



CHAPTER III

PROGRAM EVALUATION

3.1 Introduction

This study aimed to evaluate the effectiveness of the Control – Prevention of DM – HT Program (CPDP) in people at risk. The evaluation consists of 2 parts as follows: evaluation of the process and the outcomes. Both qualitative and quantitative measurements were used to analyze the impact of CPDP. The process and impact were evaluated across the program as a whole as well as compared the knowledge and behavior between people who participated in the program and those who did not.

The emphasis in evaluation of the program was on determining the efficiency of the process such as community advisor and VHV preparation, public relation, target selection and preparation, DM screening, health education, and home visit.

Analysis of the outcome indicator focused on descriptive analysis in order to better determination of how outcome analysis might be developed in the future iterancy of the program.

3.2 Objectives

The objective was to assess the results of the CPDP in regard with the process and outcomes of the CPDP program and also : 1) Describe the CPDP process evaluation and 2) Summarize the results of the outcome evaluation that includes behavior and knowledge.

3.3 Evaluation Questions and Methods

3.3.1 Process evaluation

A. Evaluation questions :

1. How successful was the program in recruiting the intended target population and serving the expected number of participants?
2. Did the superior support this program and how?
3. How much fund was used in this program ?
4. How was time management in the program, was it efficient?
5. What were procedures used to recruit and maintain participants in the program?
6. What were the barriers and facilities to attaining program's objective ?

B. Data collection method

Methods used in the process evaluation included focus group interview, in-dept interview and review document.

Focus group interview

Fifteen village health volunteers (VHV) from 13 communities were interviewed. Semi-structured interview was used to investigate VHV's perception of CPDP in order to find out VHV's idea on the preparation process, readiness to the intervention, target selection, public relation, and barriers to the implementation of the intervention.

In- depth Interview

An in-dept interview with 13 health staffs from Department of Social Medicine of Phayao general hospital, who acted as advisor for the 13 communities (one advisor per a community) was performed to determine their understanding on the context of CPDP in the community.

Review other documents

Details of control and prevention diabetes program (CPDP), Phayao general province, 2000 and summary reports of concerning research were used.

C. Time frame for collecting information

Table 7 shows the time frame for process evaluation.

Table 7: Time frame for collecting information

Activity	Period
1. Tool development	Dec, 2000
2. Tool testing	Apr – May, 2001
3. Data collection	Jun – Aug, 2001

D. Data analysis procedure

After collection, all data were verified for validity and completeness. Then sorted, rearranged, and conducted the content analysis.

E. Limitation

Program organizer did not provide pre-test of knowledge and behavior of self-care of the people at risk and diabetic patient prior to the start of the program, thus comparison cannot be made to the post-test. Therefore, a group of non-participant with similar characteristics was used as a comparison group.

3.3.2 Outcome evaluation

A. Evaluation questions.

- 1) How effective was the program in increasing knowledge of the participants?
- 2) What are the incidences of DM among population age 40 and over, who had participated in the program during the 3 years follow up? (2000 – 2002)

B. Population and sample

Population aged 40 and above, who had and had not participated in the program in 2000 were recruited from 13 communities in Phayao municipality, 60 persons per group using simple random sampling. Sample size was calculated from this formula:

$$N = \frac{(\sigma^2_1 + \sigma^2_2)(Z_{1-\alpha/2} + Z_{1-\beta})^2}{\Delta^2}$$

Where $\Delta = \mu_2 - \mu_1$, the means and variances of the two respective group are $(\mu_1 \sigma^2)$ and $(\mu_2 \sigma^2)$

σ^2_1 =variance of group 1 = 5.1

σ^2_2 =variance of group 2 = 4.8

α = level of significance = 0.05

β = power of test = 0.9, $\Delta = \mu_2 - \mu_1 = 4$ Target group number = 36 cases, but researcher expanded to 60 cases of 8 males and 52 females to prevent lost of follow up and the researcher see that this program has used less budget, therefore, to increase numbers of target group from 36 to 60 cases.

Fifteen of the seventeen participants diagnosed with diabetes through the program implemented in 2000 were included in the study, 2 patients migrated and lost of contact.

2) Measurement

To identify difference in knowledge and health behavior between non-diabetic people who participated and not participated the CPDP & questionnaire, consisted of 4 areas was used as follows:

Demographic and Socioeconomic Characteristics.

Demographic and Socioeconomic information included variables such as age, sex, marital status, educational level, occupation and income.

Risk factors

Risk factors were assessed by questions concerning the presence or absence of the following risk factors for diabetes : present hypertension , Body mass index of 25 or higher; family history of DM and not having physical examination in the past 5 years.

Knowledge

Knowledge test originally developed by health education and health behavior development team , region 10 was measured by 4 subscales: (a) knowledge of causes of diabetes (2 items); (b) knowledge of symptom/diagnosis of DM (6 items); (c) knowledge of risk factors (6 items); and (d) knowledge of DM control (6 items)

All subscales were measured on “true” , “false” and “don’t know”. Correct items were scored 1 and incorrect items were scored 0. All “don’t know” response were coded as incorrect. Over scores were summed from the individual subscale, proceeding scales ranging from 0 to 20

Health Behavior

Health behavior consisted of 5 subscales : (a) Dietary ;(b) Smoking & drinking alcohol ; (c) Emotional & social ; (d) Exercise ; (e) Drug used .Each subscale was measured on a 3 point scale 1 for “never” 2 for “sometime” and 3 for “usually” : several of items are reverse score.

To identify differences in knowledge and health behavior of diabetic patient , questionnaire which consisted of 4 areas was used as follows:

Demographic Characteristics

Demographic information included variables such as sex, age, marital status, educational level, occupational.

Risk factors

Risk factors were assessed by questions concerning the presence or absence of the following risk factors for diabetes: initial DM signs , family history of DM ,BMI of 25 km/sq.m. or higher.

Knowledge

Knowledge test originally development by health education and health behavior development team, region 10 was measured by 6 subscale : (a) knowledge of DM signs (4 items) : (b) knowledge of complication (2 items) : (c) knowledge of treatment (5 items) : (d) knowledge of prevention (3 items) : (e) knowledge of risk factors (2 items) and (f) knowledge of nutrition and diet habit (4 items)

All subscale were mainly answers by choosing one of three alternatives: “true” , “false “ and “ “don’t know “. Correct items were scored 1 and incorrect items were scored 0. All don’t know responses were scored as incorrect. Overall scores were summed from the individual subscale, proceeding scales ranging 0 to 20.

Health behavior

Health behavior consisted of 5 subscales : (a) Diet behavior (13 items) : (b) Smoking

& drinking alcohol (2 items) : (c) Treatment behavior (10 items) : (d) Feet care behavior (7 items) : (e) Exercise habit (1 item) .Each subscale was measured on a 3 point scale 1 for “ never” 2 for “sometimes” and 3 for “ usually” : several of items are reverse score., with the exception of exercise behavior that had two scales, yes or no.

C. Time frame of data collection

For outcome evaluation, the time frame was as shown in Table 8.

Table 8: Time frame of data collection

Activities	Period
1. Tools development	Dec.,2000
2. Tools testing	Jan.-Feb.,2001
3. Data collection	June –Aug,2001

D. Data analysis procedure

Cumulative incidence during 3 years would be used to calculate the number of persons who would need treatment in order to prevent confirmed diabetes during a period of 3 years.

Of all 424 samples,92 were withdrawn as a result of not fasting overnight before the test and thus only 332 subjects were screened (58 male and 274 female)

3.4 Results

3.4.1 Process evaluation

How successful was the program in recruiting the intended target population and serving expected number of participants?

Figure 2 shows the results of year 2000 implementation. A total 5791 of people aged 40 and above (2,876 males and 2,916 females) were invited for a DM screening. Of these 424 subjects, 92 were identified and excluded from the screening program due to non per oral overnight before the test, thus leaving 332 subjects were screened (58 male, 274 female). The overall screening rate was 5.7 % which lower than the expected number of participants (10%). It is found that 303 out of 332 had FBS \leq 126mg%, 11 cases out of 303 are former diabetic patients (Patients who were known having diabetes) who returned for repetition. Due to public relations campaigns aimed at target group to receive screening test of village health volunteers in some communities were not explicit, diabetic patients whom have been treated were also received the test.

Among the former diabetic patients 11 case were FBS \leq 126 mg% and 12 cases were FBS $>$ 126mg%. However, diabetic patients who repeated the test of the 2 groups were provided health education individually from health personnel. At the second test , it was found that 17 cases were FBS $>$ 126mg% and were transferred to DM clinic at Phayao general hospital. However, only 15 cases were available for home visit by community advisor, where the other 2 had migrated to somewhere else. All subjects with abnormal results on the first blood test were invited to repeat FBS 1 week after the first had classified according to the 1994. WHO criteria.

Table 9 shows the distribution of participants for DM screening; age, sex and blood test result. It was found that there were more women than men (82.5% VS 17.5%). Participants' age ranged from 22 to 95. Blood test result showed that 91.3% were FBS \leq 126mg% (old DM 3.6%, new screening blood test 96.4%, and 8.7% were FBS $>$ 126mg% (old DM 41.4% ,new screening blood test 58.6%)

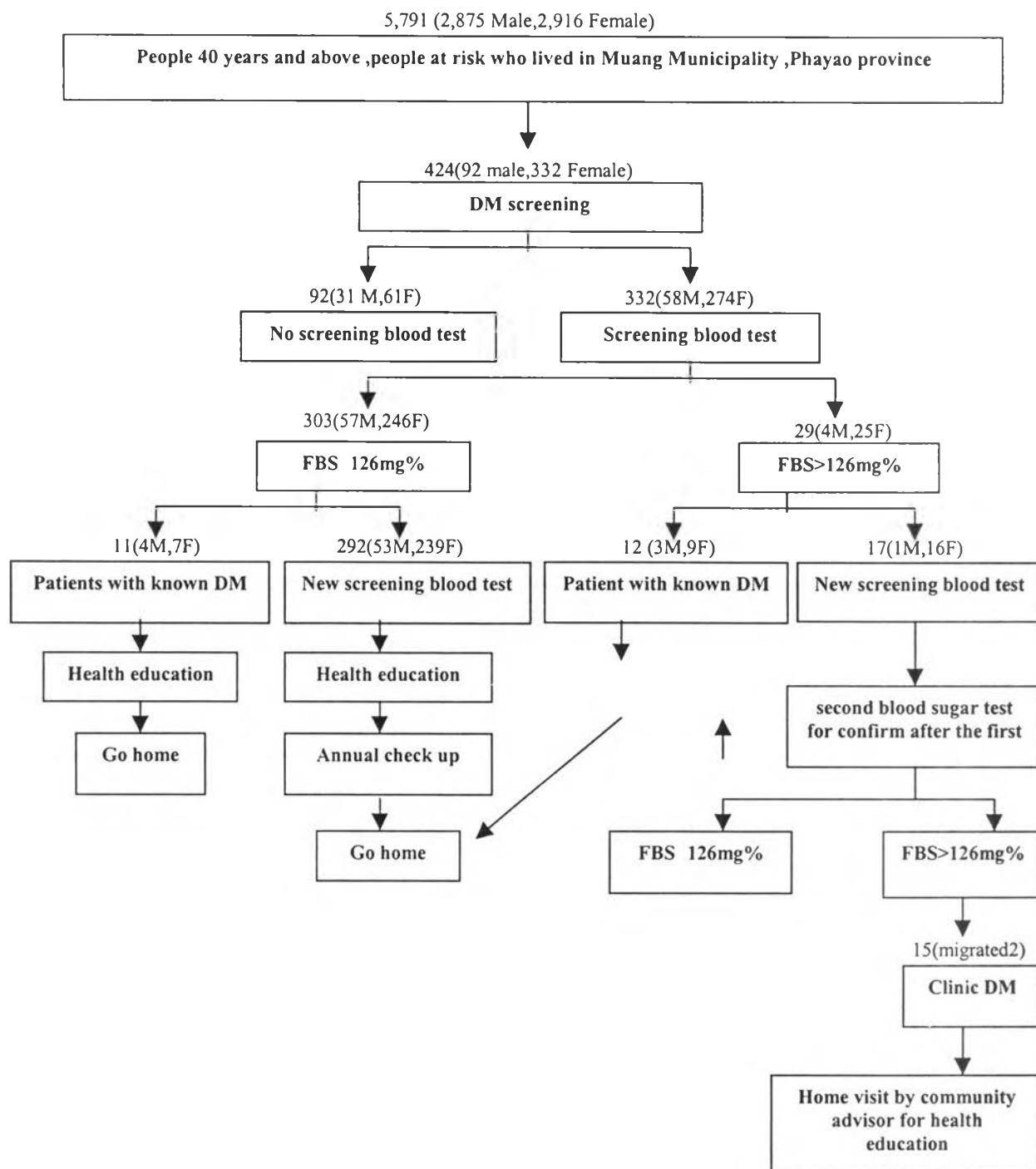


Figure 2: Results of implementation

Table 9: Distribution of participants for DM screening

Distribution of participants	No.	%
Age		
22 – 39	7	2.3
40 – 49	70	22.7
50 – 59	80	25.9
60 – 69	103	33.3
70 – 79	44	14.2
80 – 95	5	1.6
Sex		
Male	58	17.5
Female	274	82.5
Blood test result		
≤126mg%	303	91.3
-old DM	11	3.6
new screening blood test	292	96.4
>126mg%		
-old DM	29	8.7
-new	12	41.4
	17	58.6

Problems and obstacles

- 1) Community advisors are comprised of registered nurse, health educator, disease control officer, social worker, nursing staff, and assistant. However, some of them are not public health staff which might affect health educating process and cause problems on behavior on health care issue.

- 2) A broad public relation plan is hard to focus on a target group. It is because of limited time as announcement was made just 1-3 days before service day. Therefore, the majority of participants insufficient DM screening equipment e.g. weight and height scale, glucometer, cause inconvenience in working the operation.
- 3) Delay of service, some targets returned home because of hunger
- 4) The history form did not cover some important items i.e.
 - Health history, current disease
 - Risk factor e.g. CVA family history, obesity, smoking, alcoholism, renal disease, high blood fat, lack of exercise, stress
 - Risk group e.g. family history of DM, weight at birth over 4 kg
 - DM common signs e.g. frequent urination, hunger, fatigue ,excessive thirst, polyuria, pruritus, otherwise unexplained weight loss

Did the superior support this program and how ?

Chief of Department of Social Medicine, Phayao general hospital, who was in charge, well supported the DM control program as an academic consultant, providing suggestion and recommendation on problem resolution which enabled the team all through the plan.

How much fund was used in this program ?

Budget was from 2 sources: 1) Phayao general hospital supplied 332 glucostrip pads (average cost per case = 30 Bahts) 2) co-payment from participants of total 3,410 Baht (average 10 Baht per person). The expense was considered efficiently used

because the target could save time and cost of transportation. The total expense for this program was 9,660 Bahts.

How was time management in the program ?

The implementation was in accordance with the plan. For example, the time designated was July 2000 – September 2000 (3 months) and the actual implementation was July 2000 – August 2000 (2 months). Due to the appropriateness of time and duration, the target groups were co-operative in providing fully information as the appointed time.

What are procedure used to recruit and maintain participants in the program ?

Strategy used for gaining participants in the program was the preparation of working staffs. VHVs and the target groups were informed objectives, process, and benefit of participation through a meeting. Local diabetic patients were asked to tell about health problem of DM in the meeting. However the most important person for recruiting participants was public health volunteers. The reasons are that : they worked closely with the community and knew better about local problem. Moreover, people trusted them.

What were the barriers and facilitators to attaining this objectives?

There were 3 facilitators to attaining the objectives;

- 1) Director support: Chief of organization, Head of Department of Social Medicine of Phayao general hospital, Head of community health service

unit and the team consisting of 13 staffs from Social Medical Section of Phayao general hospital, have well supported this program.

- 2) Good partnerships : the program was implemented through collaborating with partner organizations and village health volunteers.
- 3) Administration and management: Head of Department of Social Medicine could manage this program well.

Obstacle of the program

Public relation did not reach all target people because community advisors have informed the village health volunteers only 2 days before the program date. In addition, the screening test was implemented on weekdays and only one day for each community. Most of target people were bored, they then could not attend the screening program. Therefore, majority of participants were elderly .

3.4.2 Outcome evaluation

How effective was the program in increasing the knowledge of participants?

1. Effect of the intervention on knowledge and DM risk behavior among people at risk

1.1 Comparison of demographic characteristics

Chi-square analysis was performed on categorical demographic characteristics: gender, age, marital status, education level, occupation, and family income level. A significance level of 0.05 was used for all statistic tests. As shown in Table 10, no significant difference between the intervention and comparison groups were found.

Table 10: Comparison of demographic characteristics

Demographic characteristic	Intervention group (n=60)		Comparison group (n=60)		P-value
	Number	%	Number	%	
Gender					0.573
Male	8	13.3	6	10.0	
Female	52	86.7	54	90.0	
Age (years)					0.248
35 – 39	1	1.7	3	5.0	
40 – 49	14	23.3	8	13.3	
50 – 59	22	36.7	27	45.0	
>60	23	38.3	22	36.7	
	(Min=35, Max=82)		(Min=38, Max=77)		
Marital status					0.459
Married	34	56.7	44	73.3	
Single/separate without a legal divorce	26	43.3	16	26.7	
Monthly income					0.934
<2,500	41	68.3	41	68.3	
2,501 – 7,500	13	21.7	14	23.3	
>7,500	6	10	5	8.3	

1.2 Comparison of DM risk factor

Preliminary analysis was made by comparing the risk factors of intervention with comparison group. There was only a significant difference of a percentage of the group reported of no physical examination in the past 5 years (60 % VS 73.3%, P=0.003) as shown in the Table 11.

Table 11: Comparison of the frequency and percentage of DM risk factors

Demographic characteristic	Intervention group		Comparison group		P-value
	Number	%	Number	%	
Present hypertension	6	23.08	6	33.33	1.00
Body Mass Index >25 kg/m ²	17	28.3	19	31.7	0.580
Family history of DM	12	20.0	16	26.7	0.090
No physical examination in the past 5 years	36	60.0	44	73.3	0.003

1.3 Knowledge Outcomes

To compare knowledge outcomes, independent t-test was used to examine the differences in knowledge outcome between intervention and comparison group. There were no significance of knowledge of six subscales and overall as shown in the Table12.

Table 12: Comparison of mean and SD of knowledge outcomes

Knowledge	Intervention group		Comparison group		P-value
	Mean	SD	Mean	SD	
Knowledge of causes of DM	1.48	0.75	1.60	0.72	0.385
Knowledge of symptoms/diagnosis of DM	4.53	1.77	4.28	1.69	0.430
Knowledge of risk factors	3.28	0.96	3.12	1.29	0.423
Knowledge of DM control/prevention	4.2	1.47	3.90	1.65	0.296
Overall	14.78	5.06	13.97	4.77	0.354

1.4 Risk health behavior outcomes

In Table 13, independent t-test was used to determine the differences in health behavior between intervention and comparison group. There was no significant difference on behavior for any of the five subscales and overall.

Table 13: Comparison of the mean and SD of health behavior score on DM by group

Behavior(Total score)	Intervention group		Comparison group		P-value
	Mean	SD	Mean	SD	
Dietary (36)	27.62	2.75	27.88	2.90	0.607
Smoking and drinking (6)	5.41	0.61	5.37	0.78	0.698
Emotional and social (21)	16.60	3.32	15.65	3.22	0.114
Exercise (9)	3.90	3.04	4.95	3.17	0.067
Drug use (6)	2.45	0.69	2.52	0.77	0.620
Overall (78)	55.98	5.65	56.37	6.17	0.723

2. Effect of the intervention on knowledge and DM risk behavior on diabetic patients

2.1 Demographic characteristics

The sample group of this study was 15 type II diabetic patients which were found through CPDP in Muang municipality. It was found that there were more women than men: (93.3% vs.6.7%). Participants' age ranged from under 40 to over 60 years (min 22, max75). Marital status of them was as follow: 66.7% married, 26.7% divorced, separated or widow, and 6.7% single. Education level of them was as follow: 26.7% high school, 66.7% primary school, and 6.7% illiterate. Occupation of them was as follow: 53.3% housewife, 26.7% merchant, 13.3% employee, and 6.7% Thai government officer, as shown in Table 14.

Table 14: Demographic characteristic of diabetic patients

Demographic characteristic	Frequency	%
Sex		
Female	14	93.3
Male	1	6.7
Age (years)		
<40	1	6.7
40 – 49	6	40.0
50 – 59	3	20.0
>60	5	33.3
(min 22, max 75)		
Marital status		
Married	10	66.7
Divorced, separated, widow	4	26.7
Single	1	6.7
Educational level		
Don't attended school		
Primary school	1	6.7
High school	10	66.7
Occupation	4	26.7
Housewife	8	53.3
Merchant	4	26.7
Employee	2	13.3
Thai government officer	1	6.7

2.2 DM risk factors

Table 15 shown risk factor of diabetic patients. Sixth of the fifteen of diabetic patients had a one risk factor (initial DM signs), eighth diabetic patients had a two risk factors (Family history of DM & initial DM signs) and one of diabetic patient had a three risk factors (Family history of DM & initial DM signs & BMI >25 kg/sq.m.)

Table 15: The frequency of DM risk factors

DM risk factor	Number (N = 15)	%
One risk factors	6	40.00
Initial DM signs		
Two risk factors	8	53.3
Family history of DM & initial signs		
Three risk factors	1	6.7
Family history of DM & initial signs & BMI >25 kg/sq.m.		

2.3 Knowledge and Health behavior outcome

The 20 items in the knowledge test worth one point each. The overall mean of knowledge measures was 13 (SD =4.68, min=1, max =18) thus, the average patients with diabetes in this program answered about three- fourth of the questions correctly. Looking at each subscales, the average of patients with diabetes answered on all subscales 65 percent of the questions correctly with exception of score for knowledge of nutrition and diet habit, which had about one-third correct answer. The results indicate that most of patients in this program misunderstand about foods related to complication reduction, especially on alcohol use and amount of food consumptions .In addition, 11 of the 15 diabetic patients thought that diabetes can be cured by herbal medicine. As a matter of fact, herbal medicine must be used through a combination of DM pill (Table 16).

Table 16: Percentage, Mean and SD of diabetic patient 's knowledge

Variable (Total score)	%	Mean	SD
Knowledge of DM signs		12.80	1.26
Diabetic patient has blood sugar 70-120 mg%	33		
DM is a condition of abnormality high blood sugar	80		
Dim sight, numbness at extremities are DM signs	80		
Weight loss, fatigue, polyphagia, polydipsia, polyurea and Ant attractive are DM signs	87		
Knowledge of complication		1.40	0.91
Complication of DM e.g. coma from hypoglycemia, infections	67		
Diabetic patients are likely to have heart disease, renal disease	73		
Knowledge of treatment		3.27	1.22
DM can be cured by herbs	27		
Blood sugar control only done by DM pill and injection	47		
DM cannot be cured	80		
Diabetic patients should take DM pills half an hour before meal	80		
Diabetic patients who takes pills with diet control and exercise will reduce blood sugar	93		
Knowledge of prevention		2.67	0.66
Early detection of DM done by blood or urine test	80		
Weight control, prohibit sweet food prevent DM	87		
Blood sugar control brings normal living	93		
Knowledge of risk factor		1.47	0.83
Obesity, stress, no exercise, frequent pregnancy are DM Causes	73		
Age over 40 is risky to DM	73		
Knowledge of nutrition and diet habit		1.47	1.06
Drinking will reduce blood sugar in diabetic patients	20		
Diabetic patient should eat often but small amount	20		
Diabetic patient can take honey	47		
If dizzy, sweat, fatigue, fainting, must eat sweet food	60		
Overall total		13.00	4.68

Health behavior

Table 17 shows the mean scores of patients performing self-care behavior. Overall health behavior score was 93.93(SD=5.70). Considered by component, mean score of diet behavior was 32.2.(SD=3.17), smoking & drinking was 5.93(SD=0.26), treatment behavior 27.93(SD=1.22), feet care 18.33(SD=2.89), emotional and social behavior 17.53 (SD=2.07) .In response to exercise behavior questions, 40 percent of patients reported that they had exercise . It was found that regular exercise of the patients were short walking and cycling for 20-30 minutes. For health behavior of diabetic patients, it was shown that some of patients were not in taking traditional medicine in correlation with prescribed medicine (mean score 1.47)

Table 17: Mean and SD of diabetic patient behavior

Variable (Total scores)	Mean	SD
Diet behavior	32.20	3.17
Having particular sweetened fruits as rambutan, grapes, durian, riped mango, and other preserved fruits	1.93	0.59
Having dried nuts	2.00	0.53
Having snacks between meals	2.07	0.59
Avoiding sweetened food when acknowledged the increase of blood sugar level	2.07	0.88
Drinking tea coffee, ovaltine with sugar, milk and coffee-mate	2.40	0.91
Having coconut milk and eggs as ingredients	2.53	0.52
Having fat meat as pork skin, pork brain	2.60	0.51
Having sweetened food as candies, desserts witch	2.67	0.49
Drinking sweetened soft drinks as sodas,syrups,and juices	2.67	0.62
Having green vegetables	2.73	0.46
Having food cooked with meat oil	2.80	0.56
Having salty food	2.80	0.41
Having each meal (3 meal) on time (at punctual)	2.93	0.26

Table 17: Mean and SD of diabetic patient behavior (Cont.)

Variable (Total scores)	Mean	SD
Smoking and drinking behavior	5.93	0.26
Drinking liquor as wine, whisky, beer	2.93	0.26
Smoking cigarette	3.00	0.00
Self- health care	27.93	1.22
Intaking traditional medicine in correlation with prescribed medicine	1.47	0.83
Self seeking for medication when become ill	2.87	0.35
Ever decrease the dose of medication or ever stop in taking medication	2.87	0.52
Physical examination at other clinic where these is no record of you having diabetes	2.93	0.26
Ever forgetting the dose of medication or ever stop intaking medication	2.93	0.26
Intake / inject medication as prescribed by physicians	2.93	0.26
Intake/ inject medication the time order	2.93	0.26
Self seeking for diabetes medication	3.00	0.00
Doubling the dose of medication or ever stop in taking medication	3.00	0.00
Physical examination as appointed	3.00	0.00
Feet care behavior	18.33	2.89
Feet exercise	2.20	0.94
Wearing socks/ slippers inside the house	2.20	0.94
Wash and dry	2.67	0.62
Self care for feet	2.67	0.62
Wearing socks/ shoes outside the house	2.73	0.70
Wearing socks to properly fitting the shoe	2.93	0.26
The use sharp tool to clip feet nails	2.93	0.26
Emotional and social behavior	17.53	2.07
Moody, upset, frustrated	1.60	0.74
Problem and worry sharing	1.60	0.74
Relaxation	1.67	0.49
Join religious activity with family	1.73	0.46
Face situation causing stress	2.33	0.62
Sleepless	2.53	0.64
One or both sides headache	2.60	0.51
Boring, inactive	2.73	0.46
Overall behavior	93.93	5.70