Recent Trends of Syphilis Incidence in Korea

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INTRODUCTION

Venereal diseases include Syphilis, Gonorrhea, Soft chancre, Lymphogranuloma venereum, and Granuloma inguinale, all of which are transmitted by sexual contacts.

Of these venereal diseases, syphilis is the most serious disease, having the nature of chronicity, of systemic involvement from the outset, of capability of involving practically every structure in human body and of asymptomatic latency in its course, and of transmissibility to offspring in man.

It is generally believed that syphilis is brought into Europe by the crews of Columbus after returning from the West Indies. But this hypothesis is poorly supported for the lack of clear evidence.

Hackett (1963) suggested that venereal syphilis was prevalent in Africa and Europe before Columbus era. This venereal syphilis became epidemic due to the movement of armies and population during the end of 14th Century. Following this epidemic, the disease was rapidly spread throughout the non-treponemal regions of the world.

Of the historical background, syphilis was introduced into Korea from Peking of China between 1506 and 1521 (Miki 1955).

During the World War II the incidence of syphilitic infection showed epidemic peak. However, after the introduction of penicillin by Mahoney et al. in 1943 for syphilis therapy, syphilis epidemic was sharply decreased throughout the world.

In recent reports (Fiumara 1962, Beerman et al. 1962, WHO 1963, Idafe and Guthe 1967), apparent increases in incidence of infectious syphilis since around 1956—1959 have been emphasized in the various countries, although there has been observed individual variations in each nation.

In Korea, current status of incidence of syphilitic infection could hardly be assessed accurately, because of that there are no reports of confident statistical data. However, recent reports (Suh et al. 1965, Kim et al. 1965, Park et al. 1965, Yang et al. 1966, Kim et al. 1968, Hankook Ilbo 1968) on syphilis highly indicate that syphilitic infection is gradually increasing in Korea since around 1962—1963.

In this study, we attempted to assess variations and to visualize the recent trends in the incidence of syphilitic infection in Korea based on the data reported recently.

INCIDENCE VARIATION

In foreign countries, syphilis is notifiable in 57 per cent of 126 countries throughout the world, and the recent increase in the annual incidence of early syphilis apparently commenced around
1956 to 1959 and has continued with some individual variation (Idäpä and Guthe 1967).

WHO study report (1964), made on trends in syphilis from 1945 to 1950 and from 1950 to 1960, showed that in 76 (72.4%) out of 185 countries and areas a persisted rising incidence of syphilis followed all-time low about 1955.

Accumulated reports (Suh et al. 1965, Park et al. 1965, Kim et al. 1968, Hankook Ilbo 1968) showed that the incidence of infectious early syphilis patients has also been increasing in Korea since 1962.

The incidence of syphilitic infection will be reviewed in categories of prostitutes, pregnant women, reported cases from OPD, and normal healthy groups.

A. Prostitutes

From the foregoing, the informations on the frequency of syphilis in the prostitute-group are based on the results of the STS. By these data, it may not present the true incidence of syphilis, but this will provide certain valuable indicator of trends in syphilis.

Before the World War II, prostitution was regarded as a major source of syphilitic infection in developed countries. But now in those countries, it was changed, although in the new sense "bread-and-butter" prostitution remains in the developed countries (Idäpä and Guthe 1967).

However, in Korea, prostitution is not only a major source of syphilis but also other venereal diseases. Public Health and Social Statistics (1966) on the result of V.D. examination for entertainers (Prostitute, Harlot, Entertainer and Dancer) are shown in Table 1.

The statistics indicate that there occurred a persisted decrease in the number of syphilis among entertainers since 1947 until 1962, and then followed a gradual increase in syphilis incidence among them.

On serological studies of syphilis among prostitutes, only limited numbers of report are available which are shown in Table 2.

The incidence of syphilis among prostitutes

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of examined</th>
<th>No. of syphilis pts.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>48,838</td>
<td>3,180</td>
<td>6.5</td>
</tr>
<tr>
<td>1960</td>
<td>33,015</td>
<td>1,646</td>
<td>4.9</td>
</tr>
<tr>
<td>1961</td>
<td>31,203</td>
<td>1,273</td>
<td>4.1</td>
</tr>
<tr>
<td>1962</td>
<td>35,682</td>
<td>861</td>
<td>2.4</td>
</tr>
<tr>
<td>1963</td>
<td>44,958</td>
<td>1,472</td>
<td>3.3</td>
</tr>
<tr>
<td>1964</td>
<td>48,211</td>
<td>2,259</td>
<td>4.7</td>
</tr>
<tr>
<td>1965</td>
<td>45,723</td>
<td>3,230</td>
<td>7.0</td>
</tr>
<tr>
<td>1966</td>
<td>58,464</td>
<td>5,696</td>
<td>9.7</td>
</tr>
</tbody>
</table>

*Year Book of Public Health and Social Statistics, 1966

<table>
<thead>
<tr>
<th>Year</th>
<th>Area</th>
<th>No. of prostitutes examined</th>
<th>No. of reactive cases*</th>
<th>Percentage</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>Pusan</td>
<td>511</td>
<td>33.5</td>
<td></td>
<td>Yang et al. 1966</td>
</tr>
<tr>
<td>1959</td>
<td>Seoul</td>
<td>382</td>
<td>71</td>
<td>18.6</td>
<td>Lyo 1961</td>
</tr>
<tr>
<td></td>
<td>Moonsan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dongduchon</td>
<td>1,078</td>
<td>172</td>
<td>16.0</td>
<td>Kim and Lew 1963</td>
</tr>
<tr>
<td>1962</td>
<td>Seoul</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taegu</td>
<td>1,057</td>
<td>171</td>
<td>16.2</td>
<td>Choi and Suh 1965</td>
</tr>
<tr>
<td>1963</td>
<td>Pusan</td>
<td>532</td>
<td>56</td>
<td>10.5</td>
<td>Moon 1964</td>
</tr>
<tr>
<td></td>
<td>Pohang</td>
<td>600</td>
<td>54</td>
<td>9.0</td>
<td>Rhee 1964</td>
</tr>
<tr>
<td>1964</td>
<td>Seoul</td>
<td>504</td>
<td>124</td>
<td>24.6</td>
<td>Yang et al. 1966</td>
</tr>
<tr>
<td>1965</td>
<td>Pusan</td>
<td>206</td>
<td>69</td>
<td>33.5</td>
<td>Kim et al. 1968</td>
</tr>
<tr>
<td></td>
<td>Wonju</td>
<td>553</td>
<td>142</td>
<td>25.7</td>
<td>Yang et al. 1967</td>
</tr>
</tbody>
</table>

*Reactive to the VDRL test.
before 1964 were 18.6% in 1959 (Lyo 1961), 16.0% in 1962 (Kim and Lew 1963), 16.1% in 1963 (Choi and Suh 1965), and 10.6% in 1963 (Moon 1964), and 9.0% in 1964 (Rhee 1964). However, the figures sharply increased to 24.6% in 1965 (Yang et al. 1966) and 33.5% in 1965 (Kim et al. 1968) and 25.7% in 1966 (Yang et al. 1967).

By Public Health and Social Statistics (1966), the increase in the incidence of syphilis among entertainers has occurred since 1963, but the data of serological studies on prostitutes indicate that there occurred an apparent increase in the incidence of syphilis since 1965.

In comparison with the data obtained in other countries, (Doges 1960, Idsoe and Guthe 1967, USPHS 1963) the beginning of rising incidence of syphilis in Korea appears to be delayed for about 5 years.

B. Pregnant Women

It is well known that syphilis in pregnancy is very much threatening because of that it causes injury both to mother and to fetus.

Since 1950, the incidence of congenital syphilis has fallen, although variations in percentage had occurred. But the fall has levelled off since 1960 and a certain percentage of the congenital syphilis is still continued in some countries (Idsoe and Guthe 1967). In developed countries, certain proportions of pregnant women show sero-reactor rates of syphilis.

In Korea, there are scanty reports on the incidence and pattern of syphilis in pregnant women (Lee and Rho 1961, Song 1963, Yang et al. 1967).

Studies made at Severance Hospital from 1959 to 1966 show that the sero-reactor rates by syphilis in pregnant women have been continuously increasing since 1963 (Table 3).

Compared with the sero-reactor rates in developed countries (Idsoe and Guthe 1967), it appears that there is a very high reactive rate of syphilis in Korean pregnant women.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. examined</th>
<th>Percentage reactive</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>277</td>
<td>1.4</td>
<td>Lee and Rho 1961</td>
</tr>
<tr>
<td>1960</td>
<td>1,389</td>
<td>1.1</td>
<td>Song 1963</td>
</tr>
<tr>
<td>1962</td>
<td>441</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>643</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td>515</td>
<td>4.8</td>
<td>Yang et al. 1967</td>
</tr>
<tr>
<td>1965</td>
<td>544</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>1966, 6</td>
<td>330</td>
<td>6.9</td>
<td></td>
</tr>
</tbody>
</table>

C. Reported Cases from OPD

The data of reported cases from OPD of Hospitals (Park et al. 1965, Suh et al. 1965, Yang et al. 1965, Kim et al. 1965) indicate that the recent rising incidence of syphilis patients apparently commenced around 1963 (Table 4.)

Yang et al. (1965) observed that the percent

<table>
<thead>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yang et al. 1965 (Navy Hospital)</td>
<td>2.34*</td>
<td>0.2</td>
<td>0.32</td>
<td>0.25</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Park et al. 1965 (Catholic Medical Center)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kim et al. 1965 (Severance Hospital)</td>
<td></td>
<td></td>
<td></td>
<td>0.94</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td>Suh et al. 1965 (Kyungpook Univ. Hospital)</td>
<td></td>
<td></td>
<td>0.22</td>
<td></td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

*Percentage of syphilis patients diagnosed.
**(Number diagnosed/Number of OPD pts.)
#Numbers of syphilis patients diagnosed.
range of syphilis among the OPD patients of Dermatology section at the Naval Hospital was 0.24%–0.32% in 1960–1962 and 3.7% in 1963. Kim et al. (1965) reported that at Severance Hospital percent range of syphilis patient was 0.22% in 1962 and it rose to 1.34% in 1963 and to 2.76% in 1964.

Though similar serological studies in other groups are lacking, these follow-up studies suggest the continuous rising rate of syphilis in Korea since 1963.

On the bases of the data from the OPD patients at their Hospitals, it was suggested by Suh et al. (1965) and Park et al. (1965) that in recent years infectious early syphilis has been gradually increasing since around 1963–1964.

D. Normal Healthy Groups

Although the sampling groups in their studies were different, the reports on the sero-reactor rates in healthy groups showed high incidence of syphilis. (Kim and Lew 1963, 1965c; Rhee 1964, Kim et al. 1965, Kim et al. 1967, Woo et al. 1967).

In the serologic study of Korean young healthy athletes in 1962, Kim and Lew (1963) observed that 7.4% of 337 were reactive to the VDRL test, and 1.5% of 337 reactive to the RPCF test. Similar study by Kim and Lew (1965b, 1965c) showed that 1.4% of 1,779 high-school graduates were reactive in STS and 4.7% of 611 youth reactive in 1965.

The serologic surveies on Army and Air Forces personnel showed that 3.4% were reactive in Army (Woo et al. 1967) and 4.6% of sero-reactor rates in Air Forces (Koh et al. 1966). In 1966 a mass survey of syphilis has been carried out in the Korean Service Corps (Kim et al. 1967), and the result showed that 10.9% of 2,010 were reactive to the VDRL test and 5.7% reactive to the RPCF test.

In the leprosy patients group, the sero-reactor rates showed very high incidence of that 18.7% and 6.9% were reactive to the RPCF test (Kim and Lew 1963, 1965a) and 9.0% reactive to the RPCF test (Rhee 1964).

Table 5. Results of STS in normal healthy groups

<table>
<thead>
<tr>
<th>Year</th>
<th>No. examined</th>
<th>No. of reactive cases</th>
<th>Percentage</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>337</td>
<td>25</td>
<td>7.4</td>
<td>Kim and Lew 1963a</td>
</tr>
<tr>
<td>1963</td>
<td>824</td>
<td>52</td>
<td>6.3</td>
<td>Rhee 1964</td>
</tr>
<tr>
<td>1965</td>
<td>1,580</td>
<td>44</td>
<td>2.8</td>
<td>Kim et al. 1965</td>
</tr>
<tr>
<td></td>
<td>1,779</td>
<td>24</td>
<td>1.4</td>
<td>Kim and Lew 1965c</td>
</tr>
<tr>
<td>1966</td>
<td>1,337</td>
<td>70</td>
<td>4.6</td>
<td>Koh et al. 1966</td>
</tr>
<tr>
<td></td>
<td>4,648</td>
<td>163</td>
<td>3.4</td>
<td>Woo et al. 1967</td>
</tr>
<tr>
<td></td>
<td>2,010</td>
<td>222</td>
<td>10.9</td>
<td>Kim et al. 1967</td>
</tr>
</tbody>
</table>

Though the percentages are lower than those reported in other countries (Edmundson et al. 1954, Ruge 1955, Ruge et al. 1960), these significantly high sero-reactive (to RPCF) percentages in leprosy patients group indicated the occurrence of higher incidence of syphilis among them than in other groups.

From the foregoing data on the incidence of syphilitic infection in the various groups, though there existed some variations in each group, it is assumed that syphilis incidence has apparently increased in recent years in Korea.

SOURCES OF INFECTION

It is well accepted that the spread of venereal disease is closely related to the environmental factors such as social, economic, behavioural and etc. It was also shown by many investigators that periodic recurrence of early syphilis is associated with war and economy (Gjessing 1956, Idsøe and Gutihe 1967).

The introduction of penicillin therapy for syphilis by Mahoney et al. has surely contributed to decline the syphilis incidence throughout the world since 1943.

It has been suggested that the wide use and abuse of penicillin for various medical conditions has contributed to prevent the incubating syphilis patients among the large
population.

The effectiveness of penicillin therapy for syphilis, together with early use of penicillin for other infections reduced the consequence of syphilis in one hand. However, it resulted in indifference of the public to the risk of the venereal diseases infection on the other hand, and penicillin did not prevent the recurrence of the syphilis which has occurred since around 1956-7 even though there is no evidence that penicillin resistant Treponema pallidum has occurred.

Along with the increased production of penicillin since 1955, the production and the general use of other broadspectrum non-treponemical antibiotics have also become greater since 1955 in the U.S.A (Ida & Gutter 1967).

It is probable that the use of penicillin has become more selective since 1956-7. Ida (1967) suggested that the diminishing of this preventive effect of penicillin may have been one of the causes of recurrence of syphilis.

At the same time, morality and behavioural changes in younger age group may have caused the increasing incidence of syphilis after World War II.

Before the World War II, in the developed countries, prostitution was a major source of the spread of the venereal diseases. But, after the War it has been changed in developed countries. However, in the developing countries the prostitution remains as a major source of syphilis and other venereal diseases in man.

In Korea, also, prostitution is a major source of the venereal diseases. Whereas in recent year, this feature is gradually changing. After the War, the surging of the cultures of developed countries flowed into Korea, and following the improvement of socioeconomic conditions, industrialization, female emancipation, and the breaking-up of old social patterns have become increasingly important factors in the spread of venereal diseases and other communicable diseases.

Analysis made on the source of the infection in male syphilis patients revealed that 90% were in prostitutes and entertainers, and 5% in housewives and unmarried girls (Park et al 1965). Suh et al. (1965) also reported that major source of infection in male syphilitic patients was prostitutes (74%).

In contrast to those high percentages of syphilis infection in male through contact with prostitutes and entertainers, the report by Kim et al. (1965) showed that 22.2% had contact with prostitutes, 22.2% with business girls, 27.7% with female students and 27.7% with others.

From these data, it is suggested that also in Korea the source of venereal infection is gradually spread into the general public as in the developed countries.

Though homosexuality has been emphasized as one of the cause of the increasing syphilis in the developed countries (Beerman 1962), the data on the extent of homosexuality and its role in the spread of syphilis infection is not available in Korea.

METHODS OF SEROLOGIC TESTS FOR SYPHILIS

There are many kinds of serological test for the diagnosis of syphilis since that Wassermann et al. (1906) developed a serologic test for syphilis using a complement fixation procedure and cardiolipin antigen.

Some of these tests are so complex to be restricted to routine serologic laboratories.

Among the all serologic tests for the diagnosis of syphilis reported since Wassermann et al. (1906) TPI test which has a high specificity of 93.7 to 100 percent (Berner et al. 1960) is most valuable and confident.

But this TPI test has various disadvantages such as the complexity of procedure, the great amount of time and expense involved, and the difficulty in obtaining the antigen.
For these reasons, Carpenter et al. (1960) reported a “Triple-Test Plan” for more accurate serological diagnosis of syphilis, in which VDRL test is used for screening in routine tests, and RPCF and TPI tests are used for the confirmation.

In most of the laboratories and research institutes for syphilis in Korea, nontreponemal tests such as VDRL, RPR card, Kolmer CF have been generally employed as shown in Table 6.

Table 6. Serological tests for syphilis applied by reporters

<table>
<thead>
<tr>
<th>Tests used</th>
<th>No. of reporters</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDRL</td>
<td>18</td>
</tr>
<tr>
<td>RPR card</td>
<td>4</td>
</tr>
<tr>
<td>Kolmer CF</td>
<td>11</td>
</tr>
<tr>
<td>RPCF</td>
<td>10</td>
</tr>
</tbody>
</table>

*A total of 18 published data are available.

Although these non-treponemal tests are highly sensitive in early stage of syphilis infection, they have low specificities, that is to say, high BFP rates.

As a simplified measure to exclude false positive and false negative in STS and to circumvent the shortage of omitting TPI test, Kim and Lew (1963) has devised a new test plan for the serologic diagnosis of syphilis in Korea.

Recently, FTA (Deacon et al. 1957) and TPHA (Rathlev 1967) have been introduced in STS, and, according to most published reports, the specificity and sensitivity compare favorably with TPI test for syphilis, and these methods could be performed without much difficulties at the University Hospitals or at the similar institutes. By incorporation of FTA and TPHA techniques the triple-test plan by Carpenter et al. or the new test plan by Kim and Lew will be reinforced and it will provide quite a confident data on the incidence of syphilitic infection in Korea.

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SUMMARY

In efforts to assess variations and to visualize the recent trends in the incidence of syphilitic infection in Korea, reported data were reviewed and analyzed in the categories of incidence variation, source of infection, and methods of STS. The results are summarized as follows:

1. It is recognized that the syphilis incidence in Korea has been increased since around 1963-1965 in parallel with the world trends, though only limited numbers of report are available for accurate and confident analysis.

2. Analysis indicates that prostitution is still a major source of male syphilis infection in Korea. However, there is some evidence to suggest that this feature has been changing recently and the source of the infection is gradually spreading into the general public as in the developed foreign countries.

3. Nontreponemal tests such as VDRL, RPR card, and Kolmer complement fixation have been exclusively used in most of laboratories and research institutes in Korea for serologic diagnosis of syphilis.

It is strongly recommended that more accurate treponemal tests such as RPCF, FTA, TPHA, TPI and etc have to be included in STS in order to perform exact diagnosis of syphilis and to obtain more confident prevalence rate of syphilis in Korea.

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RECENT TRENDS OF SYPHILIS INCIDENCE IN KOREA


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