North Clin Istanb 2022;9(6):590–594
doi: 10.14744/nci.2021.80688

ORIGINAL ARTICLE MICROBIOLOGY

Comparison of syphilis seropositivity between non-immigrant and immigrant populations in the Anatolian side of Istanbul, Turkiye: Results of five-years retrospective study

Riza Adaleti,[1] Nilgun Kansak,[1] Muge Aslan,[1] Gulcin Balkose,[2] Hande Toptan,[3] Solen Daldaban Dincer,[4] Sebahat Aksaray[5]

[1]Laboratory of Medical Microbiology, University of Health Sciences, Haydarpasa Numune Training and Research Hospital, Istanbul, Turkiye
[2]Laboratory of Medical Microbiology, Sitki Kocman University Training and Research Hospital, Mugla, Turkiye
[3]Department of Medical Microbiology, Sakarya University Faculty of Medicine, Sakarya, Turkiye
[4]Laboratory of Medical Microbiology, University of Health Sciences, Umraniye Training and Research Hospital, Istanbul, Turkiye
[5]Department of Medical Microbiology, University of Health Sciences, Hamidiye Faculty of Medicine, Istanbul, Turkiye

ABSTRACT

OBJECTIVE: Our study aimed to evaluate the seropositivity for syphilis in non- immigrant and immigrant populations and compare the results regarding demographic data.

METHODS: In accordance with the reverse algorithm, syphilis tests were performed between May 2014 and December 2018 in hospitals in our service zone for syphilis screening or symptomatic disease.

RESULTS: A total of 135.328 non- immigrant and 6.641 immigrant were screened for syphilis. Seropositivity rates were 1.3% in the non- immigrant and 3.8% in immigrant groups (p=0.0001). There was a statistically significant difference in terms of seropositivity rates between the various age groups in the local group and immigrant groups (except 18 25 age group) (p<0.05). Syphilis seropositivity rates were found to be lower in indigenous population than immigrant groups according to the years tested (p=0.0001). The seropositivity rates were 2.4% and 3.2% among the males (p=0.025) and 0.6% and 4.0% among females (p=0.0001) in non-immigrantand immigrant groups, respectively. Whereas, 0.6% of pregnant women in the local group and 3.7% of pregnant women in immigrant groups were seropositive for syphilis (p=0.0001). Among the HIV positive group, syphilis seropositivity was only observed in the non-immigrant group with a rate of 23.0% (p=0.0001).

CONCLUSION: The antibodies against syphilis were found more frequently in immigrants than non-immigrant. Among the HIV positive individuals syphilis seropositivity was only observed in the non-immigrant group.

Keywords: HIV positive; immigrant; pregnant; revers algorithm; syphilis seropositivity.

Cite this article as: *Adaleti R, Kansak N, Aslan M, Balkose G, Toptan H, Daldaban Dincer S, et al. Comparison of syphilis seropositivity between non- immigrant and immigrant populations in the Anatolian side of Istanbul, Turkiye: Results of five-years retrospective study. North Clin Istanb 2022;9(6):590–594.*

A significant increase has been observed in the number of international immigrants, in 2019, the number of migrants globally reached an estimated 272 million, 51 million more than in 2010 [1]. The latest data from the United Nations regarding refugees and asylum seekers dispersed to all parts of Tur-

Received: February 19, 2021 *Revised:* March 23, 2021 *Accepted:* April 30, 2021 *Online:* December 22, 2022

Correspondence: Riza ADALETI, MD. Saglik Bilimleri Universitesi, Haydarpasa Numune Egitim ve Arastirma Hastanesi, Tibbi Mikrobiyoloji Laboratuvari, Istanbul, Turkiye.
Tel: +90 532 696 89 17 e-mail: rizaadaleti@gmail.com

kiye, show that the numbers have reached almost four millions making Turkiye among one of the mostly affected countries [2].

Since syphilis and HIV are usually transmitted through the same route [3, 4], co infections and super infections are common. Screening sexually transmitted diseases, primarily syphilis and HIV, may help in configuring health data and establish health policies and control programs regarding communicable diseases especially among vulnerable groups such as immigrant populations.

Istanbul is Turkiye's largest metropolitan city with its approximately 16 million population. In the Northern Anatolian region of Istanbul, 12 state hospitals, of which, six are training and research hospitals, along with their district polyclinics, deliver health services to nearly 2.5 million people.

The objectives of this study are to describe retrospectively evaluation for the seropositivity of syphilis according to demographic characteristics in non- immigrantand immigrant groups of patients (age, date of test which had been done, gender, pregnant women, and HIV positive) who have presented to the hospitals in our service zone for screening purposes or suspected syphilis infection.

Highlight key points

- A high rate of seropositivity has been detected in both locals and immigrants in terms of syphilis infection.
- The high seropositivity detected in the immigrant population reveals that health policies should be developed for screening.
- Among the HIV positive group, syphilis seropositivity was observed in the local group with a rate of 23.0%.

MATERIALS AND METHODS

A total of 135.328 local and 6.641 immigrant patients were screened for syphilis in our laboratory between May 2014 and December 2018. The syphilis test results of non-immigrant and immigrant individuals who applied to the hospitals in our service zone between May 2014 and December 2018 due to screening purposes or symptomatic disease were evaluated retrospectively. Only one result for each patient was considered.

Reverse algorithm [5] is used in our laboratory to evaluate syphilis tests. The specific IgG+ IgM antibodies to Treponema pallidum were screened as an initial diagnostic test with Syphilis TP kit in ARCHITECT i2000SR (chemiluminescent method, Abbott, Germany) device. According to the manufacturer's recommendations, those with a sample/ cut off (S/CO) value of ≥1 were evaluated as reactive and those with an S/CO value <1 as non-reactive. Rapid plasma reagin (RPR) (Omega, UK) test was carried out as the second diagnostic step for the revers algorithm and for the treatment follow-up in samples with reactive specific antibodies. TPHA (Plasmatec, England) test was carried out if requested in patients with reactive specific antibodies. Cases with a positive RPR test were considered active syphilis in a dilution of ≥1/16, while they were considered past syphilis in a dilution of ≤1/8 [6].

The demographic data of the all non-immigrant and all immigrant individuals included in the study such as age, sex, pregnancy, and HIV positive were retrieved from the records in the Hospital Information Management System.

Statistically Analysis

IBM SPSS Statistics 22 for statistical analysis (SPSS, IBM, Turkiye) program was used for evaluating the data, numbers, mean, standard deviation, median, and percentages were used to evaluate descriptive data where as Chi-square test, Fisher's exact test, and continuity (Yates) correction were used in comparing qualitative data. The level of statistical significance was considered as $p<0.05$.

Ethical Approval

The approval was obtained from the Turkish Ministry of Health Haydarpasa Numune Education and Research Hospital Ethics Board No: HNEAH-KAEK2016/90-1045.

RESULTS

Patients were aged between 18 and 99 (mean 36.03±15.62) years in non-immigrant and 18–94 (mean 36.0±13.0) in immigrant group. 56% (n=79.537) of non-immigrant and 60.8% (n=4.306) of the immigrant group were female.

The distribution of data regarding syphilis seropositivity rates according to the year the test was studied and also age groups, sex, pregnancy status, and HIV positivity, in both groups are displayed in Table 1.

Table 1. Distribution of syphilis seropositivity according to revers algorithms in non-immigrant and immigrant groups

	Non-immigrant				Immigrant				Total	p
	Negative		Positive		Negative		Positive			
	n	%	n	%	n	%	n	%		
Study year										
2014	13.166	98.8	160	1.2	315	96.9	10	3.1	13651	0.008*
2015	21.555	98.9	228	1.1	580	97.5	15	2.5	22378	0.001*
2016	25.433	98.7	326	1.3	651	96.7	22	3.3	26432	0.0001*
2017	35.972	98.8	444	1.2	1041	96.0	43	4.0	37500	0.0001*
2018	37.382	98.3	662	1.7	3805	96	159	4.0	42008	0.0001*
Age										
18–25	17609	99.3	129	0.7	756	99.3	5	0.7	18499	0.996
26–35	53369	99.2	447	0.8	2485	98.0	50	2.0	56351	0.0001*
36–45	30642	98.6	431	1.4	1618	94.8	88	5.2	32779	0.0001*
46–55	12255	97.3	345	2.7	821	92.1	70	7.9	13491	0.0001*
>55	19.633	97.7	468	2.3	712	95.2	36	4.8	20849	0.0001*
Total	133508	98.7	1820	1.3	6.392	96.2	249	3.8	141.969	0.0001*
Men	54.433	97.6	1.358	2.4	2.261	96.8	74	3.2	58.126	0.025*
Women	79075	99.4	462	0.6	4.131	96.0	175	4.0	83.843	0.0001*
Pregnant	32.503	99.4	196	0.6	1.714	96.3	65	3.7	34.478	0.0001*
HIV positive	848	77.0	253	23.0	57	100	0.0	0.0	1.158	0.0001*

HIV: Human immunodeficiency virus; *: Statistical significance level accepted as p<0.05.

According to the reverse algorithm criteria, test result was seropositive in 1.3% non-immigrant and 3.8% in immigrant groups (p=0001). Seropositivity was present in 1.2%, 1.1%, 1.3%, 1.2%, and 1.7% of local dwellers, while 3.1%, 2.5%, 3.3%, 4.0%, and 4.0% of the immigrants tested positive for syphilis respectively, between 2014 and 2018 (p<0.05). Seropositivity of non-immigrant was 0.7%, 0.8%, 1.4%, 2.7%, 2.3% and seropositivity of the immigrant was 0.7%, 2.0%, 5.2%, 7.9%, and 4.8% according to age groups.

There was a statistical difference in terms of seropositivity rate between the years and various age groups (except 18–25 age groups) (p<0.05).

The seropositivity was 2.4% and 3.2% in non-immigrant and immigrant male (p=0.025) and 0.6% and 4.0% in non-immigrant and immigrant female, respectively (p=0.0001). It was determined that 0.6% of pregnant women in the local group and 3.7% of pregnant women in immigrants were positive (p=0.0001). A significant statistical difference was found between all local and immigrant groups within the scope of the study (p=0.0001).

Table 2. Distribution of RPR results of the local and immigrant patients with reactive screening test results

RPR	Negative		≤1/8		≥1/16	
	n	%	n	%	n	%
Local	145	8.0	1162	63.9	511	28.1
Immigrant	13	5.4	192	79.0	38	15.6

RPR: Rapid plasma reagin. RPR were not performed in 8 patients.

Syphilis seropositivity was 23% (253/1101) in the non-immigrant group, while seropositivity was not found in migrants with HIV positivity(n=57) (p=0.0001).

RPR negative or positive in <=1/8 titration (past infection) was at a rate of 84.4% among ELISA (IgG+IgM) and TPHA positive immigrant group while active syphilis (RPR >=16) were at 15.6% rate. The past infection was 71.9% and active infection was 28.1% of the local population (Table 2).

DISCUSSION

In this retrospective study, we evaluated the syphilis seropositivity rates of the local and immigrant population between 2014 and 2018. The total seropositivity rate was 3.8% among the immigrants, while the rate was 1.3% in the local population. According to the years tested, the total rate of seropositivity among immigrants was found to be significantly higher than the local dwellers between 2014 and 2018. A remarkable increase was observed in the immigrant group between 2016 and 2018 compared to the 2014–2015 period. Similarly, Tiittala et al. [7] reported that infectious diseases were found higher in immigrants who entered Finland in 2016 compared to those who entered in 2015. Although we do not have information about the date of entry of the immigrants to our country, it is noteworthy that syphilis seropositivity has increased each year.

When we evaluated the rate of seropositivity according to age groups, the rates were all statistically significantly higher among the immigrants, except for the 18–25 age groups. We found that the >25 age groups are more likely to have syphilis seropositivity compared to 18–25 age groups both in the non-immigrant and immigrant groups. Immigrants move from their homelands usually due to adverse living conditions usually bringing high prevalences of infectious diseases as a result [8]. However, the possibility of being infected during migration or in the country of destination should not be ruled out. In our study, RPR negative or positive in <=1/8 titration (past infection) was at a rate of 84.4% among ELISA and TPHA positive immigrant group while active syphilis was at 15.6% rate. The past infection was 71.9% and active infection was 28.1% of the local population. According to these results, it is remarkable that an active infection is higher in non-immigrant than immigrants.

In a study conducted in Israel, 678 immigrants from Ethiopia had a seropositivity of HIV at a rate of 5.8% and of syphilis at a rate of 4.9%. In the same group, it was determined that the duration of stay in the cities of their residence before the migration was directly related to the seropositivity rates of HIV and syphilis [9]. In Italy an immigrant group of 221 individuals from non-European Union countries and 150 people of Eastern European origin three patients of Eastern European origin had a confirmed diagnosis of syphilis [10].

Syphilis seropositivity was 2.4% in local men, while this rate was 3.2% in immigrant men. This rate is 0.6% for indigenous women and 3.8% for immigrant women. Although there is a higher level of syphilis seropositivity among men in our indigenous population,compared to women, it is striking that women are more seropositive in immigrants than in immigrant men. In our study, the countries where immigrants were born are not specified, we cannot make a detailed statement. On the other hand, the possibility of sexual abuse among immigrants should be considered. As the report from England [8] the finding of syphilis being associated with a reported history of torture is interesting, especially among Sudanian where experiences of torture were generally more prevalent. As the same report, a comprehensive pre-entry health assessments was examined between 2013 and 2017. According to the report overall syphilis testing yield among adults aged 15 years and older was 0.24%, the lowest non-zero yield was among Syrian nationals at 0.06% (0.02–0.15%) and the highest yield 3.33% (1.9–5.78%) among Sudanese nationals. The majority of the immigrants to our country are from the Middle East, African and Caucasian origin population. According to the report from Erzincan (A state at the East of Turkiye) the seroprevalance of VDRL/RPR was 0.23% in the irregular migrant (n=1.253) which 85% of the cases were from Afghanistan and Pakistan. As the same report anti-HIV positivity was not detected in the group [11]. Syphilis seropositivity was found 0.6% and 3.7% respectively, in the local pregnant and immigrants. A statistically significant difference was found between the two groups (p=0.0001). It is noteworthy that in other regions of our country, a much lower rate of seropositivity was found in screenings of local pregnant women in previous years [12, 13]. Since Istanbul is a metropolitan city, the prevalence of infectious disease may be higher than other regions. According to the studies conducted in Finland [7], the HIV prevalence was significantly higher with data reported by the provider operating in the Helsinki metropolitan area compared to the provider serving the rest of the country in asylum seekers. As in the general case of syphilis seroprevalence, the higher rate of seropositivity in pregnant immigrant women compared to non-immigrant pregnant women. The situation is similar in other countries, in an RPR test screening of 2526 pregnant immigrants from August 2007 to October 2018 in a tertiary hospital in Madrid, Spain, active syphilis (>=1/8) was detected in 1.6% of the women [14]. At a TPHA test screening in

Spanish and immigrant pregnant women in Granada between April 2007 and May 2008, the seroprevalence was 3.5% in immigrants, while it was 0.07% in the Spanish women [15]. According to these data, strict health policies should be brought to the agenda, especially for those with syphilis who are pregnant.

Syphilis seropositivity was 23% of the non-immigrant population who were HIV positive, while there was no syphilis seropositivity in the HIV positive group in immigrant group. Within the scope of the study, while high seropositivity was found among immigrants compared to the local population, syphilis was not detected in migrants with HIV, but this rate was a high rate in non-immigrant HIV positive. The very high rate of syphilis seropositivity in local HIV positive patients indicates raising alarms in Turkiye. It is necessary to improve health policies inclusive for both indigenous and immigrants.

Ethics Committee Approval: The Haydarpasa Numune Training and Research Hospital Clinical Research Ethics Committee granted approval for this study (date: 23.11.2020, number: HNEAH- KAEK 2020/KK245-2986).

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

Authorship Contributions: Concept – RA, NK, MA, GB, HT, SDD, SA; Design – RA, NK, MA, GB, HT, SDD, SA; Supervision – RA, NK, MA, GB, HT, SDD, SA; Data collection and/or processing – RA, GB, HT; Analysis and/or interpretation – RA, NK, MA, GB, HT, SDD, SA; Literature review – RA, NK, MA, GB, HT, SDD, SA; Writing – RA, NK, MA, GB, HT, SDD, SA; Critical review – RA, NK, MA, GB, HT, SDD, SA.

REFERENCES

1. United Nations, Migration, 2019. Available at: https://www.un.org/en/development/desa/population/migration/publications/migrationreport/docs/InternationalMigration. Accessed Dec 12, 2022.
2. UNHCR- Turkey. UNHCR Türkiye İstatistikleri. Available at: https://www.unhcr.org/tr/unhcr-turkiye-istatistikleri. Accessed Nov 16, 2022.
3. Sarıgül F, Üser Ü, Öztoprak N. Seroprevalence and risk factors in HIV/AIDS patients coinfected with syphilis. Klimik Derg 2019;32:161–4.
4. Sönmez C, Demir T, Sezen F, Kılıç S. Investigation of syphilis coinfection and performance of the Architect Syphilis Tp ELISA screening test in HIV patients. Turk J Med Sci 2018;48:1129–34. [CrossRef]
5. Dunseth CD, Ford BA, Krasowski MD. Traditional versus reverse syphilis algorithms: A comparison at a large academic medical center. Pract Lab Med 2017;8:52–9. [CrossRef]
6. Balla E, Donders GGG. Features of syphilis seropositive pregnant women raising alarms in Hungary, 2013-2016. Eur J Obstet Gynecol Reprod Biol 2018;228:274–8. [CrossRef]
7. Tiittala P, Tuomisto K, Puumalainen T, Lyytikäinen O, Ollgren J, Snellman O, et al. Public health response to large influx of asylum seekers: implementation and timing of infectious disease screening. BMC Public Health 2018;18:1139. [CrossRef]
8. Crawshaw AF, Pareek M, Were J, Schillinger S, Gorbacheva O, Wickramage KP, et al. Infectious disease testing of UK-bound refugees: a population-based, cross-sectional study. BMC Med 2018;16:143.
9. Olshtain-Pops K, Stein-Zamir C, Abramson N, Nagusa H, Haouzi-Bashan M, Maayan S. Association of HIV and syphilis seropositivity with transit stay in urban areas among Ethiopian immigrants to Israel. Isr Med Assoc J 2014;16:427–30.
10. Parco S, Vascotto F, Visconti P. Public banking of umbilical cord blood or storage in a private bank: testing social and ethical policy in northeastern Italy. J Blood Med 2013;4:23–9. [CrossRef]
11. Binay UD, Karakeçili F, Barkay O, Sümer B, Kök A, Çıkman A. Seroprevalance of HBsAg, anti-HCV, anti-HIV, and VDRL-RPR in irregular migrants. Arch Basic Clin Res 2019;1:48–50. [CrossRef]
12. Ensari T, Kirbas A, Ozgu-Erdinc AS, Gokay Saygan S, Erkaya S, Uygur D, et al. An eight-year retrospective analysis of antenatal screening results for syphilis: is it still cost effective? J Infect Dev Ctries 2015;9:1011–5. [CrossRef]
13. Tohma YA, Energin H, Özçimen EE, Çolak E. Screening for syphilis during pregnancy in Turkey. Gynecology Obstetrics & Reproductive Medicine 2016:22:72–5. [CrossRef]
14. Santiago B, Blázquez D, López G, Sainz T, Muñoz M, Alonso T, et al. Serological profile of immigrant pregnant women against HIV, HBV, HCV, rubella, Toxoplasma gondii, Treponema pallidum, and Trypanosoma cruzi. Enferm Infecc Microbiol Clin 2012;30:64–9. [CrossRef]
15. Sampedro A, Mazuelas P, Rodríguez-Granger J, Torres E, Puertas A, Navarro JM. Serological markers in immigrant and Spanish pregnant women in Granada. Enferm Infecc Microbiol Clin 2010;28:694–7.