haemagglutination Assay) or FTA-ABS total (Fluorescent Treponemal Antibody Absorption)) were diagnosed with syphilis. **Treponemal tests were used as confirmatory tests for syphilis when the nontreponemal tests were reactive. Positive nontreponemal tests were reported as a titer of antibody. Changes in titer were followed 3 months after treatment to detect a therapeutic response. Response to therapy is indicated by a two or more dilution decline in non-treponemal serological test titers or, if initial titers are positive at a 1:1 or 1:2 dilution, it is indicated by non-reactivity (5,6).** According to CDC guidelines, cases were classified into four different stages: primary syphilis, secondary syphilis, latent syphilis, and tertiary syphilis (2). **In accordance with CDC recommendations, all patients received a single injection of 2,4 million units benzathine benzylpenicillin or 2,4 million units of benzathine benzylpenicillin weekly for 3 consecutive weeks appropriate to the stage of syphilis (7).** Demographic, clinical, and laboratory data of the patients at the initial diagnosis were evaluated.

Surveillance department of Dıskapı Yıldırım Beyazıt Training and Research Hospital started to register patients diagnosed with syphilis in 2018 and report them to the Infectious Diseases clinic of the Ankara Provincial Health Directorate. In addition, the physician who ordered the test was contacted for the results of patients with positive treponemal tests. Patients with syphilis were called and informed to contact their physicians. The data of patients were retrospectively obtained from the hospital information management system, patient records, and surveillance unit records. The Ethics Committee of Yıldırım Beyazıt University Yenimahalle Training and Research Hospital approved of the study (Decision No: E-2023-06, Decision Date: 01.02.2023).

Organization and Analysis of the Research Data

The following variables were examined in the study: age group (18-25, 26-40, 41-60, and > 60 years), sex (female, male), educational status **(primary school, secondary school, high school, university),** employment status (employed, unemployed), **unprotected sexual contact** (yes, no, unknown), **syphilis testing of sexual partner** (yes, no, unknown), clinical findings (skin rash, lymphadenopathy, genital lesion), stage of syphilis (primary, secondary, latent, tertiary), clinics (dermatology, infectious diseases), the year of diagnosis (2018 - 2022), VDRL/RPR titer and HBsAg (hepatitis B surface antigen), anti-HCV (hepatitis c virüs), anti-HIV (Human Immunodeficiency Virus) serological tests.

The SPSS (Statistical Package for the Social Sciences) 20.0 package program was used for the statistical analysis of the data. Descriptive statistics are summarized with means and standard deviations, numbers, and percentages. The 95% confidence interval for percentages was calculated with the "Score (Wilson)" method using the OpenEpi online program (https://www.openepi.com/Proportion/Proportion.htm). The chi-square test was used for the comparison of categorical variables. The distribution of cases in Turkiye by year was compared with the distribution in our study. The significance threshold (p-value) was set at 0.05 for all tests. Graphs were generated using the program Excel.

Results

A total of 272 syphilis cases were included in the study. Among these cases, 82.4% were male, and 39.6% were 41–60 years old. Anti-HIV and HBsAg were positive in 7.4% and 2.9% of the cases, respectively. **A total of 37.0% of the cases were diagnosed in the primary stage, while 37.4%**

were diagnosed in the secondary stage. The distribution of syphilis cases by year is shown in Figure 1.

All cases were diagnosed in the ID and/or dermatology outpatient clinics. Figure 2 shows the distribution of syphilis cases compared to the total number of outpatient clinics (2018: 129451, 2019:154029, 2020:64370, 2021:84491, 2022:96622) by year. **As per the findings, syphilis cases were significantly higher in 2018 than in all years (except 2020), and significantly lower in 2022 than in all years.** The female sex diagnosed with syphilis was significantly higher in 2019 than in other years (p:0.007). The rate of sexual partners not tested for syphilis was significantly higher in males than in females (p= 0.027) (Table 1). Genital lesions were detected in 43.8% of patients with the primary stage, and skin rash was observed in 40.4% of patients with the secondary stage. Lymphadenopathy was present in 43% of all patients diagnosed with primary and secondary stages. Anti-HIV positivity was significantly higher in patients diagnosed in the infectious diseases outpatient clinic (p< 0.001). The cases with clinical findings were diagnosed more in the dermatology outpatient clinic (p< 0.001) (Table 2). **VDRL/RPR titers were evaluated three months after the treatment and it was observed that the titers had decreased. Before treatment, the titer was 1/32 in 134 cases and 1/16 in 40 cases. After treatment, the titer became negative in 193 cases, and it was 1/2 in 39 cases.** (Figure 3). Figure 4 shows the number of diagnosed syphilis cases yearly in Turkiye and our study. The rates of syphilis cases in our study and Turkiye as a whole were similar in 2018 and 2019 but significantly different in 2020, 2021, and 2022 (p< 0.001).

Discussion

The study found that syphilis cases were more common in males aged 41-60, and the rate of sexual partners not tested for syphilis was higher in males than in females. In addition, most syphilis cases had unprotected sexual contact. While syphilis cases with clinical findings usually refer to the dermatology clinic, anti-HIV positivity is higher among cases diagnosed at the ID clinic. Lower VDRL/RPR titers were measured in syphilis cases after treatment.

Syphilis is more common in sexually active ages and in those who have risky and unprotected sex (1). The diagnosis of syphilis is more frequent among men in Turkiye and the world (2, 5-8). The reason could be that men have more risky sexual behavior or women are more affected by social structure and pressure. In our study, the rate of not testing sexual partners for syphilis was higher in men than in women. This may be caused by the fact that men prefer polygamous sexual life more. **Studies have reported that syphilis is endemic in low-income countries and that cases have limited knowledge about sexually transmitted diseases (STDs) (10–12). In our study, the educational status and employment status of the cases were evaluated to determine the group at risk for syphilis, and no significant difference was found.**

The primary stage classically presents with a single chancre. In the secondary stage, a diffuse rash occurs, frequently involving the palms of the hands and soles of the feet, with painless lymphadenopathies (7,13). The latent syphilis stage is a period in which only serological tests are positive but no clinical findings are present (7). Our study observed that cases with clinical findings were mostly referred to the dermatology clinic. This was thought to be related to the characterization of syphilis with multiple and different skin lesions. **Additionally, the preference of cases without clinical findings to visit the ID clinic might be related to screening protocols following high-risk sexual behavior or routine follow-up of HIV-positive patients in the ID clinics.**

Syphilis is known to increase transmission in HIV-positive patients or the susceptibility of sexual partners (14). Moreover, studies have confirmed that the incidence of syphilis in HIV-positive patients has increased over the years (15,16). The HIV positivity rate in Turkiye is 0.43% (17). The HIV positivity in syphilis cases in our study was 7.4%, which was significantly higher. This result demonstrates the requirement for anti-HIV screening in syphilis cases. In previous studies, it was reported that education, informative media, posters, and billboard advertisements used for the community have increased condom use and syphilis knowledge level in individuals and decreased high-risk sexual behaviors (12,18). These results indicated that the incidence of coinfection could be reduced through education.

In our study, the distribution of syphilis cases according to years was analyzed and it was observed that most of the patients were diagnosed in 2018 and 2019. Moreover, it was observed that while syphilis cases continued to increase after 2020 based on Turkish data, the number of cases decreased in our hospital. **Our hospital started to provide healthcare to COVID-19 patients in 2020. The decrease in diagnosed syphilis cases may be related to the pandemic hospital status of our hospital. Also, the presence of syphilis may have been underdiagnosed during the pandemic. In addition, due to the workload caused by the pandemic; the notification of patients with a positive treponemal test by the surveillance unit may have been disrupted. In the last four months of 2022, the hospital was in the process of transfer, and therefore the admissions of syphilis cases might have decreased. Notably, in 2019, 50% of women were diagnosed with** syphilis in our hospital. This finding warrants further comprehensive investigation and scrutiny.

This study is a single-center study. Although it was

conducted in a training and research hospital where patients applied from all regions of Ankara, the patients who applied may not be uniformly distributed due to the location and transportation of the hospital. Therefore, the generalizability of the results for Ankara should be interpreted with caution. In addition, changes in the disease reporting system may have influenced the results. **Patient data were obtained retrospectively and the recorded clinical findings of the patients are limited.**

Conclusion

Currently, syphilis stands as a sexually transmitted disease that lends itself to facile diagnosis and potential curability through adherence to contemporary guidelines. A profound understanding of the demographic, clinical, and laboratory attributes of syphilis cases facilitates early diagnosis, curtails transmission, and averts complications. Following Turkiye's data can improve the functioning of hospital surveillance units. **In addition, monitoring the profile of syphilis cases admitted to the hospital can increase the detection rate of syphilis cases. Consequently, hospitals monitoring syphilis cases should diligently pursue notifications and conduct regular follow-ups to gather data concerning temporal variations over the years.**

Declarations

Funding: The authors received no external funding to support this research.

Conflicts of interest/Competing interests: The authors have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

Availability of data and material: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Authors' contributions:

Conceiving the Study: TUU, AHS, SK, İŞ
Data collection: HD, SK,
Data Analysis: CHH, HD
Writing up: TUU, CHH,
Submission,and Revision: TUU, AHS, İŞ

TABLE 1: Comparison of demographic and clinical characteristics of syphilis cases by gender

Variable	Category	Total		Female		Male		p-value
		N	%	N	%	N	%	
Age group	18-25	41	15.1	7	14.6	34	15.2	0.839
	26-40	99	36.4	19	39.6	80	35.7	
	41-60	106	39	19	39.6	87	38.8	
	>60	26	9.6	3	6.3	23	10.3	0.227
Education status	Primary school	73	26.8	14	29.2	59	26.3	
	Secondary school	46	16.9	10	20.8	36	16.1	
	High school	88	32,4	16	33.3	72	32.1	
	University	36	13.2	2	4.2	34	15.2	
	Unknown	29	10.7	6	12.5	23	10.3	
Employment status	Employed	170	62.5	29	60.4	141	62.9	0.740
	Unemployed	102	37.5	19	39.6	83	37.1	
Serological tests	Anti-HIV +	20	7.4	1	2.1	19	8.5	0.488
	HBsAg +	8	2.9	1	2.1	7	3.1	0.780
	Anti-HCV +	0	0	0	0	0	0	-
Year of diagnosis	2018	111	40.8	13	27.1	98	43.8	0.007
	2019*	79	29	24	50	55	24.6	
	2020	33	12.1	4	8.3	29	12.9	
	2021	32	11.8	6	12.5	26	11.6	
	2022	17	6.3	1	2.1	16	7.1	
Unprotected sexual contact	No	38	14.0	2	4.2	36	16.1	0.097
	Yes	194	71.3	38	79.2	156	69.6	
	Unknown	40	14.7	8	16.7	32	14.3	
Syphilis testing of sexual partner	No	144	52.9	21	43.8	123	54.9	0.027
	Yes *	62	22.8	18	37.5	44	19.6	
	Unknown	66	24.3	9	18.8	57	25.4	
Syphilis stage	Primary	98	37.0	12	25.0	86	39.6	0.1302
	Secondary	99	37.4	21	43.8	78	35.9	
	Latent	64	24.2	15	31.3	49	22.6	
	Tertiary	4	1.5	0	0.0	4	1.8	
Presence of clinical finding	Yes	212	77.9	36	75.0	176	78.6	0.584
	No	60	22.1	12	25.0	48	21.4	
Clinical findings&	Skin rash	110	40.4	25	52.1	85	37.9	0.075
	Lymphadenopathy	117	43.0	25	52.1	92	41.1	0.168
	Genital lesion	119	43.8	15	31.3	104	46.4	0.055

* The group from which the difference originates
& Only those with symptoms were included

TABLE 2: Comparison of demographic and clinical characteristics of syphilis cases by clinic of diagnosis

Variable	Category	Infectious Disease (74)		Dermatology (184)		p-value
		N	%	N	%	
Gender	Female	16	21.6	32	17.4	0.433
	Male	58	78.4	152	82.6	
Age group	18-25	10	13.5	30	16.3	0.951
	26-40	27	36.5	66	35.9	
	41-60	29	39.2	70	38.0	
	>60	8	10.8	18	9.8	
Education status	Primary school	22	29.7	51	27.7	0.193
	Secondary school	13	17.6	33	17.9	
	High school	30	40.5	58	31.5	
	University	17	23.0	19	10.3	
	Unknown	6	8.1	23	12.5	
Employment status	Employed	41	55.4	121	65.8	0.125
	Unemployed	33	44.6	63	34.2	
Serological tests	Anti-HIV +	14	18.9	5	2.7	<0.001
	HbsAg +	2	2.7	6	3.3	0.863
	Anti-HCV +	0	0.0	0	0.0	-
Year of diagnosis	2018	33	44.6	70	38.0	0.236
	2019	24	32.4	53	28.8	
	2020	7	9.5	23	12.5	
	2021	9	12.2	22	12.0	
	2022	1	1.4	16	8.7	
Unprotected sexual contact	No	52	70.3	130	70.7	0.988
	Yes	11	14.9	27	14.7	
	Unknown	11	14.9	27	14.7	
Syphilis testing of sexual partner	No	13	17.6	47	25.5	0.338
	Yes	40	54.1	95	51.6	
	Unknown	21	28.4	42	22.8	
Clinical findings	Yes	46	62.2	14	7.6	<0.001
	No	28	37.8	170	92.4	
Clinical findings	Skin rash	21	28.4	89	48.4	0.003
	Lymphadenopathy	19	25.7	94	51.1	<0.001
	Genital lesion	7	9.5	98	53.3	<0.001

FIGURE LEGENDS

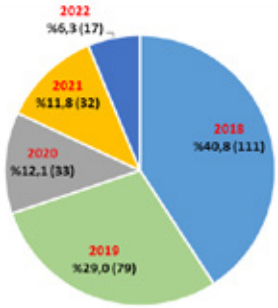

Figure 1 The distribution of syphilis cases by year.

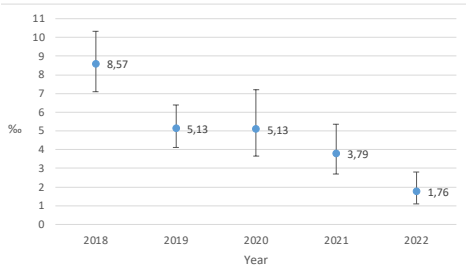

Figure 2 The distribution of syphilis cases compared to the total number of clinics

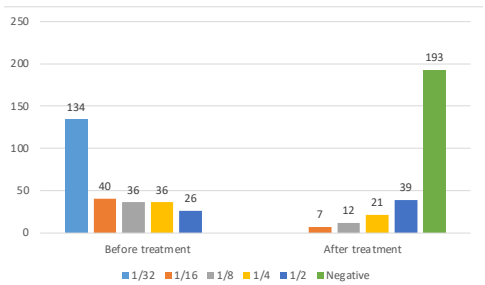

Figure 3 VDRL/RPR titers of syphilis cases before and after treatment

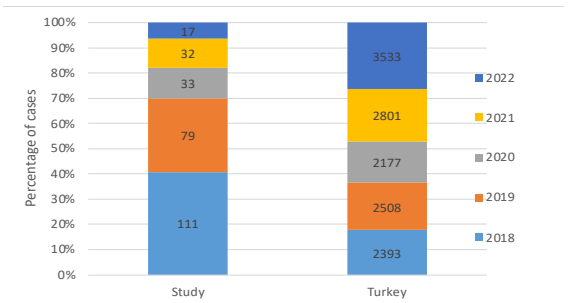

Figure 4 The number of diagnosed syphilis cases yearly in Turkiye and the study

References

1. Syphilis: Epidemiology, pathophysiology, and clinical manifestations in patients without HIV. https://www.uptodate.com/contents/syphilis-epidemiology-pathophysiology-and-clinical-manifestations-in-patients-without-hiv/. Accessed 03 March 2023
2. Syphilis - STD information from CDC. https://www.cdc.gov/std/syphilis/default.htm/. Accessed 10 March 2023
3. Rowley J, Vander Hoorn S, Korenromp E et al. Chlamydia, gonorrhea, trichomoniasis and syphilis: global prevalence and incidence estimates, 2016. Bull World Health Organ. 2019;97:548-562. DOI: 10.2471/BLT.18.228486
4. Sifiliz https://hsgm.saglik.gov.tr/tr/bulasici-hastaliklar/sifiliz/sifiliz-liste/sifiliz-istatistik.html/. Accessed 7 March 2023
5. Romanowski B, Sutherland R, Fick GH et al. Serologic response to treatment of infectious syphilis. Ann Intern Med. 1991;114:1005-1009. DOI: 10.7326/0003-4819-114-12-1005
6. Brown ST, Zaidi A, Larsen SA et al. Serological response to syphilis treatment. A new analysis of old data. JAMA. 1985;253:1296-1299.
7. Workowski KA, Bachmann LH, Chan PA et al. Sexually Transmitted Infections Treatment Guidelines, 2021. MMWR. 2021;70:1-187. DOI: 10.15585/mmwr.rr7004a1
8. Adişen E, Öztaş M, Gürer MA. Demographic Characteristics of Syphilis Patients Followed Between 1994 and 2006. Türkderm 2008;42:9-12.
9. Wong NS, Chen L, Tucker JD et al. Distribution of reported syphilis cases in South China: spatiotemporal analysis. Sci Rep.2018;8:9090. DOI: 10.1038/s41598-018-27173-y
10. Hook EW. Syphilis. The Lancet. 2017;389:1550-1557. DOI: 10.1016/S0140-6736(16)32411-4
11. Akalpler Ö, Eroğlu K. University Students' Sexual Behavior and Knowledge Levels on Common Sexually Transmitted Infections in the Turkish Republic of Northern Cyprus. Hacet Üniversitesi Hemşire Fakültesi Derg. 2015;2:1-19.
12. Ross MW. A community level syphilis prevention programme: outcome data from a controlled trial. Sex Transm Infect. 2004;80:100-104. DOI: 10.1136/sti.2003.006171.
13. Topçu W, Söyletir G , Doğanay M, Enfeksiyon Hastalıkları ve Mikrobiyolojisi. Publishing; 2017. p.341-427
14. Laga M, Manoka A, Kivuvu M et al. Non-ulcerative sexually transmitted diseases as risk factors for HIV-1 transmission in women: results from a cohort study. AIDS Lond Engl. 7:95-102. DOI: 10.1097/00002030-199301000-00015
15. Management of syphilis in the HIV-infected patient: facts and controversies. https://pubmed.ncbi.nlm.nih.gov/20797515/. Accessed 7 March 2023
16. Körber A, Dissemond J, Lehnen M et al. Syphilis with HIV coinfection. J Dtsch Dermatol Ges.2004;2:833-40. DOI: 10.1046/j.1439-0353.2004.04071.x
17. HIV-AIDS İstatistik. https://hsgm.saglik.gov.tr/tr/bulasici-hastaliklar/hiv-aids/hiv-aids-liste/hiv-aids-istatislik.html. Accessed 8 March 2023
18. Xie N, Hu X, Yan H et al. Effects of Case Management on Risky Sexual Behaviors and Syphilis Among HIV-Infected Men Who Have Sex With Men in China: A Randomized Controlled Study. Sex Transm Dis. 2022;49:22-8. DOI: 10.1097/OLQ.0000000000001502