

CHAPTER III

PROJECT EVALUATION

3.1 Introduction

The evaluation of the program used a multiple cross-sectional model in which changes in the participants over the course of the intervention were evaluated. Over the 5- month project, the followings were evaluated; knowledge outcome, perception of self-health awareness, perceived risk factors for developing diabetes, perceived benefit, barriers and self-efficacy to prevent diabetes, practice on diet control and physical activity. In addition, physical examination such as testing for fasting blood sugar and cholesterol, taking body weight, height, and blood presser were performed. Data were collected at four different occasions: firstly at the time before participants exposure to the intervention (pre-test), secondly when participant had completed a 5-day training (post-test), the third and the fourth occasions was at 3 months (3-month follow-up) and 5 months after the post-test respectively.

Participants were interviewed individually using questionnaire to collect information on the program's impact.

3.2 Purpose

The purpose of this project was to describe the results of a process and outcome evaluation of a culturally specific physical activity and dietary change program designed to reduce the risk of developing type 2 diabetes mellitus (T2DM) in Tambol Railug Thong.

The study was designed to answer the following primary questions:

1. Do participants acquire more knowledge after participating in T2DPP project?
2. Do participants have better perceptions of health status, risks for developing diabetes, benefits, barriers of health promotion and self-efficacy after participating in the program?
3. Do participants have more exercises and have better food control determined by changing in body weight, blood pressure, blood sugar and cholesterol, after participating in the program?
4. What aspects of health related quality of life do participants gain from participating in this program in the dimensions of physical, mental, emotional, social and spiritual?

3.3 Method

3.3.1 Design

A community-based intervention trial was conducted involving adults at Tambol Railugthong who were at risk for diabetes. The T2DPP procedure was described in details in Chapter 2. To aim the effect of community based interventions

on the nutrition, diabetes awareness and risk factor, one-group intervention trial and pre and post self-reported change were established.



3.3.2 Participants

The participant consisted of 49 nondiabetic adults over 40 years of age. In Tambol Railugthong who were at risk for developing type 2 diabetes. Enrollment criteria included the overweight and having Body Mass Index (BMI) greater than 25, having a family history of diabetes, having high blood pressure and high cholesterol or being female with a prior history of gestational Diabetes Mellitus, and having little exercises. The participants volunteered to enroll in this program after being informed of the study through the invitation letters inviting them to participate in the program. The letters were individually sent by mail or delivered in person by health volunteers to participants. All participants consented in writing for their participation. Recruitment was designed to enroll the approximate number of 40 participants from 11 villages in Tambol Railugthong. A step for screening and recruitment process was developed to identify qualified participants.

3.3.3 Outcome Measure

Evaluation of the effectiveness of the intervention was performed basing on the data from pre-test, post-test and follow-up assessments as the measure to follow behavior and physical outcome variables.

Knowledge

Knowledge was measured by 2 subscales: (a) knowledge on biological aspects of diabetes and dietary and (b) knowledge on the cause and prevention.

There were one correct answer and two detractors for questions to test knowledge. Correct items were scored 1 and incorrect items were scored 0. There were six questions in each subscale.

The test was given to a panel of experts on diabetes who examined it for face and content validity before conduction in the groups. Reliability analysis resulted in a 12 items scale with a Cronbach's alpha coefficient of 0.66.

Perception

Perception scale consisted of 5 subscales as follows :

- Perception of health status was assessed by a single item with perception of own health response options ranging from "poor", "fair", and "good"
- Perceived risk for developing diabetes was assessed by a single item with perception of own risk "not risk", "little risk", "moderate risk", and "high risk"
- Perceived benefit of health promotion behaviors consisted of 15 items (Cronbach's alpha =0.85). Participants responded to each statement on a 5-point scale ("strongly agree" to "strongly disagree"). High scores were indicative of greater perceived benefit to prevention on diabetes.

- Perceived barriers to health promotion behaviors consisted of 5 items (cronbach's alpha =0.81). Participants responded to each statement on a 5-point scale ("strongly agree" to "strongly disagree"). High scores were indicative of greater perceived in barriers to prevention on diabetes toward more control diets and more physical activity.
- Perceived self – efficacy contained 10 items that measured on a 5-point scale from 1) "strongly confident" to 5) "strongly unconfident" (cronbach's alpha = 0.72.). High scores were indicative of participants's high convincing to control diet and more exercise.

Behavior

Exercise contained 10 items (cronbach's alpha = 0.88) that measured on a 4-point scale (always to never) High scores were indicative that participants had more exercise habit.

Dietary was assessed using eating patterns questionnaires consisted of 10 items (cronbach's alpha = 0.72). Participants responded on a 4-point scale ("always" to "never") High scores were indicative that participants had more control diet habit.

Blood pressure

Blood pressure was taken using sphygmomanometer and stethoscope after resting for at least five minutes. Blood pressure was category into normal groups if:

Systolic < 139 and Diastolic < 89

(Chaysri and Supawan , 1995:167)

Height, weight and BMI

Height and weight were assessed on each subject while s/he was wearing indoor clothing but without shoes. Body mass index (BMI) was calculated by taking the subject's weight in kilograms divided height in meters squared. Overweight persons was defined as those with BMI of 25 or higher.

Fasting blood sugar (FBS)

Fasting blood sugar was measured by using Glucometer after the persons have not drink or eat anything for at least 8 hours. The new standards proposed by the American Diabetes Association (1997) were:

- Fasting blood sugar (FBS) levels of 126 mg/dl or higher:
Diabetes
- Blood sugar level 110-125 mg/dl: *Impaired glucose tolerance*
- Blood sugar level less than 110: *Normal*

Health related quality of life

Health related quality of life scale composing 4 components (physical, emotional, social and spiritual) was used to assess health beneficiary from the program. The measure consisted of 13 items while participants were asked to mark " X " or " ✓ " on items that they gained benefit from the program.

In addition to the above mentioned outcome variables, structured interview questions were used to ask for information in regard to demographics and family history. Demographic information included variables such as age, gender, marital status, education status, work status and income.

3.3.4 Procedure

Over the 5-month project, the followings were evaluated; knowledge outcome, perception of self-health awareness, perceived risk factors for developing diabetes, perceived benefit, barriers and self-efficacy to prevent diabetes, practice on diet control and physical activity. Data were collected at four different occasions. Pre-test were collected data on knowledge, perception of self-health awareness, perceived risk factors for developing diabetes, perceptions of benefits, barriers self-efficacy to prevent diabetes, practice on diet control and physical activity before participants were exposed to the intervention (21 January 2002). A post-test was conducted to collect data on knowledge, perception on self-health awareness, and perceived risk factors for diabetes when participants had completed a 5-day training (25 January 2002). The 3-month follow-up were conducted to collect data on knowledge, perceived of benefits, barriers, self - efficacy to prevent diabetes, practice on diet control and physical activity approximately 3 months after the post-test (25 April 2002). The 5-month follow-up was gathered clinical status such as FBS, cholesterol, blood pressure and body weight. Health related quality of life was also collected once (25 June 2002).

3.3.5 Data Analysis

Data management and results of quantitative analyses were processed with the SPSS (Statistical Package for Social Science) version 10.0 for Windows. Descriptive analysis was done based on frequencies, means and standard deviation. To analyze the significant differences on outcome variables between baseline and follow-up, paired t-test was used for continuous variables and Chi-square test was used for categorical variables.

To allow the use of a Chi-square test, perceived risk of diabetes was collapsed into categories; those perceiving themselves likely to develop diabetes and those not likely to develop diabetes. Perception of health status was collapsed into two categories, those perceiving their health status as “poor” and those perceiving it as “fair” or “good” in order to allow the use of Chi-square.

3.4 Results

Demographic Characteristic

A total of 49 non-diabetic adults were enrolled in the program. All participants have completed both pre-test, post-test and follow-up assessments. The socio-demographic and risk factors of participants are shown in Table 3. The ages of participants ranged from 41 to 79 years (Mean = 57.9, SD =9.30). In regard to marital status 61% of the participants were married and 39% were not married. The genders of participants were distributed as 84% for females and 16% for males. 88% of them completed primary school education while 12% completed secondary school or higher. In regard to working status, 61% were self-employed, 23% were employees and 16%

were unemployed. Assessment of their risk for diabetes indicated that 72% had relatives that had diabetes; 63% were considered overweight and had the BMI of greater than 25 (among the group, there were 11% of them that had BMI greater than 30 or Obese); 16% were had high Cholesterol while 96% had little exercise and 45% had hypertension. There were 11 persons that had *four or more* risk factors, to which more intervention would be given.

Table 3.1: Socio-demographic and Risk Factor Characteristic of Participants

Characteristics	Participants (n = 49)	
	n	Percent
Socio-demographic		
Participants' age		
41-50	12	25
51-60	20	41
61-70	11	22
over 70	6	12
Gender		
Female	41	84
Male	8	16
Education		
primary school	43	88
secondary school or more	8	12
Marital Status		
Married	30	61
Not Married	19	39
Single	9	18
Divorced	10	21
Occupation		
Self- Employee	30	61
Farmer	24	49
Private	6	12
Employee	11	23
Not Employee	8	16
Family Income/ month		
Enough for expense	26	53
Not enough for expense	23	47
Risk factors		
Have Family History of diabetes	22	45
Father	3	14
Mother	3	14
other	16	72
Overweight (BMI>25)	31	63
High Cholesterol	8	16
Lack of exercise	47	96
Hypertension	22	45
Gestational diabetes	1	5

Intervention Effects On Participants

Knowledge Outcome

To determine whether the program had effect on participant's knowledge, two analyses were conducted: the comparison of participants' pre-test and post-test scores to determine any immediate effects, and the comparison of participants' pre-test scores and the scores of the 3-month follow-up.

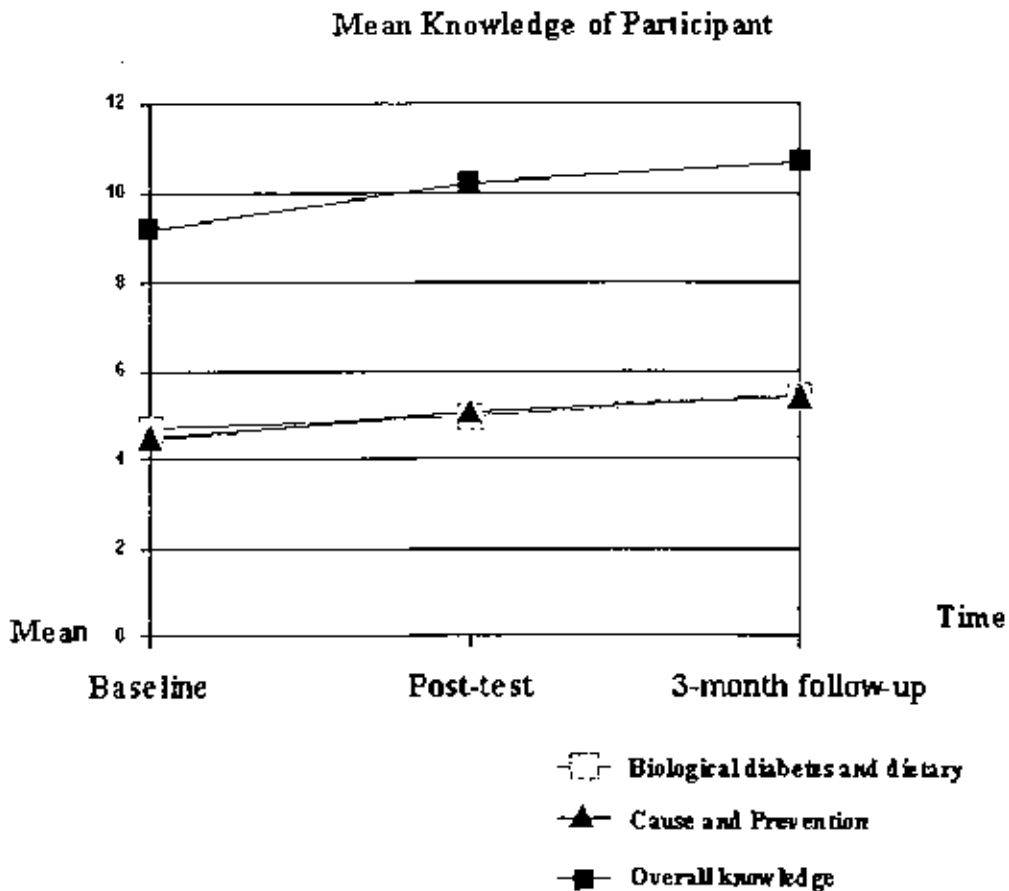
Pre-test-Post-test: The mean number of correct items on the pre-test of the overall knowledge survey was 9.2 (SD = 2.22) and the mean number of correct items on the post-test was 10.2 (SD = 1.55). A paired t-test showed a significant difference between pre-test and post-test mean scores ($P=0.003$). Significant difference across mean scores was only found in the knowledge about cause and prevention ($P=0.006$), but scores did not reflect significant increase in the knowledge of biological diabetes and dietary.

(Table 3.2)

Pre-test-Follow-up: As shown in Table 3.2 and Figure 3.1, from the baseline to the 3-month follow-up was a significant increase in the mean scores of overall knowledge and knowledge in two subscales. Such increases were in overall knowledge ($P<0.001$), knowledge about biological diabetes and dietary ($P=0.001$) and knowledge about the cause and prevention ($P<0.001$). These results indicate that the program had a significant positive effect on participants' knowledge

Table 3.2: Mean Knowledge of participants at Pre-test, Post-test and 3-month Follow-up

Areas of Knowledge	Baseline	Post-test	3 month	P-value	P-value
	SEM	SEM	SEM	Pre-test and Post-test	Pre-test and Follow-up
Biological diabetes and dietary	4.7±0.17	5.1±0.17	5.4±0.14	0.053	0.001
Cause and Prevention	4.5±0.19	5.1±0.13	5.4±0.12	0.006	<0.001
Overall knowledge	9.2±0.32	10.2±0.22	10.7±0.20	0.003	<0.001



**Figure 3.1: Compare knowledge gained at baseline, post-test and follow-up
Perception outcomes**

Perception of health status: The study subjects were asked about perceived self-health awareness at baseline and post-test. Among 49 participants, 63.9% reported that they were fair or good on health status at pre-test and moved a little bit higher (69.4%) at post-test. For the total of 31 persons who previously thought that they were in good health, in responsive to the questions asked 5 days after participation in the training, 26 of them continued thinking that they were still healthy while 5 persons thought that their health were not so good. On the other hand, the total of 18 persons who previously thought that they were not in good health, 10 of them continued thinking that they were still not healthy and 8 persons thought that their health status were better than before.

Perceived risk of developing diabetes: All participants' asked about perceived risk of developing diabetes, 73.5% reported that they had risks of developing diabetes at pre-test and perceived increasing higher risks (91.8%) at post-test. (Table 3.3).

Chi-square test was used to assess the significant change in perceived self-health awareness between pre-test and post-test, no significant was found in this group.

Table 3.3 : Perception self-health awareness and risk factor Score at pre-test and post-test

Perceived	Pre-test (n=49) n (%)	Post-test (n=49) n (%)	P-value Chi-Square
Self-health awareness			
Poor	18 (36.7)	15 (30.6)	0.581
Healthy	31 (63. 9)	34 (69.4)	
Risk factor			
Not risk	13(26.5)	4(8.2)	0.035
At risk	36(73.5)	45(91.8)	

At the 3-month follow-up, the participants had statistically significant increasing in mean perceived barrier to prevent diabetes (from 15.0 to 17.1, $P=0.007$) and mean perceived self-efficacy (from 38.5 to 43.2, $P<0.001$). At the time, however, no significant was found in reduction in mean perceived benefit of prevention (from 63.8 to 62.7, $P=0.40$) (Table 3.4).

Table 3.4: Mean Perception of Score at Pre-test and 3-month follow up (n=49)

Perceived	Pre-test	3 month follow up	Mean differences	P-value paired t - test
	SEM	SEM	SEM	
Benefit to prevent DM	63.6 ±0.76	62.7 ±1.04	0.90±1.07	0.400
Barriers to prevent DM	15.0 ±0.55	17.1 ±0.50	-2.1 ±0.74	0.007
Self - efficacy	38.5±0.58	43.2 ±0.68	-4.7±0.69	<0.001

Behaviors

Shown in Table 3.5 below is the comparison of the difference between behaviors at baseline and at the 3-month follow-up. The participants had statistically significant increasing in mean on physical activity (from 26.6 to 32.0, $P < 0.001$) but no significant was found in reduction of the mean on diet control (from 29.4 to 30.7, $P = 0.10$).

Table 3.5: Behavior on exercise and dietary scored at pre-test and at 3-month follow-up

Behavior	Pre-test	3-month follow-up	Mean differences	P-value paired t - test
	SEM	SEM	SEM	
Exercise	26.6±0.99	32.0±0.93	-5.4±1.05	<0.001
Diet control	29.4±0.68	30.7±0.74	-1.3±0.79	0.100

The impacts of the intervention on blood pressure, body weight, body mass index, fasting blood sugar and Cholesterol are shown in Table 8. It shows the findings that the participants had statistically significant reduction in mean systolic blood

pressure (128.6 to 123.7, $P=0.035$), mean body weight for all participants, normal weight, and overweight groups (from $P<0.05$ to $P<0.001$), mean BMI (from 26.8 to 26.1, $P<0.001$). The fasting blood sugar mean decreased from 92.4 to 91.9 mg/dl ($P=0.76$). Among 8 Participants who had abnormal Cholesterol at pre-test, there Cholesterol mean decreased from 222.9 to 210.3. However, this difference did not reach statistically significant.

Among 19 (38.8%) participants who had abnormal blood pressure at baseline, their blood pressure results become normal at the 5-month follow-up. Over the 5 months participants were examined FBS again, their FBS test result were still in a normal line.

Table 3.6: Impact of the Intervention Program on Clinical Status

Item	Pre-test	5 month	Mean	P- Value
	SEM	Follow up	differences	
		SEM	SEM	
Blood pressure (n=49)				
Systolic	128.6 ±3.19	123.7 ±2.01	-4.9 ±2.26	0.035
Diastolic	83.3 ±1.81	82.5 ±1.41	-0.8 ±1.67	0.627
Body weight (n=49)				
Overall participants	63.9 ±1.76	62.1 ±1.72	-1.8±0.30	<0.001
Normal weight (n=18)	52.3 ±1.85	51.2 ±1.76	- 1.1±0.39	0.015
Overweight (n =31)	70.6 ±1.61	68.5±1.68	-2.2±0.40	<0.001
Body mass index (n=49)	26.8±0.62	26.1 ±0.59	-0.8±0.15	<0.001
Fasting blood sugar (n=49)	92.4 ±1.66	91.9±1.45	0.5±1.64	0.767
Cholesterol * (n=8)	222.9±13.25	210.3 ±9.72	12.6±18.28	0.512

What Participants have gained from the Program

The participants were asked about the benefits of participating in the program. Most of them reported that they had pleasures and funs from joining group activities (100%), felt active after doing exercise (98%), had chances to meet friends in the group (98%), believed that exercise and diet control could prevent diabetes (95.9%), knew how to choose more appropriate diets (93.9%). They also felt relieved from stress and joint pains (93.9%), had more courage to exercise in public (89.5%) and had others benefits as shown in Table 3.7.



Table 3.7: Health related quality of life

Item	n	Percent
Pleasure and fun from joining the group	49	100
Feeling more active after the exercise	48	98.0
Having chances to talk with friends in the group	48	98.0
Believed that exercise helps preventing diabetes	47	95.9
Believed that diet control helps preventing diabetes	47	95.9
Learned more how to choose diet to prevent diseases	46	93.9
It helped relieving stress	46	93.9
It helped relieving joint pains	46	93.9
Feeling more courage to exercise in public	44	89.8
Getting to know more people	43	87.8
Having better sleep	42	85.7
Able to lower body weight	40	81.6
Feeling more calm, less irritable	37	75.5
Able to exchange experiences about healthy foods with the group	36	73.5
Used to catch cold quite often, after then feel stronger	32	65.3
Able to lower blood pressure	22	44.9