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Sexually Transmitted Infections in a Cohort of 15,921 Refugees (1926-1940) in the Region of Imathia, Northern Greece

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ABSTRACT This historical epidemiological study evaluates sexually transmitted infections (STIs) among Greek refugees during the Interwar period in the region of Imathia, Central Macedonia, Greece, as a part of the effort against sexually transmitted infections in Greece (1910-1940). We examined the archives of the Refugee Hospital of Veroia – the capital of the regional unit of Imathia (March 5, 1926 to October 27, 1940). This is a report of previously unpublished primary material comprising a cohort of 15,921 cases, among whom 41 patients were hospitalized on account of syphilis and 19 on account of gonococcal infection. Descriptive statistics were estimated. Primary (n=4), secondary (n=2), tertiary (n=13), congenital (n=7), and not further specified (n=15) cases of syphilis were identified, whereas a variety of differential diagnosis problems arose. Syphilis and gonococcal infection/gonorrhea seemed to affect various social groups, as evidenced by the variety of professions involved. Refugee patients originated from various areas such as Caucasus, Thrace, Constantinople, Bithynia, and Pontus. Lack of information and poor healthcare led to spreading of STIs in Greece. Law 3032/1922 was crucial for the Greek effort against sexually transmitted infections.

KEY WORDS: sexually transmitted infections, syphilis, gonococcal infection, Interwar, refugees, hospital archives

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INTRODUCITON

The history of venereology in Europe is a topic that has been drawing increasing attention (1, 2). Syphilis or "the French disease" (*maladie française* or *morbus gallicus*) is an infectious disease caused by *Treponema pallidum* and is transmitted mainly by sexual intercourse and during pregnancy from the mother to her fetus (3,4). On March 3, 1905, Fritz Schaudinn (1871-1906), Fred Neufeld (1869-1945), and Paul Erich Hoffmann (1854-1915) discovered *Treponema pallidum* (5). In 1906, the bacteriologist August Paul von Wassermann (1866-1925) introduced the first blood test that could diagnose (6) the disease, which was named after him; the "Wassermann reaction" was also the first in the nontreponemal test category. In 1921, Reuben Leon Kahn (1887-1979) identified the blood reaction that bears his name (Kahn test) (7). Syphilis is divided into four different stages: primary, secondary, latent, and tertiary, and it may also occur congenitally (8).

Gonorrhea is a sexually transmitted infection (STI) caused by the *Neisseria gonorrhoeae* bacterium (9). It was discovered by Albert Neisser (1855-1916) in 1879 (10). Galen (129-ca. 201), by mistaking the purulent secretion for semen, referred to the infection as "gonorrhea" (in Greek: *γόνος* + *ρέω,* which means the flow of the offspring).

Veroia is a city in Central Macedonia and the capital of the Prefecture of Imathia. It is located at the eastern side of the Vermion Mountains. Its strategic position – alongside Vergina and Pella – has made it an important political center since antiquity, as it was a hub of the ancient trade routes of the region; during the Roman Imperial period it was the capital of the Assembly of the Macedonians. The city of Veroia was liberated by the Greek army from the Ottoman Empire in October 16, 1912 and was annexed by Greece in July 28, 1913 by the Treaty of Bucharest. Already in 1913, the city began to accept the first waves of refugees from the East. The municipality of Veroia was founded in 1918, with more than 10,000 inhabitants (11). To our knowledge, the richness of the primary archives of the "Refugee Hospital" in Veroia has never been examined.

A few years after the end of the First World War (1914-1918) and especially after the Asia Minor Catastrophe (1922), thousands of refugees from Pontus, Asia Minor, and Constantinople arrived in Greece. As a result, "refugee" hospitals were founded throughout Greece, including Central Macedonia (12). In 1924, Mayor Ioannis Markos founded the Refugee Hospital of Veroia (13). According to the Proceedings of the Women's Charitable Society of Veroia, beds and hospital material belonging to the Society were used therein (14). The hospital included 45 beds and was housed in a two-story building belonging to the Bank of Greece (12, Sixteenth of October Street) (Figure 1). During its first years of operation, patients with symptoms relevant to internal medicine were hospitalized. The first director of the hospital was Dr. Stavros Mouratoglou (1893-1941/1944), and Vori Gryzanowski was the only nurse – a male refugee from Russia.

The aim of this study was to examine the cases of sexually transmitted infections in the unpublished archival material on the 15,921 patients who were admitted to the Refugee Hospital during the Interwar period, as part of the wider effort against STIs in Greece.

PATIENTS AND METHODS

Our data were collected from the General Hospital of Veroia, a city in northern Greece. The Hellenic Data Protection Authority (21.11.2013, Ref. ΓΝ/ΕΞ/5965-2, Permit Number 1235) and the 3rd Health District of Macedonia (09.01.2014, Reference Number Δ3β/297) approved the study. The unpublished archival material encompasses 15,921 patients who were admitted to the Refugee Hospital from March 5, 1926 to October 27, 1940. Archives were entered into a pre-coded database. Cases of syphilis and gonococcal infection were identified; descriptive statistics were estimated. Statistical analysis was conducted with STATA/SE version 13 (Stata Corp., College Station, TX, USA).

RESULTS

Syphilis

Between 1926 and 1940, 41 cases of syphilis (Table 1) with a mean age of 30.1 years (SD=13.6) were recorded at the "Refugee Hospital" in Veroia. The age ranged from 10 to 64 years, with a median age of 30 years. A second disease was present in 6 out of 41 cases (14.6%) (4 cases coexisted with malaria and 2 with lower respiratory infections, namely influenza and pleuropneumonia). The median duration of hospitalization due to syphilis was 15 days. Patients mainly originated from Pontus (North or South, 24.4%), Macedonia (24.4%), Caucasus (7.3%), and regions of Asia Minor, either inner or coastal Turkey (Table 1), (Figure 2). The following professions of patients with syphilis were recorded: housewife (16 cases, 39.0%), farmer (9 cases, 22.0%), manual worker (8 cases, 19.5%), basket maker (one case, 2.4%), and retailer (one case, 2.4%), whereas in one case (2.4%) the profession was not specified; five cases (12.2%) of underage children were identified. Notably, no sex worker cases were identified among patients with syphilis.

Table 1: Descriptive statistics of cases hospitalized due to syphilis (n=41).

Variables	n (%)
Sex	
Male	19 (46.3)
Female	22 (53.7)
Place of origin	
Aivali - Aeolia	1 (2.4)
Asia Minor (without further specification)	2 (4.9)
Bithynia (Marmaras)	2 (4.9)
Bulgaria	1 (2.4)
Cappadocia	1 (2.4)
Caucasus	3 (7.3)
Constantinople	2 (4.9)
East Thrace	1 (2.4)
Inner Turkey (Galatia)	1 (2.4)
Inner Turkey (Phrygia)	2 (4.9)
Inner Turkey (Pisidia)	1 (2.4)
Izmir - Cesme	2 (4.9)
Macedonia	10 (24.4)
Pontus (without further specification)	4 (9.8)
South Pontus	6 (14.6)
Thrace	2 (4.9)

Primary syphilis (syphilitic ulcer) represented 9.7% of syphilis cases, whereas two cases (4.9%) of secondary syphilis were noted. Tertiary syphilis pertained to 31.7% of syphilis cases and included various forms, such as gummas, syphilitic ophthalmia, and syphilitic myocarditis. Congenital syphilis accounted for 17.1% of syphilis cases and was sometimes accompanied by other diseases. Table 2 presents the forms of syphilis in detail.

Various differential diagnosis problems were noted in the hospital records (Table 3). Some cases were described as "suspicion for syphilis" while, the term "Wassermann+" was used in other cases without clearly indicating the presence of syphilis. Complex cases coexisting with various diseases, such as esophagitis, subacute rheumatism, malaria, and staphylococcal infections, were also noted.

Gonococcal infection

Between 1926 and 1940, 19 cases (Table 4) with a mean age of 29.7 years (SD=13.7) were recorded (age range: 12 to 71 years, median age: 27 years). The median duration of hospitalization due to gonococcal infection was 9 days. The following gonococcal infection forms were recorded: gonococcal arthritis, vaginitis, metritis/salpingitis, orchitis/epididymitis, and urethritis (Table 4). We noted an exceptionally interesting incident in a 22-year-old woman from Florina, a manual worker from Thessaloniki, for whom the cause of hospitalization contained a sociological component: "*pregnancy due to sex outside of marriage with acute gonococcal vulvovaginitis*" ("*εγκυμοσύνη, κλεψιγαμία μετά οξείας γονοκοκκικής αιδοιοκολπίτιδος*"). Similarly to syphilis, patients with gonococcal infections mainly originated from Caucasus, East Thrace, Constantinople, and Macedonia (Table 5), (Figure 3).

Figure 1. The Refugee Hospital of Veroia. Source: http://www.verhospi.gr

The following professions were recorded in patients with gonococcal infection: housewives (nine cases, 47.4%), manual workers (five cases, 26.3%), farmers (two cases, 10.5%), a civil servant (one case, 5.3%), and a newspaper distributor (one case, 5.3%); the profession was not specified in one case (5.3%). Notably, no sex worker cases were identified in patients with gonococcal infection.

DISCUSSION

Syphilis seemed to affect various social groups in Veroia, as evidenced by the variety of professions among hospitalized patients. According to our data, 39.0% of patients diagnosed with syphilis were housewives, highlighting the widespread dissemination of STIs in the community. Prior to the discovery of effective treatment, physicians in Europe emphasized the sanctity of marriage and claimed that extramarital relationships led to the decline of the institution of the family, while syphilis was referred to as "carnal scourge" and "family poison" (15).

The diagnostic work-up of syphilis during the Interwar period in Greece was mainly based on the clinical presentation rather than the limited selection of

Table 2. Forms of syphilis according to the medical terminology of our period under study (1926-1940).

Forms of syphilis	**n (%)**
Primary	**4 (9.7)**
Syphilitic ulcer	4 (9.7)
Secondary	**2 (4.9)**
Secondary syphilis, without further specification	1 (2.4)
Secondary syphilis coexisting with chronic malaria	1 (2.4)
Tertiary	**13 (31.7)**
Tertiary syphilis, without further specification	5 (12.2)
Tertiary syphilis involving the skin	1 (2.4)
Syphilitic ophthalmia (leukoma)	1 (2.4)
Syphilitic ophthalmia	1 (2.4)
Syphilitic myocarditis	1 (2.4)
Gummas of the right forearm	2 (4.9)
Gummas in the lower tertile of the anterior surface of the shin, coexisting with malaria	1 (2.4)
Syphilitic gumma, without further information	1 (2.4)
Congenital	**7 (17.1)**
Congenital syphilis coexisting with malaria	1 (2.4)
Congenital syphilis, malaria, nephritis	1 (2.4)
Congenital syphilis, without further specification	3 (7.3)
Congenital syphilis coexisting with influenza	1 (2.4)
Congenital tertiary syphilis	1 (2.4)
Unspecified form of syphilis	**15 (36.6)**
Syphilis**,** without further specification	12 (29.3)
Syphilitic ulceration of the left shin, Wasserman (+)	1 (2.4)
Syphilis coexisting with right pleuropneumonia	1 (2.4)
Syphilis and ulceration of the left shin	1 (2.4)

laboratory tests. The Andreas Syggros Venereal and Skin Diseases Hospital used the following tests: spirochete examination, Wassermann reaction, precipitation reaction, and cerebrospinal fluid examination (16). The diagnostic challenges of the era are reflected in the records in our archive, where some cases were marked as "suspicion for syphilis". Complex cases coexisting with malaria, staphylococcal infections, and subacute rheumatism are indicative of the diagnostic problems that doctors at the time had to resolve with limited means. Various clinical hypotheses can be discerned through the documents, such as diagnostic considerations of syphilis in cases of hemiplegia (two patients), possibly in view of neurosyphilis that could not be proved with certainty. Precise information about the diagnostic tests used in the Veroia Refugee Hospital at that time has not been preserved in the archives.

The use of the term "Wasserman+" is rather unclear; we can only wonder whether this was an entry in order to avoid stigma or a cautious diagnosis of a possibly false positive (17) for which doctors

Figure 2. Place of origin of patients with syphilis.

Figure 3. Place of origin of patients with gonococcal infection.

Table 3. Cases where syphilis was implicated in the differential diagnosis (n=11).

Hospitalization date	Gender	Age	Profession	Diagnostic dilemma	Days hospitalized
Aug 25, 1934	M	62	Peddler	Suspicion for syphilis	9
Feb 01, 1937	F	19	Household	Hemophilia (Suspicion for syphilis)	10
Apr 17, 1934	F	22	Household	Suspicion for syphilis	8
Jul 28, 1936	F	23	Manual worker	Suspicion for syphilis	3
Oct 18, 1935	M	65	Farmer	Staphylococcal infection and suspicion for syphilis	21
Jun 08, 1936	M	35	Shepherd	Right hemiplegia, Wassermann+	9
Jul 25, 1934	M	34	Manual worker	Malaria and suspicion for syphilis	10
Oct 05, 1937	F	26	Not specified	Esophagitis and subacute rheumatism, Wassermann+	6
Sep 19, 1935	M	2	Underage	Malaria and suspicion for syphilis	10
Jun 27, 1938	F	60	Household	Right foot inflammation, suspicious for syphilis	22
Feb 02, 1937	M	58	Shoemaker	Left hemiplegia (possibility of syphilis)	52

F: Female, M: Male

could not make a definite, clinical diagnosis of syphilis. Notably, the specificity of Wassermann reaction for syphilis was not optimal; it could also be positive (i.e. false positive) for other infectious and non-infectious causes involving tissue damage, as well as treatments for syphilis *per se* (such as mercury). A possible example could also pertain to our observed case of subacute rheumatism, as the latter is associated with a false positive Wasserman reaction (18).

Various forms of gonococcal infections were also identified; gonococcal arthritis, vaginitis, metritis/salpingits, orchitis/epididymiytis, and urethritis were recorded. Gonococcal arthritis had received considerable attention in prestigious scientific journals of the time, such as the *British Medical Journal* in 1932 (19,20) and a case report in *The Lancet* in 1927 (21). It is worth noting that although arthritis had been a known aspect of gonococcal infection since 1507 (Pierre Van Forest) (22) and 1664 (Pierre Martin de La Martinière) (23), the medical identification of the microorganism *Neisseria gonorrhoeae* with arthritis was established through the culture of joint fluid six years after its discovery, namely in 1883 by Pétrone (19).

The fact that no sex workers were identified as having STIs in our material seems puzzling. It might be postulated that either sex workers avoided hospitalization due to the stigma or that they sought care in another nearby larger city, such as Thessaloniki; nevertheless, the fact that no sex workers were identified in our study sample may just be due to the small cohort size of patients with STIs. Interestingly, prostitutes were called *pastrikiés (παστρικές)*, namely "clean women"; although this may seem a euphemism, they were inspected by the doctors once a month. After the arrival of refugees, poverty, unemployment, and prostitution were widespread. Two systems were proposed to limit prostitution in Interwar Greece: the "regulatory" and the "abolitionist". The supporters of the former wanted the obligatory stay of sex workers in the brothels so that they could be better supervised by the Ministry of Health; the followers of the second system – like Georgios Fotinos (24) – demanded the abolition of brothels (25).

It has been postulated that lack of information and poor health care during the Interwar period led to the spreading of STIs overall in Greece (26). Law

Table 4. Descriptive statistics of incidents with gonococcal infection.

Variables	n (%)
Sex	
Male	8 (42.1)
Female	11 (57.9)
Forms of gonococcal infection	
Gonococcal arthritis	2 (10.5)
Gonococcal vaginitis	3 (15.8)
Gonococcal metritis/salpingitis	6 (31.6)
Gonococcal orchitis/epididymitis	3 (15.8)
Gonococcal urethritis	1 (5.3)
Not further specified	4 (21.1)

Table 5. Place of origin of patients with gonococcal infection.

Place of origin	n (%)
Aivali - Aeolia	1 (5.3)
Bithynia (Marmaras)	1 (5.3)
Cappadocia	1 (5.3)
Caucasus	3 (15.8)
East Thrace	3 (15.8)
Inner Turkey (Pisidia)	1 (5.3)
Constantinople	3 (15.8)
Macedonia	4 (21.1)
South Pontus	1 (5.3)
Thrace	1 (5.3)

3032/1922 "About the measures to combat sexually transmitted infections and sex workers" was published as a milestone in the Greek effort against sexually transmitted infections (27). The state, despite the establishment of the above Law, failed to limit the spread of STIs (26). Treatments used during the Interwar period were mercury (15,28), potassium iodide (15), arsenic (15,29-31), bismuth (32), and pyrotherapy (artificial fever) (7,15,30) for syphilis and caustic substances, cautery, silver nitrate, and potassium permanganate for gonorrhea (33); nevertheless, this information was not recorded in our archives.

The efforts against sexually transmitted infections in Greece began with the establishment of the Andreas Syggros Venereal and Skin Diseases Hospital on January 4, 1910 (34) by the widow of the banker Andreas Syggros (1830-1899), Iphigenia Syggrou (1842-1921) in memory of her husband and with the contribution of Professor Georgios Fotinos (1976-1961) (35,36). The Hospital was established by Law 3354/1909; a pioneering institution for its time, the purpose of this "guarding-hospital" was to treat people suffering from venereal diseases and disseminate knowledge to the community (30). It had two outpatient departments, and many patients were treated daily; however, such a sophisticated setting was not available in Veroia during our study period.

The Hellenic Society of Venereology and Dermatology had been founded in 1914 by Georgios Fotinos (30); in the same year, Fotinos formed a committee for the study and control of sexually transmitted infections (27). However, successive wars prevented further advancements until 1922, when Law 3032/1922 was introduced (37). According to Article 1 of the Law, the establishment of committees in each prefecture was approved in order to supervise sex workers (27). The commissions could classify or decertify a woman as a sex worker, allow the establishment of brothels, abolish brothels, and try to persuade sex workers to quit their profession (Article 2). Finally, medical examination was required for all sex workers, as well as compulsory treatment in appropriate institutions (Article 5) (16). The Legislative Decree "About the hospitalization of sex workers affected by sexually transmitted infections" was published in 1923 and decreed that brothels would thereafter assume the financial responsibilities for the medical care of their sex workers. If the sex worker was poor, the costs were covered by the State and not by the brothel (Article 1) (38).

In 1929, Law 4068 "About combating Hereditary Syphilis", established anti-venereal stations in Macedonia, Thrace, and Epirus for the purpose of investigating the outbreaks of hereditary syphilis and providing free treatment along with education about its risks (Article 2). The staff of the stations consisted of a specialist venereologist (Article 5) (39); to our knowledge, an anti-venereal station was not available in Veroia during our study period.

There were already eight anti-venereal hospitals in Greece in 1932 (Athens, Thessaloniki, Kavala, Drama, Chios, Chania, Heraklion, and Ioannina), nine venereology doctor offices (four in Athens (40), one in Piraeus, one in Thessaloniki, one in Patras, and one in Crete), and two anti-venereal port clinics (in Piraeus and in Thessaloniki) (27).

Despite the originality of this study, some limitations should be acknowledged. First, there was no independent validation of diagnosis by other experts of this period. There was no information about the total set of clinical findings and laboratory tests conducted. For "suspicious cases" and differential diagnosis problems, we had no information about any final designation of the disease. Moreover, the subcohort of STIs was small compared with the records of the 15,921 patients hospitalized during this period. Furthermore, as mentioned above, there was no information regarding the specific treatments that the hospitalized patients received for their STIs. In addition, there are no data regarding cases of STIs recorded in Veroia prior to the Asia Minor Catastrophe 1922, as the Veroia hospital was founded in 1924 and no health records are available beforehand. Selection bias should also not be underestimated; for instance, although urethritis is the commonest clinical expression of gonococcal infection, only one case was noted in our material, possibly highlighting that this manifestation was not considered serious enough to lead patients to seek treatment in the hospital and be eventually hospitalized.

CONCLUSION

Sexually transmitted diseases in Greek refugees reflect the adverse socioeconomic and health

conditions faced by this heterogeneous group after their arrival in Greece. Syphilis was a particularly dark chapter in the history of medicine. The scientific community had been struggling with the disease because effective treatments were not available; it was also a serious public health problem during the Interwar period.

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