

KNOWLEDGE ATTITUDE BARRIERS AND PREVENTIVE BEHAVIORS OF TUBERCULOSIS
AMONG MYANMAR MIGRANTS IN HUA FAI VILLAGE MAE SOT DISTRICT TAK
PROVINCE THAILAND



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จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

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Thesis Title	KNOWLEDGE ATTITUDE BARRIERS AND PREVENTIVE BEHAVIORS OF TUBERCULOSIS AMONG MYANMAR MIGRANTS IN HUA FAI VILLAGE MAE SOT DISTRICT TAK PROVINCE THAILAND
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การศึกษานี้ได้ดำเนินการศึกษาในระหว่าง มี.ค.- เม.ย. 2557 เพื่ออธิบายลักษณะทางสังคม ความรู้ ทศนคติ และอุปสรรคเกี่ยวกับการป้องกันโรควัณโรค และประเมินความสัมพันธ์ของปัจจัยดังกล่าวที่มีผลต่อพฤติกรรมการป้องกันโรควัณโรคของผู้อพยพชาวพม่าในหมู่บ้านหัวฝาย อำเภอแม่สอด จังหวัดตาก ประเทศไทย โดยเก็บข้อมูลโดยใช้แบบสัมภาษณ์ ผลการศึกษาพบ 67.8% ของผู้ถูกสัมภาษณ์อยู่ในกลุ่มอายุ 18-41 ปี เป็นผู้หญิง 65.8% เป็นผู้ที่มิมีสถานะแต่งงานแล้ว 66.3% ประมาณ 54.8% ของผู้ถูกสัมภาษณ์เป็นชาวพม่า จบการศึกษาระดับมัธยมศึกษา 32.9% โดยประกอบอาชีพเป็นพนักงานก่อสร้าง 36.0% และ 93.1% ของผู้ถูกสัมภาษณ์มีค่าเฉลี่ยของดัชนีความมั่งคั่งของประเทศไทย (IWI) อยู่ในระดับต่ำ ซึ่ง 94.2% มีค่า IWI ต่ำกว่า 60 นอกจากนี้ 45.2% พักอาศัยในห้องพักที่มีผู้พักร่วมกัน 0-3 คน โดยที่พักระยะแยกจากคนไทย และ 43.1% อาศัยอยู่ในประเทศไทยมาประมาณ 5 ปีหรือต่ำกว่า ผลการทดสอบความสัมพันธ์ระหว่างตัวแปรต้นและตัวแปรตามด้วยสถิติ Pearson's Chi-square test พบว่า สถานภาพสมรส ($p=0.008$), ระดับการศึกษา ($p=0.002$), อาชีพในปัจจุบัน ($p<0.001$), ระยะเวลาที่อาศัยอยู่ในประเทศไทย ($p=0.001$), ระดับของ IWI ($p=0.011$) และการมีผู้พักอาศัยอยู่ร่วมในห้องพักเดียวกัน ($p=0.008$) มีความสัมพันธ์กับพฤติกรรมการป้องกันโรควัณโรค แหล่งข้อมูลและหัวข้อความรู้เกี่ยวกับโรควัณโรค ได้แก่ การได้รับข้อมูลจากครอบครัว/เพื่อน/เพื่อนร่วมงาน ($p<0.001$) หนังสือพิมพ์และนิตยสาร ($p=0.001$) ตลอดจนสาเหตุการเกิดโรควัณโรค ($p<0.001$) การป้องกันโรค ($p=0.001$), และวิธีการติดต่อของโรค ($p=0.001$) มีความสัมพันธ์กับระดับพฤติกรรมการป้องกันโรควัณโรค นอกจากนี้ระดับของอุปสรรคมีความสัมพันธ์กับระดับพฤติกรรมการป้องกันโรควัณโรค ($p<0.001$) สำหรับผลการวิเคราะห์ Multivariate analysis และ Binary logistic regression พบปัจจัยที่มีความสัมพันธ์พฤติกรรมการป้องกันโรควัณโรคดังนี้ ระดับอุปสรรค ($p<0.001$) , ระยะเวลาที่อาศัยอยู่ในประเทศไทย ($p<0.016$) อาชีพในปัจจุบัน ($p<0.001$) และข้อมูลเกี่ยวกับศูนย์ดูแลสุขภาพผู้ป่วยวัณโรค/ ผู้ให้บริการ จากผลการศึกษาพบว่าผู้อพยพชาวพม่ามีความรู้และทัศนคติเกี่ยวกับโรควัณโรคอยู่ในระดับต่ำ และอุปสรรคเกี่ยวกับการป้องกันโรคอยู่ในระดับสูง ดังนั้นควรมีแผนการส่งเสริมสุขภาพโดยใช้ชุมชนเป็นฐานและจัดทำโปรแกรมการให้ความรู้เกี่ยวกับโรควัณโรคแก่ผู้อพยพกลุ่มนี้ นอกจากนี้ควรมีการตรวจคัดกรองโรควัณโรคในค่ายพักผู้อพยพ เพื่อการตรวจหาผู้ป่วยวัณโรคในระยะเริ่มต้นและให้รักษาอย่างเหมาะสมต่อไป

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ลายมือชื่อนิสิต

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YE WIN AUNG: KNOWLEDGE ATTITUDE BARRIERS AND PREVENTIVE BEHAVIORS OF TUBERCULOSIS AMONG MYANMAR MIGRANTS IN HUA FAI VILLAGE MAE SOT DISTRICT TAK PROVINCE THAILAND. ADVISOR: DR ALESSIO PANZA, pp.

The study was conducted between middle of March to first week of April 2014, to describe independent variables (socio-demographic characteristics, information, knowledge, attitude and barriers towards prevention of TB), and to assess any association of these independent variables with the dependent variables (preventive behaviors). Data was collected using interviewer administrated questionnaire from total 392 participants. The 65.8% of respondents were females, 66.3% were married, 54.8% were Burmese, 36.0% were construction workers, 93.1% were at below the average International Wealth Index (IWI), 45.2% were living with 0-3 people, about 43.1% were living in Thailand for 5 years or less. 65% of respondents had low level of knowledge, 55.9% had low level of attitude, 41.3% had high level of barriers and 51.8% had low preventive behavior levels. Pearson's Chi-square test was used to find out the associations and revealed that: marital status ($p=0.008$), level of education ($p=0.002$), current occupation ($p<0.001$), duration of stay in Thailand ($p=0.001$), IWI category ($p=0.011$), people living in the same room ($p=0.008$), family, friends, colleagues ($p<0.001$), newspapers and magazines ($p=0.001$), causes of TB ($p<0.001$), prevention of TB ($p=0.001$), mode of transmission of TB ($p=0.001$) and barrier levels ($p,0.001$) were associated with preventive behavior levels. Multivariate analysis was done using Binary logistic regression: barrier levels ($p<0.001$), duration of stay in Thailand ($p<0.016$), current occupation ($p<0.001$) and information about TB healthcare center/service providers were the factors associated with preventive behaviors. As there were low levels of knowledge, low levels of attitude and high levels of barriers towards prevention of TB were found among the participants, community-based health promotion and education programs on TB should be strategically planned and implemented. Furthermore, screening camping for TB should be done with to carry out early case detection and treatments for TB.

Field of Study: Public Health

Student's Signature

Academic Year: 2013

Advisor's Signature



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CHAPTER I

INTRODUCTION

1.1 Background and rationale

Tuberculosis, in the past also called Phthisis or Phthisis pulmonalis, is a common, and in many cases lethal, infectious disease caused by various strains of mycobacteria, usually *Mycobacterium tuberculosis* (Kumar et al., 2007). Other TB causing mycobacteria are *M. bovis*, *M. africanum*, *M. canetti*, and *M. microti* (Verver et al., 1997). TB has two forms which are active disease and latent infection. People with latent TB infection do not have any symptoms and it is not infectious to others (CDC, 2011a). Transmission of TB occurs in active form. TB can be transmitted from infected person to another through droplets which contains *M. tuberculosis* which was expelled from the lungs and throats of that infected person. Drug sensitive and active TB can be cured and treated if it is treated properly with the anti-microbial drugs. MDR-TB and XDR-TB will be developed if TB is improperly treated. Without proper treatments, 60% of people with TB disease will die. HIV infected people are more likely to happen active TB disease (WHO, 2013).

TB happens in all parts of the world and it is also the second leading cause of deaths from the other infectious diseases worldwide apart from HIV (Gerald et al., 2010). Though TB is preventable and curable disease, it is still a globally concerned major public health problem suffering millions of people in the world (WHO, 2012a). In 2012, the largest number of new TB cases occurred in Asia bearing the 60% of total new cases in the world. People at all age groups are at risk of TB. Young adults at their most reproductive age are frequently affected by TB. More than 95% of TB deaths occurred in low- and middle income countries. In 2012, there was 8.6 million

of people with TB disease and 1.3 million died from TB in the world. There were about 450,000 people with MDR-TB worldwide. About 9.6% of MDR-TB cases were XDR-TB. Approximately 1.1 million of HIV-positive cases developed new TB cases. TB is a main killer for people with HIV and it is the cause of 25% of all HIV deaths (WHO, 2013).

Due to migration, TB is still important public health issue in developed and industrialized countries. Most of the cases occur in ethnic minorities who arrived from the countries with TB high burdens and assembled together to live in the poor communities inside the wealthy cities. Moreover, migration also increases the risks of TB transmission particularly if the migrants originated in high prevalent countries causing the disease burdens to the host countries. Therefore, developed countries have challenges for TB control. The link between TB and poverty is mediated by malnutrition, poorly ventilated housing, overcrowding, social deprivation, poor social capital, stress and smoking. The perceptions towards the illness and health in many minority communities result in a negative effect in health-seeking behavior and access to health care services. Homeless, women and unemployed people experience longer delays in health care seeking leading to increased sufferings, higher expenses and higher risks for transmission to the community. Both Myanmar and Thailand are among the 22 high burden countries for TB. Comparing with Thailand, Myanmar has significantly higher prevalence and incidence of TB, MDR-TB, XDR-TB and HIV infection (WHO, 2012b). The migrations of Myanmar migrants into Thailand are increasing since 1992. In 2012, there were about 1.1 millions of Myanmar migrants in Thailand un-accounted for the undocumented migrants (Chantavanich and Vungsiriphisal, 2012a).

The prevalence and incidence of TB of Myanmar migrants are not known exactly because there are many undocumented and unregistered migrants who cannot be registered and treated for TB in health care centers. Not only TB data, the data of MDR-TB, XDR-TB and TB-HIV co-infections are also limited. As TB is a preventable disease, having good preventive behaviors of TB is very important to reduce the disease transmission of TB among Myanmar migrants. Knowledge, attitude, barriers and the associations of these factors to the preventive behaviors of TB among Myanmar migrants in Hua Fai village, Mae Sot district are not known as there was no previous study.

1.2 Research Questions

1. What are the socio-demographic characteristics?
2. What are the levels of knowledge and attitude about TB?
3. What are the levels of barriers for prevention of TB?
4. What are the levels of preventive behaviors of TB?
5. What are the factors associated to the preventive behaviors of TB?

1.3 Research Objectives

General objective

To identify the associations and factors influencing between socio-demographic characteristics, knowledge, attitude, barriers and preventive behaviors of TB among the Myanmar migrants in Hua Fai village, Mae Sot district, Tak province, Thailand.

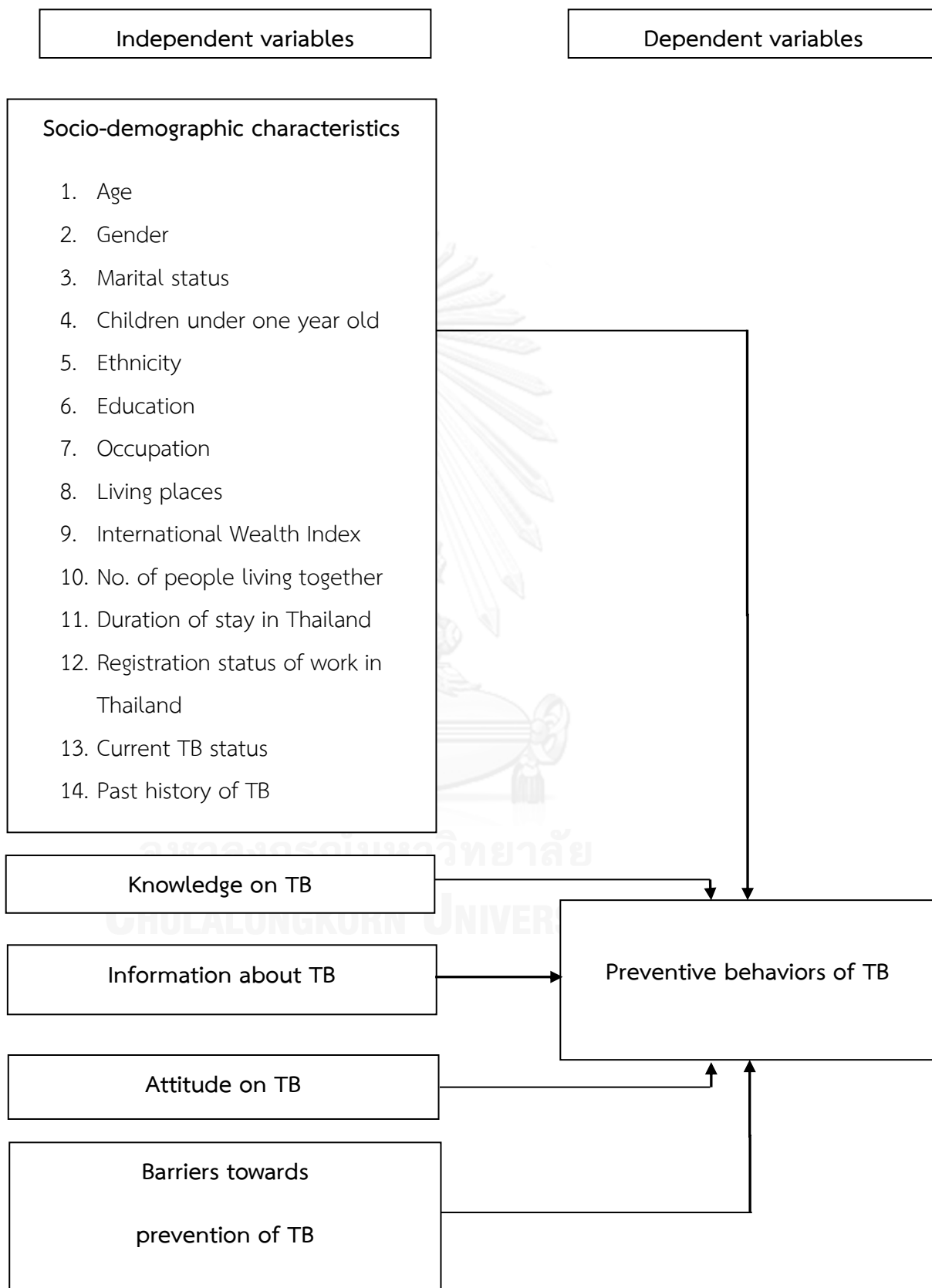
Specific objectives

1. To identify the socio-demographic characteristics of Myanmar migrants in Hua Fai village, Mae Sot district.
2. To find out the levels of knowledge and levels of attitude among Myanmar migrants in Hua Fai village, Mae Sot district.
3. To find out the levels of barriers towards prevention of TB among Myanmar migrants in Hua Fai village, Mae Sot district.
4. To identify the levels of preventive behaviors of TB among Myanmar migrants in Hua Fai village, Mae Sot district.

1.4 Research Hypothesis

1. There is association between the socio- demographic characteristics and the preventive behaviors of TB among Myanmar migrants in Hua Fai village, Mae Sot district.
2. There is association between knowledge on TB and the preventive behaviors of TB among Myanmar migrants in Hua Fai village, Mae Sot district.
3. There is association between attitude on TB and preventive behaviors of TB among Myanmar migrants in Hua Fai village, Mae Sot district.
4. There is association between barriers towards prevention of TB and preventive behaviors of TB among Myanmar migrants in Hua Fai village, Mae Sot district.

1.5 Conceptual Framework



1.6 Operational definitions

The followings are the operational definitions for this study.

Tuberculosis: refers to the active pulmonary tuberculosis caused by *M. tuberculosis*.

Socio-demographic characteristics

- Age: referred to the self-reported last completed birthday at the time of interview.
- Marital status: meant the status of the marriage of the respondents at the time of interview. It was categorized as 'Single', 'Married', 'Divorced', 'Separated', 'Widow' and 'Others'.
- Children under one year of age: meant that the whether there was at least one child (or) more in respondents families (or) at respondents living places and it was categorized into 'Yes' or 'No'.
- Ethnicity: referred to the ethnic origins of the respondents at the time of interview and it was categorized into 'Burmese', 'Karen', 'Mon', 'Shan' and 'Others'.
- Education: referred to the highest attained levels of education of the respondents at the time of interview and it was categorized as 'No education', 'Primary school (grade 1 – 4)', 'Secondary school (grade 5-8)', 'High school (grade 9 – 10)', 'University graduate (finished university)' and 'Others'.

- Occupation: referred to the current occupations of the respondents at the time of interview and it was categorized into ‘No occupation’, ‘Agricultural worker’, ‘Construction worker’, ‘Factory worker’, ‘General workers’ and ‘Others’.
- Living places: referred to the locations of the current living places which were attached with the Thai people or Myanmar migrants. It was categorized into ‘Attached with the residence (s) of Thai people’ and ‘Separated with the residence (s) of Thai people’.
- International Wealth Index: referred to the tool used to measure the wealth status of the community which consisted of three parts: consumer durables, housing characteristics, and public utilities (please see details in Chapter II – literature review).
- Number of people living in the same room: referred to the total number of people who could be any of family members (or) relatives (or) friends (or) colleagues of the respondents those who were living together with respondents in the same room.
- Duration of stay in Thailand: referred to the total number of years and months that the respondents had been staying in Thailand since the time of first migration into Thailand and it was categorized into ‘Years’ and ‘Months’.

- Registration status of work in Thailand: referred to the respondents' self-reported current registration status of work in Thailand supported by evidence of work permit as observed by the interviewers. It was categorized into 'Registered' and 'Unregistered'. Self-reported registered status of work without evidence of work permit was counted separately in the questionnaire.
- Current TB status: referred to the respondents' status on currently receiving the anti-TB treatments (or) being diagnosed as active pulmonary TB patient by the professional health care providers at the time of interview. This information was supported by the documents of diagnosis (or) treatments for TB. The confirmation of the TB status of the respondents were checked and confirmed by the researchers by reviewing their documents. Self-reported TB patients without evidence of any diagnosis documents were counted separately in the questionnaire.
- Past History of TB: referred to the to the respondents' previous status on TB regarding whether he/she had received any anti-TB treatment provided by the professional health care providers in the past. This information was supported by the documents of diagnosis (or) treatments for TB. The confirmation of the TB status of the respondents were checked and confirmed by the researchers by reviewing their documents. Self-reported TB patients without evidence of any diagnosis documents were counted separately in the questionnaire.

Knowledge on TB: referred to the understanding of the Myanmar migrants about TB regarding the causes, mode of transmissions, signs and symptoms, preventions, treatments and misconceptions.

Information about TB: referred to respondents status on received TB information (categorized into 'Yes' or 'No'), sources of TB information (categorized into - Newspapers and magazines, Radio, TV, Billboard, Brochures, posters and other printed materials, Health workers, Family, friends, neighbor and colleagues, Religious leaders, Teachers and Others), contents of TB information (categorized into - Causes of TB, Mode of transmission of TB, Diagnosis of TB, Prevention of TB, How to stay to avoid getting TB from close contact people with TB, Treatments of TB, Information about TB healthcare center(s)/providers: categorized into 'Yes' or 'No', Type of TB healthcare center: Public, Private, Clinic of NGO/INGO and others, Distance to TB healthcare center(s): categorized into ≤ 5 km or > 5 km and Time taken to go to TB healthcare center.

Attitude on TB: meant thoughts and beliefs about the TB from variety of perspectives. It included four components, susceptibility, severity, benefits to the TB prevention. These components were categorized into 'Strongly Agree', 'Agree', 'Not Sure', 'Disagree' and 'Strongly Disagree'.

- Perceived susceptibility: meant that the opinions of the respondents on getting TB related to the preventive behaviors.
- Perceived severity of TB: meant that the opinions of the respondent on how severe the TB related to the preventive behaviors.

- Perceived benefits of prevention of TB: meant that the opinions of respondents on the benefits that would gain from preventing and not acquiring the tuberculosis.

Barriers towards prevention of TB: meant that the social, economic, availability and accessibility of TB health care services and immigration status which contributed as the barriers of the respondents in order to practice the preventive behaviors of TB.

- Affordability to eat foods with good nutrition: meant that the respondents affordability to the nutritious foods which consist of carbohydrates, proteins and fats in their diet.
- Crowded living places: meant that the rooms (or) houses (or) tents (or) any other current living places of the respondents where the total number of people currently living was more than two.
- Poorly ventilated living places: referred to the current living places of the respondents where did not have at least one window (or) air duct to get the dynamic open air flow.
- Availability of TB health care center/service provider: meant that the public (or) private (or) NGO/INGO healthcare center(s) for TB are available in the study area.
- Accessibility of the TB health care center: meant that the TB health care center(s) were located within 5 kilometers of walking distance from the current living places of the respondents.

- Immigration status to seek health care: meant that ‘legal’ or ‘illegal’ immigration status of the respondents in Thailand.
- Direct services costs for health care of TB: meant that the money which had to be paid to receive the TB healthcare for diagnosis, treatments and buying the medicines.
- Indirect services costs for health care of TB: meant that the money which had to be paid for the transportation fees (or) others indirect service(s) fees to seek health care for TB.

Preventive behaviors of TB: referred to the ‘activities of the individuals who believes himself for the purpose of preventing or detecting illness in asymptomatic state’ (Kasl and Cobb, 1966).

- Cough etiquette and cough hygiene: meant that the behavior of the respondents of covering the mouth (or) nose while he/she is coughing or sneezing to prevent the spread of infections.
- Hand washing after touching the public items: meant that the hand washing behavior of the respondents after touching (or) handling the public items which also include the daily working instruments and tools.
- Avoiding the crowded living places: meant that the behavior of respondents to avoid the places with crowded people in order to prevent TB.
- Living in good ventilated places: meant that the behavior of respondents to live in the places with good ventilation where there is at least one window (or) air duct.
- Eating foods with good nutrition: meant that respondents eat the foods with good nutrition which contain carbohydrates, proteins and fats as their diets.

- Screening for pulmonary TB: meant that respondents screened their TB status by checking their sputum at TB health care centers(s) if they suffer cough for more than 2 to 3 weeks.
- Seek health care if TB is suspected: meant the health seeking behavior of the respondents with professional healthcare providers at TB healthcare centers(s) if the signs and symptoms of TB were suspected.
- Avoiding close contact with TB patients: meant that behavior of respondents in avoiding to be in close contact with TB patients.
- BCG vaccination: meant the behavior of respondents making sure that BCG vaccination was done to either of their own the children (or) the others children.
- Read / Watch / Listen the TB information: meant the behavior of respondents reflecting the gathering of the TB through media (or) health care personnel (or) other sources by reading, watching and listening.

CHAPTER II

LITERATURE REVIEW

2.1 Nature of Tuberculosis

TB is a common and fatal infectious disease caused by numerous strains of mycobacteria, commonly *Mycobacterium tuberculosis*. TB infection begins when the mycobacteria reach the pulmonary alveoli, where they invade and replicate within endosomes of alveolar macrophages. The primary site of infection in the lungs, known as the "Ghon focus", is generally located in either the upper part of the lower lobe, or the lower part of the upper lobe. Through blood, TB can also spread infection to more distant sites, such as peripheral lymph nodes, the kidneys, the brain, and the bones (Kumar et al, 2007). All parts of the body can be affected by the disease, though for unknown reasons it rarely affects the heart, skeletal muscles, pancreas, or thyroid (Amonkar, Rupani, Shah, & Parmar, 2009)

2.2 Transmission of Tuberculosis

When people with active pulmonary TB cough, sneeze, speak, sing, or spit, they expel infectious aerosol droplets 0.5 to 5.0 µm in diameter. A single sneeze can release up to 40,000 droplets (Cole and Cook, 1998). Each one of these droplets may transmit the disease, since the infectious dose of tuberculosis is very small (the inhalation of fewer than 10 bacteria may cause an infection) (Nicas et al., 2005). People with prolonged, frequent, or close contact with people with TB are at particularly high risk of becoming infected, with an estimated 22% infection rate (Ahmed and Hasnain, 2011). A person with active but untreated tuberculosis may infect 10–15 (or more) other people per year (WHO, 2013).

Environmental factors that favor the probability of TB transmission are a) exposure of TB in relatively small, enclosed spaces; b) inadequate local or general ventilation that results in insufficient dilution and/or removal of infectious droplet nuclei; and c) recirculation of air containing infectious droplet nuclei (CDC, 1994).

2.3 Vulnerable populations for TB

People with impaired immune system, such as HIV infected people, malnourished or diabetic people, or who smoke tobacco, are highly susceptible to develop the active form of TB (WHO, 2013a). Another high-risk population are injecting drug users, prisoners, communities with deprived medical care settings, people who are in close contact with active TB patients (Griffith and Kerr, 1996). TB is also highly linked with the overcrowding and together with mal-nutrition, it becomes the disease of poverty (Lawn, 2011).

2.4 Symptoms of Tuberculosis

Symptoms of pulmonary tuberculosis are cough lasting for more than 2 to 3 weeks, coughing up blood, fever, night sweats, weight loss and loss of appetite. (StopTB Partnership, 2014).

2.5 Diagnosis of Tuberculosis

Active tuberculosis

A medical history includes the symptoms of TB, exposure to TB, past history of TB infection or TB disease, and risk factors for TB. Demographic factors (e.g, occupation, ethnic groups, country of origin) are also important to ask as these factors might increase the exposure to TB or to MDR-TB. The finding of *M. tuberculosis*, acid-fast-bacilli (AFB) on the sputum smear or pus or tissue biopsy indicates the TB disease. As

not all the acid fast bacilli are *M. tuberculosis*, culture of the samples is done to get the definite diagnosis of TB (CDC, 2011b). However, for the countries where culture is not readily available, a patient with two sputum smear positive for AFB is also considered as 'definite' case (WHO, 2007). Posterior-anterior chest X-ray can be used to identify the lesions and abnormalities of the lungs. The findings from chest X-rays cannot diagnose the TB definitely. It can be used to exclude the like-hood of TB for a person with positive skin tuberculin test (CDC, 2011c). Interferon- γ release assays can be used for the diagnosis of TB but because of the resource limitations, there are only little use of it in developing world (Metcalfe, 2011). Adenosine deaminase testing and nucleic acid amplification tests are used for rapid diagnosis of TB (Bento et al., 2011).

Latent tuberculosis

TB blood test or the Mantoux tuberculin skin test (TST) can be used to detect the *M. Tuberculosis* infection. The test measures the immune reaction of patients to *M. tuberculosis*. It is performed by injecting tuberculin fluid into the skin of lower part of the arm. The result is observed within 48 to 72 hours whether there is induration on the arm. For confirmation of TB, more tests are necessary (CDC, 2011d). Replacement for Mantoux test, QuantiFERON-TB Gold blood test was developed to measure the immune reaction of patients to *M. tuberculosis*. It is used for initial and serial testing of people with risks of both active or latent TB infection (McShane, 2011a). The Xpert MTB/RIF an automated diagnostic test which can identify *M. Tuberculosis* and its resistance to rifampicin (WHO, 2013b). In December 2010, the World Health Organization (WHO) endorsed the Xpert MTB/RIF for use in TB

endemic countries and declared it a major milestone for global TB diagnosis (WHO, 2010a). The Xpert MTB/RIF detects DNA sequences specific for *Mycobacterium tuberculosis* and rifampicin resistance by polymerase chain reaction (Van Rie et al., 2010).

2.6 Treatment of Tuberculosis

WHO developed the Stop TB strategy, strengthening the DOTS, which has the goal to reduce the burden of TB by 2015 to get benefit from the universal access to high-quality diagnosis and patient-centered treatments for all TB patients, TB/HIV patients and drug resistant TB patients (WHO, 2013c).

According to WHO TB treatment guidelines for national TB programs, (WHO, 2010b) there are four aims for treatment of TB:

(1) to cure and restore quality of life and productivity, (2) to prevent death from active TB or its complications, (3) to prevent the relapse of TB, (4) to reduce the TB transmission to others, (5) to prevent the occurrence and transmission of drug resistance.

The first-line anti-TB drugs for adults are isoniazid (H) , rifampicin (R), pyrazinamide(Z) ethambutol (E) and streptomycin(S).

The different drugs have different mechanisms of actions against TB bacteria. Isoniazid has the bactericidal actions to rapidly killing bacteria but it produce bacteriostatic action for the slow growing bacilli. Rifampicin has both bactericidal and sterilization effects. Ethambutol has bacteriostatic effect at low dose, but with higher dose it is bactericidal. Pyrazinamide has weak bactericidal effect but it is effective for

the bacteria inside macrophages, or in acidic environment or in areas of acute inflammation. Streptomycin is also an effective bactericidal drug which has to be administered intramuscularly. The drugs are used as the FDC forms, except streptomycin injection, to increase the patients' adherence and to prevent drug resistance.

Regimen for new patients

New patients are those who have no history of previous TB treatment (or) who has taken anti-TB drugs for less than one month no matter the sputum smear or culture results are positive or not.

The treatment has two options:

Standard regimen for new TB patients: (presumed, or known, to have drug-susceptible TB): Intensive phase (2 months of HRZE) and continuation phase (4 months of HR).

Standard regimen for new TB patients: (for conditions with the presence of high level of isoniazid resistance among new TB cases and no testing for isoniazid susceptibility (or results are not available) before the beginning of continuation phase): **Intensive phase** (2 months of **HRZE**) and **continuation phase** (4 months of **HRE**).

Regimen for previously treated patients: Previously treated TB patients refer to those who are returning after default, who are retreated after treatment failure and relapse cases.

Standard regimens for previously treated patients : Intensive phase (2 months of HRZES and 1 month of HRZE) , Continuation phase (5 months of HRE). DST has to be done and results have to be waited to confirm the patients have MDR-TB or not. For countries using the rapid molecular-based DST, it usually takes 1 or 2 days to obtain. For countries using conventional DST, it takes weeks or months to get the result. The regimen will be modified according to the DST results which particularly show the resistance to the first line anti-TB drugs. For countries without the DST facilities, the NTP should take prompt actions to send the sputum specimens to the reference laboratories to obtain the MDR-TB results while the patients are undergoing the standard regimens.

Multidrug resistance and extreme drug resistant TB

MDR-TB is form of TB which has resistance to at least isoniazid(H) and rifampicin(R) which are the two most powerful (standard) first line anti-TB drugs. The causes of MDR-TB is using the anti-TB drugs inappropriately or incorrectly or using the poor quality medicines. Second line anti-TB drugs have to be used for MDR-TB and the treatment duration is extensive (up to two years). The second-line medicines are not always available, more costly and have severe side effects to the patients. The second-line anti-TB drugs are aminoglycosides: e.g., amikacin (AMK), kanamycin (KM); polypeptides: e.g., capreomycin, viomycin, enviomycin; fluoroquinolones: e.g., ciprofloxacin (CIP), levofloxacin, moxifloxacin (MXF); thioamides: e.g. ethionamide, prothionamide ; cycloserine: e.g., closerin and terizidone. XDR-TB is a form of MDR-TB, which responds to few medicines which include the most effective second-line anti-TB drugs such as fluoroquinolones or injectables.

2.7 Prevention of TB

Good nutrition

It is well established that nutritional deficiency is associated with impaired immune functions and also it has long been known that there is an association between TB and malnutrition. Malnutrition enhances the development of active TB, and active TB makes malnutrition worse. Available data suggest that malnutrition affects cell-mediated immunity, which is critical for controlling TB infection, and may increase the risk of active TB disease development by six to ten times (USAID, 2008). It is generally recommended that all people consume approximately 15 – 30% of energy as protein, 25–35% as fat and 45–65% as carbohydrate as a good nutrition (WHO, 2013d).

Cough etiquette and cough hygiene

For the effective prevention of TB, practice of covering the mouth and nose while coughing and sneezing which is known as cough etiquette and cough hygiene have to be followed (Stop TB partnership and WHO, 2008).

Environmental measures

The source of TB infection can be controlled by diluting and removing contaminated air and by using general ventilation: using the natural ventilation (e.g., open doors, windows), using mechanical ventilation equipment to circulate and move air in a building and using local exhaust ventilation (e.g., hoods, tents, or booths) (CDC, 1994).

Vaccination

Bacillus Calmette–Guérin (BCG) is the currently available vaccine which is effective against the disseminated forms of tuberculosis in childhood (McShane, 2011b). BCG is prepared from a strain of live bovine tuberculosis bacillus which is an attenuated form. It is effective up to 80 % in preventing TB for 15 years duration. The protectiveness of BCG, varies depend on the geographical places and the lab where the vaccine was produced. (Venkataswamy et al, 2012).



2.8 Global situations on Tuberculosis

About 30 % of the total populations in the world have *M. Tuberculosis* infection (WHO, 2013). There were about 8.7 million of new TB cases and 1.4 millions of deaths due to TB in 2011. Approximately 1.1 million (13 %) of new TB cases are co-infected with HIV. There are 430,000 TB deaths with HIV infection and 990,000 TB deaths without HIV infection. The estimated numbers of cases are highest in Asia. Approximately 60 % of total cases are in Asia (South-East Asia and Western Pacific) region. In worldwide, about 3.7% of new cases and 20% of previously cases have MDR-TB cases and about 9 % of these MDR-TB cases have XDR-TB (WHO, 2012c). South-East Asia region has about 40 % (3.48 million) of total new TB cases in the world. Bangladesh, India , Indonesia , Myanmar and Thailand are the five countries which are among the 22 countries of highest TB burden in the world. TB cases are occurring among the people in the maximum productive age group of 25 to 54 years which has large impact on the social and economic loss. In 2010, male-to-female ratio of new sputum smear positive cases was 2.0. About 1.7-2.5% of new TB cases and estimated 17-18% of previously treated TB cases have MDR-TB. Among the detected cases, about 25% of the world's MDR-TB cases were in this region in 2010. This region also hosts 11% (about 3.5 million) of total people with HIV in the world. Average 5.7% of TB cases in this region are co-infected with HIV (WHO, 2012d).

2.9 Tuberculosis in Myanmar and Thailand

TB prevalence in Myanmar is 506 per 100,000 populations and the incidence is 993 new cases per year. Mortality rate due to TB is 48 per 100,000 populations. There were 42,324 new sputum smear positive cases (32 % of total new cases). Total TB cases were 132,131 and total re-treatment cases were 11,009. 4.2 % of total new cases and 10 % re-treatment cases are MDR-TB cases. TB prevalence in Thailand is 161 per 100,000 populations and the incidence is 124 new cases per year. Mortality rate due to TB was 14 per 100,000 populations. There were 33,169 new sputum smear positive cases (52 % of total new cases). Total TB cases were 63,909 and total re-treatment cases are 3,767. 1.7 % of total new cases and 35 % re-treatment cases were MDR-TB cases (WHO, 2012e and 2012f). Comparing the two countries, Myanmar has the relatively higher TB disease burden than Thailand.

2.10 Global situations on migrations and health

Between 1960 and 2005 the number of international migrants in the world more than doubled, from an estimated 75 million in 1960 to almost 191 million in 2005, according to a United Nations report, *Trends in total migrant stock, 2005 revision*. Migration is now running at about 3% annually, according to the IOM. Undocumented migration is harder to track but the International Labour Organization estimates that there are 15–30 million irregular immigrants internationally. The sheer scale of human displacement has turned migrant health into a priority global public-health issue, an issue rendered more complex by the diversity of the populations involved from people in search of work or education to more vulnerable groups like asylum seekers and refugees (Figueroa-Munoz et al., 2008).

2.11 Migrants and TB

Migrant and refugee communities have special health needs and experience obstacles for accessing health care such as language, stigmatization, poor cultural awareness, psychological distress, disruption of families and social networks, and economic difficulties. Although they should be entitled to the same health-care services as the general population, in practice many are denied access or experience barriers such as lack of cultural sensitivity, language skills, awareness of rights and services provided. Cross-border populations are low-income minorities living near a border and working in the neighboring country, involving continuous movement across borders. Often, they are skilled temporary migrants performing services abroad without intention or right to settle or seek permanent employment in the host country. These include both legal and undocumented cross-border migrants; manual workers; internal migrants; sex workers; mobile occupational persons such as truck drivers, crop pickers or traders. Legal groups have access to health care; but more often these people are illegal workers who are excluded from services. Cross-border procurement is important as drug availability could differ across borders. Drugs may be available over-the-counter, be more affordable or of dubious quality. The association between TB and poverty is mediated by overcrowding, poorly ventilated housing, malnutrition, smoking, stress, social deprivation and poor social capital. The perceptions of health and illness in many minority groups are altered resulting in a negative impact on health-seeking behaviors and access to services. Important factors include disrupted social networks, social exclusion, reduced accessibility to health care, lack of egalitarian participation in society and lack of trust, understanding or respect for the system. Women, unemployed and homeless people experience

longer delays in seeking care resulting in increased suffering and expenses and higher risk of community transmission. Stigmatization of diseases such as TB, HIV/AIDS, malaria and mental distress further impede access. Asylum seekers who have been tortured may find it difficult to trust doctors since torture is often administered by them. As long as marked economic differences prevail between industrialized countries and other countries, economic migration will remain an unavoidable event. Economic migrants tend to be skilled or semiskilled workers who emigrate with a long term perspective. Migration increases the risks of transmission of infectious diseases such as TB, particularly if migrants originated in high prevalent countries. Many countries advocate for targeted screening of immigrants according to the country of origin and enhanced surveillance for recently arrived populations. Ensuring adequate access to health care will facilitate early identification and treatment of TB (Figueroa-Munoz et al., 2008).

In Thailand, TB is the second leading cause of mortality among the 49 infectious diseases under surveillance. From 2007 to 2011, the number of reported TB cases among the foreigners increased from 573 to 1,905 and pulmonary TB alone is from 483 (84%) to 1,683 (88%). TB is also the third most reported cases among the foreigners. Out of total 1,905 cases, 1,358 (71%) of cases were from Myanmar people. In 2011, total numbers of reported TB cases by Myanmar nationalities in Thailand is 1,358 including the cases from the migrants. The distribution patterns of TB disease from the reported cases are pulmonary TB (89 %), TB meningitis (1.25 %) and TB other organ (9.58 %) (MOPH, 2011).

2.12 Migrations of Myanmar people into Thailand

According to National Population and Housing Census 2010, Thailand has total population of 65.4 million. In 2009, there were about 3.1 million of migrants working in Thailand (UN and IOM, 2011). About 2.5 million (80 % of total migrant populations) are from Myanmar (Mahidol university and WHO, 2011).

In 2012, the number of total migrants were 1,186,805 : 619,644 of them were in the legal status (registered) and 567,161 were in the illegal status (unregistered). Most of the working migrants are un-skilled and low-skilled workers (Chantavanich and Vungsiriphisal, 2012).

2.13 Health Belief Model

It was developed in 1950 in USA by the researchers. It is a psychological model which tries to explain and predict about the health behaviors. It is focused on the beliefs and attitudes of the individuals. In case of TB prevention, if a person

1. Feels that an undesirable health condition (e.g, being infected with TB) can be avoided.
2. Has positive expectation by taking the recommended action (e.g, effective preventive behaviors would prevent from getting TB).
3. Believes that he/she can successfully take the recommended health actions (e.g, he/she would practice the preventive behaviors with full confidence).

HBM has four components; perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. 'Readiness to Act' of individuals is also taken into account as a concept in HBM. Rosenstock and others added the other concept in 1988 which make HBM to fit for unhealthy behavior such as smoking, alcohol drinking etc. In this study perceived susceptibility means the respondent opinion of chances of getting TB if she/he doesn't practice preventive behaviors. Perceived severity means the respondents' opinions of how serious the implications of TB and its consequences such as economic, psychological, social and job-related problems. Perceived benefits refers to the respondent's belief in the facts that if he/she practice the preventive practices would protect him/her from getting TB. Perceived barriers mean that the respondent's opinion of the tangible and psychological costs of the preventive behaviors (Strecher and Rosenstock, 1997).

2.14 International Wealth Index (IWI)

International Wealth Index (IWI) is the comparable asset based index for household's long-term economic status that can be used for all low and middle income countries. IWI is similar to the widely used wealth indices included in the Demographic and Health Surveys and UNICEF MICS (Multiple Indicator Cluster Survey) with the addition of the property of comparability across place and time. A household's ranking on IWI indicates to what extent the household possesses a basic set of assets, valued highly by people across the globe. IWI is based on data from 2.1 million households in 97 developing countries. Test analyses show IWI to be a reliable and valid index. National IWI values are highly correlated with established welfare measures like the Human Development Index ($r=.90$); IWI-based poverty measures are highly correlated with poverty headcount ratios. IWI is calculated by the formula which was based on the possession of the assets. The assets include (i) seven consumer durables (possession of a TV, refrigerator, phone, bicycle, car, cheap utensil- approximately under 50 USD and expensive utensil- approximately over 300 USD), (ii) access to two public services (water and electricity) and (iii) three housing characteristics (number of sleeping rooms, quality of floor material and quality of toilet facility). This set of assets was selected because of its wide availability in household surveys and because it differentiates well across the wealth range needed for a wealth index covering the complete developing world. Quality of water supply, quality of floor material and quality of toilet facility were measured with three categories: (1) Low quality, (2) Middle quality, and (3) High quality. For the number of sleeping rooms also a three-category variable is used: (1) Zero or One sleeping rooms, (2) Two sleeping rooms, and (3) Three or more sleeping rooms. Zero and One

rooms are combined, because it is in a substantial number of surveys not possible to distinguish between households that have one sleeping room and households that only have one room, and hence use the living room for sleeping.

Definitions of the quality of water, floor materials and toilet facility were as mentioned below.

Water supply –

- (1) Low quality: unprotected well, borehole, spring, surface water, etc.
- (2) Middle quality is public tap, protected well, tanker truck, etc.
- (3) High quality is bottled water or water piped into dwelling or premises.

Toilet facility –

- (1) Low quality is traditional pit latrine, hanging toilet, or no toilet facility.
- (2) Middle quality is public toilet, improved pit latrine, etc.
- (3) High quality is any kind of private flush toilet.

Floor quality:

- (1) Low quality is none, earth, dung etc.
- (2) Middle quality is cement, concrete, raw wood etc.;
- (3) High quality is finished floor with parquet, carpet, tiles, ceramic etc.

IWI values can be calculated for individual person using the predefined formula in SPSS.

For detail calculation of IWI in SPSS, the standard labels were given to the variables: TV labeled as 'Household or member owns a TV', refrigerator labeled as 'Household or member owns a fridge', phone labeled as 'Household or member owns a phone', bicycle labeled as 'Household or member owns a bicycle', car labeled as 'Household

or member owns a car', cheaputen as 'Household or member owns at least one cheap utensil' and exputen 'Household or member owns at least one expensive utensil'. For scoring, score '1' was given to each durable item that the respondent(s) owned, and score '0' was given for each durable item(s) that the respondent(s) did not own.

Standard labels for quality of water, quality of floor materials quality of toilet materials and number of sleeping rooms were given as follow: Water supply – Low quality to 'water1', Medium quality to 'water2', High quality to 'water3'; Floor materials – Low quality to 'floor1', Medium quality to 'floor2', High quality to 'floor3'; Toilet facility – Low quality to 'toilet1', Medium quality to 'toilet2', High quality to 'toilet3'; Number of sleeping room – Zero (or) One to 'sleepr1', Two to 'sleepr2', Three (or) more to 'sleepr3'

For quality of water, floor materials, toilet facility: score '1' was given for the Low quality, '2' was given for the Medium quality, '3' was given for High quality respectively. For number of sleeping rooms: score '1' was given to Zero (or) One room, '2' was given to Two rooms and '3' was given to Three (or) more rooms.

After completing the data set, using 'Compute' command in SPSS, IWI values could

be calculated with the following formula: $(25.00447 - 6.306477 * \text{water1} - 2.302023 * \text{water2} + 7.952443 * \text{water3} - 7.439841 * \text{toilet1} - 1.090393 * \text{toilet2} + 8.140637 * \text{toilet3} -$

$7.558471 * \text{floor1} + 1.227531 * \text{floor2} + 6.107428 * \text{floor3} + 8.612657 * \text{tv} + 8.429076 * \text{fridge} + 7.127699 * \text{phone} + 8.056664 * \text{electr} + 4.651382 * \text{car} + 1.84686 * \text{bicycle} + 4.118394 * \text{ch}$

$\text{cheaputen} + 6.507283 * \text{exputen} - 3.699681 * \text{sleepr1} + 0.38405 * \text{sleepr2} + 3.445009 * \text{sleepr3}$).

If the household has all durables and highest quality housing and services, its IWI value is 100. If it has none of the durables and lowest quality housing and services,

it's IWI value is 0. IWI can be used for all low income countries and the majority of middle income countries. In this study, average of IWI of the respondents was compared with the average IWI value of Thailand which was 77.5 based on the 2006 MICS 3 database of Thailand (Smits et al., 2012).



2.15 Related studies

Socio-demographic characteristics and preventive behaviors of TB

Age and preventive behaviors of TB

The study of (Xu et al., 2013) was to assess the delays in health care seeking, diagnosis and treatment among TB patients and to find the associated factors with the delays in Bao'an District, Shenzhen, China. This study revealed that female sex and older age were significantly associated with delay in health care seeking. The first episode of TB and smear positivity was significantly associated with lower odds of delay in diagnosis. And then the smear positivity was significantly associated with higher odds of delay in treatment.

Gender and preventive behaviors of TB

The study of (Wang et al, 2008) explores the knowledge of TB and health care seeking behaviors of people in different gender in rural area, Yangzhong County, a rural area of China. This study revealed that only 16.0%(men 17% and women 15%) of study populations knew the cough for more than three weeks as a symptom of suspected TB. Less women knew the health facilities and current health care policy for TB than men. Fewer women would like to learn and share the TB information to others. On the other hand, 79.2% of women with cough symptom would like to seek health care and only 58.6% of men did. But large number of women preferred to go the low level health facilities such as drug stores and village clinics rather than the hospitals.

Marital status and preventive behaviors of TB

The study of (Yusuf, 2004) revealed that the respondents level of knowledge on signs and symptoms are low and very few know about the prevention of TB by BCG vaccination. Half of married couples were delayed in seeking treatment for TB. The respondents with working status are also delayed in seeking the treatment.

Ethnicity and preventive behaviors of TB

The study of (Isarabhakdi, 2004) conducted in Kanchanaburi province, Thailand, revealed that the different ethnics of Myanmar migrants have different pattern of health seeking behavior. Migrants from Burmese, Karen and Mon ethnics were involved in this study. The findings stated that migrants of 60% of Karen ethnic had the most inappropriate health seeking behavior by taking self-treatment whereas only 16% of Burmese and 20% of Mon ethnics did the same self-treatment. The major influencing factors for the inappropriate health seeking practices were the language barriers and the locations of the residences of the migrants were inside the forest especially for the Karen ethnics.

Education and preventive behaviors of TB

The study of (Shetty et al., 2006) conducted in South India revealed that education was one of the associated factors of TB. They found out that lower education level was associated with TB: the lower the education level, the higher the risk of getting TB.

Occupation and preventive behaviors of TB

(Naing et al., 2012) studied in Songkhla province, Southern Thailand focused to explore the health care seeking practices for suspicious symptoms of TB and other factors influencing on these practices. Migrants workers are from three categories of occupation (factory workers, rubber tappers and construction workers) are involved in this study. This study revealed that the about 90% of workers from each occupational categories take self-medication when the suspicious symptoms of TB are developed. TB suspicious symptoms were found about 6% among factory workers, about 27% and 30% in rubber tappers and construction workers respectively.

Wealth index and tuberculosis

The study of (Spence et al., 1993) explored the relationship between the Tb and poverty in Liverpool. In this retrospective study, all forms of TB who are 344 residents of Liverpool with TB were correlated with the four indices of poverty; council housing, free school meals, the Townsend overall deprivation index, and Jarman index. The findings indicated that the poverty had strong correlation with Jarman index ($r=0.73$, $p<0.001$) and concluded that the TB remained strongly associated with poverty.

Number of people living together and preventive behaviors of TB

The study of (Baker et al., 2008) which conducted in New Zealand stated that the poor housing conditions which were crowded with many people attributed to TB. They focused on the migrant people from the countries with high incidence of TB. The results mentioned that the household crowding was statistically associated with TB.

Duration of stay and preventive behaviors of TB

The study of (Verver et al., 2002) done in Netherlands found out that there was association between the long duration of stay and positive contribution towards the screening for TB among the immigrants. In Netherland, all immigrants from high TB endemic countries had to undergo entry TB screening by X-rays and voluntary half yearly screening for 2 years. This study found out that immigrants with long duration of stay in Netherland had more likely to do the voluntary screening rather than those who just arrived. This study highlighted that the longer the duration of stay, the more the participants wanted to screen for TB.

Registration status and preventive behaviors of TB

The study of (Huffman et al., 2012) in Kazakhstan highlighted that due to the illegal aspects, undocumented seasonal workers from the other region, Uzbekistan, encountered the barriers and unfavorable conditions for the health seeking of TB. These workers had delays in treatment-seeking and treatment interruptions which tend to increase the severity of TB and enhance the development of MDR-TB.

Knowledge and preventive behaviors of TB

(Bati et al., 2013) studied in Ethiopia revealed that the study populations had the low level of TB knowledge about causal agent which was only 3.3% and about the major symptoms (cough for two weeks and above) which was only 9.9%. Additionally, this study highlighted the low level of general knowledge, negative attitude are significantly associated with poor practices of TB especially in female participants from Nuer site, one of the study locations, comparing with the other sites. This study assumed that the mobilization of the populations from Nuer site make more difficult

to deliver the health education about TB comparing with the others. (Yadav et al., 2006) studied in sandstone workers in the desert of Rajasthan, India. This revealed that the sandstone workers have very low level of knowledge on TB. Only 1.6% know about the causal factor of TB, 0.8% know about the BCG as vaccination for prevention of TB and 45.2% have misconceptions of TB thinking it is a hereditary disease. The findings suggest that there is strong association between the low level of TB knowledge and literacy level. The study of (Hoa et al., 2003) conducted in rural area of Vietnam revealed that a large proportion of individuals with a cough for more than three weeks had limited knowledge of the causes, transmission modes, symptoms, and curability of TB. Men had a significantly higher knowledge score than women. Better knowledge was significantly related to seeking healthcare and seeking hospital care for TB. This study also highlighted that participants who mentioned that radio and television as sources of information had higher knowledge scores compared with those who reported receiving information from friends or relatives. Findings from this study highlighted that there was the association between the TB knowledge levels and media access. The study of (Kiko, 2013) in Japan revealed that effective health education which strengthens to improve the knowledge about TB and recognizing the threats of TB lead to the promotion of TB preventive intentions and behaviors. This study mentioned that in order to improve the community's understandings of TB about its threats, contents of TB information were important.

Attitude and preventive behaviors of TB

Perceived susceptibility and preventive behaviors of TB

The study of (Zhang et al., 2007) highlighted that in the study populations, the wrong perceptions on TB were linked with the low education levels and low socio-economic status. Only 40% of the respondents had susceptibility on TB that it was caused by close contact with TB patients. Because of these wrong perceptions and other existing stigmas, respondents seek health care for TB only when they failed to treat themselves. Most of them seek health care at informal and less qualified village level health care providers.

Perceived severity and preventive behaviors of TB

The study of (Liefoghe et al., 1997) revealed that TB is perceived as a contagious, 'sensitive' disease difficult to diagnose and treat. Community members believe that TB should be diagnosed and treated in a hospital or by a medical doctor and not at the peripheral level. TB treatment is perceived as long, agonizing and cumbersome. Traditional treatment is considered a valid alternative to modern treatment, believed to be as effective and much shorter. Only after symptoms persist for some time and/or the suspect's health deteriorates, are modern health services consulted. This study highlighted that the complexity of wrong perceptions and stigmas misled the respondents to the wrong direction or delay in health seeking practices.

Perceived benefits and preventive behaviors of TB

The study of (Hochbaum and United States, 1958) highlighted that the perceived benefits of the people brought them to the health care services. He studied 1,200 respondents to see whether they look for the chest X-rays during a period to for

their own health benefits from the perceived benefits and susceptibility aspects to diagnose the disease. He found that 82% of people who had good perceptions on susceptibility and benefits had come to had voluntary chest X-ray.

Barriers to prevention of TB

Malnutrition and prevention of TB

The study of (Strachan et al., 1995) compared the two groups of people, Hindu Asians and Muslims, to explore that whether vegetarian diet is a risk factor for TB in Asian immigrants in South. The results revealed that the risk of tuberculosis was increasing with the decreasing intake of fish or meat. The vegetarians have 8.5 times more risk than the daily meat (or) fish eaters. This study highlights that for Asian immigrants, the vegetarian diet is an independent risk factor. There is the interaction between malnutrition and tuberculosis and these two are the problems of significant magnitude in majority of the developed regions of the world. Malnutrition can bring the state of secondary immunodeficiency which increases the susceptibility to TB. In TB patients, due to loss of appetite, malnutrition occurs. Both micronutrients deficiencies and protein-energy malnutrition increase the risk of TB (Gupta et al., 2009).

Crowded living places and prevention of TB

The study of (Clark et al., 2002) conducted in Canada highlighted that TB there were significant associations between housing density, isolation, income levels, and TB. Houses with crowded conditions have the potential to increase exposure of

susceptible individuals to infectious TB cases, and isolation from health services may increase the likelihood of TB.

Poor ventilated places and prevention of TB

The study of (Beggs et al., 2003) used three epidemiological models that have been used to predict the transmission of airborne disease in confined spaces to find out the nature of the transmission pattern of TB. The study revealed that if the proximity of a susceptible to an infector is ignored, then the probability of an individual contracting a TB infection is primarily governed by the length of time the individual is exposed to the infectious agent. If the concentration of quanta in the room air is high, the time period before infection occurs would be short. Conversely, if quanta levels are low, the safe exposure duration would be much longer.

Availability of TB healthcare center to prevention of TB

The study of (Wandwalo and Morkve, 2000) conducted in Mwanza, Tanzania highlighted that the delays in health seeking for TB were significantly longer in rural areas. The patient's delay was significantly associated with the travelling distance from homes to clinics, level of education and knowledge about TB. This study also pointed out that the most important influencing factors for the delay were availability and accessibility of services and patients knowledge level.

Accessibility of TB health care center to prevention of TB

The study of (Lienhardt et al., 2001) in Gambia revealed that there were delays in the study populations to the TB treatment especially for those who were staying in the rural areas. The major reasons were due to hard access to the diagnostic and treatment facilities and lack of awareness about the signs and symptoms of TB.

Direct costs and preventive behaviors of TB

The study of (Kamolratanakul et al., 1999) conducted in Thailand highlighted that the out-of-pocket expenditures for treating the illness for TB patients – with incomes below the poverty line- were accountable for more than 15% of yearly household incomes. And the incomes were reduced by 5% due to illness related effects. Health expenditures were mostly financed from the savings from the household, payments from the relatives and community members. However, 11.8% of patient households took out bank loans, and 15.9% sold part of their property.

In-direct cost and preventive practices of TB

The study of (Cambanis et al., 2005) in Ethiopia revealed that delays in health seeking over 4 weeks were significantly associated with rural residence, transport time over 2 hours, overnight travel, transport cost exceeding US\$1.40, having sold personal assets prior to the visits, and use of traditional medicine. The majority of patients cited economic or logistical barriers to health care when asked directly about causes of delay.

TB and Myanmar migrants in Thailand

(Hemhongsra et al., 2008) revealed that the rate of diagnosed TB per 100,000 persons was 109 in Thais and 490 in non-Thai people (340 in refugees and 150 in migrants). 608 (56%) non-Thai pulmonary TB patients were diagnosed with smear-positive TB, whereas 247 (43%) Thais - were diagnosed with smear-positive TB Only 493 (29%) Thai patients with unknown HIV status and 693 (71%) of 972 non-Thai patients with unknown HIV status. Out of 1,662 patients registered in one year, 1,087(65%) of people were non-Thai persons and among non-Thai people 38% are migrants, 51%

of these migrants were in un-registered immigration status. And 6 cases of MDR-TB were identified among the Myanmar migrants. It is found out that in Tak province, under Migrant Health Program, TB is the second most reported disease among the other two communicable diseases from 2004 to 2006 (IOM and MOPH, 2009). The patterns of sickness and prevalent diseases among foreign patients are not so different from Thai patients. Somehow, emerging disease like TB still found with more prevalence rate among foreign patients compared to Thai patients. By comparing the prevalence between Thai and foreign patients, it was found that the prevalence TB was about 2 times higher in non-Thai people (Mahidol university and WHO, 2011).

In 2011, there were 1,358 reported TB cases who were Myanmar nationalities including the cases from the migrants. The distribution patterns of TB disease from the reported cases were pulmonary TB (89 %), TB meningitis (1.25 %) and TB other organ (9.58 %) (MOPH, 2011).

Myanmar migrants and Mae Sot district

Mae Sot is one of the 9 districts of Tak province located at western Thailand. It is about 560 kilometers in border with Myanmar. It is the main land gateway between Myanmar and Thailand and the Asian Highway (AH1) links between Thailand and Myanmar. Mae Sot district has 10 sub-districts which are Mae Sot, Mae Ku, Phawo, Mae Tao, Mae Kasa, Tha Sai Luat, Mae Pa, Mahawan, Dan Mae La Mao and Phra That Pha Daeng. There are estimated 266,000 migrant workers in Tak province and about 45% (120,000) of Myanmar migrants are in Mae Sot district (Chantavanich and Vungsiriphisal, 2012).

Tuberculosis in Myanmar migrants in Mae Sot

In 2001, total 13 XDR-TB cases were identified in Myanmar migrants in Mae Sot by MOPH and ,in 2002, there were 885 Myanmar migrants had to take the treatment for TB among 30,000 Myanmar migrants in Mae Sot who were seeking jobs in agricultural and garment factories. In 2004, Mae To clinic in Mae Sot reported 700 new TB cases among the Myanmar migrants. Another 2 cases of identified XDR-TB were Myanmar migrants in Mae Sot in June 2007 (Manirul and Pyrikamon, 2007).

Hua Fai village

It was one of the villages of the Phra That Pha Daeng sub-district under Mae Sot district. It was one of the category 1 villages of the Phra That Pha Daeng sub-district. It was a small village and known as Moo 2 village which has the total populations of 1,482 people (males 765 and females 717) and 563 households (Tak provincial administrative office, 2013). Myanmar migrant community in Hua Fai village is less well known as the location of the living places of these migrants were in the rural area. The distribution pattern of Myanmar migrants in Hua Fai was very sparse patterns in the ways of clustered community: some of them were living in paddy fields where their tents (or) living places were far from the each other house and as well as from the center of village, some of them were living inside the village with poor housing conditions like temporary shelters, some of them were living in the crowded hostels inside the compounds of Thai people who were the owner of small business such as small factories. There was not known NGO/INGO healthcare organization which was covering and providing healthcare services to the study populations in Hua Fai. As both unregistered and registered Myanmar migrants were

residing in Hua Fai, the health care needs, especially for unregistered migrants could not be fulfilled. The number of exact Myanmar migrants and their households are not known because of their frequent migration in nature and the sparse distribution patterns of living places. Therefore, the researcher interviewed with one of the volunteers from Ambassador for Christ Church to get the estimated population data of the migrants. The volunteers from the Ambassador for Christ Church have been providing the social and nutritional supports to the Myanmar migrants in Mae Sot including the migrant community in Hua Fai village. According to the interview and reviewing the list of migrants receiving the supports from the volunteer leader, up to November 2013, the estimated number of Myanmar migrants at the Hua Fai village is about 900 and the total number of households is about 200 (Steven, Interview, 30 November, 2013). There was no previous similar research in that community. Therefore the preventive behaviors and the associated factors from the Myanmar migrant community in Hua Fai village were not known.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

Cross-sectional descriptive study design was used.

3.2 Study area

This study was conducted in the Hua Fai village, Mae Sot district, Tak province, Thailand.

3.3 Duration of study

This study was conducted from the middle of March 2014 to first week of April 2014.

3.4 Study Population

Both registered and unregistered Myanmar migrants who were at 18 years of age and above, and currently living at Hua Fai village, Mae Sot district.

3.5 Sample size: Cochran (1963:75) formula was used to calculate the sample size.

$$n_0 = \frac{Z^2 pq}{(e)^2}$$

$$n_0 = \frac{(1.96)^2 (0.49) (0.51)}{(0.05)^2}$$

$$n_0 = 384$$

Where, n_0 = sample size

p = 0.49 prevalence of TB in Myanmar: reference from (WHO, 2012g)

q = $1 - p$ = $1 - 0.49 = 0.51$

Z^2 = value for Z area under the curve

e = desired level of precision (0.05)

The calculated sample size is 422 (384 + 10 % of expected refusals data).

3.6 Sampling method

Multistage sampling method was used to collect the sample.

First stage - Researcher purposively selected the Mae Sot district due to the large populations of Myanmar migrants, large number of cross border populations and variety of occupations of the migrants.

Second stage - The researcher purposively selected the Hua Fai village at tabon Mae Sot because i) there was no previous study conducted in the selected area ii) the existence of Myanmar migrant populations at the selected area was less well known than the other areas as it was located in the rural area of Mae Sot district.

Third stage - Then the researcher used convenient sampling method was used to collect the samples. The researcher used the link from the

The volunteers from Ambassador of Christ's church had been providing the social supports to the Myanmar migrants in Hua Fai village for several years. Therefore, these volunteers had known and had been familiar with the Myanmar migrants from Hua Fai. Through the link of these volunteers, the researcher reached out into community. In the community, firstly, the researcher obtained the samples from

Myanmar migrants those who were receiving the social supports from the volunteers. Secondly, through social network and individual contacts: based on the occupation and living places; of the Myanmar migrants who were interviewed firstly, the researcher expanded in finding more samples using convenient sampling using the subsequent networking the contacts among the community. Simple random sampling could not be used because most of respondents were highly mobile, and their mobility made impossible to have a complete list of migrants with their residences and working place addresses from where to draw the sample randomly.

Inclusion criteria

Myanmar migrants who are

- Age (18) years and above.
- Able to speak Myanmar language fluently.
- Willing to participate in the interview
- With or without past history of cured or completed TB treatment
- People who have been living Mae Sot for more than (3) months

Exclusion criteria

- People who are physically or mentally ill to communicate with the interviewers.
- People with current TB diagnosed or being treated by the professional healthcare providers.

3.7 Measurement Tool

Research instrument

Researcher used the interviewer administered questionnaire. Questionnaire was developed by modifying the question sets from the book 'A guide to developing knowledge, attitude and practice surveys' (WHO, 2008b), and modified from the previous studies. The questionnaire was translated from English into Myanmar language by an expert in English and Myanmar language. Then back translation was done from Myanmar to English language which was done by second expert. There were 6 sessions in the questionnaire. These sessions are as mentioned below.

- (I) Socio-demographic characteristics
- (II) Knowledge on TB
- (III) Information about TB
- (IV) Attitude on TB
- (V) Barriers towards prevention of TB
- (VI) Preventive behaviors of TB

(I) Socio-demographic characteristics

This section include the questions aimed to find out the socio-demographic characteristics of the respondents such as age, gender, marital status, ethnicity, education, occupation, living places, international wealth index, no. of people living together, duration of stay in Thailand, registration status of work in Thailand, past history of TB and current TB status. There were 16 questions in this section.

The International Wealth Index (IWI) consisted of the three parts (i) consumer durables, (ii) housing characteristics and (iii) public utilities. The consumer durables include 7 items: television, refrigerator, phone, car, bicycle, cheap utensils and expensive utensils and others. The cheap utensils are the items which value approximately less than 50 USD (e.g., chairs, table, clock, fan etc.) and the expensive utensils are items which value approximately more than 300 USD (e.g., air-conditioners, computers etc.). Housing characteristics included 4 items: quality of water supply, quality of floor materials, quality of toilet facility and number of sleeping rooms. The categorizations and scorings of variables were done according to the methods from the paper (Smits et al., 2012).

(II) Knowledge on TB

This session included the knowledge about TB of the sample populations which include cause of TB, transmission, signs and symptoms, prevention, diagnosis, treatments, misconceptions, sources and contents of the information about TB. There were 8 question stems in this section which covered 39 items. The answers were categorized into true, false or don't know. A correct answer was given '1' score and '0' score for wrong or do not know answers. The scores vary from 0 to 39 and all the individual answers were summed up for total score. Bloom's cut off point 60%-80% was used for the classification of scores into 3 levels as mentioned below.

Low level	(less than 59 %)	0 – 23 scores
Moderate level	(60 - 80 %)	24 - 31 scores
High level	(81 - 100 %)	32 - 39 scores

(III) Information about TB

This section included the questions aimed to find out the sources of TB information and contents of TB information including the information about TB health care centers. There were 6 questions in this section.

(IV) Attitude on TB

This section aimed at the determining of the attitude about TB of the sample populations which included the susceptibility, severity and benefits towards the prevention of TB by using Likert's scale. There were 3 question stems which covered 15 items in this section. The answers were categorized as 'Strongly Agree', 'Agree', 'Neutral', 'Strongly Disagree' and 'Disagree'. The rating scale was measured as follow:

Positive Statements		Negative Statements	
Choice	Score	Choice	Score
Strongly Agree	5	Strongly Agree	1
Agree	4	Agree	2
Neutral	3	Neutral	3
Disagree	2	Disagree	4
Strongly Disagree	1	Strongly Disagree	5

The scores vary from 15 to 75 and all the individual answers were summed up for total scores. The scores were classified into 3 levels (Positive Attitude, Neutral Attitude and Negative Attitude) according to Bloom's cut off point 60%-80%.

- Negative Attitude - 15 - 45 scores
- Neutral Attitude - 46 - 60 scores
- Positive Attitude - 61 - 75 scores

(V) Barriers to prevention of TB

This session included the social, economic, availability and accessibility of TB health care services and immigration status barriers to the prevention of TB of the sample population. There were 9 questions in this section. The answers were categorized into 'agree', 'disagree' or 'uncertain'. A score '2' was given to 'agree', '1' was given to 'uncertain' and '0' was given to disagree answers. The scores vary from 0 to 18. All the individual answers were summed up for total scores. Bloom's cut off point 60%-80% was used for the classification of scores into 3 levels as mentioned below.

Low level	(less than 59 %)	0 - 10 scores
Moderate level	(60 - 80 %)	11 - 14 scores
High level	(81 - 100 %)	15 - 18 scores

(VI) Preventive behaviors of TB

The questions in this section aimed at finding the behaviors of the respondents towards the prevention of TB. There were '10' questions. The answers were categorized into 'always', 'sometimes' and 'never'. The score was given as '3' to 'always', '2' to 'sometimes' and '1' to 'never' answers. The scores vary from 10 to 30. All the individual answers were summed up for total scores. The two levels of preventive behaviors low and high were mentioned as below.

Low level	(\leq 60%)	10 - 18 scores
High level	(>60%)	19 - 30 scores

Reliability test

To establish the clarity (ambiguity of words, misinterpretation of questions, inability to answer the questions and sensitive questions) of the questionnaire, a pilot test was conducted with 30 Myanmar migrants at Kachanaburi province where the characteristics of Myanmar migrants were similar to that in Mae Sot. For the internal consistency of the rating scales, Cronbach's alpha coefficient was calculated for attitude section of questionnaire and the result was 0.86. To test the internal consistency of the questions with dichotomous choices, KR 20 test was done and the result was 0.70.

Validity test

Ensuring the content validity of the research instrument was done by reviewing the previous literatures and consulting with 4 experts who were Dr. Alessio Panza (Thesis adviser), Assoc. Prof. Ratana Somrongthong (Chairperson), Dr. Wattasit Siriwong (Examiner), Dr. Nanta Auamkul (External Examiner). The validity of the instrument was tested using the Item Objective Congruence index and the result was 0.65.

3.8 Data collection

Data collection from total 392 (92.9% of calculated sample size) target respondents was done. Remaining 7.1% of calculated sample size could not be obtained due to frequently changing living places of illegal migrants and unavailability of time of the participants for being interviewed. Face to face interviews were done to respondents by 5 trained interviewers. The interviewers were the volunteers from Ambassador for Christ Church at Mae Sot. These volunteers were Myanmar people who were familiar with Myanmar migrant community at Hua Fai village as they had been providing the

social and nutritional supports to the Myanmar migrant community for several years. The researcher asked for the permission from the leader of the Church to hire these volunteers as the interviewers for this study.

One day prior to the interview, the interviewers were trained by the researcher. The training was the interactive type of training which lasted about five hours. The training sessions included about the objectives of this study, selection of participants, explanation and interpretation of questionnaires, and face-to-face interviewing method. The interviewers were trained how to explain to the respondents about the objectives, anonymity, confidentiality, free participation, freedom to withdraw, access to final report, and no use of data for other purpose and would be thanked for their time. Role play sessions were also involved to practice the face to face interview sessions. For the strict confidentiality of the illegal migrants, the researcher used the questionnaire which did not include any personal identification of the respondents which could link to his (or) her illegal status. The coding system for the respondents was used, and that system was strictly applied during each and every interview session. The interviewers were intensively trained by the researcher about the absolute confidentiality of the legal status of the migrants that would not be revealed to anybody. For confidentiality purpose, all the interviewers were volunteers from the Ambassador for Christ Church who had been dealing with the migrant community for several years without any problems of revealing the immigration status of the migrants to the relevant authorities. The researcher trained the interviewers to understand the contents of the questionnaire, to explain the questions clearly to the subjects, to fill the questionnaire correctly and thoroughly

based on the answers of the respondents without any suggestion or leading the answers.

The trained 5 interviewers reached out to the households of the Myanmar migrants depending on the available time of the respondents. The interviews were conducted at the households of the migrants during the free time of the respondents apart from their working hours. The interviews took about 20 – 30 minutes. Prior to the interviews, client information and informed consents were provided to the respondents, and only when the respondents agreed to participate in the study, face to face interviews were conducted. During the data collection period, daily short meetings, about 5 to 10 minutes, were done to provide instructions to the trained 5 interviewers before going out for the data collection. Data collection locations were assigned to all of the 5 interviewers in order to avoid the interviewing of respondents twice. All the respondents under the inclusion criteria were interviewed using the same questionnaire to fulfill the sample size. Every evening, the researcher checked the filled questionnaire of the interviewers for completeness, correctness and consistency. Clarifications were done to the interviewers before letting them go home. At the end of the study, leaflets with information on general knowledge on TB and prevention behaviors of TB were disseminated to all the participants. These leaflets were used as TB health promotion materials which were approved by ministry of health Myanmar.

3.9 Data analysis

Questions and answers were coded and entered into the computer. The SPSS software was used to do the statistical analysis.

Uni-variate analysis

For univariate analysis: frequencies, percentage, mean and standard deviation were calculated. For calculation of IWI, pre-defined formula (please refer for details in literature review section) was used in SPSS to get the IWI values for the individual respondents. Then the IWI values were categorized into two sets of category: (i) 'below the average IWI of Thailand' and 'above the average IWI of Thailand' based on the IWI of Thailand which was 77.5 (ii) IWI values were categorized into five categories mentioned as follow: ' ≤ 20.00 ' (lowest quintile: poorest migrants), '20.01 - 40.00', '40.01 - 60.00', '60.01 - 80.00' and ' ≥ 80.01 ' (highest quintile: richest migrants).

Bivariate analysis

For bivariate analysis (hypothesis testing), Pearson's Chi square test was used to find out the possible associations between:

- socio-demographic characteristics and preventive behaviors of TB
- knowledge, attitude, barriers and preventive behaviors of TB

For socio-demographic characteristics variables: each of the independent variables was coded into categorical variables for bivariate analysis using Chi-Square test. For those variables with frequency less than 5 in more than 20% of cells, Fisher's exact test was used to find the associations. Separate bivariate analysis between every independent categorical variables (age, gender, marital status, having children under

one year of age, ethnicity, level of education, current occupation, IWI and IWI category, no. of people staying in same room, living (or) non-living with Thai people, duration of stay in Thailand and work registration status) and dependent categorical variable (preventive behavior levels of TB) were done to find out the associations.

For preventive behaviors, as the distribution of preventive behaviors scores was skewed, median score of 18.00 was used for cut-off point for categorization. Preventive behaviors were categorized into two levels: 'Low' level for the scores less than or equal to 18.00 ($\leq 60\%$ of total score) and 'High' level for the scores more than 18.00 ($> 60\%$ of total scores). Minimum score was 10.00 and the maximum score was 30.00.

Before finding the associations between knowledge, attitude, barrier and preventive behaviors, Kolmogorov-Smirnov test was done to explore the data distribution pattern. Normally distribution was not found in the data from the variables. Therefore, non-parametric tests were used to find the associations.

For knowledge on TB, three categorized levels (low, medium and high levels) were used to find out the associations with preventive behavior levels (low and high levels).

For attitude on TB, three categorized levels (negative, neutral and positive attitude levels) were used to find out the associations with preventive behavior levels (low and high levels).

For barriers towards prevention of TB, three categorized levels (low, moderate and high levels) were used to find out the associations with preventive behavior levels (low and high levels).

Multivariate analysis

Binary logistic regressions were done for the variables who had $p < 0.05$ from the Chi-square test (or) Fisher's exact test to construct the multivariate analysis model. The variables which had the value of $p < 0.2$ from the binary logistic regression were selected for multivariate analysis. Multivariate analysis was done to find out the factors associated with preventive behaviors of TB.

3.10 Ethical Consideration

This study was conducted with the approval from the Ethical Review Committee of the Chulalongkorn University. Before interviewing the respondents, the researcher and interviewers gave clear verbal explanation to each respondents regarding the objectives and procedures of the study. The informed consent which contained information of confidentiality, free participation, freedom to withdraw, and no use of data for other purpose was obtained from the participants who were willing to participate in the study.

3.11 Limitations

The study was limited to Myanmar migrants in Hua Fai village only. Therefore, the findings could not generalize the whole Myanmar migrants in other communities in Thailand. It was a big challenge for the interviewers to collect the data because of the available time of the respondents varied among the respondents. Although the volunteers were familiar with the respondents, reluctances to participate in this study were found out as they were sensitive about being asked questions in face to face

interview sessions especially those who are illegal migrants. As the research tool used in this study did not include the questionnaire about TB and HIV, knowledge and attitude of the community on the link between TB and HIV could not be explored. The design of this study was cross-sectional survey and it did not reveal their preventive behaviors over a period of observation. Therefore, they would give the answers which are socially acceptable. This study used convenience sampling method. Therefore, there was a chance of having selection bias. However, as the study populations were highly mobile simple randomization was not possible to access to the respondents.

3.12 Expected benefits and application

The results of this study were expected to be useful for both government and non-governmental sectors for reviewing, planning and implementation regarding the health promotion, health education and behavior change communication programs for TB among the Myanmar migrants at Hua Fai village, Mae Sot. from Myanmar in Thailand. By doing effective activities for TB prevention, early diagnosis and treatments, disease burdens of TB can be reduced.

CHAPTER IV

RESULTS

This chapter presents the findings from the data analysis of the survey.

4.1.1 Univariate analysis

The univariate analysis includes the frequency and percentage distribution of the respondents' socio-demographic characteristics, screening for TB, knowledge on TB, information about TB, attitude about TB, barriers to the prevention of TB and the preventive behaviors of TB.

(i) Socio-demographic characteristics

Table 1 mentioned the socio-demographic characteristics of the respondents at Hua Fai village, Tak province, Thailand. 98.7% of the respondents were below the age of 61 years. Majority of the respondents, 65.8% were females. The majority of the respondents, 66.3% were married. The majority of the respondents, 81.6% had no child under (1) year of age in their family or at the current living places. The majority of the respondents, 54.8% were Burmese, and 36.5% were Karen and the remaining were Mon, Shan and the other ethnics. Majority of the respondents, 36.0% were construction workers. Most of the respondents, 93.9% were at below the average IWI index, 77.5, of Thailand. Majority of the respondents, 94.2% were below the IWI of 80.1. Majority of the respondents, 45.2% were staying together with 3 persons or less. The majority of the respondents, 96.7% were living separately from the residences of Thai people. Majority of the respondents, 43.1% were staying in Thailand for five years or less. Majority of respondents 69.4% were unregistered for their current work,

22.4% of them were registered and able to present their work permits, and the remaining were said to be registered but could not show their work permits.

Table 1: Number and percentage distribution of respondents by socio-demographic characteristics (n=392)

Socio-demographic characteristics		Frequency	Percentage	Cumulative percentage
Age (years):	18 - 29	133	33.9	33.9
	30 - 41	133	33.9	67.8
	42 - 53	90	23.0	90.8
	54 or more	36	9.2	100
Gender:	Female	258	65.8	65.8
	Male	134	34.2	100
Marital status:	Married	260	66.3	66.3
	Single	98	25.0	91.3
	Divorced	20	5.1	96.4
	Widow	9	2.3	98.7
	Missing data	5	1.3	100
Have child under (1) year of age:	No	320	81.6	81.6
	Yes	72	18.4	100
Ethnicity:	Burmese	215	54.8	54.8
	Karen	143	36.5	91.3
	Mon	11	2.8	94.1
	Shan	4	1.0	95.1
	Others	16	4.1	99.2
	Missing data	3	0.8	100
Level of education:	Secondary school	129	32.9	32.9
	Primary school	126	32.1	65
	High School	77	19.6	84.6
	No education	49	12.5	97.1
	University graduate	7	1.8	98.9
	Missing data	4	1.0	100

Table 1: Number and percentage distribution of respondents by socio-demographic characteristics (n=392) (continued).

Socio-demographic characteristics		Frequency	Percentage	Cumulative percentage
Current occupation:	Construction	141	36.0	36.0
	Factory worker	70	17.9	53.9
	No occupation	66	16.8	70.7
	Agricultural	55	14.0	84.7
	General worker	53	13.5	98.2
	Others	3	0.8	99
	Missing data	4	1.0	100

Table 1: Number and percentage distribution of respondents by socio-demographic characteristics (n=392) (continued)

Socio-demographic characteristics		Number	Percentage	Cumulative percentage
International Wealth Index (IWI):	Below the average IWI of Thailand(77.5)	368	93.9	93.1
	Above the average IWI of Thailand(77.5)	24	6.1	100
IWI category:	≤ 20.0 (lowest quintile)	15	3.8	3.8
	20.1 - 40.0	112	28.6	32.4
	40.1 - 60.0	148	37.8	70.2
	60.1 - 80.0	94	24.0	94.2
	≥ 80.1 (highest quintile)	23	5.8	100
People living in the same room:	≤3 people	177	45.2	45.2
	4 - 7 people	151	38.5	83.7
	≥8 people	60	15.3	99
	Missing data	4	1.0	1
Current living place:	Attached to the Thai residence (s)	11	2.8	2.8
	Separated from Thai residence (s)	379	96.7	99.5
	Missing data	2	0.5	0.5
Duration of stay in Thailand (years):	≤ 5	169	43.1	43.1
	5.1 - 10	128	32.7	75.8
	10.1 - 15	46	11.7	87.5
	15.1 - 20	25	6.4	93.9
	20.1 - 25	15	3.8	97.7
	≥ 25.1	9	2.3	100
Registration status of work:	Un-registered	272	69.4	69.4
	Registered with work permit evidence	88	22.4	91.8
	Registered without work permit evidence	31	7.9	99.7
	Missing data	1	0.3	100

Table 2 mentioned the results of the medical history for the screening of TB. Regarding the signs and symptoms of TB, 1.5% of the respondents had cough for more than 2 to 3 weeks and 0.3% had coughing up the blood, and the remaining respondents did not have any other signs and symptoms of TB. None of the respondents were having TB at the time of interview. Only 0.8% of the respondents had TB in the past and had documented history of taking anti-TB drugs regularly.

Table 2: Medical history for Tuberculosis screening (n=392)

Screening results for TB		Number	Percentage
Signs and symptoms of TB:	Cough for more than 2-3 weeks	6	1.5
	Coughing up blood	1	0.3
Current TB status:	Yes	0	0.0
Past history of TB:	Yes	3	0.8
Taking anti-TB drugs in the past:	Yes (without evidence of document)	3	0.8

(ii) Knowledge on TB

Table 3 revealed that 65.0% of respondents were at the low level of knowledge, 33.2% of them were at moderate level, and 1.8% of them were at high level.

Table 3: Number and percentage distribution of knowledge levels. (n=392)

Knowledge levels	Number	Percentage	Cumulative percentage
Low level (0 - 23 scores)	255	65.0	65.0
Moderate level (24 – 31 scores)	130	33.2	98.2
High level (32 - 39 scores)	7	1.8	100

Range 1 – 33 scores, Mean score = 20.31, SD = 6.806

Table 4 mentioned the knowledge of the respondents on TB regarding the causes and transmission of TB. 69.6% of respondents knew that TB is a communicable disease, and 70.2% of respondents knew that TB spreads from a person with active lungs TB to the others, 12.0% of them knew that TB is not transmitted through handshakes, 18.4% of them knew that TB is not transmitted through sharing the dishes, 18.4% of them knew that TB is not transmitted through eating the same plate, 16.6% of respondents knew that TB is not transmitted through touching the public items, 17.6% of them knew that mosquito bite cannot transmit TB, and 19.1% of them knew that TB cannot be transmitted through blood transfusion.

Table 4: Number and percentage distribution of knowledge on causes and transmissions of TB information. (n=392)

Knowledge on causes and transmission of TB	Correct	Incorrect and Don't know	Missing data
Causes of TB:	n(%)	n(%)	n(%)
TB is a communicable disease.	273(69.6)	118(30.1)	1(0.3)
TB is caused by the germs produced from a person with active lungs TB.	275(70.2)	116(29.5)	1(0.3)
Transmission of TB is:	n(%)	n(%)	n(%)
Through handshakes*	47(12.0)	344(87.7)	1(0.3)
Through the air when a person with active lungs TB coughs or sneezes.	299(76.2)	92(23.5)	1(0.3)
Through sharing dishes*	72(18.4)	318(81.1)	2(0.5)
Through eating from the same plate*	72(18.4)	317(80.9)	3(0.7)
Through touching items in public places (doorknobs, handles of the tools and instruments, etc.)*	65(16.6)	326(83.1)	1(0.3)
Through mosquito bite*	69(17.6)	321(81.9)	2(0.5)
Through blood transfusion*	75(19.1)	316(80.6)	1(0.3)

*Negative statement.

Table 5 mentioned the knowledge of the respondents on TB regarding the signs and symptoms and prevention of TB. Only 17.1% and 14.5% of respondents knew that gain weight and gain appetite were not the symptoms of TB. Only 18.4% of respondents knew that avoiding handshake, 20.9% of them knew that avoiding the sharing of dishes, 15.8% of them knew that closing widows at home, 19.6% of them knew that taking anti-biotic, and 19.9% of them knew that praying cannot prevent TB respectively.

Table 5: Number and percentage distribution of knowledge on signs and symptoms and prevention of TB. (n=392)

Knowledge on signs and symptoms, and prevention of TB	Correct	Incorrect and Don't know	Missing data
	n(%)	n(%)	n(%)
Signs and symptoms of TB:			
Cough for more than 2-3 weeks	275(70.2)	116(29.5)	1(0.3)
Coughing up blood	301(76.8)	91(23.2)	0
Evening rise in low grade fever	208(53.1)	183(46.6)	1(0.3)
Sweating at night time	196(50)	196(50.0)	0
Gain weights*	67(17.1)	324 (82.6)	1(0.3)
Gain appetite *	57(14.5)	335(85.5)	0
TB can be prevented by:			
Avoiding hand-shakes*	72(18.4)	320(81.6)	0
Covering mouth and nose when coughing or sneezing.	326(83.2)	66(16.8)	0
Avoiding the sharing of dishes*	82(20.9)	310(79.1)	0
Washing hands after touching items in public places.	177(45.2)	214(54.5)	1(0.3)
Closing windows at home*	62(15.8)	330(84.2)	0
Having nutritious foods.	98(25)	294(75)	0
Taking anti-biotic*	77(19.6)	314(80.1)	1(0.3)
Praying*	78(19.9)	313(79.8)	1(0.3)
BCG vaccination in children under one year of age.	203(51.8)	189(48.2)	0
TB can be diagnosed by examining the sputum.	32(8.2)	360(91.8)	0

*Negative statement.

Table 6 mentioned that the knowledge of the respondents on treatments of TB. Only the respondents who knew that TB can be cured were taken into account for the analysis. Only 8.0% of respondents knew that medicines provided by the compounders at drug stores, 2.8% of them knew that self-treatments, 8.6% of them knew that praying can, 8.6% of them knew that taking treatments from traditional healers, and 7.7% of them knew that skipping anti-TB drugs can not cure TB respectively.

Table 6: Number and percentage distribution of knowledge on treatments of TB. (n=392)

Knowledge on treatments of TB	Correct	IC & DK	MD
	n(%)	n(%)	n(%)
TB can be cured (n=392):	326(83.2)	66(28.6)	0
TB can be cured by (n=326):	n(%)	n(%)	n(%)
Medicines given by the compounder at drug store*	26(8.0)	299(91.7)	1(0.3)
Home rest without taking medicine*	10(3.1)	316(96.9)	0
Self-treatments*	9(2.8)	317(97.2)	0
Praying*	28(8.6)	298(91.2)	0
Taking treatment with traditional healers*	28(8.6)	298(91.2)	0
Taking anti-TB drugs provided by doctors/nurses.	208(63.8)	118(36.2)	0
Skipping the anti-TB drugs*	25(7.7)	301(92.3)	0

*Negative statement, MD = Missing data, IC = incorrect, DK = don't know

Table 7 mentioned the knowledge of the respondents on the persons at risk of TB. Only 20.4% of the respondents knew that well-nourished people are not at risk of TB.

Table 7: Number and percentage distribution of knowledge on persons at risk of TB. (n=392)

Knowledge on persons at risk of TB	Correct	IC & DK	MD
<i>Following persons are at risk of TB</i>	n(%)	n(%)	n(%)
Poor people	106(27.1)	285(72.6)	1(0.3)
Well-nourished people*	80(20.4)	312(79.6)	0
Old people	49 (12.5)	342(87.2)	1(0.3)
People living in crowded places	259(66.1)	133(33.9)	0
People living close to the TB patients	234(59.7)	157(40.0)	1(0.3)
People living in good ventilated places	212(54.1)	179(45.6)	1(0.3)

*Negative statement, MD = Missing data, IC = incorrect, DK = don't know

(iii) Sources and contents of TB information

Table 8 mentioned that only 30.9% of respondents received the TB information. Only the numbers of respondents who received TB information were analyzed. As respondents could answer more than one answer, the total percentage of TB information sources might exceed 100%. Among respondents who had received the information about TB (n=121): majority of respondents (70.2%) received from family, friends, neighbors and colleagues, 55.4% from health workers, 27.3% from TV, 23.1% from printed materials, 21.5% from radio, 18.2% from newspaper and magazine, and 14.3% received from the remaining sources.

Table 8: Number and percentage distribution of sources of TB information.

Received information about TB (n=392)	Number	Percentage
Yes	121	30.9
No	271	69.1
Common source (s) to receive TB information (n=121)	Number	Percentage
Family, friends, neighbors and colleagues	85	70.2
Health workers	67	55.4
TV	33	27.3
Brochures, posters and other printed materials	28	23.1
Radio	26	21.5
Newspapers and magazines	22	18.2
Religious leaders	9	7.4
Teachers	13	6.1
Others	1	0.8

Table 9 revealed that majority (66.9%) of respondents received causes of TB as contents of TB information. Only 25.0% of respondents who have received TB information knew TB health care centers (service providers) at Mae Sot. The 29.0% of respondents knew the public hospital, Mae Sot general hospital, 3.0% of them knew private hospitals but could not mention the names, 93.9% of them knew an INGO clinic (Mae Tao clinic). Living places of 87.8% of respondents were more than 5 kilometers from the TB healthcare center. The majority, 48.0%, of respondents take 1.1 to 2 hours to reach the TB healthcare centers that they have known.

Table 9: Number and percentage distribution of contents of TB information

Contents of TB information received (n=121)	Number	Percentage
Causes of TB	81	66.9
Prevention of TB	39	32.2
How to stay to avoid getting TB from the close contact	18	14.9
Mode of transmission of TB	15	12.4
Diagnosis of TB	5	4.1
Treatments of TB	4	3.3
Know any TB health care center (service providers) in Mae Sot (n=392):	Number	Percentage
Yes	98	25.0
No	294	75.0
TB health centers (n=98):	Number	Percentage
Public hospital (Mae Sot general hospital)	29	29.6
Private hospital	3	3.0
Clinic of NGO/INGO (Mae Tao clinic)	92	93.9
Distance of TB health center in kilometers (n=98)	Number	Percentage
≤ 5 km	8	8.2
> 5 km	86	87.8
Missing data	4	1.0
Time taken to go to the TB health center (n=98)	Number	Percentage
≤ 1.0 hour	14	14.3
1.1 - 2.0 hours	47	48.0
2.1 - 3.0 hours	35	35.7
3.1 - 4.0 hours	1	1.0
≥ 4.1 hours	1	1.0

(iv). Attitude on TB

Table 10 mentioned that 55.9% of respondents had negative attitude, 42.6% of them had neutral attitude, 1.5% of them had positive attitude towards TB.

Table 10: Number and percentage distribution of attitude level towards TB. (n=392)

Attitude Levels	Number	Percentage	Total (%)
Negative attitude (15 - 45 scores)	219	55.9	55.9
Neutral attitude (46 - 60 scores)	167	42.6	98.5
Positive attitude (61 - 75 scores)	6	1.5	100

Range 32 - 67, Mean score = 45.85, SD = 4.111

Table 11 revealed the number and percentage distribution of attitude towards TB regarding the perceived susceptibility, severity and benefits of preventing TB. The results revealed that about 44% (43.6%) of respondents agreed on that they could get TB. The 23% of respondents disagreed that women have higher chance to get TB than men. About 38% (37.7%) of respondents disagreed that by living in crowded place they could not get TB. About 54% (53.8%) of respondents agreed that they were at risk to get TB by working or staying closely with TB patients. About 45% (45.5%) of respondents disagreed that TB is not a dangerous disease.

Table 11: Number and percentage distribution of attitude towards TB (n=392).

Attitude towards TB	SA	A	N	D	SD	MD
Susceptibility:	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
I think I can get TB.	29(7.4)	142(36.2)	50(12.8)	121(30.9)	50(12.8)	0
I think women have higher chance to get TB.*	27(6.9)	154(39.4)	120(30.7)	87(22.2)	3(0.8)	1(0.3)
If I live in the crowded place, I cannot get TB.*	11(2.8)	73(18.6)	160(40.8)	142(36.2)	6(1.5)	0
If I am not malnourished, I am susceptible to TB.*	19(4.8)	85(21.7)	122(31.1)	134(34.2)	32(8.2)	0
I think I am at risk to get TB by staying (or) working closely with a TB patient.	55(14)	156(39.8)	94(24)	63(16.1)	23(5.9)	1(0.3)

*Negative statement, SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree,

SD=Strongly disagree, MD= Missing data

Table 11: Number and percentage distribution of attitude towards TB. (n=392)

(continued).

Attitude towards TB	SA	A	N	D	SD	MD
Severity:	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
In my opinion, TB is a very serious disease.	36(9.2)	124(31.6)	144(36.7)	79(20.2)	9(2.3)	0
I think TB is a very serious problem around my current living place.	16(4.1)	61(15.6)	134(34.2)	172(43.9)	8(2.0)	1(0.3)
TB is not dangerous disease.*	14(3.6)	123(31.4)	112(28.6)	139(35.5)	1(1.0)	0
Delay in TB treatment can be fatal.	90(23.0)	162(41.3)	54(13.8)	49(12.5)	37(9.4)	0
If my employers know that I have TB, I can be dismissed from my work.	30(7.7)	188(48.0)	64(16.3)	79(20.2)	31(7.9)	0
If my friends know that I have TB, I can be discriminated.	65(16.6)	222(56.6)	61(15.6)	36(9.2)	7(1.8)	1(0.3)
Benefits:	n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
If I cover my mouth and nose when I cough or sneeze, I can prevent the transmission of TB.	98(25.0)	149(38.0)	101(25.8)	38(9.7)	6(1.5)	0
If I avoid living in the crowded places, I can prevent TB.	59(15.1)	204(52.0)	82(20.9)	33(8.4)	14(3.6)	0

*Negative statement, SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree,

SD=Strongly disagree, MD= Missing data

Table 11: Number and percentage distribution of attitude towards TB. (n=392)

(continued).

Attitude towards TB	SA	A	N	D	SD	MD
If I live in the good ventilated places, I can prevent TB.	78(19.9)	222(56.6)	67(17.1)	16(4.1)	8(2.0)	1(0.3)
If I eat nutritious foods (i.e carbohydrates , fats and proteins), I can prevent TB.	56(14.3)	192(49.0)	52(13.3)	59(15.1)	32(8.2)	1(0.3)

*Negative statement, SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly disagree, MD= Missing data

(v). Barriers towards prevention of TB

Table 12 mentioned that majority of respondents, 41.3%, had high level, 35.7% of them had moderate level, and 23.0% had low level of barriers towards prevention of TB respectively.

Table 12: Number and percentage distribution of barrier levels towards prevention of TB. (n=392)

Barriers levels	Number	Percentage	Total (%)
Low level (0 - 10 scores)	90	23.0	23.0
Moderate level (11 - 14 scores)	140	35.7	58.7
High level (15 - 18 scores)	162	41.3	100

Range 1 - 18, Mean score = 12.82, SD = 3.685

Table 13 revealed the barriers among the respondents, Most of the respondents (92.1%) had barriers in avoiding crowded places, about 78% (78.1%) had barriers in living in good ventilated places, and about 77% (76.5%) of respondents had barriers in having diet with good nutrition towards the prevention of TB. About 65% (64.8%)

of respondents had affordability barriers for direct services costs for TB healthcare and about 64% (63.8%) of respondents agreed that their illegal immigration status were barriers to seek healthcare for TB.

Table 13: Number and percentage distribution of barriers towards prevention of TB. (n=392)

Barriers towards prevention of TB	Agree	Disagree	Un-certain
	n(%)	n(%)	n(%)
I am so poor to have diet with good nutrition (i.e carbohydrate, proteins and fats) though I want to have it.	300(76.5)	74(18.9)	18(4.6)
I am so poor to avoid living in crowded places to prevent TB.	361(92.1)	26(6.6)	5(1.3)
I cannot live in the good ventilated places because of I am so poor.	306(78.1)	70(17.9)	16(4.1)
If TB is suspected, I cannot seek health care to do sputum screening test because I don't know the TB health care center.	220(56.1)	152(38.8)	20(5.1)
If TB is suspected, I cannot seek health care as the health care center for TB that I have known is too far (more than 5 kilometers or about 3 miles) away from my current living place.	90(23.0)	24(6.1)	278(70.9)
If TB is suspected, I cannot seek health care for TB because I am afraid of being caught by the local authorities as my immigration status is illegal.	250(63.8)	102(26.0)	40(10.2)
If I have TB, I cannot seek health care because I have no money to pay for the diagnosis, treatments, laboratory tests and anti-TB drugs.	254(64.8)	54(13.8)	84(21.4)

Table 13: Number and percentage distribution of barriers towards prevention of TB. (n=392) (continued)

Barriers towards prevention of TB	Agree	Disagree	Un-certain
	n(%)	n(%)	n(%)
If I have TB, I cannot seek health care for TB because I have no money to pay for transportation and other expenses.	231(58.9)	71(18.1)	90(23.0)
If I have TB, I cannot take the anti-TB drugs regularly and timely because my working hours are not regular.	138(35.2)	77(19.6)	177(45.2)

(vi). Preventive behaviors

Table 14 mentioned that about the preventive behavior levels of respondents. As the distribution of data was skewed, median score of 18.00 was used for cut-off point. Two levels of preventive behaviors were categorized into 'Low' for those equal and below the 18.00 scores, and 'High' levels for those above 18.00 score. The results revealed that about 52% (51.8%) of respondents were at the low level of preventive behaviors, and about 48% (48.2%) of them were at high level.

Table 14: Number and percentage distribution of preventive behaviors of TB. (n=392)

Preventive behavior levels	Number	Percentage	Cumulative percentage
Low level (10 - 18 scores)	203	51.8	51.8
High level (19 - 30 scores)	189	48.2	100

Range 11 - 30, Mean score = 19.02, Median score = , SD = 4.124

Table 15 revealed that more than 25% of respondents never practiced the preventive behaviors such as covering mouth and nose, washing hands after touching public utilities, avoiding crowded places, eating nutritious foods, screen sputum when TB is suspected and avoiding close contact with TB patients.

Table 15: Number and percentage distribution of preventive behaviors of TB.

(n=392)

Preventive behaviors of TB	Always	Sometimes	Never	Missing data
	n(%)	n(%)	n(%)	n(%)
I cover my mouth and nose when I cough or sneeze.	71(18.1)	222(56.6)	99(25.3)	0
I wash my hands after touching the public items (e.g, door knobs, handles of the tools and instruments).	65(16.6)	201(51.3)	126(32.1)	0
I avoid crowded living places.	70(17.9)	176(44.9)	145(37.0)	1(0.3)
I live in the good ventilated places.	36(9.2)	306(78.1)	50(12.8)	0
I eat nutritious food (i.e, carbohydrates, proteins and fats) to prevent TB.	54(13.8)	174(44.4)	164(41.8)	0
I seek health care to screen my sputum if I have cough for more than 2 to 3 weeks.	86(21.9)	134(34.2)	171(43.6)	1(0.3)
I seek health care with the professional health care providers (such as doctors or nurses) if I suspect that I have TB.	126(32.1)	159(40.6)	107(27.3)	0
I avoid being in close contact with TB patients.	80(20.4)	173(44.1)	139(35.5)	0
I make sure that the children under one year of age to be vaccinated with BCG vaccine.	138(35.2)	171(43.6)	82(20.9)	1(0.3)
I read (or) watch (or) listen the information about TB.	86(21.9)	200(51.0)	106(27.0)	0

4.1.2. Bivariate analysis

(i) Socio-demographic characteristics and preventive behavior levels

Table 16 presented the associations between the socio-demographic characteristics and preventive behaviors. Variables :age, gender, marital status, having child under one year of age, ethnicity, level of education, current occupation, International Wealth Index (IWI), people living in the same room, current living place, duration of stay in Thailand were categorized to find out the associations with preventive behavior levels using Chi-square (or) Fisher's exact test as necessary.

Variables which had the frequency of data in more than 20% of cells were less than 5 were merged: for marital status category: widows, others and separated were merged into one category; for ethnicity category: Karen, Mon, Shan and other ethnics were merged into one category; for current occupation: general workers and others were merged as one category; for duration of stay (years): 15.1 – 20, 20.1 – 25 and ≥ 25.1 categories were merged as ≥ 15.1 years.

Table 16 revealed that preventive behavior levels of respondents were associated with marital status ($p=0.008$), current occupation ($p<0.001$), category of IWI ($p<0.05$) duration of stay in Thailand ($p <0.001$). There was no association with between other variables of socio-demographic characteristics and the preventive behaviors.

Table 16: Association between socio-demographic characteristics and preventive behavior levels. (n=392)

Socio-demographic characteristics		Preventive behavior levels		Total n (%)	Chi-Square	p value
		Low n (%)	High n (%)			
Age (years):	18 – 29	67(50.4)	66(49.6)	133(100)	2.914	0.405
	30 – 41	74(55.6)	59(44.4)	133(100)		
	42 – 53	41(45.6)	49(54.4)	90(100)		
	54 or more	21(58.3)	15(41.7)	36(100)		
Gender:	Female	138(53.5)	120(46.5)	258(100)	0.876	0.349
	Male	65(48.5)	69(51.5)	134(100)		
Marital status:	Married	133(51.2)	127(48.8)	260(100)	9.743	0.008
	Single	46(46.9)	52(53.1)	98(100)		
	Divorced, Widow, separated and others	23(79.3)	6(20.7)	29(100)		
	Missing data	-	-	5(100)		
Have children under one year of age:	No	167(52.2)	153(47.8)	320(100)	0.113	0.737
	Yes	36(50.0)	36(50.0)	72(100)		
Ethnicity:	Burmese	104(48.4)	111(51.6)	215(100)	1.780	0.182
	Others	96(55.2)	78(44.8)	174(100)		
	Missing data	-	-	3(100)		
Level of education:	Secondary school	59(45.7)	70(54.3)	129(100)	14.613	0.002
	Primary school	80(63.5)	46(36.5)	126(100)		
	High School, University and others.	33(39.3)	51(60.7)	84(100)		
	No education	28(57.1)	21(42.9)	49(100)		
	Missing data	-	-	4(100)		

Table 16: Association between socio-demographic characteristics and preventive behavior levels. (n=392) (continued)

Socio-demographic characteristics		Preventive behavior levels		Total n (%)	Chi-Square	<i>p</i> value
		Low n (%)	High n (%)			
Current occupation (workers):	Construction	76(53.9)	65(46.1)	141(100)	22.482	<0.001
	Factory	24(34.3)	46(65.7)	70(100)		
	Unoccupied	39(59.1)	27(40.9)	66(100)		
	Agricultural	40(72.7)	15(27.3)	55(100)		
	General and others	23(41.0)	33(59.0)	56(100)		
	Missing data	-	-	4(100)		

Table 16: Association between socio-demographic characteristics and preventive behaviors levels (n=392). (continued)

Socio-demographic characteristics		Preventive behavior levels		Total n (%)	χ^2 test	P value
		Low n (%)	High n (%)			
IWI:	Below average IWI of Thailand	194(52.7)	174(47.3)	368(100)	2.090	0.148
	Above average IWI of Thailand	9(37.5)	15(62.5)	24(100)		
IWI category:	≤ 20.0	10(66.7)	5(33.3)	15(100)	13.065	0.011
	20.1 - 40.0	67(59.8)	45(40.2)	112(100)		
	40.1 - 60.0	81(54.7)	67(45.3)	148(100)		
	60.1 - 80.0	36(38.3)	58(61.7)	94(100)		
	≥ 80.1	9(39.1)	14(60.9)	23(100)		
People living in the same room:	≤3 people	88(49.7)	89(50.3)	177(100)	9.649	0.008
	4 - 7 people	71(47.0)	80(53.0)	151(100)		
	≥8 people	42(70.0)	18(30.0)	60(100)		
	Missing data	-	-	4(100)		
Current living places:	Separated from Thai residence(s)	195(51.5)	184(48.5)	379(100)	-	0.546*
	Attached to Thai residence(s)	7(63.6)	4(36.4)	11(100)		
	Missing data	-	-	2(100)		
Duration of stay in Thailand (years):	≤ 5	88(52.1)	81(47.9)	169(100)	16.172	0.001
	5.1 - 10	64(50.0)	64(50.0)	128(100)		
	10.1 - 15	15(32.6)	31(67.4)	46(100)		
	≥15.1	36(14.5)	13(5.2)	49(100)		

*Fisher's Exact tests results as there were more than 20% of cells with the values of less than 5.

Table 16: Association between socio-demographic characteristics and preventive behaviors levels (n=392). (continued)

Socio-demographic characteristics		Preventive behavior levels		Total n (%)	χ^2 test	P value
		Low n (%)	High n (%)			
Registration status:	Unregistered	141(51.8)	131(48.2)	272(100)	0.234	0.890
	Registered (with permit)	47(53.4)	41(46.6)	88(100)		
	Registered (without permit)	15(48.4)	16(51.6)	31(100)		
	Missing data	-	-	1(100)		

(ii) Sources, contents of information and preventive behaviors

Table 17 revealed that preventive behavior levels were associated with sources of information: Family, friends, neighbor and colleagues ($p < 0.001$), newspaper and magazines ($p = 0.001$).

Table 17: Association between sources of TB information and preventive behavior levels.

Sources of TB information	Preventive behavior levels		Total n(%)	x ² test	p value
	Low n(%)	High n(%)			
Received information about TB: (n=392)					
No	137(50.6)	134(49.4)	271(100)	0.534	0.465
Yes	66(54.5)	55(45.5)	121(100)		
Common source(s) of TB information: (n=121)					
Family, friends, neighbor and colleagues:					
No	4(11.1)	32(88.9)	36(100)		<0.001*
Yes	62(72.9)	23(27.1)	85(100)		
Health workers:					
No	34(63.0)	20(37.0)	54(100)	2.787	0.095
Yes	32(47.8)	35(52.2)	67(100)		
TV:					
No	44(50.0)	44(50.)	88(100)	2.689	0.101
Yes	22(66.7)	11(33.3)	33(100)		

*Fisher's Exact tests results as there were more than 20% of cells with the values of less than 5.

Table 17: Association between sources of TB information and preventive behavior levels. (continued)

Sources of TB information	Preventive behavior levels		Total n(%)	x ² test	p value
	Low n(%)	High n(%)			
Brochures, posters and other printed materials:					
No	49(52.7)	44(47.3)	93(100)	0.559	0.455
Yes	17(60.7)	11(39.3)	28(100)		
No	49(51.6)	46(48.4)	95(100)	1.569	0.210
Yes	17(65.4)	9(34.6)	26(100)		
Newspapers and magazines:					
No	61(61.6)	38(38.4)	99(100)	10.980	0.001
Yes	5(22.7)	17(77.3)	22(100)		
Religious leaders:					
No	62(55.4)	50(44.6)	112(100)	-	0.730*
Yes	4(44.4)	5(55.6)	9(100)		
Teachers:					
No	60(55.6)	48(44.4)	108(100)	0.414	0.520
Yes	6(46.2)	7(53.8)	13(100)		

*Fisher's Exact tests results as there were more than 20% of cells with the values of less than 5.

Table 18 revealed the association between the contents of information and preventive behaviors. There were associations between causes of TB ($p < 0.001$), prevention of TB ($p = 0.001$), mode of transmission of TB ($p = 0.001$), information about health care centers (or) service providers for TB ($p < 0.001$), and information about private hospital ($p = 0.007$), and the preventive behaviors.

Table 18: Association between contents of TB information and preventive behavior levels.

Contents of TB information	Preventive behavior levels		Total n(%)	x ² test	p value
	Low n(%)	High n(%)			
Contents of TB information received: (n=121)					
Causes of TB:					
No	9(22.5)	31(77.5)	40(100)	24.749	<0.001
Yes	57(70.4)	24(29.6)	81(100)		
Prevention of TB:					
No	53(64.6)	29(35.4)	82(100)	10.444	0.001
Yes	13(33.3)	26(66.7)	39(100)		
How to stay from close contact with TB patients:					
No	53(51.5)	50(48.5)	103(100)	2.665	0.103
Yes	13(72.2)	5(27.8)	18(100)		
Mode of transmission of TB:					
No	64(60.4)	42(39.6)	106(100)	-	0.001*
Yes	2(13.3)	13(86.7)	15(100)		

Table 18: Association between contents of TB information and preventive behavior levels. (continued)

Contents of TB information	Preventive behavior levels		Total n(%)	x ² test	p value
	Low n(%)	High n(%)			
Diagnosis of TB:					
No	64(55.2)	52(44.8)	116(100)		0.658*
Yes	2(40.0)	3(60.0)	5(100)		
Treatments of TB:					
No	64(54.7)	53(45.3)	117(100)		1.000*
Yes	2(50.0)	2(50.0)	4(100)		

*Fisher's Exact tests results as there were more than 20% of cells with the values of less than 5.

Table 18: Association between contents of TB information and preventive behavior levels. (continued)

Contents of TB information	Preventive behavior levels		Total n(%)	x ² test	p value
	Low n(%)	High n(%)			
Know any TB health care service providers in Mae Sot (n=392):					
No	125(42.5)	169(57.5)	294(100)	40.463	<0.001
Yes	78(79.6)	20(20.4)	98(100)		
Knowledge on TB healthcare centers (n=98):					
Public hospital:					
No	58(84.1)	11(15.9)	69(100)	2.863	0.091
Yes(Mae Sot hospital)	20(69.0)	9(31.0)	29(100)		
Private hospital:					
No	78(82.1)	17(17.9)	95(100)		*0.007
Yes	0(0)	3(100)	3(100)		
Clinic of NGO/INGO:					
No	5(83.3)	1(16.7)	6(100)	0.055	0.814
Yes(Mae Tao clinic)	73(79.3)	19(20.7)	92(100)		
Distance to TB health care center(n=98):					
≤5 kilometers	6(75.0)	2(25.0)	8(100)	0.072	0.788
>5kilometers	68(79.1)	18(20.9)	86(100)		
Missing data:	-	-	4(100)		

*Fisher's Exact tests results as there were more than 20% of cells with the values of less than 5.

(iii) Knowledge, attitude, barriers and preventive behavior levels

Table 19 revealed that there was no statistically significant association between knowledge levels and preventive behavior levels ($p = 0.403$).

Table 19: Association between knowledge levels and preventive behavior levels. (n=392)

Level of knowledge	Preventive behavior levels		Total n(%)	Chi- square test	p value
	Low n(%)	High n(%)			
Low	136(53.3)	119(46.7)	255(100)	0.700	0.403
Moderate and high levels*	67(48.9)	70(51.1)	137(100)		

*Moderate and high levels of knowledge were merged as there were very few data which were less than 5 in the cells of high knowledge level.

Table 20 revealed that there was no statistically significant association between attitude levels and preventive behavior levels ($p = 0.624$).

Table 20: Association between attitude levels and preventive behavior levels. (n=392)

Level of attitude	Preventive behavior levels		Total n(%)	Chi- square test	p value
	Low n(%)	High n(%)			
Negative	111(50.7)	108(49.3)	219(100)	0.241	0.624
Neutral and positive levels*	92(53.2)	81(46.8)	173(100)		

*Neutral and positive levels of attitude were merged as there were very few data which were less than 5 in the cells of High attitude level.

Table 21 revealed that there was statistically significant association between barrier levels and preventive behavior levels ($p < 0.001$).

Table 21: Association between barrier levels and preventive behavior levels.
(n=392)

Level of barriers	Preventive behavior levels		Total n(%)	Chi- square test	p value
	Low n(%)	High n(%)			
Low	26(28.9)	64(71.1)	90(100)	25.83	<0.001
Moderate	87(62.1)	53(37.9)	140(100)		
High	90(55.6)	72(44.4)	162(100)		

(iv). Multivariate analysis

Binary logistic regressions were done for the variables which were statistically significant. Multivariate analysis model was constructed using the variables which had ($p < 0.2$) from binary logistic regression. These variables with ($p < 0.2$) included marital status, ethnicity, level of education, current occupation, international wealth index (IWI), IWI category, people living in the same room, duration of stay in Thailand, knowledge on TB healthcare center (or) service providers and barriers level. Step by step, variables which had non-significant p values were excluded from the model until the final model is constructed as shown in Table 22. As mentioned in Table 22, the final multivariate analysis revealed that high preventive behaviors of TB was associated with barriers level ($p < 0.001$), duration of stay in Thailand ($p = 0.016$), current occupation ($p < 0.001$), information about TB healthcare center (or) services providers ($p < 0.001$).

Table 22: Multivariate analysis of factors associated with high preventive behaviors of TB.

Variables	B	Adjusted OR	95% CI	p value
Barrier levels:				<0.001
Low level	1.510	4.528	2.230 – 9.196	<0.001
Moderate level	0.018	1.018	0.577 – 1.798	0.950
High level®		1		
Duration of stay in Thailand (years):				0.016
≤ 5	0.990	2.692	1.214 – 5.967	0.015
5.1 - 10	1.085	2.959	1.320 – 6.636	0.015
10.1 - 15	1.570	4.806	1.757– 13.144	0.002
≥15.1®		1		
Current occupation:				<0.001
Factory	1.631	5.111	2.362 - 11.059	
General and others	1.342	3.826	1.724 – 8.491	
Construction	0.824	2.281	1.156 – 4.500	
Unoccupied	0.613	1.846	0.855 – 3.987	
Agricultural®		1		
Information about TB healthcare centers (or) services providers in Mae Sot *	2.156	8.638	4.379 – 17.041	<0.001
*yes compared to no				

® = Reference

CHAPTER V

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 DISCUSSION

This study was conducted to describe independent variables such as socio-demographic characteristics, knowledge on TB, attitude towards TB, barriers towards prevention of TB, and to find out the associations of these independent variables with dependent variables (preventive behaviors of TB) among Myanmar migrants at Hua Fai village, Mae Sot district, Tak province, Thailand. The data was collected using interviewer administered structured questionnaires.

(i) Socio-demographic characteristics

About 68% (67.8%) of respondents were in the 18 to 41 years of age group, about 66%(65.8%) of them were females, around 66% (66.3%) of them were married, about 55%(54.8%) were Burmese, about 33%(32.9%) had attained the secondary school level, 36% were working as construction workers. Most of the respondents (93.1%) were at below the average IWI of Thailand and 94.2% of them were below IWI index of 80.1, about 45%(45.2%) were living with 0-3 people in the same room, about 97%(96.7%) of respondents were living separately from the residences of Thai people, and about 43%(43.1%) were living in Thailand for 5 years or less.

It was found that about 70% (69.4%) of Myanmar migrants were un-registered for their work. This finding was consistent and higher than the two studies which were conducted among Myanmar migrants; (Thwin, 2008): conducted in Phuket and 64.6% of respondents were un-registered; and (Ti, 2007): conducted in Phangnga and 61% of respondents were unregistered. This study revealed that the percentage of

unregistered migrants was higher in Hua Fai than the other study areas. This could possibly be explained by the fact that Hua Fai was a more remote place than Phuket and Phangna and it was easier for unregistered migrants to hide from Thai authorities and avoid registration. And there was no operationally implementing NGO/INGO in this study area. These situations made Myanmar migrants in Hua Fai were more highly vulnerable to TB as well as other health problems especially the communicable diseases.

This study revealed that the preventive behaviors of respondents were associated with marital status ($p=0.008$), level of education ($p=0.002$) and current occupation ($p<0.001$), and duration of stay in Thailand ($p=0.001$) which were consistent with (Thwin, 2008). This study revealed that single respondents had higher preventive behavior scores than married one. It could be concluded that single marital status practice more preventive behaviors than married people as they have no one to take care if they got TB. It was found that the higher the education level, the higher the preventive behavior scores. This was due to having better knowledge about TB than the others due to literacy. Factory workers had better preventive behaviors than the other respondents. This could be explained that the nature of the job and the working environments could enhance their preventive behaviors as they might have more chances to attend the TB health talks, campaigns and health promotion events at the working site to gain more knowledge. Additionally, there were associations between IWI category ($p=0.011$) and people living in the same room ($p=0.008$) were associated with the preventive behavior levels. It could be explained that respondents with higher wealth status could afford more in nutrition, housing and health care expenses than those were at lower wealth status. It was found that the

higher the number of people staying with respondents in the same room, the lower the preventive behaviors. It could be explained that the respondents who were living with more people had fewer chances to practice for TB prevention due to unavoidable crowded living conditions.

In this study, the IWI values of respondents were measured with the average IWI value of Thailand which was 77.5. IWI value of Myanmar could not be used because there was no literature on calculated average IWI for Myanmar. Though there was association between the IWI category and preventive behaviors of TB, the calculated IWI values for the respondents in this community could be under estimated comparing with the economic contexts in Myanmar as the expenditures for basic livings in Thailand were higher than Myanmar.

From this study, it could be learnt that the IWI values of the respondents could not be compared across countries and years. The association between the IWI categories and the preventive behavior levels of TB revealed that the IWI could be measured within the groups with the dependent variables (preventive behaviors of TB). These two findings verified the literature of (Smits, 2013).

(ii) Sources, contents of information and preventive behaviors

This study revealed that about 69% (69.1%) have not received the information about TB which was consistent with (Nkulu, 2010), a study conducted among migrants in Sweden, which finding showed 67% of respondents were lack of TB information. But that finding was inconsistent with (Thwin, 2008), which revealed that 88% of respondents have heard about TB. It could be due to the different locations and populations of the two studies. Among the 30.9% who have received TB information,

it was found that family, friends, neighbors and colleagues were the common sources of information for majority of respondents (70.2%) and around 70% (66.9%) of respondents have heard about the causes of TB, and these findings were inconsistent with (Thwin, 2008). It could be explained that numbers of health workers which provide TB information in Phuket could be more than in Hua Fai and contents of TB information provided to community in Phuket could be different from Hua Fai. The 75% of respondents did not know about the information of TB healthcare centers (service providers) in Mae Sot. Among those who knew about the health center for TB, most of them (93.9%) have known of Mae Tao (INGO clinic). This study revealed that about 88% of respondents were living more than 5 kilometer walking distance away from the TB healthcare centers and about 84% of respondents needed 1 to 3 hours to reach the TB healthcare centers. The vulnerability of migrants was superimposed by their locations of the living places which were too far away from TB healthcare center and time taken to go to the health centers which could make the respondents to get more socio-economic burdens (e.g., need to take leave from their work and salary might be cut off, might need to spend more indirect costs to receive the TB health care services).

There was significant association between the sources of TB information: Family, friends, colleagues ($p < 0.001$), newspapers and magazines ($p = 0.001$), and preventive behaviors, which were consistent with (Thwin, 2008). There were no associations between health workers as a source of TB information and preventive behavior levels which was inconsistent with (Thwin, 2008). It could be explained that the activities of health workers for the TB health education and health promotion for Myanmar migrants might be fewer in Mae Sot than Phuket. The significant

associations between contents of TB information: causes of TB ($p < 0.001$); prevention of TB ($p = 0.001$), mode of transmission of TB ($p = 0.001$), and preventive behavior levels were also found out consistent with findings of (Thwin, 2008).

(iii) Knowledge on TB

This study revealed that 65% of respondents were at low knowledge level which was consistent with both (Thwin, 2008); 69.9% were at need improvement level, and (Sreechat, 2013); 74.2% were at low level. More than 50% (50.0% to 70.2%) of respondents could correctly answer about the signs and symptoms of TB (excluded the negative statements). Most of the respondents (80% and above) had misconceptions about knowledge on TB.

This study revealed that knowledge levels were not associated with the preventive behavior levels ($p = 0.403$) and it was inconsistent with (Thwin, 2008) and (Sreechat et al., 2013). It could be explained that, the common source of TB information is from their friends, family and colleagues. As the overall knowledge level of the sample population is low, the peer information on TB among the respondents could be wrong and not supportive for the preventive behaviors.

(iv) Attitude towards TB

This study revealed that about 56% (55.9%) of respondents were at negative attitude level and it was consistent with (Thwin, 2008): 54.7% were at need improvement level. The finding Inconsistent with (Okanurak et al., 2008) which was conducted among TB patients in Bangkok: 25.8% of respondents were in negative attitude level.

This study revealed that there was no association between attitude towards TB and the preventive behaviors which was consistent with (Thwin, 2008). It could be

explained by Behavior Theory of Health Belief Model by Rosenstock which was later expended by Becker which explained that many variables such as perceived susceptibility, severity, barriers, benefit, efficacy, threat, cue to action, and demographic and socio-psychological variables played roles to perform behavior. This finding was not easy to explain and qualitative research might need to be conducted to explore the in depth association with attitude and preventive behavior levels in this study.

(v) Barriers towards prevention of TB

This study revealed that about 40% (41.3%) of respondents were in high barrier levels which was consistent with (Thwin, 2008): 50.6% were at need improvement level of barriers. Among the barriers, about 92.0% (92.1%) of respondents had barriers of being unable to avoid the crowded living places. It could be explained that their working and living places were usually crowded with people. About 78% (78.1%) of respondents had barriers in living in the good ventilated places. It revealed that living and working places of majority of respondents were did not have good ventilations for airflows. About 77% (76.5%) of respondents had barriers to have diet with good nutrition. It was because the respondents did not know that the foods with good nutrition can prevent TB. Similarly, about 65% (64.8%) of respondents had financial barriers to pay money to receive for TB healthcare. About 64% (63.8%) of respondents had barriers to seek healthcare for TB due to their illegal immigration status. This study revealed that there was statistically significant association between barrier levels and preventive behavior levels of TB ($p < 0.001$) and it was consistent with (Thwin, 2008).

5.2 Conclusion

This study revealed that ethnicity, level of education, current occupation, duration of stay in Thailand, IWI category, people living in the same room were associated with the preventive behaviors of TB.

In this study, only about 31% (30.8%) of respondents received information about TB. For the sources of information: family, colleagues, friends, newspapers and magazines were statistically significant with preventive behavior levels. There was also statistical significant association between the knowing the information about TB health care center (service providers) in Mae Sot and preventive behaviors ($p < 0.001$).

The results showed that there was no statistically significant association between knowledge of respondents and preventive behaviors. But as there were many misconceptions about TB among the respondents and the knowledge was also correlated with barriers, it is very crucial to improve the knowledge of the respondents and very important to correct their misconceptions from both government and non-government organizations.

For attitude, though there was no significant association, it is to be considered as important factor as majority of respondents were in low attitude levels. Regarding the barriers, business owners and official authorities should reform (or) modify the working places and living places to be good ventilated for the benefits of the owners, workers and community from the aspect of environmental approach on TB prevention. Though registration status of the respondents was not associated with

preventive behaviors, the health expenditures were related to the work registration status due to insurance scheme. And there were barriers regarding the affordability to receive the TB health care services. Therefore, it is crucial for government officials and other organizations who are dealing to strengthen the work registration process for those who were not registered yet.

5.3 Recommendations

Recommendations for organizations

These results are guides for any organization that providing health promotions to direct their service to these particular socio-economic groups of Myanmar migrants in Hua Fai village in Mae Sot.

As the majority of respondents were un-registered migrants, there were socio-economic barriers to access the health services which made the community to be more vulnerable to the diseases and infections compared to those who were registered.

Therefore, organizations from both public and private sectors should arrange and implement the registration process for the un-registered migrants to receive the health services.

In order to raise the community awareness and improve their TB knowledge; health education through interpersonal communication (health volunteers) and distribution of IEC (Information, Education and Communication) materials in Burmese language using printed media (posters and pamphlets with TB information etc.) should be implemented effectively. The contents of TB information in the IEC materials which are going to be delivered to the community should be highlighted about the causes of TB, prevention of TB and mode of transmission of TB as well as the information

about healthcare center (location and available services for TB). Health promotion events (e.g., community health talks and health promotion camping should be implemented with the objectives in order to uplift the attitude of the respondents.

The research tool used in this study could not explore the community's knowledge and attitude on the link between the TB and HIV in the community. Therefore, both public and private organization should implement the health promotion on HIV together with TB program.

Recommendation for further research

For further research, qualitative research with in depth interviews or focus group discussions to explore the knowledge and attitude factors which might have associated with the preventive behaviors of TB that could not be revealed by this study. As this study did not find out the information on HIV related with TB, future research should be focused on both TB and HIV in order to know the two commonly related diseases.



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Appendix A: Questionnaire

**Knowledge, attitude, barriers and preventive behaviors of Tuberculosis among
Myanmar Migrants at Hua Fai village, Mae Sot district, Tak province, Thailand.**

Questionnaires

Date / / Respondent code no.

Interviewer code no.

Starting time of the interview (Hour) : (Minute)

End time of the interview (Hour) : (Minute)

(I) Socio-demographic characteristics

Please make the mark (√) in the provided blanks for the answers. (e.g,)

Please write down the answers in the provided spaces if necessary.

(e.g, ...xxxxxx...)

1 .What is your age ?

..... years.

2 . What is your gender ?

2.1 Male 2.2 Female

3. What is your marital status ?

3.1 Single 3.2 Married

3.3 Divorced 3.4 Widow

3.5 Separated 3.6 Others (please specify)

4. Do you have kids under (1) year of age in your family (or) at your living place ?

4.1 Yes 4.2 No

5. What is your ethnicity ?

5.1 Burmese 5.2 Karen 5.3 Mon 5.4 Shan

5.5 Others.....(please specify).

6. What is your level of education ?

6.1 No education 6.2 Primary school 6.3 Secondary school 6.4 High School 6.5 University graduate

6.6 Others.....(please specify)

7. What is your current occupation ?

7.1 No occupation 7.2 Agricultural worker 7.3 Construction worker 7.4 Factory worker 7.5 General worker

7.6 Others.....(please specify)

8. International Wealth Index

8.1 Do you currently own the following consumer durables ?

Please make the mark (√) in the provided blanks for the answers under **Yes** and **No** columns. More than 'One' item can be answered.

If the answers are not included in the item list please write down in the 'Others' blank.

Items	Yes	No
8.1.1 Television		
8.1.2 Refrigerator		
8.1.3 Phone		
8.1.4 Car		
8.1.5 Bicycle		
8.1.6 Cheap utensils		
8.1.7 Expensive utensils		
Others(please specify)		

8.2. Housing characteristics

Please make the mark (√) for the answers in the provided spaces under '**Mark**' column.

8.2.1 Floor materials		Mark
Low quality	- none, earth, dung etc.	
Medium quality	- concrete, raw wood, etc.	
High quality	- finished floor with parquet, carpet, tiles, ceramic etc.	

8.2.2 Toilet facility		Mark
Low quality	- traditional pit latrine, hanging toilet, or no toilet facility etc.	
Medium quality	- public toilet, improved pit latrine etc.	
High quality	- any kind of private flush toilet.	

8.2.3 No of rooms	Mark
Zero or one	
Two	
Three or more	

8.3 Public utilities

8.3.1 Access to government electricity line: Yes No

8.3.2 Water source		Mark
Low quality	- unprotected well, borehole, spring, surface water, etc.	
Medium quality	- public tap, protected well, tanker truck, etc.	
High quality	- bottled water or water piped into dwelling or premises.	

9. How many people are currently living with you in the same room of your living place ?(please specify).

10. Currently, your living place is

10.1 Attached to the residence (s) of Thai people

10.2 Separated from the residence (s) of Thai people

11. How long have you been in Thailand ?

..... years and Months.

12. What is your registration status of work ?

12.1 Registered with evidence of work permit

12.2 Registered without evidence of work permit

12.3 Un-registered

Screening Questions for TB

13. Currently do you have one (or) more of the following signs and symptoms ?

13.1 Cough for more than 2-3 weeks Yes No

13.2 Coughing up blood Yes No

13.3 Evening rise in low grade fever Yes No

13.4 Sweating at night time Yes No

13.5 Loss of weights Yes No

13.6 Loss of appetite Yes No

14. Currently, do you have TB ?

14.1 Yes 14.2 No

(Instruction: If the answer is 'Yes', please go to question no. '15'.

If the answer is 'No', please go to question no. '16').

15. Currently, are you diagnosed as TB patient (or) taking anti-TB treatments provided by the professional health care providers (e.g , medical doctors or nurses).

15.1 Yes (with the evidence of diagnosis or treatment documents of TB)

15.2 Yes (without the evidence of diagnosis or treatment documents of TB)

15.3 No

16. In the past, did you have TB ?

16.1 Yes 16.2 No

(Instruction : If the answer is 'Yes', please go to the question no. '17'.

If the answer is 'No', please go to the question no. '19').

17. In the past, did you receive anti- TB treatments which were provided by the professional health care providers (e.g medical doctors or nurses) ?

17.1 Yes (with the evidence of diagnosis or treatment documents of TB)

17.2 Yes (without the evidence of diagnosis or treatment documents of TB)

17.3 No

(Instruction: If the answer is either one of the ‘Yes’ mentioned above, please go to the question no. ‘18’. If the answer is ‘No’, please go to the question no. ‘19’).

18. In the past, did you take the anti-TB drugs -

18.1 Regularly

18.2 Non-regularly

18.3 Cannot recall

(II) Knowledge on TB

Please make the mark (√) for the answers in the provided spaces under **TRUE**, **FLASE** and **DON`T KNOW** columns.

Statements	TRUE	FALSE	DON`T KNOW
19. TB is a communicable disease.			
20. TB is caused by the germs produced from a person with active lungs TB.			
21. Transmission of TB is			
21.1 Through handshakes			
21.2 Through the air when a person with active lungs TB coughs or sneezes.			
21.3 Through sharing dishes			
21.4 Through eating from the same plate			
21.5 Through touching items in public places (doorknobs, handles of the tools and instruments, etc.)			
21.6 Through mosquito bite			
21.7 Through blood transfusion			
22. Signs and symptoms of TB are			
22.1 Cough for more than 2-3 weeks			
22.2 Coughing up blood			
22.3 Evening rise in low grade fever			
22.4 Sweating at night time			
22.5 Gain weights			
22.6 Gain appetite			

(II) Knowledge on TB (continued)

Please make the mark (√) for the answers in the provided spaces under **TRUE**, **FLASE** and **DON`T KNOW** columns.

Statements	TRUE	FALSE	DON`T KNOW
23. TB can be prevented by			
23.1 Avoiding hand shakes			
23.2 Covering mouth and nose when coughing or sneezing			
23.3 Avoiding the sharing of dishes			
23.4 Washing hands after touching items in public places			
23.5 Closing windows at home			
23.6 Having nutritious foods			
23.7 Taking anti-biotics			
23.8 Praying			
23.9 BCG vaccination in children under one year of age			
24. TB can be diagnosed by examining the sputum.			
25. TB can be cured. (If the answer is ‘True’ , please ask the question 26) (If the answer is ‘False’ or ‘Don`t Know’ , please go to question no. 27).			
26. TB can be cured by			
26.1 Medicines given by the compounder at drug store			
26.2 Home rest without taking medicine			
26.3 Self-treatments			
26.4 Praying			
26.5 Taking treatment with traditional healers			
26.6 Taking anti-TB drugs provided by doctors or nurses.			
26.7 Skipping the anti-TB drugs.			
27. Following persons are at risk of TB			
27.1 Poor people			
27.2 Well-nourished people			
27.3 Old people			
27.4 People living in crowded places			

(II) Knowledge on TB (continued)

Please make the mark (√) for the answers in the provided spaces under **TRUE**, **FLASE** and **DON`T KNOW** columns.

Statements	TRUE	FALSE	DON`T KNOW
27.5 People living close to the TB patients			
27.6 People living in good ventilated places			

(III). Information about TB

28. Have you ever received information about TB ?

28.1 Yes 28.2 No

(Instruction: If the answer is ‘Yes’ , go to the question no. ‘29’.

If the answer is ‘No’ , please go to the question no. ‘31’).

29. Please answer the common source (s) from where did you receive the TB information ?

(The answer (s) can be more than one.)

29.1 Newspapers and magazines

29.2 Radio

29.3 TV

29.4 Billboard

29.5 Brochures, posters and other printed materials

29.6 Health workers

29.7 Family, friends, neighbor and colleagues

29.8 Religious leaders

29.9 Teachers

29.10 Others (please specify).

30. What contents of TB information that you received ?

(The answer (s) can be more than one.)

30.1 Causes of TB

30.2 Mode of transmission of TB

30.3 Diagnosis of TB

30.4 Prevention of TB

30.5 How to stay to avoid getting TB from the close contact people with TB

30.6 Treatments of TB

31. Do you know any TB health care center in Mae Sot ?

31.1 Yes 31.2 No

(Instruction: If the answer is ‘Yes’ , please go to the question no. ‘32’.

If the answer is ‘No’, please go to the question no. ‘34’).

32. TB health care centers that you have known is (are)

32.1 Public hospital

Please mention the name of the hospital if you know

32.2 Private Hospital

Please mention the name of the hospital if you know

32.3 Clinic of NGO / INGO

Please mention the name of the clinic if you know

32.4 Others(please specify).

33. Location of TB health center -

33.1 How far is the TB health center (in estimated kilometers) from your
current living place ?.....

33.2 How long does it take to go to the TB health center ?
..... hours , minutes.

(IV). Attitude on TB

Please make the mark (✓) for the answers in the provided spaces under **SA, A, N, D** and **SD** columns.

SA = strongly agree, A = agree, N= neutral, D = disagree, SD = strongly disagree

Statements	SA	A	N	D	SD
34. Susceptibility					
34.1 I think I can get TB.					
34.2 I think women have higher chance to get TB.*					
34.3 If I live in the crowded place, I cannot get TB.*					
34.4 If I am not malnourished, I am susceptible to TB.*					
34.5 I think I am at risk to get TB by staying (or) working closely with a TB patient.					
35. Severity					
35.1 In my opinion, TB is a very serious disease.					
35.2 I think TB is a very serious problem around my current living place.					
35.3 TB is not dangerous disease.*					
35.4 Delay in TB treatment can be fatal.					
35.5 If my employers know that I have TB, I can be dismissed from my work.					
35.6 If my friends know that I have TB, I can be discriminated.					
36. Benefits to prevention of TB					
36.1 If I cover my mouth and nose when I cough or sneeze, I can prevent the transmission of TB.					
36.2 If I avoid living in the crowded places, I can prevent TB.					
36.3 If I live in the good ventilated places, I can prevent TB.					
36.4 If I eat nutritious foods (i.e carbohydrates , fats and proteins), I can prevent TB.					

(V) Barriers towards prevention of TB

Please make the mark (✓) for the answers in the provided spaces under **Agree, Disagree, and Don` t know** columns.

Statements	Agree	Disagree	Un-certain
37. I am so poor to have diet with good nutrition (e.g., carbohydrate, proteins and fats) though I want to have it.			
38. I am so poor to avoid living in crowded places to preventTB.			
39. I cannot live in the good ventilated places because of I am so poor.			
40. If TB is suspected, I cannot seek health care to do sputum screening test because I don` t know the TB health care center.			
41. If TB is suspected, I cannot seek health care as the health care center for TB that I have known is too far (more than 5 kilometers or about 3 miles) away from my current living place.			
42. If TB is suspected, I cannot seek health care for TB because I am afraid of being caught by the local authorities as my immigration status is illegal.			
43. If I have TB , I cannot seek health care because I have no money to pay for the diagnosis, treatments, laboratory tests and anti-TB drugs.			
44. If I have TB, I cannot seek health care for TB because I have no money to pay for transportation and other expenses.			
45. If I have TB, I cannot take the anti-TB drugs regularly and timely because my working hours are not regular.			

(VI) Preventive behaviors of TB

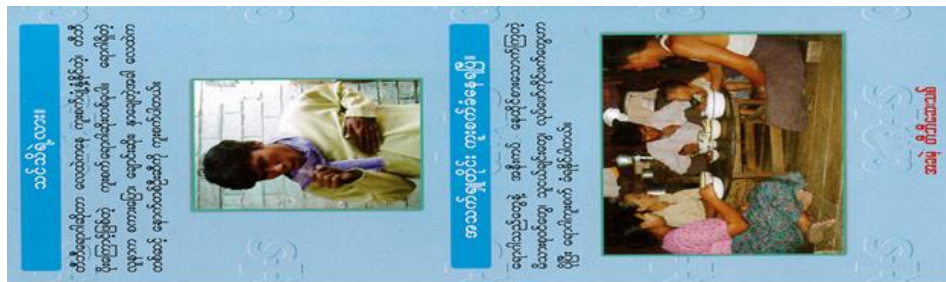
Please make the mark (✓) for the answers in the provided spaces under **Always**, **Sometimes**, and **Never** columns.

Statements	Always	Sometimes	Never
46. I cover my mouth and nose when I cough or sneeze.			
47. I wash my hands after touching the public items (e.g, door knobs, handles of the tools and instruments).			
48. I avoid crowded living places.			
49. I live in the good ventilated places.			
50. I eat nutritious food (i.e, carbohydrates, proteins and fats) to prevent TB.			
51. I seek health care to screen my sputum if I have cough for more than 2 to 3 weeks.			
52. I seek health care with the professional health care providers (such as doctors or nurses) if I suspect that I have TB.			
53. I avoid being in close contact with TB patients.			
54. I make sure that the children under one year of age to be vaccinated with BCG vaccine.			
55. I read (or) watch (or) listen the information about TB.			

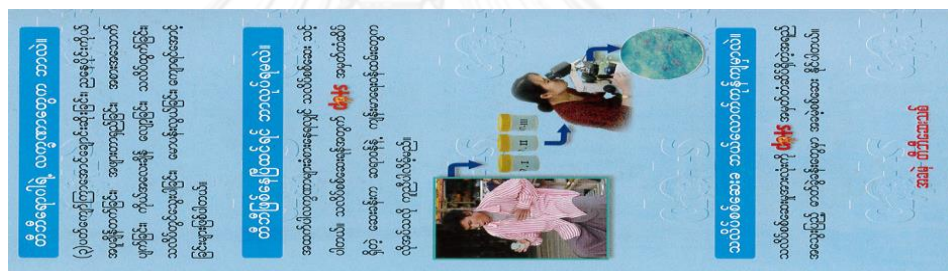
Appendix B

Information leaflet about TB

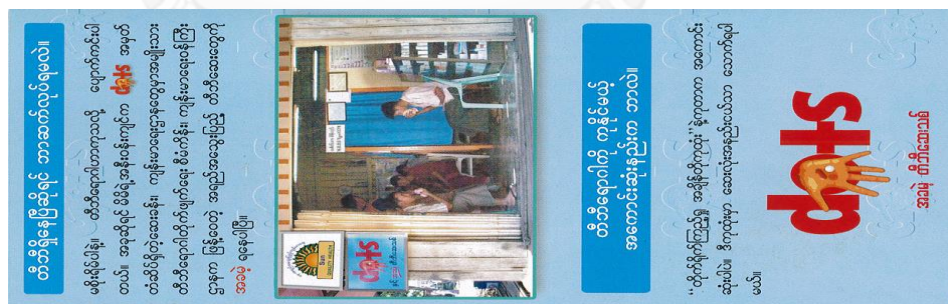
Section (1).



Section (2).



Section (3).



The above mentioned leaflet in Burmese language consists of the information about Tuberculosis.

Section (1) Mentioned about the causes , transmission and factors of TB

Section (2) Mentioned about the signs and symptoms and diagnosis of TB and

Section (3) Mentioned about the preventive behaviors of TB.



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