



Special Article



History of Syphilis and Gonorrhea in Korea

Jae-Ki Choi ^{1,*}, Seung-Ju Lee ^{2,*}, and Jin-Hong Yoo ¹

¹Division of Infectious Diseases, Department of Internal Medicine, College of Medicine, The Catholic University of Korea, Seoul, Korea

²Department of Urology, College of Medicine, The Catholic University of Korea, Seoul, Korea

OPEN ACCESS

Received: Jun 6, 2019

Corresponding Author:

Jin-Hong Yoo, MD, PhD

Division of Infectious Diseases, Department of Internal Medicine, The Catholic University of Korea College of Medicine, Bucheon St. Mary's Hospital, 327 Sosa-ro, Bucheon 14647, Korea.

Tel: +82-1577-0675

Fax: +82-32-340-2669

E-mail: jhyoo@catholic.ac.kr

*These authors contributed equally to this work.

Copyright © 2019 by The Korean Society of Infectious Diseases and Korean Society for Antimicrobial Therapy

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ORCID iDs

Jae-Ki Choi

<https://orcid.org/0000-0003-4666-960X>

Seung-Ju Lee

<https://orcid.org/0000-0003-0072-8010>

Jin-Hong Yoo

<https://orcid.org/0000-0003-2611-3399>

Conflict of Interest

No conflicts of interest.

ABSTRACT

In Korea, systematic management of sexually transmitted infections (STIs), including syphilis and gonorrhea, began only after the end of the Korean War. Since the enactment of the Law on Prevention of Communicable Diseases of 1954, STI has been managed and regularly monitored in high risk group. However, the major turning point was the implementation of the Special Law on Prostitution, which was enacted in September 2004. The national policy on STI management had also changed from management of core groups by mandatory to voluntary examinations and treatment of patients by health examinations. The national surveillance system for STI was introduced in 2000 by the revision of the Prevention of Communicable Diseases Act of 1999. The incidence of STI had increased in the 1960s, but began to decline at the 1970s. In the 21st century, the incidence of STI has been increasing again. Currently, more thorough methods of STI management are needed in Korea.

Keywords: Syphilis; Gonorrhea; Non-Gonococcal Urethritis, Korea

EPIDEMIOLOGY IN KOREA

Sexually transmitted infection (STI) refer to all diseases that may be transmitted through sexual intercourse or contact. Although more than 20 microorganisms that cause STI have been found till date, syphilis and gonorrhea, which have clear clinical symptoms, were considered to be typical STI in the past when there was a lack of diagnostic tests. Since the occurrence of STI requires sexual contact, there are core groups in the epidemiology of STI. There was no officially approved prostitution business in Korea in the past, but it started spreading under Japanese influence after the first Sino-Japanese War in 1895. The Japanese government officially legalized public-funded prostitution in March 1916, and this system was maintained under the law until it was officially cancelled by the United States Army Military Government in Korea (USAMGIK) in February 1948, after the liberation of Korea from Japan. Private prostitution businesses increased around areas where public prostitution flourished previously and where the American army stayed after the liberation. As a result, the incidence of STI increased across the country, mainly among core groups including prostitution business workers, special adult entertainment establishment workers, and hygiene-related workers. For national management of STI, the government announced the Law on Prevention of Communicable Diseases in February 1954, specified by law that STI should be regularly

monitored, and indicated that members of core groups, as well as patients, should carry medical certificates. This led to positive outcomes where the investigation and management of core groups, including female commercial sex workers who were often exposed to STI due to social history, were achieved successfully. In contrast, investigation and management of other non-core-group individuals were insufficient and only relied on individual investigations.

It was difficult to accurately assess the national incidence and prevalence of STI in all individuals due to unwillingness of patients to disclose outcome of diagnoses and low sensitivity of diagnostic tests in the past. Therefore, in epidemiology, STI epidemics are estimated by observing progress over time. Studies on the prevalence of syphilis and gonorrhea in Korea were reported in the 1960s, and core group female commercial sex workers were followed up usually through examinations for medical certificates.

According to statistics published by the Ministry of Public Health and Society in the 1970s, the incidence of gonorrhea in core group females increased 10-fold, whereas that of syphilis doubled over 10 years between early 1960s and early 1970s. At the time, the reasons for the increase were suspected to be changes in sexual norms after the Korean War, more open sexual culture among younger generations, and increase in poorly managed private prostitution.

Since studies on the incidence and epidemics of STI in non-core-group populations are characterized by different sample populations, methods, regions, and periods, it is very difficult to compare or analyze their results. Fortunately, one medical institution has continued its investigation of seroprevalence of syphilis in patients. According to the researches conducted on blood donors, patients who had regular medical examinations, and pregnant women, the seroprevalence of syphilis in non-core-group patients continued to decrease between the 1970s and 1990s, from 6 - 7% in the 1960s to below 1%. This is attributable to the distribution of penicillin, an effective antibiotic against syphilis, and increased awareness of the risks of syphilis. Although statistics on previous prevalence of gonorrhea in Korea are not available, a report made in 1999 demonstrated that 18 - 25% of non-core-group patients who presented to hospitals for diagnosis of STI and 5% of special adult entertainment establishment workers (those who worked at adult entertainment establishments for foreign clients or those who were thought to work frequently in adult entertainment businesses) had gonorrhea. A common trend observed in reports across the world was that the incidence of the incidence of gonorrhea continued to decrease until the 1990s, as was the case for syphilis.

A different trend was recognized worldwide at the start of the 21st century, where STI, which were previously on decreasing trends, started to increase again. The Korean government introduced a sentinel surveillance system for STI based on voluntary participation of medical personnel in August 2000, with amendment of the Law on Prevention of Communicable Diseases in 1999. In a sentinel surveillance system, sample institutions are selected for infectious diseases that require national management, especially those for which complete enumeration of all patients is difficult or those characterized by relatively low severity and high incidence. This aids in continuous and regular collection, analysis, and publishing of relevant data, with an ultimate aim to use these for management and prevention of infectious diseases. Although this is not a perfect system, it has enabled Korea to obtain national epidemiological data on STI. The number of gonorrhea cases reported through the sentinel surveillance system was on a rising trend between 2001 and 2003, as in other countries, and

then decreased until 2010. In the early 2000s, the prevalence of gonorrhoea was approximately 0.1% in non-core-group university students, much higher at 8.8% in sex workers, and 7.3 - 7.9% in adolescents who had run away from home [1].

The implementation of the Special Law on Prostitution, which was enacted in September 2004, marks an important milestone in the history of STI in South Korea. This law regards the core groups, which were previously managed as those requiring regular examinations, as those who require legal punishment. As a result, the number of patients managed by STI examinations has decreased, whereas sex trade and prostitution in black markets have increased due to increased suppression of sex trade without provision of alternative measures and increase in new forms of sex trade. The national policy on STI management has also changed from management of core groups by mandatory to voluntary examinations and treatment of patients by health examinations.

In 2011, the surveillance system for primary and secondary stage infectious syphilis and congenital syphilis were changed from sentinel surveillance to complete enumeration to strengthen the level of surveillance. Since then, more than 500 males and 500 females with infectious syphilis were reported each year.

The Health Insurance Review and Assessment Service (HIRA) and National Health Insurance Service (NHIS) started to publish big data on public health in 2008, which has enabled reviews of treatment data of all patients across the country. According to the yearly treatment rate data from HIRA, the rate for gonorrhoea decreased by 44% from 84.9 in 2008 to 47.2 per 100,000 persons in 2014. Gonorrhoea is 3.5-times more prevalent in males than in females, and most prevalent among both genders in their 20s and 30s. Primary and secondary stage infectious syphilis increased by 7% in 18.7 in 2008 to 20 per 100,000 persons in 2014. Although it was 1.5-times more prevalent in males in 2008, the incidence has increased relatively more in females, resulting in decreases in the gender difference. Like gonorrhoea, syphilis is most prevalent in both genders in their 20s and 30s.

Recent media reports have suggested the possibility of increased STI in the elderly. The size of elderly population increased recently with increase in average lifespan; the elderly now are more sexually active with changes in the social perception of sexual life and availability of treatment for erectile dysfunction. However, it still remains questionable as to whether increase in sexual activities in the elderly leads directly to increased STI, given the characteristics of STI. In reality, the incidence of STI is very much lower in the elderly than in younger generations according to STI epidemiological investigations in the elderly and the data published by HIRA.

CLINICAL MANIFESTATION OF THE DISEASES IN KOREA

Gonorrhoea is caused by *Neisseria gonorrhoea*, which is a Gram-negative coccus named after Neisser who discovered it in 1897. In contrast to syphilis, *N. gonorrhoea* actively exchanges antibiotic resistance through plasmids, which are the means of genetic transmission. Therefore, tetracycline-resistant strains have also increased in Korea recently, which is a problematic issue [2-4]. Although gonorrhoea was once the most common STI, it has been on a decreasing trend since 2003. Nevertheless, it is still one of the most commonly reported STI along with non-gonococcal diseases in Korea. Gonorrhoea is transmitted very easily, and 20% of males who

have sexual intercourse once with an infected female may acquire the disease. With four to five sexual intercourses, the rate increases to 80%. The rate of transmission from infected males to females is much higher, and more than half of females who have sexual intercourse once with an infected male acquire the disease. The most significant clinical issue is the increased antibiotic resistance observed in *N. gonorrhoea*. This is a worldwide trend that affects Korea without any exception. Although gonorrhoea was treated with penicillin or tetracyclines until the 1990s, they have become ineffective, necessitating the use of cephalosporin agents, which are third-generation antibiotics. However, with a rise in resistance to cephalosporin, cases of treatment failure have increased, and the most recent guidelines recommend the combined use of two types of antibiotics. Since the use of antibiotics has increased with an increase in gonorrhoea patients, antibiotic resistance is expected to increase even further, thus being of concern for future guidelines on STI treatment.

Syphilis is caused by *Treponema pallidum*. The name 'syphilis' comes from the name of a shepherd boy Syphilis in the poem "Syphilis or the French Disease" by Fracastoro in 1530, an Italian poet and physician.

Although it is widely believed that syphilis spread to Europe with the discovery of the American continent by Columbus, there are strong objections to this theory that the disease was already present in Europe prior to that. Interestingly, incidence of syphilis increased across Europe in the year following the discovery of the American continent; many suffered from this disease as it was incurable for a long time until the discovery of penicillin.

Tertiary stage syphilis, particularly neurosyphilis, was common prior to the discovery of penicillin, but much less common and rarely seen these days. However, neurosyphilis is still not uncommon in Acquired Immune Deficiency Syndrome (AIDS) patients.

It is estimated that syphilis was also observed in Korea starting in the 16th century, but most cases were in the late 19th century. During the Japanese occupation of Korea, it was the second most common disease after malaria.

With the discovery of penicillin after the liberation of Korea, the incidence of syphilis seemed to decrease drastically but started to increase again in the 1960s. Since 1965, early latent syphilis has been more common than clinically symptomatic syphilis. In the 1960s, clients of prostitution establishments, which were the major source of syphilis infection, used '-mycin' antibiotics (estimated to have been oral penicillin or ampicillin) for prophylaxis without medical discretion, so syphilis could not be prevented completely. Moreover, due to the insufficient supply of benzathine penicillin, which can be administered intravenously only once for primary and secondary stage syphilis, in Korea at the time, procaine penicillin or aqueous penicillin, which should be administered daily for two weeks, were mostly used. In some cases, even Salvarsan 606, which was commonly used during the Japanese occupation, was used for treatment. Therefore, syphilis in Korea in the 1960s and 1970s was characterized by cases that were treated incompletely and became latent [5]. Although the incidence decreased to below 1% in the 1990s with better healthcare, the rate started to increase again in the 2000s.

Two reports have been published on the increase in incidence of infectious syphilis since 2000. According to the sentinel surveillance data, the incidence of primary and secondary stage syphilis has also increased since 2000. The incidence increased mostly among patients

who were in their 20s and has been on an increasing trend annually among the elderly who are above 60 years. This increase is attributable to a now common open attitude to sex, increased risk of exposure to STI with increased population movement, and an increase in diagnostic tests during annual health examinations. With the implementation of the Special Law on Prostitution in 2004, sex trade establishments have been targeted for arrest and punishment; the sex trade market has expanded to include sex trade and contact mediated by the internet [6].

Moreover, the incidence of primary and secondary stage syphilis has also increased recently [7].

Human Immunodeficiency Virus (HIV)-infected individuals have been found to also exhibit a clearly increasing trend of syphilis infection, so there is an impending need to manage this group. Another serious issue is the fact that syphilis has increased recently in elderly patients who are in their 60s. This is because more elderly patients are now more sexually active with the availability of erectile dysfunction treatments and other medical developments. In particular, elderly patients tend to miss their STI symptoms or regard them as symptoms of aging, leading to late diagnosis. Therefore, attention is required in syphilis and gonorrhea among the elderly, youth, and AIDS patients.

PREVENTION AND MANAGEMENT

Important management strategies for STI, such as syphilis and gonorrhea, include regular examinations for core groups, surveillance system for STI, and promotion of public awareness. The Law on Prevention of Communicable Diseases, which was established as Act 308 of the law on February 2, 1954, marks the beginning of national prevention and management of syphilis and gonorrhea [8]. Gonorrhea and syphilis were designated as type 3 infectious diseases by law. Moreover, the law specified that “patients who have STI and have been found by governors of provinces or special cities to have significant concern of transmission to other individuals should receive examination for STI as defined by the health minister (Article 3, Section 8, Clause 2)”. It also specifies that “governors of provinces or special cities may order patients who have sufficient evidence for an STI and are exposed to environments that facilitate the transmission of STI to receive health examination as defined by the health minister (Article 3, Section 9)” in order to prepare the legal evidence for mandatory health examination of core groups. Moreover, as the evidence for establishment of facilities to diagnose, treat, and prevent STI as type 3 infectious diseases, the law specified that “① provinces or special cities should establish convalescence or treatment facilities required to prevent the type 3 infectious diseases as defined by the health minister” and that “② cities, and town may establish convalescence or treatment facilities required to prevent the type 3 infectious diseases as defined by the health minister (Article 5, Section 24)”. Since the national management of STI at the time was limited to core groups, STI clinics established across the country by law were not available for other patients and were only available to prostitutes working for United Nations military personnel. However, the scope of STI treatment was expanded to other patients in the 1960s.

The third amendment of the Law on Prevention of Communicable Diseases in 1983 specified that “if patients and those who should receive health examination for STI as defined through ② Section 2 of Article 8 do not receive the examination, they may not work in the areas defined by the same, and those in charge of these businesses may not employ

workers without proper health examination (Clause 6)” [9]. By specifying that employees in positions that require health examination for prevention of STI may not work in prostitution should they not receive STI examination, the law strengthened the level of mandatory monitoring. Through the Regulation on Health Examination for Employees in Hygiene-Related Work established in 1984, the number of STI examinations for those requiring the examinations was further specified. As such, although sex trade was openly available at certain areas with social tolerance of sex trade and lack of enforcement of laws while it remained illegal, the Ministry of Public Health registered those requiring STI examination to local public health centers for regular examinations. Since women working in sex trade and owners of sex trade businesses could continue their work when they followed the guidelines, they were cooperative with the mandatory STI examination system. However, with the establishment of the Special Law on Prostitution in March 2004, registration for regular STI examination now serves as evidence for sex trade, and individuals that register are targeted for arrest and punishment [10]. Therefore, the examination rate decreased drastically among sex trade workers, and there has been much confusion in policies for STI examination among sex trade workers. The Law on Prevention of Communicable Diseases was partially amended seven times through 5 and 2 government and parliament proposals, respectively. Recently, it was amended into “Law on Management and Prevention of Infectious diseases” in February 2010, and the previously used term 'STD was changed to STI [11]. The Department of Policy on Diseases, which is under the Bureau of Health Policy, Office for Healthcare Policy of the Ministry of Health and Welfare, and the tuberculosis and HIV/AIDS Control Department under the Center for Disease Prevention of the Korea Centers for Disease Control and Prevention (KCDC) are responsible for establishing basic plans for prevention and management of STI. On the other hand, prevention and management projects are implemented by municipal and provincial Bureaus of Public Health Policy and public health centers.

In terms of national surveillance of STI, except the data collected from regular examination of females working in sex trade conducted at the public health centers in municipal, Gun, and Gu, no data or surveillance systems on the total prevalence or incidence of STI were available prior to 2000. National surveillance systems were established after 2000, and a sentinel surveillance system for STI was established in August 2000 in departments of urology, gynecology, and dermatology at all university hospitals, public health centers, and two private hospitals at each local government. In 2011, KCDC established a new surveillance system by which syphilis and five other STI (gonorrhea, chlamydia, genital herpes simplex, condyloma acuminata, and chancroid) are managed through complete enumeration and sentinel surveillance, respectively, for systematic surveillance and analysis [12]. In addition, public health centers educate on prevention and management, develop and distribute promotional materials, provide targeted education for adolescents, soldiers, elderly, and other high-risk groups in collaboration with other departments, conduct other promotional activities, encourage examination for couples, and distribute condoms for promotion and education on STI prevention.

KCDC also publishes annual clinical guidelines on STI, including syphilis and gonorrhea. With the need for standardized national guidelines on prevention, diagnosis, and treatment of STI, a guideline on STI that is appropriate for South Korea was published in 2011 under the leadership of the government in collaboration with academic societies (Korean Association of Urogenital Tract Infection and Inflammation and others) [13]. The guideline was updated in 2016 [14].

Since syphilis has not developed penicillin resistance yet, antibiotic treatment remains very effective. However, antibiotic resistance in gonorrhea has become a serious worldwide problem. In other words, antibiotics that were previously effective are now ineffective; there is also a lack of new antibiotics. This is a disaster caused by ill-advised use of antibiotics – a problem that everyone should cooperate to solve.

REFERENCES

1. Lee SJ. Revision of the guideline on sexually transmitted infections (STIs) and prevalence survey of STIs. Korea Center for Diseases Control and Prevention, 2016. Available at: http://www.prism.go.kr/homepage/researchCommon/downloadResearchAttachFile.do?work_key=001&file_type=CPR&seq_no=001&pdf_conv_yn=Y&research_id=1351000-201500173. Accessed 03 July 2017.
2. Kim JH, Chang IH. Epidemiology of antimicrobial-resistance in sexually transmitted infections in Korea: implications for rational treatment. *Korean J UTII* 2012;7:106-20.
3. Lee H, Kim H, Kim HJ, Suh YH, Yong D, Jeong SH, Lee K, Chong Y. Increasing incidence of high-level tetracycline-resistant neisseria gonorrhoeae due to clonal spread and foreign import. *Yonsei Med J* 2016;57:350-7.
[PUBMED](#) | [CROSSREF](#)
4. Chae JY, Oh MM. Treatment of *Neisseria gonorrhoeae* in the era of multidrug resistance. *Korean J Urogenit Tract Infect Inflamm* 2015;10:12-8.
[CROSSREF](#)
5. Kim YL, Woo TH. Current status of syphilis in Korea. *Korean J Dermatol* 1970;8:31-5.
6. Lee IS. Historical changes and the present situation of sexually transmitted diseases. *J Korean Med Assoc* 2008;51:868-74.
[CROSSREF](#)
7. Korea Center for Disease Control and Prevention. Infectious diseases surveillance yearbook, 2016. Available at: http://cdc.go.kr/CDC/info/CdcKrInfo0302.jsp?menuIds=HOME001-MNU1132-MNU1138-MNU0038&fid=32&q_type=&q_value=&cid=75290&pageNum=. Accessed 9 March 2018.
8. Korea Ministry of Government Legislation. The Law on Prevention of Communicable Diseases. Ministry of Health. Rep. of Korea. 1954. Available at: [http://www.law.go.kr/법령/전염병예방법/\(00308,19540202\)](http://www.law.go.kr/법령/전염병예방법/(00308,19540202)). Accessed 31 December 2018.
9. Korea Ministry of Government Legislation. The Law on Prevention of Communicable Diseases. Ministry of Health and Social Affairs. Rep. of Korea. 1983. Available at: [http://www.law.go.kr/법령/전염병예방법/\(03662,19831220\)](http://www.law.go.kr/법령/전염병예방법/(03662,19831220)). Accessed 31 December 2018.
10. Korea Ministry of Government Legislation. Act on the Punishment of Arrangement of Commercial Sex Act. Ministry of Justice. Rep. of Korea. 2004. Available at: [http://www.law.go.kr/법령/성매매알선등행위의처벌에관한법률/\(07196,20040322\)](http://www.law.go.kr/법령/성매매알선등행위의처벌에관한법률/(07196,20040322)). Accessed 31 December 2018.
11. Korea Ministry of Government Legislation. The Law on Prevention of Communicable Diseases. Ministry of Health and Welfare. Rep. of Korea. 2010. Available at: [http://www.law.go.kr/법령/감염병의예방및관리에관한법률/\(09932,20100118\)](http://www.law.go.kr/법령/감염병의예방및관리에관한법률/(09932,20100118)). Accessed 31 December 2018.
12. Korea Center for Diseases Control and Prevention. Infectious disease portal. Available at: <http://www.cdc.go.kr/npt/biz/npp/iss/stisStatisticsMain.do>. Accessed 31 December 2018.
13. Lim DH, Lee SJ, Shim B, Kim CS, Kim ME, Cho YH. The new Korean guideline for sexually transmitted infections. *Korean J UTII* 2011;6:96-113.
14. Korea Center for Disease Control and Prevention. Korean Association of Urogenital Tract Infection and Inflammation. Sexually transmitted infection Korean treatment guidelines, 2016. Available at: <http://www.uti.or.kr/include/pdf/sexually-transmitted-infection-2016.pdf>. Accessed 31 December 2018.