Chapter 5

Conclusions and Discussion

The study of characteristics of pulmonary TB patients and HIV infection was performed in Zonal TB Center 11, Nakhon Si Thammarat using an analytical cross-sectional design. The data were collected from medical records and HIV serosurveillance during November 1, 1994 to September 20, 1998. The aims of this study were to investigate the characteristics of disease between HIV status and the determinants of interest and developed model to discriminate HIV infection. Thus, we obtained a sample of 1,080 subjects divided into two groups : TB patients without HIV infection 956 cases (88.52%) and those with HIV infection 124 cases (11.48%).

Conclusions

Most of subjects were males (81.02%) and 18.98% of females. Married group was found to be 76.52% and single group was 13.87%. The preliminary data analysis based on Pearson's chi-squared test and 95% confidence of odds ratios, we found that age, marital status, occupation, haemoptysis, fever, weakness, weight loss and chest x-ray findings were associated with HIV infection. After adjusted for confounding factors using Mantel-Haenszel adjusted odds ratio, the marital status and fever were not statistically significant. Thus, in the univariate analysis, we found age, occupation, haemoptysis, weakness, weight loss and chest x-ray findings were associated with HIV infection in pulmonary TB patients.

In the multivariate analysis, after adjusted for confounding factors by using multiple logistic regression, it was found that age, occupation, haemoptysis, weakness, weight loss, other symptoms and chest x-ray findings were associated with HIV infection in pulmonary TB patient. The other symptoms were not significant in

the univariate analysis after adjusted for age. The association might be diluted by other factors. The factors positively associated with HIV infection included age, occupation, weakness and weight loss whereas the haemoptysis, other symptoms and chest x-ray findings are found to be negatively associated with HIV infection. We concluded that age, occupation, weakness and weight loss were the risk factors of HIV infection.

These significant variables were used to assess the probability of HIV infection. The modeled estimates of these measures were derived from the regression coefficients (Figure 4.8) to give expressions for the probability of HIV infection as shown.

$$P = \frac{1}{1+\exp[2.74-1.15X_1-1.57X_2-0.73X_3+1.13X_4-1.05X_5-0.61X_6+0.77X_7+0.71X_8]}$$

where X_1 = (age <30 yrs.), X_2 = (age 30-39 yrs.), X_3 = (not agriculture worker),
X_4 = (presence of haemoptysis), X_5 = (presence of weakness),
X_6 = (presence of weight loss), X_7 = (presence of other symptoms),
X_8 = (chest x-ray with cavity)

This model provides a simplified interpretation for the probability of HIV infection. Thus, we can use this model as a screening test to discriminate HIV infection in pulmonary TB patients.

Discussion

The demographic factors associated with HIV infection included age and occupation. It was found that age group of < 40 years has a higher risk of HIV infection than > 40 years group. This association is consistent with the study of Hussain (1995) that revealed a significant relationship between HIV seropositivity iÿ TB patients with 25-44 years of age group. Similarly, results of Taweepvoradaj (1996) and Akksilp (1995) study showed that the highest prevalence of HIV infection in TB patients were in the age group of 20-39 and 21-30 years, respectively. In this study, being a wage earner (including employee and employee as labourer) was statistically

associated with TB patients with and without HIV infection, whereas the study of Hussain (1995) had reported this association only among employees as labourers.

The relationships between HIV status and disease characteristics, including haemoptysis, weakness, weight loss, other symptoms and chest x-ray findings were statistically significant. Furthermore, weakness and weight loss were found to have risk factors of getting HIV infection among TB patients. Whereas haemoptysis, other symptoms and chest x-ray findings had a negative association with HIV infection among TB patients. Most of these findings are consistent with the results reported by Al-Ghazzi (1995), except that weakness had insufficient evidence to show the relationship in the Al-Ghazzi report. This difference may be due to the stage of HIV infection and delay of treatment in TB patient.

The other symptoms (such as anorexia, sleeplessness and anxiety) were observed in TB patients without HIV infection. These symptoms are commonly found in the elderly, corresponding to the mean age of the comparison group (47 years) was higher than the study group (39 years) as shown in the upper Figure 3.1 and 3.2 respectively.

Note that the chest x-ray finding in cavity group is negatively related to HIV infection. It implies that the cavitary is commonly found in TB patients without HIV infection, and TB patients with HIV infection have a higher risk of non-cavity and miliary than the HIV seronegative group. This finding is consistent with the report of Veerapand (1997), that chest x-ray findings were found to rely on HIV infected stage or the levels of cellular mediated immunity (CMI). The atypical form commonly appeared in the patients who have low resistance. The typical form was found in the patients who have slightly low resistance. In addition, the cavitary was found to occur from interaction of hypersensitivity of cell-mediated immunity (CMI). When HIV infected, it reduces the CMI, so the cavitary lesions are rare. From Table 1.1 the early stage of HIV infection often has cavities and the late stage often infiltrates with no cavities. In this case, it might be possible that most TB patients with HIV infection came to see the doctor in the late stage or had delayed treatment. It might thus be implied that HIV infection occurred before tuberculli. Once the patient was infected with HIV, it reduced CMI, so the patient had opportunistic infection with *M.*

tuberculosis. Moreover, patients with cavitary tuberculosis have persistent coughing and may have haemoptysis. Thus, the negative association between haemoptysis and HIV status is reasonable. However, a further prospective study should be considered to strengthen the relationship between chest x-ray findings and HIV infection among pulmonary TB patient.

Loss of body weight was clearly found in late stage of HIV infection. This result supports the association of chest x-ray findings and HIV infection that TB patients with HIV infected came to see the doctor in the late stage or had delayed treatment.

In the statistical analysis we have reversed the outcomes and the determinants. Thus, HIV status determines the demographics and disease characteristic factors including *age, occupation, haemoptysis, weakness, weight loss, other symptoms and chest x-ray findings*. We obtained the model from these variables as a characteristic diagnostic test. Further research is needed to strengthen these variables for a variety of demographic factors and disease characteristics of pulmonary TB patients to discriminate the probability of HIV infection.

Limitations

Since the data for this study were collected from medical records, the disadvantages and limitations for this study must be considered. Incomplete information of medical records caused a lot of missing values. The disadvantages of using secondary data are lack of information of some variables, for instance, drug sensitivity test.

Most of missing data on demographic factors was derived from the patients who came from other provinces and were referred to their provinces. The researcher could not followings because of the limitation of time, and it consumes a lot of money.

The "none" symptoms of cough, chest pain, dyspnea and fever were grouped into the "low levels" of each symptom, because they are not different between the "none" and the "low levels" except chest pain. However, these variables were not

found to be associated with HIV status among TB patients in the univariate and multivariate analyses.

Recommendations

HIV infection among TB patients is determined by demographic factors and disease characteristics, such as age, occupation, haemoptysis, weakness, weight loss, other symptoms and chest x-ray findings. We would like to document the advantages of this study. The model of probability of HIV infection could be used as a characteristic-screening test to discriminate HIV infection in pulmonary TB patients for physician decision making to be confirmed in the laboratory. In addition, it is useful for planning of treatment and health care. Also, the model can be used to evaluate HIV infection in pulmonary TB patients in other areas that has similar epidemic. The different epidemic areas should be considered for the variety of demographic factors of pulmonary TB patients.

Further study should be a follow up study that can obtain complete data and variables of interest, especially drug sensitivity test. The effectiveness of treatment and various factors such as drug resistance should be investigated in pulmonary TB patients with and without HIV infection. Moreover, survival time and quality of life should also be considered.