

# Socio-demographic Factors Influencing Tuberculosis Transmission

Sung Kwan Lee, Paul K. Mills

*Department of Preventive Medicine and Public Health, School of Medicine, Kyung-pook University*

## I. INTRODUCTION

Although the Korean national government has had a national tuberculosis control program in operation since 1961 the prevalence rate of tuberculosis remains 3.3%.

This investigation was initiated in an effort to study the effect of various socio-economic factors on the transmission of tuberculosis in rural Korean villages. Two villages in a representative rural area were selected as sites for the investigation.

In particular, the tuberculosis prevalence rate within family units was studied to determine whether the prevalence rates were higher within particular family units or not. In rural Korean villages the extended family (i.e. more than two generations living the same household) is the predominant family type and contact between members of the same family clan living the same village is frequent. In this investigation an effort was made to determine the effect, if any, of these types of living conditions and this type of family system on the transmission of tuberculosis.

## II. MATERIALS and METHODS

### Study area:

The two villages, San-jun and Kum-

kock, are selected as study areas which are located in Kyung-san county, Namchun township. The villages were closely matched for major demographic variables. Both villages have a population of approximately six hundred with comparable age and sex distribution.

Present status of tuberculosis in the both areas:

At the time this investigation began, the mortality rate from tuberculosis was 69/100,000 population. Previous workers in this area Hong (1974), and Lee (1974) have noted that only one out of eight tuberculosis patients are registered in the health center and even when the patients are registered management is so poor that rate of completion of treatment is usually only 28% and that fully 50% of the discharged patients have active disease at time of discharge.

In January 1976, in the village of San-jun, there were 18 presently registered patients and 9 discharged patients still living in the village (total of 27). In the village of Kum-kock, however, there were only 2 presently registered patients and 7 discharged patients (total of 9). Thus we assumed at this time the prevalence rate would be higher in San-jun and that certain factors may be operative here which would be absent in Kum-kock.

### Study methods:

The investigation of the tuberculosis situation in the two villages was begun on Feb. 23, 1976. The investigation consisted of two phases: tuberculin testing and X-Ray examination.

Tuberculin testing was done by the Mantoux method using I. T. U. of purified protein derivative (0.002mg. PPD).

In the village of San-jun a total of 548 persons were tested which is 85.6% of the resident population. They were examined for the tuberculin reactions after the appropriate time lapse of 48 to 72 hours. A total of 428 (82% of the objective population) received chest X-Ray.

In the village of Kum-kock 459 persons (83%) received tuberculin testing. Among the objective population 390 persons (86%) received chest X-Ray.

### III. RESULTS

In San-jun 348 out of 548 persons reacted positively to the PPD testing, showing a tuberculin positive rate of 63.5% for that village. This is approximately the same as the national rate.

In Kum-kock 237 out of 459 persons reacted positively, a rate of 51.6%, which is somewhat lower than in San-jun (Table 1).

As PPD reactions were recorded, record was also kept of those persons having a BCG scar on their shoulder. In San-jun only 22.5% had received BCG vaccination while in Kum-kock the rate of BCG vaccination was 35.2%.

The natural infection rate of those under 14 years (those children with no BCG scar who had positive reactions) was quite high

**Table 1.** Positive rate of tuberculin test

Area		San-jun	Kum-kock	
Objective pop.		640	555	
Responded pop.		548 (85.6%)	459 (82.7%)	
Total positive		348 (63.5%)	237 (51.6%)	
By age groups	No. of examined	Pos. rate	No. of examined	Positive rate
0-4	48	8	31	17
5-9	85	40	59	12
10-14	74	49	59	32
15-19	54	82	58	71
20-24	26	50	34	60
25-29	29	92	29	75
30-34	25	71	22	54
35-39	44	79	26	50
40-44	28	87	31	82
45-49	29	86	28	56
50-54	19	88	19	42
55-59	26	90	22	89
60+	61	80	41	88
Total	548	64	459	52

**Table 2.** Natural positive rate of those under 14 years of age

Area	Examined	Positive
San-jun	77	15 (19.5%)
Kum-kock	18	0

in San-jun. A total of 15 out of 77 or 19.5% were naturally infected in that village. In Kum-kock the natural infection rate of those under 14 was 0% (Table 2).

The prevalence rate of active tuberculosis in San-jun is 6.1%, which as we expected was much higher than it was in Kum-kock where it is only 2.1% (Table 3).

The results of X-Ray examination revealed an interesting pattern of disease among family groups. At the time of X-Ray each person was asked to give his or her family

**Table 3.** Prevalence rate of tuberculosis

Area		San-jun		Kum-kock	
Objective pop. (Aged 5 or more)		521		455	
Respondents		428 (82.2%)		390 (85.7%)	
Positive		26 (6.1%)		8 (2.1%)	
By age group	Examined	Positive rate	Examined	Positive rate	
5-9	62	2(3%)	56	0	
10-14	61	2(3%)	53	1(2%)	
15-19	54	1(2%)	50	0	
20-24	20	2(10%)	27	0	
25-29	29	2(6%)	29	1(3%)	
30-34	23	0	22	0	
35-39	31	2(6%)	26	0	
40-44	28	1(3%)	31	2(7%)	
45-49	29	2(6%)	23	0	
50-54	19	1(5%)	19	0	
55-59	21	3(14%)	19	0	
60+	51	8(16%)	35	4(11.4%)	
Total	428	26(6.1%)	390	8(2.1%)	

**Table 4.** Tuberculosis prevalence by family name in San-O

	Choi	Sohn	Others	Total
No. examined	80	143	200	428
Active	8(10%)	11(7.4%)	7(3.5%)	26(6.1%)
Suspect	0	9(6.1%)	3(1.5%)	12(2.8%)
Pleural adhesion	0	0	3(1.5%)	3(0.7%)
Calcification	0	3(2.0%)	2(1.0%)	5(1.2%)
Inactive	0	1(0.7%)	3(1.5%)	4(0.9%)
Activity undeter	2(2.5%)	0	0	2(0.5%)
Total	10(12.5%)	24(16.2%)	19(9.0%)	52(12.1%)

name, that is, the name of the head of that particular household. The results show that certain families display a much

**Table 5.** Tuberculosis prevalence by family name in Kum-O

	Suk	Han	Others	Total
No. examined	105	78	207	390
Active	4(3.8%)	3(3.8%)	1(0.5%)	8(2.1%)
Suspect	2(1.9%)	2(2.6%)	2(1.0%)	6(1.5%)
Pleural adhesion	1(1.0%)	0	1(0.5%)	2(0.5%)
Calcification	0	0	1(0.5%)	1(0.3%)
Inactive	0	0	0	0
Activity undeter	1(1.0%)	0	0	1(0.3%)
Total	8(7.6%)	5(6.4%)	5(2.4%)	18(4.6%)

higher prevalence rate of tuberculosis than do other families. Foreexample, in San-jun, 14.3% of all the members of the Choi family showed some type of abnormality on their X-Ray. (Abnormality is defined as active disease, suspect, pleural adhesion, calcification, inactive or activity undetermined). Fully 13% those family members had active disease. The Sohn family likewise had a very high rate of abnormality (17%) and active disease (9%). On the contrary all the members of other family units combined had an abnormality rate of only 8.3% and an active case rate of only 3.5% (Table 4).

If you remember, for this village the total active case rate was very high, 6.4% of all those having X-Rays.

In the village of Kum-kock a similar pattern was observed. Those individuals belonging to the Suk family showed an abnormal rate of 10% and an active case rate of 5%. The Han family members had an abnormal X-Ray rate of 5.7% and an active case rate of 4%. All other families combined has an abnormal rate of 2.4% and an active case rate of only 0.5%. The

total active case rate for Kum-kock was only 2.1% which is lower than the national rate (Table 5).

#### IV. DISCUSSION

The results of this investigation reveal two interesting points. The first is that although the two villages studied are very similar in demographic, geographic and other characteristics, a very different situation exists in tuberculosis prevalence. As seen in Tables 1, 2 and 3, the tuberculin positive rate, the natural infection rate and the active case rate are all much higher in San-jun than in Kum-kock. A possible explanation for this phenomenon is that in the village of San-jun there are two individuals who have frequent and continuous contact with many members of the community. Both of these individuals are sputum positive individuals (As revealed by direct smear). Also these two individuals in the past have refused to be registered as T.B patients in the county health center and have refused to accept any treatment for the disease.

In addition one of these individuals has frequent contact with young mothers and children in San-jun. Another individual who has frequent contact with community and who is a tuberculosis patient is the village barber. His closed humid shop provides a perfect environment for the transmission of the tubercle bacillus. Neither of these situations prevails in Kum-kock where all indices of tuberculosis are much lower.

The second interesting point is that the distribution of tuberculosis in both villages follows a familial pattern. That is, the prevalence rate of tuberculosis is much high-

er within certain families than it is within other families. An explanation of this phenomenon may be that the village may be aware of the infectious nature of the disease and thus avoid contact with individuals outside their own family as possible. Yet they still must live in close physical proximity to members of their own family. This enhances the spread of disease within family units. In San-jun 7 out of 41 households with tuberculosis patients have two or more patients.

#### V. CONCLUSIONS

Mass tuberculin testing in two rural Korean villages showed a much higher infection rate by tuberculosis in one of the villages even though both villages are very similar. Various reasons for this situation have been noted including the fact that influential community members who have frequent contact with many villages are open tuberculosis patients. In the future it is recommended that control activities concentrate on such individuals and that strenuous efforts be made to convert them to sputum to sputum negative at the earliest possible date.

X-Ray screening in the two villages showed a distinctive familial pattern in both villages under study. Certain family units were shown to have much higher active case rates than other family units. Therefore it is our conviction that in the future tuberculosis control programs in Korea direct their control activities towards those family units which display higher prevalence rates.

## REFERENCES

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