

## **CHAPTER 3**

### **PROJECT EVALUATION**

#### **3.1 Introduction**

Project evaluation of “Face to face education for village health volunteers on Directly Observed Treatment Short-Course (DOTS) in new smear positive pulmonary tuberculosis patients” training was a formative evaluation aiming to develop and improve the project for its fulfillment and become beneficial to tuberculosis control of Roi-Et province. The project was evaluated in accordance with input factors, processes, outcomes, effects and impacts of the project using qualitative and quantitative data collection methods.

It is very essential that project organizer have to carefully supervise and evaluate every step of project operations under the set criteria to achieve goals standard and objectives of the project. Outcomes of project evaluation are separated into 2 phases. Phase 1 (Intensive/initial phase), which will appear in this thesis, is only the first 2 months of the treatment and is the very important phase of treatment under DOTS method. For evaluation of Phase 2 (Continuation phase), the author will later submit to responsible government offices.

### **3.2 Purpose**

- 1) To assess the knowledge of village health volunteers about tuberculosis before and after training.
- 2) To evaluate operational performance of village health volunteers in supervising new smear positive pulmonary tuberculosis patients in taking their anti-TB drugs in each village/ community.
- 3) To evaluate the treatment outcomes of the short-course treatment in new smear positive pulmonary tuberculosis patients with direct supervision of village health volunteer on anti-TB drug administration.

### **3.3 Evaluation Questions**

- 1) What are the input factors of this study project?
- 2) Is it appropriate to use of face to face education in tuberculosis control work under the short-course treatment of DOTS scheme?
- 3) After project completion, how is the knowledge and work performance of village health volunteers in supervision of patients' anti-TB drug administration?
- 4) What are the treatment outcomes of the project "Face to face education for village health volunteers on directly observed treatment short-course (DOTS) in new smear positive pulmonary tuberculosis patients"?

### **3.4 Evaluation Design**

For the training project “Face to face education for village health volunteers on directly observed treatment short-course (DOTS) in new smear positive pulmonary tuberculosis patients”, the author designed a total evaluation process as formative evaluation. The formative evaluation was adopted to evaluate progress of project and apply for better improvement in order to fulfill the objectives. The collected data was compared with the set criteria which will be evaluated based on several achieving factors such as input, process, output, effect, outcome and impact as guidelines in Table 3.1.

**Table 3.1 : Evaluation guidelines for “Face to face education for village health volunteers on directly observed treatment short-Course (DOTS) in new smear positive pulmonary tuberculosis patients” project.**

<b>Objectives</b>	<b>Aspects to be evaluated</b>	<b>Data Sources</b>	<b>Data Collection</b>	<b>Data analysis</b>	<b>Indicators/ Evaluation criteria</b>
1. To evaluate initial input factors of the training project.	<p>1. Main factors and project feasibility.</p> <p>1.1 Personnel section</p> <ul style="list-style-type: none"> <li>- Facilitator/ Trainer</li> <li>- Village health officer</li> <li>- Tuberculosis clinic officer</li> <li>- Village health volunteers in village or community that has selected patients.</li> </ul> <p>1.2 Budgets</p> <p>1.3 Supplies/ materials</p> <p>1.4 Duration</p> <p>1.5 Location</p>	<p>1. Project documents</p> <p>2. Project organizer</p>	<p>1. Interview</p> <p>2. Registration documents, reports</p>	<p>1. Compare required number of persons with existing ones.</p> <p>2. Compare qualifications, experience with work description.</p> <p>3. Compare required budgets with the received budgets.</p> <p>4. Assess adequacy of instruments and training supplies and documents.</p> <p>5. Appropriate location and time.</p>	<p>1. Enough working persons as planned</p> <p>2. Qualifications or experience are elegant to present job description.</p> <p>3. Have budget as planned.</p> <p>4. Have adequate instruments and supplies.</p> <p>5. Sufficiency of time.</p> <p>6. Suitability of training location.</p>

**Table 3.1 : Evaluation guidelines for “Face to face education for village health volunteers on directly observed treatment short-Course (DOTS) in new smear positive pulmonary tuberculosis patients” project. (Cont.)**

<b>Objectives</b>	<b>Aspects to be evaluated</b>	<b>Data sources</b>	<b>Data Collection</b>	<b>Data analysis</b>	<b>Indicators/ Evaluation criteria</b>
2. To evaluate training process.	<ol style="list-style-type: none"> <li>1. Process of project training</li> <li>2. Atmosphere of the training                             <ul style="list-style-type: none"> <li>- Contents</li> <li>- Participation</li> </ul> </li> <li>3. Problems and obstacles</li> </ol>	<ol style="list-style-type: none"> <li>1. Project documents</li> <li>2. Training participants</li> <li>3. Speakers / facilitators</li> </ol>	<ol style="list-style-type: none"> <li>1. Collection of relevant documents</li> <li>2. Questionnaire</li> <li>3. Interview</li> </ol>	<ol style="list-style-type: none"> <li>1. Compare planned duration with actual time spent.</li> <li>2. Find mean and percentage of participant’ knowledge</li> <li>3. Analyze contents to identify problems and obstacles.</li> </ol>	<ol style="list-style-type: none"> <li>1. Project operation progressed as planned.</li> <li>2. Participants have better.</li> <li>3. knowledge after training.</li> </ol>
3. To evaluate project output.	<ol style="list-style-type: none"> <li>1. Number of village health volunteers who completed the training.</li> </ol>	<ol style="list-style-type: none"> <li>1. Number of training participants.</li> <li>2. Reports at health centers/ community hospitals</li> </ol>	<ol style="list-style-type: none"> <li>1. Tests</li> <li>2. Questionnaire</li> </ol>	<ol style="list-style-type: none"> <li>1. Compare planned duration with actual time spent.</li> <li>2. Find mean &amp; percentage of participants’ knowledge</li> </ol>	<ol style="list-style-type: none"> <li>1. Compare planned duration with actual time spent.</li> </ol>

**Table 3.1 : Evaluation guidelines for “Face to face education for village health volunteers on directly observed treatment short-Course (DOTS) in new smear positive pulmonary tuberculosis patients” project. (Cont.)**

<b>Objectives</b>	<b>Aspects to be evaluated</b>	<b>Data sources</b>	<b>Data Collection</b>	<b>Data analysis</b>	<b>Indicators/ Evaluation criteria</b>
4. To evaluate effect of the training project.	<ol style="list-style-type: none"> <li>1. Knowledge gained from the training.</li> <li>2. Skills learnt from the training.</li> <li>3. Outcome of direct observation treatment short course in pulmonary tuberculosis patients.</li> </ol>	<ol style="list-style-type: none"> <li>1. Project participants</li> <li>2. Selected qualified patients</li> </ol>	<ol style="list-style-type: none"> <li>1. Tests</li> <li>2. Questionnaires</li> <li>3. Checklist</li> </ol>	<ol style="list-style-type: none"> <li>1. Find mean &amp; percentage / SD of participants' knowledge.</li> <li>2. Paired T-Test</li> </ol>	<ol style="list-style-type: none"> <li>1. Compare mean difference.</li> </ol>
5. To evaluate outcome of the project	<ol style="list-style-type: none"> <li>1. Conversion rate</li> <li>2. Default rate</li> <li>3. Death rate</li> <li>4. Cure rate</li> </ol>	<ol style="list-style-type: none"> <li>1. Reports on tuberculosis according to DOTS guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Test</li> <li>2. Questionnaire</li> <li>3. Checklist</li> </ol>	<ol style="list-style-type: none"> <li>1. Cohort analysis</li> </ol>	<ol style="list-style-type: none"> <li>1. Follow DOTS guidelines and criteria.</li> </ol>

**Table 3.1 : Evaluation guidelines for “Face to face education for village health volunteers on directly observed treatment short-Course (DOTS) in new smear positive pulmonary tuberculosis patients” project. (Cont.)**

<b>Objectives</b>	<b>Aspects to be evaluated</b>	<b>Data sources</b>	<b>Data Collection</b>	<b>Data analysis</b>	<b>Indicators/ Evaluation criteria</b>
6. To evaluate impact of the project.	<ol style="list-style-type: none"> <li>1. Default rate</li> <li>2. Death rate</li> <li>3. Cure rate</li> <li>4. Morbidity rate</li> </ol>	<ol style="list-style-type: none"> <li>1. Reports on tuberculosis according to DOTS guidelines.</li> </ol>	<ol style="list-style-type: none"> <li>1. Test</li> <li>2. Questionnaire</li> <li>3. Checklist</li> </ol>	<ol style="list-style-type: none"> <li>1. Cohort analysis</li> </ol>	<ol style="list-style-type: none"> <li>1. Follow DOTS guidelines and criteria</li> </ol>

### 3.5 Data Collection Methods

Data collection methods consist of:

1. **Collect from secondary data.** It was to collect general information of new smear positive pulmonary tuberculosis patients who registered for treatment from July 2000 to October 2000 from 5 tuberculosis clinics using purposive sampling within standard criteria such as name, age as well as medical history which consists of
  - OPD card
  - TB card
  - TB register
  - TB laboratory register
  
2. **Interviews:** This was carried out by an interview with one officer at each tuberculosis clinic (totally 5 clinics) to ask for additional opinions on selected patients. The example of these additional opinions are symptoms of patients on the day they came for treatment, their cooperation in receiving instruction on self care, convenience in coming for medical services and the location their houses. These were collected for the convenience in project implementation.
  
3. **Knowledge assessment:** This was carried out to assess the knowledge of 2 selected village health volunteers of each village before commencement of the training by having them take the pre test. The author read all questions



for them as to prevent reading and sight problems for those elderly village health volunteers. There were averaged of 8-12 village health volunteers of each village.

4. **Observation:** This was to observe general symptom of patients selected into the study in their houses before and during the time of training, especially the observation of Rifampicin's colour in the urine during their period of planned treatment. "Surprise Visits" were made for such observations once a week during the intensive phase of the first 2 months and once a month during the continuation phase to collect and summarize data for analysis.
5. **In-depth interviews:** All selected patients were interviewed using question guidelines as detailed in Appendix 17 to check qualification and performance of person who in charge of supervising anti-TB drug use.
6. **Post test:** Village health volunteers who completed the supervision of the Anti-TB drug administration for 2 months of intensive phase of patients took post test using the same questions as in the Pre test to assess their knowledge after the training and compare with the pre-test results.

### 3.5.1 Tools and Instruments

- In-depth interview guideline developed by the author. This is used to assess the

- quality of work performance of village health volunteers in supervising of anti-TB medication. It was used as a trial test for TB patients in TB clinic at Nong Phok District Hospital.
- Copies of TB cards to collect patients' medical history
- DOT card as shown in Appendix 11
- Packages of anti-TB drug
- Posters and pamphlets on tuberculosis
- Questionnaire for the pre-post tests used for assessing the knowledge of selected village health volunteers trail tested for VHVs in Nong Phok district.

### **3.5.2 Monitoring**

Project monitoring to check project sustainability is divided into 2 phases, the intensive or initial phase (the first 2 months of the treatment) and the continuation phase (four months period following the initial phase). Treatment outcome was evaluated using Cohort Analysis. Results of the study presented in this thesis only involve the Conversion (Phase 1) because of limiting factors of time. The cohort analysis will be submitted to the relevant offices later.

#### **Monitoring Phase 1**

The author goes to studied areas once a week to collect data, supervise and check performance quality of village health volunteers in monitoring patients' medication, in compliance to DOTS criteria, totaling 8 times per 1 patient studied. Data was collected from patients as follows.

1. Surprise visit to the patients without schedule.
2. Count the remained anti-TB drugs and the empty used packages by cross checking with DOTS card.
3. Check DOTS card to find out whether supervisor of patients' anti-TB drug use checked on the card correctly or not. Copy the data from DOT card into TB card prepared by the author.
4. Ask patient to collect urine and check its color in the morning to check whether patients take anti-TB drug continually, especially Rifampicin, the main drug used in short-course TB treatment.
5. In depth interview with the patients following questionnaire guidelines.
6. Observe general symptom of patient in each follow-up visit. Record all details in TB card.
7. Evaluate the default rate of selected TB patients.
8. Collect patient's sputum at the end of the intensive phase to check for conversion rate.

### **Monitoring Phase 2**

The author has to collect data, supervise and check the performance quality of village health volunteers once a month, totaling 4 times per one studied patient. The steps of this phase are as follows:

1. Proceed as step 1-6 of Phase 1.
2. During the 5<sup>th</sup> month of treatment where there is a surprise visit, collect patient's sputum to assess failure rate and default rate.

3. During the 6<sup>th</sup> month of treatment where there is a surprise visit, collect patient's sputum to assess failure rate, default rate and cure rate.

### **3.6 Data Analysis**

Qualitative data analysis is carry out by content analysis which comprises of the classifying of data collected from in depth interview into groups, interpreting data and identify the relation of data and the directly observed treatment short-course (DOTS) to summarize study outcome. Treatment outcome evaluation was conducted using Cohort analysis in accordance to the WHO guidelines. There were evaluations of AFB conversion rate of greater than 85% at the end of the 2<sup>nd</sup> month, the failure rate at the end of the 5<sup>th</sup> month, The cure rate during or at the end of 6<sup>th</sup> month, and the default rate was evaluated throughout treatment period.

Quantitative analysis from Pre test and Post test with SPSS for Windows was used for quantitative data analysis and knowledge of training analysis.

### **3.7 Results**

Evaluation outcomes of village health volunteer training project are as follows:

## **Input Evaluation**

### **1. Personnel**

- 1.1 Trainer: The author was the trainer of the training project therefore there was no difference in contents related to tuberculosis. The author is a responsible officer in a TB clinic and has already passed the training from Region 7 Center for Tuberculosis Control, Ubonratchathani Province. Language used in the training was the same dialect as of the village health volunteers'. The training was conducted for qualified TB patients only, which allowed time interval and made it convenient for the author to conduct all these.
- 1.2 Officers at TB clinics who work in the areas of 5 districts in Roi-Et province are familiar with each other. They can work and cooperate with each other comfortably and quickly.
- 1.3 Supervisors of author understand and realize the importance of tuberculosis control in Roi-Et province. They supported the project very well and even permitted the author to conduct the study during office hours.
- 1.4 Health officers at the health centers cooperated well in paying visits to TB patients to evaluate village health volunteers' performance. They all were well trained about DOTS.
- 1.5 Village health volunteers of each village participated in the training did cooperate very well and specially contributed their time to the project.

1.6 Patients: Number of patients who met selection criteria depended on number of population in the district, which made different chances of being selected. Forty-four participants were selected according to the inclusive criteria. Two of them were excluded from 46 cases due to one case was under 15 years old and the other one was severe sickness. In some districts, the number of patients was so small therefore selecting time was extended in order to recruit adequate number of patients for the evaluation, as shown in Table 3.2, resulted that the evaluation outcome was delayed.

**Table 3.2 : Registered all cases tuberculosis patients. ( n = 103 )**

<b>Variables</b>	<b>Number</b>	<b>Percentage</b>
<b>1. Gender</b>		
Male	67	65
Female	36	35
<b>Total</b>	<b>103</b>	<b>100</b>
<b>2. Age groups ( years )</b>		
0-20	2	1.9
21-30	14	13.6
31-40	16	15.5
41-50	20	19.4
51-60	17	16.5
61-70	22	21.4
71-80	10	9.7
>81	2	1.9
<b>Total</b>	<b>103</b>	<b>100</b>
<b>Mean=50.01, Min = 11,</b>	<b>Max = 86 , S.D = 17.04</b>	
<b>3. TB clinic registered</b>		
Meyavadi district	7	6.8
Nong Phok district	16	15.5
Pho Chai District	17	16.5
Phon Thong district	31	30.14
Selephum district	32	31.1
<b>Total</b>	<b>103</b>	<b>100</b>

Table 3.2 showed that there were male and female patients registered at the set time 65% and 35 % respectively. The group that has highest number (21.4 %) of tuberculosis patients was 61-70 years. The mean age is 50.01 years.

The youngest patient was 11 years old and the oldest was 86 years of age with standard deviation of 17.04. The highest number of patients was at Selephum district, 31.1 percent.

**Table 3.3: Details of each type tuberculosis patients who registered at the set time.**

<b>Variables</b>	<b>Number</b>	<b>Percentage</b>
<b>1. Types of disease</b>		
- Pulmonary TB	88	85.4
- Extra Pulmonary TB	15	14.6
* TB of Lymph nodes	7	6.8
* TB Meningitis	5	4.9
* TB Pneumopleuritis	2	1.9
* Other TB	1	1
<b>Total</b>	<b>103</b>	<b>100</b>
<b>2. Types of registration</b>		
- New patient: N	86	83.5
- Relapse patient: R	3	2.9
- Transfer in: TI	6	5.8
- Treatment after default: TAD	2	1.9
- Failure: F	0	0
- Others: O	6	5.8
<b>Total</b>	<b>103</b>	<b>100</b>



**Table 3.3 : Details of each type tuberculosis patients who registered at the set time. (Cont.)**

<b>Variables</b>	<b>Number</b>	<b>Percentage</b>
<b>3. Results of sputum exam for diagnosis</b>		
- <b>Positive</b>	<b>52</b>	<b>50.5</b>
• New	46	88.5
• Relapse	3	5.8
• Transfer in	1	1.9
• Treatment after default	1	1.9
• Other	1	1.9
- <b>Negative</b>	<b>35</b>	<b>34.0</b>
- <b>Unknown</b>	<b>16</b>	<b>15.5</b>
<b>Total</b>	<b>103</b>	<b>100</b>
- Category 2	3	2.9
- Category 3	25	24.3
- Others	1	1.0
<b>Total</b>	<b>103</b>	<b>100</b>

Table 3.3 showed that pulmonary tuberculosis was found to be the most detected cases of 85.4 percent with positive sputum of 50.5 percent (88.5 percent of new cases with smear positive), and 15.5 percent of unknown results of sputum exam, including extra pulmonary tuberculosis as well. Only 25.3 percent had chest x-rays available for determination. Category 1 treatment was the most treatment received by the majority of patients (71.8%).

**Table 3.4 : New smear pulmonary tuberculosis patients who were selected to the training project and received treatment Category 1.**

<b>Variables</b>	<b>Number</b>	<b>Percentage</b>
<b>1. Gender</b>		
- Male	27	61.4
- Female	17	38.6
<b>Total</b>	<b>44</b>	<b>100</b>
<b>2. Age (years)</b>		
10-20	1	2.3
21-30	4	9.1
31-40	9	20.5
41-50	9	20.5
51-60	8	18.2
61-70	7	15.9
71-80	5	11.4
>80	1	2.3
<b>Total</b>	<b>44</b>	<b>100</b>
Mean =49.8, Min= 20, Max= 82, S.D. = 16.51		
<b>3. TB clinics</b>		
Meyavdi district	3	6.8
Nong Phok district	8	18.2
Pho Chai district	6	13.7
Phon Tong district	14	31.8
Selephum district	13	29.5
<b>Total</b>	<b>44</b>	<b>100</b>

From table 3.4 showed that 44 cases with new smear positive pulmonary tuberculosis were selected as inclusion criteria and 2 cases of them were excluded (1 case was seriously ill and 11 years of old age), highest number of 31.8 % selected new smear pulmonary tuberculosis patients registered for treatment in Phon Tong district,

followed by Selephum district, 29.5 %. The lowest number of 6.8 % was at Meyavadi district. Majority of the patients were male, 61.4%. Youngest patient was 20 years of age, and the oldest was 82 years old. Mean age was 49.8 years with Standard Deviation of 16.51.

**Table 3.5 : The number of VHVs who supervised the TB patients.**

Variable	1 <sup>st</sup> VHV		2 <sup>nd</sup> VHV	
	Number	%	Number	%
<b>1. Gender</b>				
Male	12	27.3	9	20.5
Female	32	72.7	35	79.5
<b>Total</b>	<b>44</b>	<b>100</b>	<b>44</b>	<b>100</b>
<b>2. Age groups ( years)</b>				
26 – 30	3	6.8	3	6.8
31 – 35	7	15.9	2	4.5
36 – 40	11	25.0	9	20.5
41 – 45	11	25.0	15	34.1
46 – 50	9	20.5	11	25.0
51 – 55	3	6.8	4	9.1
<b>Total</b>	<b>44</b>	<b>100</b>	<b>44</b>	<b>100</b>
<b>3. Knowledge level</b>				
Primary school	38	86.4	37	84.1
High school	4	9.1	3	6.8
> High school	2	4.5	4	9.1
<b>Total</b>	<b>44</b>	<b>100</b>	<b>44</b>	<b>100</b>

- 1<sup>st</sup> VHV: Mean = 40.75, Min = 26, Max = 53 , S.D = 6.53
- 2<sup>nd</sup> VHV: Mean = 42.79, Min = 27, Max = 54 , S.D = 5.88

From table 3.5 showed that there were 88 VHVs who supervised the TB patients, and divided into 2 groups (supervisor and sub – supervisor). The data of genders and age groups of both VHVs who selected were not different than other group, but knowledge level of the 2<sup>nd</sup> group higher than the 1<sup>st</sup> group ( > high school ).

## **2. Budgets and Instrument**

Budgets and instruments for project implementation were sufficient as some of them were supported from government sectors such as anti-TB drugs, laboratory investigations, posters and pamphlets.

### **Process evaluation**

Process of face to face education training was conducted following the guideline not later than 3 days after patients were diagnosed from physicians and registered at district TB clinic. It aimed to assist patients to get treatment as soon as possible as patients received only 7- day supply of anti-TB drugs from TB clinic before going home. This way the treatments were continued before village health volunteer training processed. The duration of project implementation was found to be a significant problem as the project was a prospective study. It cannot identify exact number of patients within scheduled time. Project schedule had to be extended for another 1 month in order to recruit adequate number of samples resulting in prolonged project evaluation and some patients had to stop taking medicines periodically because of severe side effects. The location for the training was in an area of studied village, it helped reducing the expenses and was convenient for village health volunteers to travel.

### Effect evaluation

After a one month extension, 44 patients were selected from 5 districts as required and 88 village health volunteers were chosen based on pre-test results are as shown in the following table.

**Table 3.6 : Pre – test and Post – test results of all village health volunteers who were supervision the patients.**

Statements	Pre- test		Post- test	
	No.	%	No.	%
1. Tuberculosis is a communicable disease caused from bacteria.	48	54.5	71	80.6
2. Tuberculosis can be classified into 2 groups.	42	47.7	66	75.0
3. Pulmonary tuberculosis is the most concerned health problem.	46	52.2	66	75.0
4. Symptoms of pulmonary TB patients are fever, cough and weight loss.	57	64.7	61	69.3
5. The most convenient and cost effective method for Pulmonary TB diagnosis is sputum exam.	31	35.2	51	57.9
6. Diagnosis of pulmonary TB is based on x-ray result and sputum exam.	30	34.0	40	45.4
7. Directly Observed Treatment Short (DOTS) is a method that WHO accepted as the most effective measure.	43	48.8	44	50.0
8. When there are TB patients in the village or community, community members should encourage them and take care of the continuous medication.	49	55.6	68	77.2
9. The best tuberculosis prevention is to cure the infected persons.	49	55.6	46	52.2
10. Village health volunteers, relatives, health officers, etc can help supervising and monitoring patients' medication.	63	71.5	72	81.8

**Table 3.7 : Pre and Post-test scores of all village health volunteers who were in charge of patients' medication**

Knowledge level	Pre- test		Post- test	
	No.	%	No.	%
Low (0-5 score)	50	56.8	23	26.1
Good (6-8 score)	34	38.6	56	63.6
Excellent (9-10 score)	4	5.5	9	10.2
Total	88	100	44	100
Mean = 5.20	Min =2, Max=9	S.D.=1.81	Mean 6.46, Min=3	Max=10, S.D.=1.57

From Table 3.6 and 3.7, at low knowledge level (0-5 scores) all village health volunteers At a good knowledge level (6-8 scores) and excellent level (9-10 scores) of post-test were increasing from 38.6 % to 63.6% and 5.5% to 10.2 % respectively. Mean score of pre-test all village health volunteer was 5.20 with minimum score of 2, maximum score of 9 with Standard Deviation of 1.81. The post-test of all village health volunteer had a mean score of 6.46 with minimum score of 3, maximum score of 10 and Standard Deviation of 1.57.

**Table 3.8 :** Values of sample numbers, mean, standard deviation, t value and df value of 95 % mean confidence of scores' difference of TB knowledge of village health volunteer who in charged of TB patients' medication using Category 1 treatment both before and after face to face education training.

	n	<u>Mean</u>	S.D.	Mean Diff	Sd	95 % Mean Diff	t	df	P value
Post test	88	6.46	1.57	1.261	1.991	0.839-1.683	5.94	87	0.000
Pre-test	88	5.20	1.81						

From Table 3.8, sample numbers of 88 village health volunteers were tested for their TB knowledge. It found that all village health volunteers had pre-test mean scores equal to 5.20 (S.D = 1.81) and post-test mean scores of 6.46 (S.D = 1.57). The post-test mean score was higher than pre-test with the different mean score of 1.261 (S.D= 1.991), which is significantly different with P value of 0.000 at 95 percent confidence interval. The mean difference ranged from 0.839 to 1.683.

**Table 3.9 : Pre-test results for 2 groups of village health volunteers.**

Statements	1st VHV		2nd VHV	
	No.	%	No.	%
1. Tuberculosis is a communicable disease caused from bacteria.	23	52.3	25	56.8
2. Tuberculosis can be classified into 2 groups.	23	52.3	19	43.2
3. Pulmonary tuberculosis is the most concerned health problem.	24	54.5	22	50.0
4. Symptoms of pulmonary TB patients are fever, cough and weight loss.	29	65.9	28	63.6
5. The most convenient and cost effective method for Pulmonary TB diagnosis is sputum exam.	12	27.3	19	43.2
6. Diagnosis of pulmonary TB is based on x-ray result and sputum exam.	22	50.0	8	18.2
7. Directly Observed Treatment Short (DOTS) is a method that WHO accepted as the most effective measure.	22	50.0	21	47.7
8. When there are TB patients in the village or community, community members should encourage them and take care of the continuous medication.	22	50.0	27	61.4
9. The best tuberculosis prevention is to cure the infected persons.	27	61.4	22	50.0
10. Village health volunteers, relatives, health officers, etc can help supervising and monitoring patients' medication.	33	75.0	30	68.2



**Table 3.10 : Range of Pre-test scores of 2 village health volunteers who were in charge of patients' medication**

Knowledge level	1 <sup>st</sup> VHV		2 <sup>nd</sup> VHV	
	No.	%	No.	%
Low (0-5 score)	25	56.8	25	56.8
Good (6-8 score)	15	34.1	19	43.2
Excellent (9-10 score)	4	9.1	0	0
Total	44	100	44	100
Mean = 5.39	Min =2, Max=9	S.D.=2.5	Mean= 5.02, Min=2,	Max=8, S.D.= 1.55

\* VHV= Village health volunteer

From Table 3.9 and 3.10, at low knowledge level (0-5 scores) first village health volunteer and second village health volunteer had the same scores of 56.8%. At a good knowledge level (6-8 scores), first village health volunteer and second village health volunteer had scores of 34.1% and 43.2% respectively. At an excellent knowledge level (9-10 scores), first village health volunteer got scores of only 9.1 percent whereas second village health volunteer had zero score. Mean score of first village health volunteer was 5.39 with minimum score of 2, maximum score of 9 with Standard Deviation of 2.5. The second village health volunteer had a mean score of 5.02 with minimum score of 2, maximum score of 8 and Standard Deviation of 1.55.

**Table 3.11 : Post-test results for 2 village health volunteers**

Statements	1st VHV		2nd VHV	
	No.	%	No.	%
1. Tuberculosis is a communicable disease caused from bacteria.	38	86.4	33	75.0
2. Tuberculosis can be classified into 2 main groups.	32	72.7	34	77.3
3. Pulmonary tuberculosis is the greatest public health problems.	34	77.3	32	72.7
4. Symptoms of pulmonary TB patients are fever, cough and weight loss.	32	72.7	29	65.9
5. The most convenient, comfortable and cost effective method for TB diagnosis is sputum exam.	21	47.7	29	65.9
6. Diagnosis of pulmonary TB is based on chest x-ray result and result of sputum exam.	23	52.3	17	38.6
7. Directly Observed Treatment Short (DOTS) is a method that WHO accepted as the most effective measure.	23	52.3	21	47.7
8. When there are TB patients in the village or community, community members should encourage them and take care of continuous medication.	32	72.7	36	81.8
9. The best tuberculosis prevention is to cure the infected persons.	26	59.1	20	45.5
10. Village health volunteers, relatives, health officers, etc can help supervising and monitoring TB patients' medication.	36	81.8	36	81.8

**Table 3.12 : Range of Post-test scores of 2 village health volunteers who were in charge of supervising patients' anti-TB drug medication**

Knowledge level	1 <sup>st</sup> VHV		2 <sup>nd</sup> VHV	
	No.	%	No.	%
Low (0-5 score)	12	27.3	11	25.0
Good (6-8 score)	28	63.6	28	63.6
Excellent (9-10 score)	4	9.1	5	11.4
<b>Total</b>	<b>44</b>	<b>100</b>	<b>44</b>	<b>100</b>
Mean=6.40, Min=4	Max=9, S.D.=1.3		Mean 6.52, Min=3	Max=10, S.D.=1.77

\*VHV= Village health volunteer

Form Table 3.11 and 3.12, first village health volunteer and second village health volunteer had decreased scores 27.3 and 25.0 percent respectively at a low knowledge level. At good knowledge level, both village health volunteers had the same 63.6 percent increased score. At excellent knowledge level, only second village health volunteer had increased scores of 11.4 percent compared to the unchanged scores of the second village health volunteer. Mean, minimum, and maximum scores and standard deviation of first village health volunteer were 6.40, 4, 9, and 1.3 respectively. The second village health volunteer had mean, minimum, and maximum scores of 6.52, 3 and 10 respectively with standard deviation of 1.77.

**Table 3.13 : Values of sample numbers, mean, standard deviation, t value and df value of 95 % mean confidence of scores' difference of TB knowledge of village health volunteer who in charged of TB patients' medication using Category 1 treatment both before and after face to face education training.**

	n	Mean	S.D.	Mean Diff	Sd	95 % Mean Diff	t	df	P value
1 <sup>st</sup> VHV									
Post test	44	6.409	1.369	1.022	1.848	0.406-1.584	3.669	43	0.001
Pre-test	44	5.386	2.048						
2 <sup>nd</sup> VHV									
Post-test	44	6.522	1.771	1.500	2.118	0.855-2.144	4.696	43	<0.001
Pre-test	44	5.022	1.547						

From Table 3.13, sample numbers of 88 village health volunteers were tested for their TB knowledge. It found that the first village health volunteer had pre-test mean scores equal to 5.386 (S.D = 2.048) and post-test mean scores of 6.409 (S.D = 1.369). The first village health volunteer's post-test mean score was higher than the second volunteers with the different mean score of 1.022 (S.D= 1.848), which is significantly different with P value of 0.001 at 95 percent confidence interval. The mean difference ranged from 0.460 to 1.584. For the second village health volunteer, pre-test mean scores was 5.022 (S.D = 1.547) and post test mean scores was 6.522 (S.D = 1.771). Mean difference between pre and post test was 1.500 (S.D = 2.118) with P value < 0.001 at 95% confidence interval and the range of mean difference of 0.855 to 2.144.