CHAPTER II

REVIEW OF RELATED LITERATURE

The present study was related to TB in the following areas:

2.1 General Knowledge about Tuberculosis

Causes

TB is caused by *Mycobacterium tuberculosis*, discovered by Robert Koch in 1882. Mycobacteria can be divided into 3 groups: mycobacterium complex, non-tuberculosis mycobacterium (NTM) and *Mycobacterium leprae*. TB belongs to the *M. tuberculosis* complex. There are 2 methods for definitely detecting TB: acid-fast staining and inoculation for culture.

Types of TB

TB in humans can be classified into 2 groups, based on the sites of involvement:

1. Pulmonary TB. TB can occur at any side of the lungs or both sides. About 80% of TB involve the lung and cause great public health concerns at present due to air-borne transmission.

2. Extra-pulmonary TB. This can infect any organ other than the lungs e.g. pleura, lymph nodes, abdomen, genitor-urinary tract, skin, joints and bones.

Disease Transmission (Ministry of Public Health, 1998)

Pathogenic bacteria can be transmitted from the lungs of patients when coughing, sneezing or spitting. The pathogens pass out with the discharge, or droplet nuclei as small as 1-5 microns. Then they are inhaled until they reach the alveoli and establish themselves there, which is known as the primary focus. Then, the pathogenic bacteria undergo cell division and spread to the lymph glands at the bronchi, causing lymph den it is, and infection takes place. However, only 10% of TB-infected people can become reactivated and get sick. Symptoms of active TB can be observed within a few months or 20-30 years later.

Symptoms (Journal of TB, 1996)

The frequent symptoms are coughing, which can last for 3 weeks. Fever, particularly, at nighttime, hemoptysis and green or yellow sputum can be observed. In severe cases, patients can have a flu-like symptoms, usually occurring in the afternoon, evening or at night;, weight loss, anorexia, tiredness, pains in the breast and difficulty breathing.

TB Control (Guidelines for National Program, 2003)

The main strategy for controlling TB is directly observed treatment short course, or DOTS.

The minor strategies include:

1. BCG vaccine

2. Preventive therapy

3. Preventive measures in hospitals and health centers

Diagnosis (Ministry of Public Health, 1998)

The following procedures are used for the diagnosis of the smear-positive pulmonary TB:

1. At least two initial sputum smears for AFB (direct smear microscopy) or

2. One sputum examination for AFB with radiographic abnormalities compatible with TB or

3. One sputum specimen for AFB and culture-positive for *M. tuberculosis*

The procedures for diagnosis of smear negative pulmonary TB are:

1. At least 3 sputum smears negative for AFB and radiographic abnormalities not compatible with active pulmonary TB, and decision made by a clinician to treat the patient with a full course of anti-TB therapy.

2. Laboratory result shows positive culture for *M. tuberculosis* but sputum examination for AFB staining is negative.

TB Registration (Ministry of Public Health, 1998)

1. *New cases* refers to new patients who have never had treatment for TB or those who have taken anti-TB drugs for less than 1 month.

2. *Relapse cases* refers to patients previously declared cured but who later develop a new episode of smear-positive or culture-positive for TB.

3. *Failure cases* refers to patients with persistent smear-positive sputum after 5months' treatment, or who have a new smear-positive sputum examination again in the fifth month after treatment, or TB cases with a smear-negative

sputum examination when registered, or extra pulmonary TB cases but the sputum smear for AFB becomes positive after 2 months of treatment.

4. *Treatment after default cases* refers to patients who do not collect drugs for 2 months or more at any time after registration and return for treatment again.

5. *Transfer in cases* refers to patients who are transferred from healthcare units to continue their treatment at other healthcare units.

6. *Other cases* refers to patients who are not categorized in any of the abovementioned categories, for example, patients having tuberculosis treatment at private healthcare units for more than 4 weeks, or patients detected by a doctor as relapse cases by sputum smear examination.

TB Treatment (Ministry of Public Health, 1998)

Short Course Chemotherapy. According to the recommendations of the National Tuberculosis Control Program and the WHO, short-course chemotherapy can be divided into 4 main systems:

CAT.1 2HRZE(s)/4HR is provided for new TB cases with positive sputum smear or severe cases.

CAT.2 SHRZE/1HRZE/5HRE is provided for relapse, failure or return after default (those who stopped drugs for a period of time and resumed treatment later) cases with sputum smear-positive examinations.

CAT.3 2HRZ/4HR is provided for TB cases with sputum smear-positive results or extra pulmonary TB.

CAT.4 H alone or second line drug is provided for the chronic TB cases with failed treatment, particularly, for those who have failed CAT.2treatment.

Note CH = isoniazid, R = rifampicin, Z = pyrazinamide, S = streptomycin, E = ethambutol; the figures in front of the abbreviated drug names refer to the number of months required for drug treatment

Evaluation of TB Treatment (Ministry of Public Health, 1998)

1. *Cured* cases refers to initially smear-positive patients who have at least 2 negative sputum smear examinations in the last month of treatment. The cure rate should be > 85%.

2. *Complete treatment* cases refers to patients who initially have positive sputum smears and the sputum smear becomes negative after finishing the full course of treatment in the intensive phase, but no sputum smear results are found when the treatment is completed, or patients have negative sputum smears at both initial and final periods of treatment.

3. *Failure* cases refers to:

    3.1 patients who remain smear-positive, or become smear-positive again at least 5 months after the start of treatment

    3.2 patients who are initially smear-negative but become smear-positive after 2 months of treatment

    3.3   relapse cases

    3.4   default cases or patients who do not collect anti-tuberculosis drugs for 2 months

    3.5   died, or patients who die during the treatment, irrespective of the cause

    3.6   transfer-out; patients who are transferred to another healthcare unit and the results are unknown

2.2 Concept on knowledge, Attitude, and Practice

Definitions of Knowledge

Bloom (1971) defined knowledge as anything related to retrieval of any particular or general matter including methods, processes, or situations with the emphasis on memory.

Good (1973) defined knowledge as facts, principals or details of anything the individuals receive and store.

Prapapen Suwan (1983) claimed that knowledge is basic behaviors that the learners can remember and retrieve by seeing or hearing, for instance, knowledge about definitions of technical terms, meanings of fact, theories, principles of law, possible solutions and standards.

Wichai Wongyai (1990) defined knowledge as fundamental behaviors that learners can remember or retrieve by seeing and hearing. Knowledge at this stage includes facts, principles, and definitions of technical terms.

In short, knowledge is the ability to retrieve facts or experiences from observations, assumptions, principles and details. These facts or experiences are stored and performed as behaviors from retrieval. These behaviors can be observed and evaluated.

Levels of Knowledge

Bloom (1971) classified the ability from the lowest to the highest levels, as follows:

1. Knowledge refers to the ability to memorize or recall.

2. Comprehension refers to the ability to interpret and infer.

3. Application refers to the ability to apply knowledge to any situation.

4. Analysis refers to the ability to identify any components meaningfully.

5. Synthesis refers to the ability to create new things.

6. Evaluation refers to the ability to judge the value of things based on certain criteria.

Evaluation of Knowledge

There are various tools to evaluate knowledge; since these tools have various characteristics, in the present study, a test was chosen.

A test refers to a systematic method to compare the behaviors of at least 2 people at a certain time, or the behaviors of an individual or several people at different periods of time.

Definitions of Attitudes

Goods (1973) stated, in the Dictionary of Education, that attitude is readiness for performance by supporting or opposing situations, people or things.

Rokeach (1970) claimed that attitude is the combination or arrangement of beliefs about any thing, matter or circumstance. The combinations of these beliefs determine the likelihood of individuals to react or respond in a like of dislike manner.

Prapapen Suwan (1983) defined attitude as beliefs or feelings of individuals about anything e.g. people, things, actions, situations, and so on. It includes performance indicating a mental state on anything mentioned above.

Thus, it can be concluded that attitude is the overall feelings of individuals about situations, people, or anything that encourages them to behave in response to stimuli, relating to agreement or disagreement.

Attitude Scales

Generally, attitude scales consist of 2 main parts:

1. Statements on attitude

2. Answers

The most common attitude scales are the Thurstone-type, Likert, Guttman, and Osgood scales. Each has advantages and disadvantages.

Definitions of Practices

Put Sujamnong (1976) defined behaviors as the actions performed by individuals.

Prapapen Suwan (1983) defined behaviors as any activities that humans perform, whether they can be clearly observed or not. They can be kept inside or performed observably.

Ampom Thongkrajai (1987) defined behaviors as any activities humans perform that are evident by observation. It is believed that, psychologically, all behaviors that humans perform stem from causes or intentions. Meanwhile, there are stimuli or encouragement for the actions to respond to human needs. When the needs are fulfilled or the goals are achieved, the behaviors are terminated and they return to homeostasis.

In summary, behaviors are any actions, reactions, or activities that are performed obviously, or kept inside, with response to the needs of the individual.

Scales for Practices

1. 1.Behavior intentions, for example, questions about the activities or behaviors that will be performed.

2. Behavior observations

3. Behavior indicators, or the collection of information on any activities when the individuals have already behaved.

4. Indirect behavior measures, or the reports of individuals about what they have done in normal situations.

In the present study, an interview checklist was used to collect information on the treatment behaviors of tuberculosis patients.

Relationships between Knowledge, Attitudes and Practices

Prapapen Suwan (1979) claimed that it is not always true that individuals will perform based on what they have learned, but attitude will act as a bridge between knowledge and actions or practices. If there is a positive attitude combined with other factors encouraging people to act or behave, it is more likely that they will act or behave compared with a negative attitude. Fabiyi (1985) indicated that knowledge support can initiate behaviors and practices in both direct and indirect ways; in indirect ways, attitude acts as a bridge (Schwaety, 1975).

2.3 Factors Associated with TB Treatment (Brannon & Feist, 1997)

There are 5 main factors associated with treatment: personal characteristics, sickness conditions, treatment, types of clinics, and the interactions of healthcare staff and patients.

2.3.1 The personal characteristics influencing treatment are age, sex, marital status, family status, occupation, income, personal beliefs, social norms and attitudes, and social support.

Age. The relationship between compliance in healthcare programs and age is complicated and results from several factors, such as certain diseases and duration of sickness. Previous studies showed that the ages of the tuberculosis patients affected compliance in healthcare programs, i.e. compliance can be increased or decreased

depending upon age. This was confirmed by the study of Jaruwan Manasurakan (1987), who examined the relationships between certain factors and compliance with treatment of 300 TB patients aged between 16-72 years old. Most of the samples were between 21-30 years old, followed by 31-40 years old. The study revealed that age was associated with compliance with treatment. In other words, older patients complied with treatment better than younger ones. This may be because adults have better decision-making for health self-care, higher acceptance and responsibility. However, Alinger and Dear (1990) found no correlation between age and compliance with tuberculosis treatment after 6 months' treatment.

Sex.   There were slight differences in treatment compliance between males and females. Jaruwan Manasurakan (1987) indicated that females complied better with treatment than males. This may be because male patients usually believe that their sickness is not severe, and when they recover, they stop taking drugs or intentionally miss a follow-up appointment. Moreover, male patients missed appointments more frequently than females due to their status as family leaders, since they had to work to support their families. This is consistent with Pattana Pokaew (1994), who found that among 57 tuberculosis cases, there were no correlations between age and compliance with TB and hypertension treatments.

Social Support.   Cameron (1996) indicated that the participation of the patients, healthcare staff and family members in disease treatment had a positive effect on treatment compliance, while desertion of the patient had a negative effect on treatment. Previous studies were conducted in pregnant cases (Jutathip Suesut, 1994)

and tuberculosis cases (Sumalee Amarinsanguanpen, 1997; Morisky et al., 1990). Jutathip Suesut (1994) studied the relationships between health perception, support from the couple and compliance with treatment programs of 161 pregnant cases with pregnancy-related hypertension. She found that the support of the couple had a positive effect on compliance with treatment programs. Sumalee Amarinsaengpen (1997) examined the relationships between family support and compliance with tuberculosis treatment for 121 cases at the Tuberculosis Center, Region 10, Chiang Mai Province. She indicated that the scores for family support and treatment compliance were positively related. In addition, Morisky et al. (1990) demonstrated that social support from friends, family members or healthcare teams encouraged TB patients to perceive the danger of the disease, leading to awareness of the appropriate behaviors and better treatment compliance.

Social Values. TB patients are afraid of stigmatization by their neighbors. This may impact not only upon the patients themselves, but their families (Lie Fooghe, 1993). When a family member is diagnosed with TB, the family may be stigmatized by the community. Thus, they avoid informing anyone that they are infected with TB. In Pakistan, it is difficult to make appointments with TB cases, particularly married women, as it may result in divorce.

Personal beliefs. The study by Kannika Ruenchan (1992) demonstrated positive relationships between health beliefs and self-care among hypertension patients.

Norms and Attitudes. Jaruwan Manasurakan (1992) found that attitude towards TB illness was significantly related to compliance with TB treatment. In other words, patients with positive attitudes complied better with TB treatment. This was comparable with the study by Ampai Chanakok and Yuwayoung Yaowapan (1992), who investigated the relationships between knowledge, attitudes and behaviors in the prevention of AIDS among 461 vocational students in Chiang Mai Province. They found that there were positive relationships between attitudes toward AIDS and AIDS-preventive behaviors. This contrasts with the study by Unchalee Singhasut (1991), who found no relationships between attitudes toward AIDS and behaviors in AIDS infections.

Financial problems. This is another factor influencing TB treatment. A study of the behaviors of patients undertaking treatment for 24 months, but who could not be cured, showed that about 181 uncured patients, accounting for 49.7%, were very poor. Similarly, the study of TB patients at the Lung and Breast Diseases Hospital (Jiraluk Pakungsamai et al., 1982) revealed that 300 default cases, accounting for 30%, had financial problems.

Knowledge about Pulmonary TB and Practices. In foreign countries, there have been several studies on health education programs to enhance compliance with treatment, particularly drug use in TB cases.

Morisky et al. (1990) studied health education programs to enhance compliance with drug treatment among 205 TB cases. Of these, 88 cases were active TB, and 117

cases had no evidence of active disease. These two phases of TB cases were divided into 2 groups: sample and control. The control group received a special intervention, i.e. consultation, health education about the disease, and individual incentive motivation. The sample group received normal care. They were followed up once a month until the completion of the treatment program. The study showed that the active TB cases with the special intervention had higher rates of punctual appointments than the normal care group. There were no significant differences in average scores for drug use between the two groups. For the cases with no evidence of active disease, those with the special intervention had significantly higher rates of continuous treatment and compliance with drug treatment than those with normal care. It can be concluded that the health education program and the individual incentive motivation had positive effects on continuous self-care and behaviors in the treatment of TB cases. Cargill (1992) examined variables and nursing practices related to compliance with treatment among 70 elders. They were separated into 3 groups: (1) control, (2) those who were educated with healthcare for 20 minutes, and (3) those who were educated with healthcare and had telephone follow-up. The study revealed that the third group had significantly higher changes in their risk behaviors than the other groups.

In Thailand, Nongpimon Sapimon (1987) investigated the achievement of health education and continuous care among 60 tuberculosis cases treated by DOTS. They were split into 2 groups: sample and control (30 cases each). Compliance with treatment before and after health education were evaluated, as well as the continuous care in weeks 2 and 8 of treatment. The study indicated that in weeks 2 and 8 of treatment, the patients with health education and continuous care showed better compliance and health practices than those with normal care. This suggested that health

education and follow-up sessions were considerable factors in improving the services of healthcare centers.

Jariyawat Kompayak and Prapa Limprasut (1989) examined the effects of healthcare methods on treatment compliance among hypertensive cases with unknown reasons. The 241 samples were divided into 3 groups: group 1 consisted of 81 cases receiving the healthcare system 1, i.e. interviewing, giving advice and problem solving by cooperation between the researcher and the patients; group 2 contained 80 cases receiving healthcare method 2, i.e. interviewing, giving advice and problem solving by the cooperation between the patients and their family members, regarded as social support; group 3, comprising 80 cases, was the control group. The study showed that in phase 2 of treatment, groups 1 and 2 had higher scores for treatment compliance during phases 1 and 2 of treatment (one month and three months after the experimental period). In addition, the scores for treatment compliance in phase 2 were higher than those in phase 1. No statistical differences in treatment compliance were observed between healthcare methods 1 and 2. It was suggested that educational methods should comprise suggestions and cooperation in problem-solving, rather than conventional methods.

Sumrit Srithamrongsawat and Pranom Limsomboon (1993) conducted a comparative study of punctuality and completeness of treatment program for old and new tuberculosis patients who received home-visits by healthcare staff, with those who did not. The study reviewed the treatment records of TB cases, in 1992. The result showed that the patients with home visits had significantly higher punctuality rates than those without.

2.3.2 Degrees of Sickness

This refers to the severity of disease. Generally, it is believed that people who are seriously sick and may be in danger of dying will have higher levels of motivation for treatment compliance than those who are not seriously sick (Brannon & Feist, 1997).

2.3.3 Treatment with Side Effects of Drugs, Duration of Treatment and Complication of Treatment

The side effects of anti-tuberculosis drugs may result in adverse impacts on patients, and sometimes patients must stop using those drugs (Ministry of Public Health, 1998). This is supported by the study of Sarai Danwanit, Preeya Wongthai and Yuwadee Chotwattanapong (1990), who studied the problems of 300 default cases at the Lung and Breast Diseases Hospital, and found that about 9.4% of default cases had drug allergy problems. This was the third most important problem after financial problems and working outside their hometown. A study of the factors associated with directly observed therapy short course (DOTS) with 104 failure cases, smear-positive after completion of treatment, or did not collect drugs for more than 2 months with incomplete treatment, or who died, revealed that the side effects of drug treatment were one factor affecting ineffective treatment (Kanokrat Siripanichakorn, Fisal Lubis, Dusit Sujirarat, & Kanda Wattanopas, 1999).

Regarding to duration of treatment, it was found that the longer the treatment period, the higher the possibility of stopping drug treatment before completion of treatment (Cameron, 1996; Taloy & Littlewood, 1998). Jaruwan Manasukarn (1987) examined the relationships between certain factors and treatment compliance among

300 tuberculosis cases. She found that duration of treatment had a statistically negative relationship with treatment compliance. In other words, patients who had longer treatment performed poor treatment compliances. This may be because the patient were tired of the treatment and felt desperate, so it was more likely that the patients stopped their drugs. This is because when patients have had drugs for a period time, they feel better, and therefore assume that they are cured. This is consistent with the study by Sukon Losiri (1996) about uncontrolled short course treatment at the Lung Diseases Hospital in Bangkok. It was found that among 6,000 TB patients, in a 2-month treatment course, the default rate was only 5.88%, but when the treatment period was prolonged to 4 months, the default rate increased to 11.5%.

In addition, the prolonged treatment period resulted in missed appointments or treatment ignorance among the TB patients treated by DOTS at regional hospitals, community hospitals of TB Center Region 4, Ratchaburi. It was found that among 941 TB cases, the rate of missed appointments was 33.82% and most of these cases (71.81%) missed appointments in the intensive phase (Boonchart Klutpuang, Pada Limpasaichol, Ruthaiwan Boonpendej, 1995). Ailinger and Dear (1998) investigated treatment compliance regarding punctual appointments and drug-taking for 6 months to prevent TB in 65 Latin migrants with latent TB infection. From reviews of self-reports, it was found that compliance with seeing the doctor at the first appointment was 8%, but after 6 months, only 60% of patients kept appointments punctually. Compliance with taking anti-tuberculosis drugs was reduced from 89% in the first month to 65% when the treatment was completed in 6 months. This indicated that treatment compliance is crucial, so the awareness of the importance of TB treatment among Latin migrants should be increased. The possible outcomes of treatment compliance include:

(1) patients lack knowledge about risk conditions of latent TB infection, (2) latent TB infectious patients do not realize the importance of treatment, due to unclear symptoms, (3) patients believe that the treatment methods are not compatible with the biomedical model, and (4) there are constraints in accessing healthcare services, e.g. insufficient medical staff specializing in migrants' languages.

Complication of Treatment. Patients tend to refuse treatment compliance to anti-TB drugs if they need several drugs many times a day (Brannon & Feist, 1997).

Cramer et al. (cited in Brannon & Feist, 1997) found that compliance among patients who had one tablet/day of anti-tuberculosis drugs was as high as 88%, while those who had 2 tablets/day were 81%, 3 tablets, 77%, and > 3 tablets/day, 39%. This suggested that treatment compliance decreased when the patients had > 3 tablets/day, so that treatment compliance was associated with the number of drugs patients had to take in a day. This was supported by the study of Jaruwan Manasurakarn (1987), who found that TB patients receiving standard drug treatment (2 kinds of drugs/day until the treatment was completed) complied less with their treatment than those receiving 2-phase drug treatments (phase 1, in the first 3 months, receiving 3 kinds of drugs; phase 2 receiving 2 kinds of drugs every day until the treatment completion).

2.3.4 Types of Clinics

This consists of working days, working hours, number of medical staff and disease examination specialists.

2.3.5 Interrelationship Between Healthcare Service Staff and Patients

The interrelationship between healthcare service staff and patient is a crucial factor affecting patient compliance with treatment. It includes communication between healthcare staff and patients, the personalities of the healthcare staff, and the waiting time to see the doctor.

Communication between healthcare staff and patients

Cameron (1996) asserted that healthcare staff should provide adequate clear information about treatment plans and should not use technical terms. The information should be given at the first service, because it can reduce patients' stress. Brannon and Feist (1997) studied an evaluation of patients' comprehension of types of communication affecting treatment compliance. They found that most of the patients who complied with the treatment better were those receiving information about their sickness and the reasons for treatment. This was confirmed by the study of Helby et al. (1989 cited in Brannonb & Feist, 1997) who found that diabetics complied better with treatment when they received information about diabetes. This was similar to the study by Stanton (1987 cited in Brannon & Feist, 1997), who found that knowledge about hypertension treatment programs contributed to higher compliance with treatment by hypertension patients.

Personalities of Healthcare Staff

The personalities of healthcare staff, particularly doctors, are a crucial factor for treatment compliance (Brannon & Feist, 1997). DiNicolo and DiMetteo (1984 cited in Brannon & Feist, 1997) found that patients followed instructions more strictly when

doctors were generous, friendly and interested in the patients' problems, compared with the reasons for treatment refusals, especially for medical treatments. These included unclear explanations, conflicting information given to patients, trustworthy personality and the ignorance of doctors (Manot Lotrakul, 1997).

Waiting Time for the Doctor

Waiting time significantly affected treatment compliance (Brannon & Feist, 1997), but there was no effect if the waiting time were < 30 minutes. However, compliance would decrease to less than 40% if the patients had to wait for doctors for > 1 hour (Davidson & Schrag, 1969 cited in Brannon & Feist, 1997).

Continuous Follow-up of TB Patients.

Sixty DOTS tuberculosis patients were divided equally into sample and control groups. Treatment compliance was assessed before and after health education, and follow-up sessions were conducted continuously in weeks 2 and 8 of treatment. The study showed that the patients who received health education and continuous follow-up sessions had significantly better compliance than those with conventional treatment methods.

Sumrit Srithamrongsawat and Pranom Limsomboon (1993) conducted a study comparing the treatment program punctuality and completeness among old and new tuberculosis patients receiving home visits from healthcare staff, with those without home visits. They found that punctuality rates in service access of those with home visits were significantly higher than those without. The coefficient correlation of the

healthcare staff affected compliance in the healthcare programs. In order to promote compliance, the healthcare staff should realize the importance of these factors and improve them to suit the characteristics of the patients.

Evaluation of Compliance in Healthcare Programs

The concept of evaluation on health care program compliance is similar to that of treatment compliance. Hays et al. (1994) proposed 3 ways of evaluating treatment compliance: (1) self-report, (2) peer reviews by family members, friends or healthcare staff, and (3) clinical observations, e.g. examination of drug levels in the blood or urine, and the relationship of the examination results and body conditions.

Brannon and Feist (1997) articulated 5 fundamental ways for evaluating treatment compliance:

1. 1. *Interview by the doctor.* This is not very useful since the doctors always expects higher than actual compliance.

2. *Interview of the patients.* This is useful, as clear information can be obtained. This method, however, is rather complicated since the patients always give untrue information to avoid the interview. Moreover, some patients may overestimate their levels of compliance due to lack of necessary information.

3. *Interview by healthcare teams and family members.* Observing patients continuously is rather difficult, particularly food and drink consumption habits. Family members give exaggerated information very often.

4. *Drug counts*. This is very common, but it is difficult to count the quantity of drugs patients have to take. It is important to keep in mind that patients may intentionally throw drugs away or lose them. In addition, some share their drugs with their friends.

5. *Biochemical test*. This is done to determine the drug concentration in the blood or urine. This method, however, is quite expensive and may cause some problems. For instance, some drugs cannot be examined from urine, and drug absorption differs between individuals. Moreover, reliable biochemical results require frequent tests. In addition, the results of drug examinations are the consequences of certain times of drug taking, not an indicator that the patients have taken drugs strictly according to medical advice.

In the present study, the outcomes of TB treatment for new TB cases were investigated based on the WHO clinical diagnostic standards. Furthermore, factors related to treatment were also examined by using an interview checklist designed by the researcher from the review of the related literature. Interviewing the new TB cases may not be a reliable method, as it may entail some mistakes. However, the reviewer attempted to modify the interview questionnaire, incorporating the suggestions of the 4 experts to ensure the most reliable questions in the checklist. It is speculated that the result of the present study will be useful for improving TB treatment.