Thai Health Education Program for Improving TB Migrant's Compliance

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Objective: *Investigate the effectiveness of health education programs by using the PRECEDE-PROCEED Model to improve non-Thai migrant TB patient's compliance during treatment.*
Material and Method: *This quasi-intervention study was conducted in three targeted hospitals, between August 2009 and December 2010. The study sample consisted of 100 cases, 50 cases who registered in Samutsakorn Province served as the intervention group and 50 cases who registered in Samutprakarn Province served as the control group.*
Results: *At the end of the health education intervention, the intervention group showed significantly improved health-behavior scores in nine domains-health promotion, health education, predisposing, reinforcing, enabling factors, behavior and lifestyle, environment, and health status, which were also significantly higher than the control group ($p<0.001$). The percentage of patients achieving successful treatment outcomes was 76% in the intervention group and 62% in the control group.*
Conclusion: *The tuberculosis treatment and care program, and the associated health education interventions enabled migrants to complete the treatment regimen and achieve treatment success. It could also help TB staff develop an appropriate program and clear understanding of TB control among migrants. It is recommended that this type of information and health education program be used in other hospitals and healthcare settings providing TB services for migrants throughout the nation.*

Keywords: *Tuberculosis, Migrants, Health education, and patient's compliance*

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The WHO grades Thailand ranked eighteen of 22 countries with a high TB burden[1]. Migrants are one of the most important groups to target for TB control due to growing numbers, crowded living conditions, high mobility, and lack of legal status in Thailand[2] and with high defaulted rates of 57.82% and low completion rate of 42.18%[3]. TB, HIV-associated TB, and MDR-TB in migrants from Myanmar are important public health problems[4].

Undocumented migrants represent 5 to 30% of immigrants and 5 to 10% of TB cases. Most countries reported full access to diagnosis and treatment, but in practice, there were limitations[5].

Meanwhile, about 5,399/1,284,920 non-Thai migrants were diagnosed as having tuberculosis during annual physical checkups[6]. Health education is one important method to provide information to the patients and to improve patients' compliance.

In "Bangkok: a Haven for Asian Migrants" by BBC News, 2006[7], reported that the Thai government estimated that 2.3 million migrants were living in the country-though given the difficulties of documenting illegal workers, the actual figure could be much higher.

For the roles of the National TB Program, the team will need to focus on initiatives to expand services to the increasing number of migrants. Several factors render non-Thai migrants one of the most important groups to target for TB control because the majority of non-Thai migrants are unregistered and therefore, not eligible for health care and therefore continue to transmit the disease[8,9].

Health education intervention and materials are very essential to improving TB prevention, control, and treatment at every level and to the target group particularly in the marginalized and migrant populations. Additionally, providing health education to improve compliance with treatment and enhancing

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patient pretreatment counseling and education about TB are strongly recommended. The results from the present study will be beneficial for TB programs to develop appropriate interventions and services to control TB among migrants in the future. In particular, those providers caring for them should have a high level of concern about their access to care and services in order for early case detection and treatment to stop spreading TB and expanding the chain of transmission to Thai residents.

Material and Method

This was a quasi-experimental research study,including pre and post-test two group design conducted to provide a comprehensive health education intervention for 50 undocumented migrant TB cases assigned in the intervention group (Table 1), i.e., those registered in Samutsakorn (2 hospitals) while the remaining 50 cases were classified as the control group, i.e., those registered in Samutprakarn (1 hospital). All 100 undocumented TB cases who met the inclusion criteria were introduced and invited to take part in this study. All socio-demographic variables were tested for association with level of treatment success. Statistical analysis comprised Pearson Chi-square test and t-test. Questionnaire for the patients regarding to treatment outcomes and health care services for migrants were developed. There were six parts of the structured questionnaire: Part 1: General information of TB patient characteristics, social assessment, Part 2: Knowledge about TB, Part 3: Behavior and Environmental assessment, Part 4: Educational and Ecological assessment, Part 5: Predisposing, Reinforcing, Enabling factors, Part 6: Administration

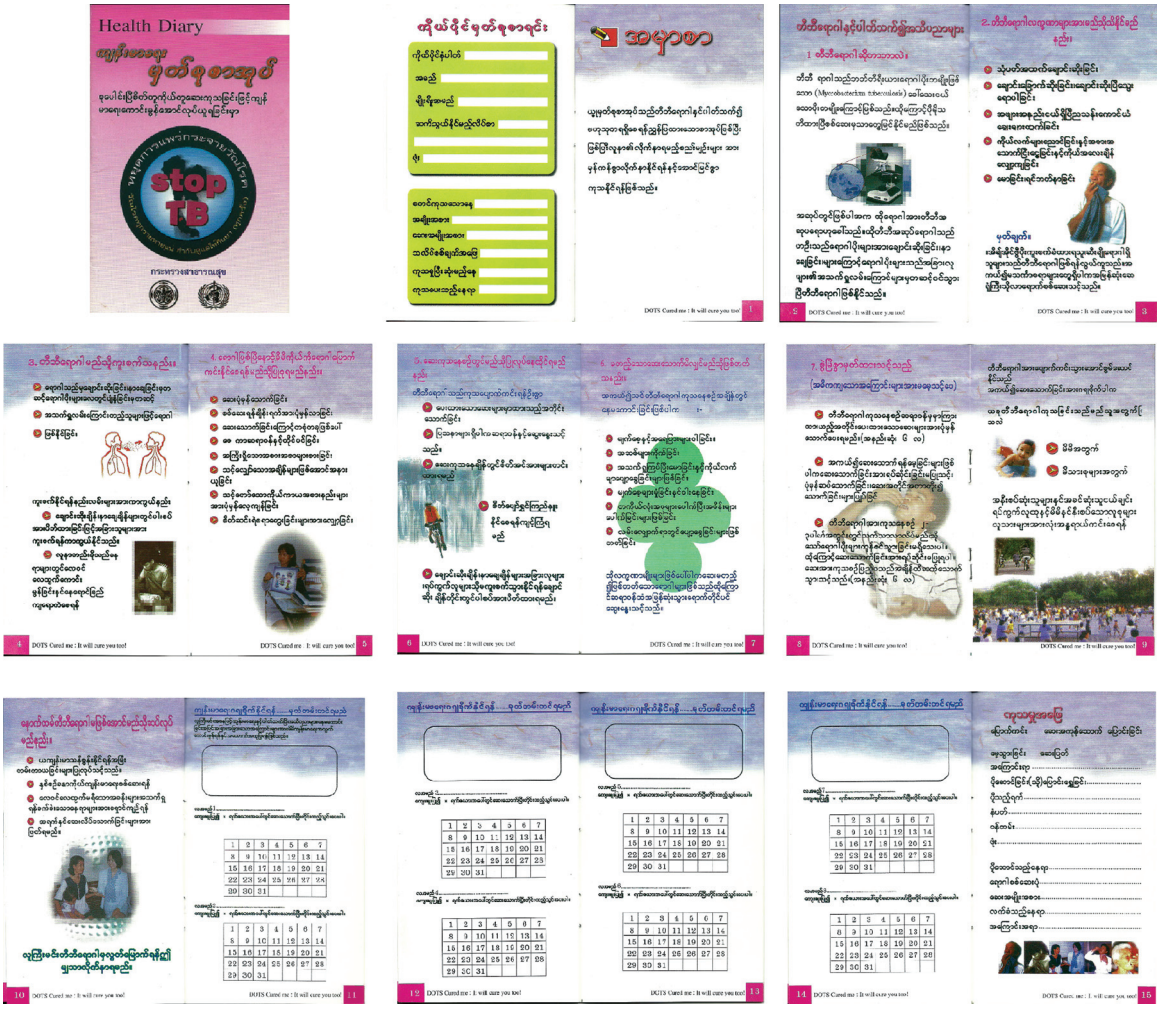

Fig. 1 Health education material

Table 1. Intervention activities

Month	Week	Main activities	Descriptions	Health education program	Home visiting	Remarks
M1	1-2	Migrant-centered approaches (20-30 minutes)	Activity 1.1: Improving knowledge about TB; understanding about processes of the treatment; concerning about compliance behaviors (drug taking, following-up, health care, minor side effects, sleeping, exercise)	Conducting by research team and assistants (TB clinic, health care staff with translators)	Performing by research team and assistants (health workers, community based workers, health volunteers)	Assistants were trained/skilled before implementing the study
	3-4		Activity 1.2: Home visiting program (getting cure having good compliance behavior)			
M2	5-6	Moral-migrant H.edu program (20-25 minutes)	Activity 2.1: Motivation and moral supporting for patient's compliance: conversation regarding to current signs and symptoms, drug taking, appointment keeping, problem solving, how to take drugs and exterminate sputum	Conducting by research team and assistants (TB clinic, health care staff with translators)	Performing by research team and assistants (health workers, community based workers, health volunteers)	Assistants were trained/skilled before implementing the study
	7-8		Activity 2.2: Home visiting program (stop TB spreading out and cutting TB transmission by regularly taking anti-TB medicine)			
M3	9-10	PRE: predisposing, reinforcing, enabling (20-25 minutes)	Activity 3.1: Conversation and discussion about treatment processes, patients' opinions about provider relationship, family members, and close-friends and others. Providing more information regarding to TB standard of treatment and care, service system, and duration of the treatment	Conducting by research team and assistants (TB clinic, health care staff with translators)	Performing by research team and assistants (health workers, community based workers, health volunteers)	Assistants were trained/skilled before implementing the study
	11-12		Activity 3.2: Home visiting program (getting better by having good food, good exercise, good environment)			
M4	13-14	Migrant volunteer peer support (20-30 minutes)	Activity 4.1: Discussion regarding on the past experiences and lessons learned during the treatment processes about three months ago and how to cope with and how to manage for 2-3 months left	Conducting by research team and assistants (TB clinic, health care staff with translators)	Performing by research team and assistants (health workers, community based workers, health volunteers)	Assistants were trained/skilled before implementing the study
	15-16		Activity 4.2: Home visiting program (promoting TB prevention and control in migrant community - case contact, early case detection, access to care)			
M5	17-18	Employer-employee empowerment (20-30 minutes)	Activity 5.1: Explanation for sharing experiences and demonstration of sputum results, treatment outcomes from month 1 to month 4 or 5, volumes of medicine and drug tablets, again how to take drugs and exterminate sputum	Conducting by research team and assistants (TB clinic, health care staff with translators)	Performing by research team and assistants (health workers, community based workers, health volunteers)	Assistants were trained/skilled before implementing the study
	19-20		Activity 5.2: Home visiting program (social support, moral support: friendly, warmly, sympathetically approached to the migrant)			

1) For the control group, the patients will be received a routine TB treatment and care service from the hospitals.
2) TB pamphlet in Myanmar language developed by National TB Program was distributed to participants.

Table 1. (cont.)

Month	Week	Main activities	Descriptions	Health education program	Home visiting	Remarks
M6	21-22	Moral-migrant H.edu program (20-25 minutes)	Activity 6.1: Moral support and empowerment of migrant TB cases to take care themselves in order to complete the treatment program. Informing them to keep taking TB drug regularly until at the end of month 6 or discharge	Conducting by research team and assistants (TB clinic, health care staff with translators)	Performing by research team and assistants (health workers, community based workers, health volunteers)	Assistants were trained/ skilled before implementing the study
	23-24		Activity 6.2: Home visiting program (good hygiene, good health, good quality of life - in appropriate lifestyle and migrant community/environment). Evaluation of the patients' compliance and treatment outcomes			

1) For the control group, the patients will be received a routine TB treatment and care service from the hospitals.
2) TB pamphlet in Myanmar language developed by National TB Program was distributed to participants.

and Policy assessment: Health service issues, Part 7: Implementation, Process, Impact, and Outcome Evaluation. This research was approved by Ethical Approval No. MUTM 2009-076-01/ EC submission No. TMEC 09-066 (25 Dec 2009-24 Dec 2010).

Results

Social and economic demographic characteristics of the samples

The characteristics of migrant patients are shown in Table 2 and 3. Of 100 eligible patients, all of them were undocumented migrants of Myanmar nationality, registered as new cases with category I. Majority of the sampled TB migrant patients in both groups were male (64% in the intervention group vs. 56% in the control group). Most were aged between 26 and 35 years (46% in both the intervention and control group). The migrants in both groups were workers for domesticate employment sectors (66% in the intervention group vs. 60% in the control group). Over half of participants had four to six family members (64% in the intervention group vs. 76% in the control group). Thirty percent in the intervention group vs. 26% in the control group reported that they were living in homes for rent. In the intervention group, 28% reported they had been living in Thailand for about three to five years. The control group 32% reported they had been living here for about nine to 10 years. All the participants were planning to move to other places for seeking new work.

Treatment outcome and success

At the end of the treatment program, 78% of the intervention group was smear-positive cases, and 32 (64%) were on initial treatment period with good adherence (80%) under the supervision of community health volunteer (52%). Meanwhile, 76% in the control group was smear-positive cases, and 27 (54%) were on initial treatment period with good adherence (76%) under the supervision of village health volunteer (48%). In the intervention group, of the 39 TB migrant cases, 31 (80%) had conversed sputum-smear with 76% treatment success and 18% defaulted. Meanwhile, in the control group, of the 38 TB migrant cases, 27 (71%) had conversed sputum smear with 62% treatment success and 34% defaulted.

Health assessment among migrants, before and after intervention in intervention & control groups

The questions on health behaviors assessment included nine topics with 22 items divided into three

Table 2. Number and percentage of the samples by social and economic demographic characteristics (n = 100)

Characteristic of samples	Intervention group		Control group		p-value
	n = 50	%	n = 50	%	
Socio-demographic characteristics					
Age					0.629
15-25 years	18	36.0	20	40.0	
26-35 years	23	46.0	23	46.0	
36-45 years	8	16.0	7	14.0	
46-55 years	1	2.0	0	0	
Mean	29.16		28.08		
SD	7.12		6.94		
Gender					0.414
Male	32	64.0	28	56.0	
Female	18	36.0	22	44.0	
Occupation					0.536
In-house employed	33	66.0	30	60.0	
Factory worker	17	34.0	20	40.0	
Family members					0.013
1-3 persons	12	24.0	6	12.0	
4-6 persons	32	64.0	38	76.0	
7-10 persons	6	12.0	6	12.0	
Type of residence					0.736
Room for rent	14	28.0	11	22.0	
Home for rent	15	30.0	13	26.0	
A shack in the camp	12	24.0	13	26.0	
A compartment of a factory	9	18.0	13	26.0	
How long did you live in this urban province?					0.142
1-2 years	7	14.0	4	8.0	
3-5 years	14	28.0	8	16.0	
6-8 years	12	24.0	12	24.0	
9-10 years	8	16.0	16	32.0	
Over 10 years	10	20.0	10	20.0	

levels - good, fair, and poor, and applied to evaluate health behaviors of the patients in both groups starting with collecting the data during home visits and at the time of follow-up from the beginning and at the end of treatment course (Table 4).

The intervention group, it was found that the nine key health behaviors and potential factors among migrants and all of the mean scores before and after were significantly different ($p<0.001$). For health promotion and health education, the mean scores at before and after intervention were changed markedly with a significant difference ($p<0.001$). For predisposing factors, reinforcing factors, and enabling factors, the mean scores before and after intervention were also changed markedly with a significant difference ($p<0.001$). For behavior and lifestyle, environment, health status and quality of life, the mean scores at before and after intervention were also changed markedly with a significant difference ($p<0.001$) with the treatment success rate of 76% when compared with the control group at 62% ($p<0.047$). Finally, the distribution of frequency and percentage of nine health behaviors for each item among respondents are shown. For the control group, it was found that the nine concerned health behaviors and potential factors among migrant and mean scores before and after remained the same.

It was also concluded that before the intervention approach in both groups, the health behavior among migrants was slightly equal to each other at the same level "almost poor" at 50 to 100%. After employing the intervention approach, the health behavior among migrants improved from poor to fair and good levels, measured between and within groups at a significant difference ($p<0.001$). The intervention group was totally different when compared with the control group as shown in Table 4.

Table 3. Number and percentage of the samples by patient registrations and categories (n = 100)

Characteristic of samples	Intervention group		Control group		p-value
	n = 50	%	n = 50	%	
Treatment outcomes					
Category of TB: pulmonary TB					0.812
Smear-positive	39	78.0	38	76.0	
Smear-negative	11	22.0	12	24.0	
Phase of treatment					0.700
Initial phase	32	64.0	27	54.0	
Continuation phase	18	36.0	23	46.0	
Adherence/compliance					0.617
Regularity	40	80.0	38	76.0	
Irregularity	10	20.0	12	24.0	
DOT observers					0.232
TB clinic nurse	2	4.0	0	0	
Village health volunteer	22	44.0	24	48.0	
Community volunteer	26	52.0	21	42.0	
Family member	0	0	2	4.0	
Self-care/administration	0	0	3	6.0	
Sputum conversion rate	(n = 39)		(n = 38)		0.121
Converted	31/39	80.0	27/38	71.0	
Un-converted	8/39	20.0	11/38	29.0	
Treatment outcomes					0.266
Cure	24	48.0	18	36.0	
Complete	14	28.0	13	26.0	
Default	9	18.0	17	34.0	
Transferred out	3	6.0	2	4.0	
Treatment success					0.047
Successful	38	76.0	31	62.0	
Unsuccessful	12	24.0	19	38.0	

Discussion

The results of the present study supported the PRECEDE-PROCEED Model that provides a comprehensive structure for assessing health and quality-of-life needs and for designing, implementing, and evaluating health promotion and other public health programs to meet those needs[10]. Direct observation and regular home visits by health workers appear to reduce the risk of non-adherence. More patient-centered interventions and greater attention to structural barriers are needed to improve treatment adherence[11]. The result was consistent with the other studies[12]. As a result, the PRECEDE-PROCEED Model provides a valuable theoretical framework for considering such barriers. The PRECEDE-PROCEED Model defines three types of factors that influence behavior, predisposing, enabling, and reinforcing. Predisposing factors are characteristics that motivate a person to engage in behavior. These can include beliefs, attitudes, or knowledge or demographic background factors thought to impact the likelihood of engaging in the behavior. Enabling factors include characteristics of the environment that facilitate the behavior, as well as skills or resources, such as health insurance or ease of transportation, which make it possible to engage in the behavior. Reinforcing factors are defined as rewards or punishments that follow the behavior or are anticipated as a consequence of the behavior. Expectations about the support of friends and family for a behavior are often viewed as important reinforcing factors[11]. This confirmed that the interventions provided and applied for these migrants should be implemented to improve patient adherence during the treatment. Ying Li studied "Community health needs assessment with PRECEDE-PROCEED MODEL: a mixed methods study" and quoted that there are many models for health promotion; studies have shown that the PRECEDE-PROCEED model

Table 4. The comparison of the mean score on variables, between before and after in the intervention and control groups

Variables	Intervention group					Control group				
	Before mean±SD		After mean±SD		p-value	Before mean±SD		After mean±SD		p-value
Health promotion	1.18	0.19	1.94	0.18	0.000	1.16	0.21	1.22	0.28	0.050
Health education	1.05	0.20	2.07	0.47	0.000	1.04	0.19	1.11	0.33	0.090
Predisposing factors	1.43	0.22	2.59	0.42	0.000	1.42	0.27	1.45	0.27	0.083
Reinforcing factors	1.61	0.36	2.14	0.35	0.000	1.52	0.37	1.58	0.40	0.057
Enabling factors	1.04	0.17	2.56	0.63	0.000	1.08	0.19	1.12	0.24	0.083
Behavior and lifestyle	1.03	0.16	2.25	0.21	0.000	1.02	0.13	1.05	0.16	0.103
Environment	1.04	0.19	2.35	0.33	0.000	1.12	0.27	1.09	0.21	0.051
Health status	1.03	0.15	2.48	0.63	0.000	1.09	0.21	1.19	0.43	0.086
Quality of life	1.15	0.20	2.17	0.37	0.000	1.16	0.24	1.29	0.36	0.050

Variables	Before					After				
	Intervention group mean±SD		Control group mean±SD		p-value	Intervention group mean±SD		Control group mean±SD		p-value
Health promotion	1.18	0.19	1.16	0.21	0.515	1.94	0.18	1.22	0.28	0.000
Health education	1.05	0.20	1.04	0.19	0.806	2.07	0.47	1.11	0.33	0.000
Predisposing factors	1.43	0.22	1.42	0.27	0.843	2.59	0.42	1.45	0.27	0.000
Reinforcing factors	1.61	0.36	1.52	0.37	0.230	2.14	0.35	1.58	0.40	0.000
Enabling factors	1.04	0.17	1.08	0.19	0.377	2.56	0.63	1.12	0.24	0.000
Behavior and lifestyle	1.03	0.16	1.02	0.13	0.826	2.25	0.21	1.05	0.16	0.000
Environment	1.04	0.19	1.05	0.15	0.777	2.35	0.33	1.12	0.27	0.000
Health status	1.03	0.15	1.09	0.21	0.118	2.48	0.63	1.19	0.43	0.000
Quality of life	1.15	0.20	1.16	0.24	0.883	2.17	0.37	1.29	0.36	0.000

is most useful for practitioners in planning and developing health promotion[11]. Behavior change strategies should take predisposing factors, enabling factors and reinforcing factors into consideration[13]. Additionally, If TB education was introduced as a component of TB screening process, assuring that it was tailored to educational background, addressed misconceptions and access problems, it could well help improve TB control in the communities[14] with contact tracing, particularly within ethnic communities, appears to be more cost-efficient and less intrusive[15]. The presented study confirmed that comprehensive health education intervention and every two-week follow-up in a TB clinic or tracing to the TB patient's house and workplace was appropriate to apply for migrant cases. Home visit activities providing them essential supplies for daily life were sufficient to promote patient compliance for migrants. In some cases, personal telephone counseling interventions were performed to improve and remind the patients to take their drugs regularly[16]. The good lessons learned from the present study were patient-centered approaches using case-by-case management and humanitarian interventions with social support without any security issues were still needed to support the poor TB migrants who really needed help and health care while living in urban areas in Thailand.

Conclusion

Based on the results of the presented study, it can be concluded that the tuberculosis treatment and care program provided and factors examined with health education interventions enabled and supported migrants complete and reach treatment success, and helped TB staff for developing an appropriate program and enhancing clear understanding of TB control among migrants. The authors recommend that this type of information and health education program should

be applied to other hospitals and health care settings that provide TB services for migrants living throughout the country.

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Potential conflicts of interest

None.

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โปรแกรมกิจกรรมสุขศึกษาเพื่อส่งเสริมพฤติกรรมการปฏิบัติตามแผนการรักษาของแรงงานต่างด้าวที่ป่วยเป็นวัณโรค

พรศักดิ์ โคตรวงษ์, จรณิต แก้วกังวาล

วัตถุประสงค์: *เพื่อศึกษาประสิทธิผลการจัดโปรแกรมการให้สุขศึกษาด้วยการประยุกต์ใช้ทฤษฎี PRECEDE-PROCEED Model เป็นกรอบในการพัฒนาพฤติกรรมร่วมมือในการรักษา*

วัสดุและวิธีการ: *เป็นการศึกษากึ่งทดลอง ดำเนินการในสองจังหวัดเขตเมือง ในระว่างเดือนสิงหาคม พ.ศ. 2552 ถึง ธันวาคม พ.ศ. 2553 มีผู้ป่วยวัณโรคชาวพม่าเข้าร่วมโปรแกรมสุขศึกษา จำนวน 100 ราย แบ่งเป็นกลุ่มทดลอง 50 ราย ในโรงพยาบาลจังหวัดสมุทรสาคร 2 แห่ง และกลุ่มเปรียบเทียบ 50 ราย ในโรงพยาบาลจังหวัดสมุทรปราการ 1 แห่ง*

ผลการศึกษา: *สำหรับโปรแกรมสุขศึกษา พบว่าในกลุ่มทดลองเมื่อสิ้นสุดแผนการรักษา มีระดับของการปฏิบัติตนตามแผนการรักษา การดูแลสุขภาพทั้งเก้าด้านดีขึ้นอย่างมีนัยสำคัญ ($p<0.001$) เมื่อเปรียบเทียบกับกลุ่มเปรียบเทียบ และยังพบว่าผลสำเร็จในการรักษาของกลุ่มทดลอง ได้ร้อยละ 76 สูงกว่ากลุ่มเปรียบเทียบ ได้ร้อยละ 62 อย่างมีนัยสำคัญ ($p<0.047$)*

สรุป: *ผลการศึกษานี้สามารถสรุปได้ว่า แรงงานต่างด้าวในประเทศไทยควรได้รับการขึ้นทะเบียนตามนโยบายของภาครัฐ และการดูแลรักษาวัณโรคที่จัดบริการให้แรงงานต่างด้าว และการจัดโปรแกรมสุขศึกษาควรให้การส่งเสริมสนับสนุนสำหรับแรงงานต่างด้าวให้ประสบผลสำเร็จในการรักษา ซึ่งจะช่วยให้ผู้รับผิดชอบงานวัณโรคได้สามารถพัฒนากิจกรรมโครงการที่เหมาะสมกับแรงงานต่างด้าวและเข้าใจการควบคุมวัณโรคในกลุ่มแรงงานต่างด้าวยิ่งขึ้น ผู้นิพนธ์มีข้อเสนอแนะว่า ข้อมูลและโปรแกรมสุขศึกษาในการศึกษานี้จะสามารถปรับประยุกต์ใช้ในโรงพยาบาลและสถานบริการสาธารณสุขที่ให้บริการสำหรับแรงงานต่างด้าวในพื้นที่อื่น ๆ ในประเทศได้*