# CHAPTER 5

# Conclusion and Recommendations

This chapter is divided into four parts: conclusion, implications of findings, limitations of the study, and recommendations for further research.

## 5.1 Conclusion

This randomized controlled trial, post-test only design, was conducted to investigate the effect of the Medication Adherence Enhancement Program on medication adherence and treatment success among newly diagnosed pulmonary tuberculosis patients. The participants were recruited at the TB clinic at Buddhachinaraj Hospital. They were adult newly diagnosed PTB patients who were registered and visited for follow-up care at the TB clinic, had sputum smear-positive, had definitely never taken anti-tuberculosis drugs, lived in Phitsanulok province or not more than 50 kilometers distance from the hospital. Initially, 58 participants were randomly assigned to the control and intervention groups. Of the 58, 50 participants completed all aspects of the study. There was a 14% attrition rate with 50 participants who completed the study and were available for analysis, 25 in the intervention group and 25 in the control group. The participants in the intervention group received the Medication Adherence Enhancement Program, whereas, those in the control group received usual care. The Medication Adherence Enhancement Program was an individualized intervention. The program combined interventions based on self-efficacy and self-regulation concepts of social cognitive theory. The instruments in the program included the lesson plan, video presentation, scenarios, patient's and supporter's manuals, Training and Recording Forms for Self-Regulation to Adhere to Medication and Self-Efficacy for Self-Regulation of Medication Adherence Scale. The program provided during the first two months of TB treatment with seven sessions for raising self-efficacy for self-regulation to adhere to TB medication. Within these seven sessions, they had two sessions for home visits and two sessions for telephone reminder and counseling.

The research instruments included a Demographic and Clinical Characteristics Data Collection Form, a Pulmonary Tuberculosis-Related Characteristics Data Collection Form, a Supporter's Demographic Characteristics Data Collection Form, and an Anti-Tuberculosis Medication Adherence Scale. These instruments were content validated by five experts. The Anti-Tuberculosis Medication Adherence Scale was tested for reliability using the Kuder-Richardson 20 method (KR 20) and reported at .76. Medication adherence was collected at the 3rd and 6th months after implementing the program, using the Anti-Tuberculosis Medication Adherence Scale. Treatment success was evaluated at the 6th months after implementing the program or at the end of treatment, using the Criteria to Identify the TB Treatment Outcomes of WHO (WHO, 2010b). Data was analyzed using descriptive statistics, Chi-square test, Fisher's exact test, and Mann-Whitney U test.

The findings of the study indicated that medication adherence of the participants in the intervention group ($\bar{x}$ ±SD = 4.84±.47) at the 3rd month after entering the program, were significantly higher than those in the control group ($\bar{x}$ ±SD = 3.92±1.11, $p<.001$). However, at the 6th month after entering the program, medication adherence of the participants in the intervention group ($\bar{x}$ ±SD = 4.80±.50) were higher than those in the control group ($\bar{x}$ ±SD = 4.12±1.58), but not significantly different. Treatment success of the participants in the intervention group (100%) was higher than those in the control group (96%), but significantly different.

**5.2 Implications of findings**

Based on the study results, the Medication Adherence Enhancement Program increased TB medication adherence and treatment success. This finding can be applied for nursing practice, nursing education and nursing administration which are described as follows:

5.2.1 Implications for nursing practice

The Medication Adherence Enhancement Program based on self-efficacy and self-regulation concepts is a potentially useful program for improving TB medication adherence and treatment success. The implications for nursing practice are as follows;

1) the three continuous processes of self-regulation to adhere to TB medication and four sources for raising self-efficacy for self-regulation should be implemented in nursing practice, 2) the TB patients should be taught to know their tasks, trained how to do, and practice in sub-skills of self-regulation; goal setting, self-monitoring, and self-reflection, 3) patients who are successful in self-regulation for adhering TB medication and have positive outcomes should be promoted to be a role model for patients, 4) approaching the individual TB patient as early as possible after the patient registration is recommended in order to build good relationships which leads for raising self-confidence to perform other behavior goals during the treatment course, 5) strong verbal persuasion and physical and emotional arousal should be used when in contact with the patients and during the processes of information provision, feedback, and problem-solving discussion, and 6) at the initial of the treatment course or in case missing appointments, a telephone call a few days prior to the appointment for reminding and counseling should be done.

The Medication Adherence Enhancement Program proves how nurses and family supporters can successfully work together to improve TB medication adherence and achieve positive outcome. In addition, family supporters are convenient and accessible to the patients. The implications are as follows; 1) nurses should create a high quality of relation and communication between themselves and patients and family supporters at the initial of treatment course for enhancing patient's confidence to perform behavior goals, 2) a supporter's manual developed and utilized in this study should be distributed to prepare family supporters, and 3) nurses or health care workers working in primary care unit should be encouraged to monitor and support the family supporters.

The video presentation, scenarios and patient's manual utilized in this study should be distributed to TB clinic and should be used to educate TB patients in clinical practice. It is expected that these instruments can modify their attitude and beliefs, and motivate and enhance patients' self-confidence to adhere to TB medication.

5.2.2 Implications for nursing education

The findings provide evidence to grow knowledge in nursing science regarding behavior change approach and clinical outcome improvement. They should be added to the knowledge of enhancing medication adherence strategies for newly diagnosed pulmonary tuberculosis patients. The finding may provide rigorous evidence that can be integrated into nursing curricula at the undergraduate and graduate levels or into the orientation program of new TB staff for better nursing intervention among PTB patients. Since the program required some specific advanced skills such as self-efficacy and self-regulation enhancement, advanced nursing training is needed for preparation of advanced practitioner nurses to work with the PTB patients and their family supporters. The Training and Recording Forms for Self-Regulation to Adhere to Medication and the Self-Efficacy for Self-Regulation of Medication Adherence Scale utilized in this study should be creatively distributed throughout the training process.

5.2.3 Implications for nursing administration

The Medication Adherence Enhancement Program will improve linkages between the TB clinic care, the primary unit care, and family care and will improve patients' ability to self-regulate their behaviors and conditions. The program can fill the gap of limited budget and staff for TB control. The choice of a family supporter also helps to reduce the stigmatization and disrespect of the patients. Nursing administrators should support the required budget, material, and manpower to facilitate the program implementation. Moreover, consideration for a special team and setting should be made in order to do the program possible work because advanced practitioner nurses are needed in the program implementation. A special course or program for training should be developed to train nursing staff at TB clinics and primary care units. The training program should be used to prepare nurses or other health care workers for conducting the Medication Adherence Enhancement Program.

**5.3 Limitations of the study**

There are possible limitations in this study that limits its applicability to other as presented below.

5.3.1 The participants of this study included only the newly diagnosed pulmonary tuberculosis patients who had smear-positive sputum and ability to communicate in Thai and were registered and visited for follow-up care at only one selected TB clinic in Phitsanulok province. Therefore, a generalization of the finding to other groups of TB patients and other settings should be considered.

5.3.2 The results of this study showed that the Medication Adherence Enhancement Program was not a significant difference of medication adherence and treatment success at the 6$^{th}$ month after entering the program or at the end of treatment between groups. It is likely that medication adherence and treatment success were influenced by the confounded factors of the added interventions of money incentive and effective strategies of late patient tracers during the period of the study; or the unknown level of medication adherence self-efficacy of the participants after entering the program for three months. These situations may have attenuated the effects of the Medication Adherence Enhancement Program on medication adherence behavior and treatment success outcome.

5.3.3 Two participants in the control group died before evaluation of the medication adherence at the 3$^{rd}$ month after entering the program, and were excluded from the study. This may have affected the proportion of treatment success and all treatment outcomes. Additionally, the death of the participants may be influenced by their poor medication adherence behavior. This attrition of the participants may have an effect on the study results.

**5.4 Recommendations for further research**

Based on the limitations of this study, recommendations for further study include the following:

5.4.1 The Medication Adherence Enhancement Program needs further testing of its adaptability to a variety of settings and its application to other TB populations who need long-term treatment, especially the patients experienced with poor medication adherence behavior or those who have low level of medication adherence self-efficacy at baseline.

5.4.2 The effectiveness of the Medication Adherence Enhancement Program on medication adherence and treatment success by controling confounding factors such as

money incentives, late patient tracers, and baseline medication adherence self-efficacy of the patients should be done to clarify.

5.4.3 The effectiveness of the Medication Adherence Enhancement Program on other outcomes such as death rate and relapse rate should be investigated.

5.4.4 The cost-effectiveness of the Medication Adherence Enhancement Program should be investigated.

5.4.5 A follow-up study using the repeated measures experimental design should be done to identify long term (such as 8 or 10 or 12 months) effectiveness of this program on medication adherence and treatment outcomes.