

CHAPTER IV

RESEARCH RESULTS

This study was a descriptive research to study the prevalence, knowledge, attitude, modifying factors, and preventive health action of Diabetes Mellitus among the population. Preventive health action of Diabetes Mellitus includes nutrition, physical health and stress management. In addition, to investigate the association among the factors relevant to health behaviors, Subjects included 350 people (≥ 30 years old) from Wangkeeree Sub-District, Huai yot District, Trang Province. The results of this study are presented in 8 parts as follows:

- Part 1. Demographic characteristics of the population
- Part 2. Knowledge of DM
- Part 3. Attitude towards DM
- Part 4. Modifying Factors of DM
- Part 5. Preventive health action of DM
- Part 6. Prevalence of DM
- Part 7. Association among knowledge, attitude, modifying factors, and preventive health action of DM
- Part 8. Association between preventive health action of DM and the prevalence of DM

Part 1. Demographic Characteristics of the Population

Data was obtained from 350 respondents, out of which 213 were female (60.9 %) and 137 male (39.1%). The youngest was 30 years old and the oldest was 86 years old. When divided into five groups the respondents between 30-39 years old at 34.6% and 40-49 years old at 29.4%. The average age of the samples was 47 years. The majority of the respondents were married at 89.4%, 9.8% had been widowed, divorced or separated and 1.7% were single.

In respect to their occupation, 71.4% were agriculture related, which was the majority group. The balance was comprised of commercial, government officers, employees, housekeepers and others. The majority of the respondents had a primary school education at 77.4%, while 10.3% had no formal education. The balance of the 3 levels was comprised of secondary school, certificate/diploma, and Bachelor's Degree or higher.

The highest number of respondents, 87.4%, had no family history of DM, while 12.6% had a family history of DM. The majority of the respondent, 88.3%, had not had a non-communicable disease.

The highest number of respondents, 61.4%, had a body mass index between 18.5 Kg/m² and 25 Kg/m², 25.1% had body mass index of more than 25 Kg/m², and 13.4% had body mass index of lower than 18.5 Kg/m². The highest number of respondent, 41.4%, had their last physical examination within the last six month, 38.6% had never had a physical examination, 12.3% had their last physical

examination more than one year ago, and 7.7% had their last physical between six month and one year ago (Table 4.1).

Table 4.1 : Demographic characteristics of the population (n = 350)

Characteristics	Number	Percentage
Age (Years)		
30-39	121	34.6
40-49	103	29.4
50-59	42	12.0
60-69	64	18.3
≥70	20	5.7
Mean=47.5 SD=12.83 Median=47.5	Min=30	Max=86
Gender		
Female	213	60.9
Male	137	39.1
Marital status		
Married	313	89.4
Widowed	28	8.0
Single	6	1.7
Divorced/Separated	3	0.9
Occupation		
Agriculture	250	71.4
Housekeeper	39	11.1
Commercial	29	8.3
Employee	20	5.7
Government officer	6	1.7
Other	6	1.7
Education		
Primary school	217	77.4
No formal education	36	10.3
Secondary school	28	8.0
Bachelor's Degree or higher	8	2.3
Certificate/Diploma	7	2.0

Table 4.1 : (Cont.) Demographic characteristics of the population (n = 350)

Characteristics	Number	Percentage
Family History of DM		
Have family history of DM	44	12.6
- Parents	21	6.0
- Sibling	19	5.4
- Grandfather/ Grandmother	4	1.1
No family history of DM	306	87.4
Ailment		
Heart disease	7	2.0
Diabetes Mellitus	15	4.3
Hypertension	19	5.4
No ailments	309	88.3
Body Mass Index (Kg/m²)		
Lower than 18.5	47	13.4
18.5 – 25	215	61.4
More than 25	88	25.1
Last Physical Examination		
Within the last 6 months	145	41.4
Between 6 month and 1 year	27	7.7
More than 1 year ago	43	12.3
Never had an examination	135	38.6

Part 2. Knowledge of DM

Knowledge: The questionnaire concerning knowledge of the disease included 15 items. The total scores concerning the knowledge in this study ranged of 15 points. The average knowledge level was 11.6, SD was 4.39, Minimum was 0 and Maximum was 15. The majority of the study population had a high knowledge of DM at 66.3%, a moderate knowledge of DM at 20.3%, and a low knowledge of DM at 13.4% of the study population (Table 4.2). The majority of the study

population had correct answers over 80%. The question that correct lower than 80% was susceptibility of family history of DM, severity complication to blindness, renal's disease, heart disease. The details of the data are shown in Appendix D.

Table 4.2 : Distribution of Knowledge of DM

Knowledge Level (Points)	Number (n=350)	Percentage (100.0)
Low (0-7)	47	13.4
Moderate (8-11)	71	20.3
High (12-15)	232	66.3
Minimum=0	Maximum=15	Mean=11.6 S.D=4.39

Part 3. Attitude of DM

Attitude: The answers recorded from each aspect of attitude towards preventive health actions on the questionnaire, were from a total of 10 items. The total scores concerning the attitude towards preventive health action group in this study ranged from 10 to 40 points. The average attitude was 30.1, SD was 4.60, Minimum was 12 and Maximum was 40. The majority of the study population had a moderate attitude level towards DM at 60.9%, followed by a high attitude level at 26.6% and a low attitude level at 12.6% of the study population (Table 4.3). The lowest level of attitude was their attitude towards exercise; they think that hard work can decrease blood sugar level and that hard work was the same as exercise. The details of data are shown in Appendix D.

Table 4. 3 : Distribution of Attitude Level

Attitude Level (Points)	Number (n=350)	Percentage (100.0)
Low (10-25)	44	12.6
Moderate (26-32)	213	60.9
High (33-40)	93	26.6
Minimum=12	Maximum=40	Mean=30.1 S.D.=4.60

Part 4. Modifying Factors of DM

Modifying Factors of DM: The questions concerning the modifying factors to preventive action on the questionnaire, included a total of 10 items. The total score concerning modifying factors toward cues to action and social support in this study ranged from 10 to 40 points. The average modifying factors group was 21.3, SD was 6.59, Minimum was 11 and Maximum was 40. The majority of the study population had a low modifying factors level at 75.4%. The moderate modifying factors level was at 20.6%, and the high modifying factors level was at 4.0% of the study population (Table 4.4). For the last three months, most of the people never received cues to action about DM from television, newspapers, magazines, manuals, their families, or health personnel. But most of the people had regular social support about eating, exercising, and relaxing. The details of data are shown in Appendix D.

Table 4.4 : Distribution of the Modifying Factors Level

Modifying Factor (Points)	Number (n=350)	Percentage (100.0)
Low (10-25)	264	75.4
Moderate (26-32)	72	20.6
High (33-40)	14	4.0
Minimum=11	Maximum=40	Mean=21.3 S.D.=6.59

Part 5. Preventive Health Action of DM

The answers recorded from the aspect of preventive health action on the questionnaire, included a total of 15 items. The total score concerning preventive health action in this study ranged from 10 to 60 points. The average preventive health action was 41.8, SD was 7.36, Minimum was 17, and Maximum was 60. The majority of the study population had an appropriate preventive health action level at 58.3%, followed by an inappropriate level at 29.1%, and a highly appropriate level at 12.6% of the study population (Table 4.5). The details of data are shown in Appendix D.

Table 4.5 : Distribution of practice level

Preventive Health Action Level (Points)	Number (n=350)	Percentage (100.0)
Inappropriate (15-37)	102	29.1
Appropriate (38-49)	204	58.3
Highly Appropriate (50-60)	44	12.6
Minimum=17	Maximum=60	Mean=41.8 S.D.=7.36

Nutrition's Preventive Health Action: The answer to each aspect of the nutrition's preventive health action level on the questionnaire, included a total of 7 items. The total score for preventive health action in this study ranged from 7 to 28 points. The average score of preventive health action was 20.2, SD was 3.30, Minimum was 8 and Maximum was 28. The majority of the study population had an appropriate preventive health action level at 58%, followed by an inappropriate level at 27.7% and finally a highly appropriate level at 14.3% of the study population (Table 4.6). Most of the study population had appropriate knowledge about eating habits and they reported eating vegetables regularly. The details of the data are shown in Appendix D.

Table 4.6 : Distribution of Nutrition's Preventive Health Action Level

Nutrition's Preventive Health			
Action Level (Points)	Number (n=350)	Percentage (100%)	
Inappropriate (7-18)	97	27.7	
Appropriate (19-23)	203	58.0	
Highly appropriate (24-28)	50	14.3	
Minimum=8	Maximum=28	Mean=20.2	S.D.=3.30

Exercise's Preventive Health Action: The answers recorded from each aspect of the exercise's preventive health action level on the questionnaire, consisted of 4 items. The total score ranged from 4 to 16 points. The average exercise preventive health action was 9.4, SD was 4.43, Minimum was 4 and Maximum was 16. The majority of the study population had an inappropriate preventive health action level towards exercise at 53.7%, followed by an appropriate

level at 24% and a highly appropriate level with 22.3 of the study population (Table 4.7). More than 30% never exercise and had inappropriate knowledge about exercise. The details of the data are shown in Appendix D.

Table 4.7 : Distribution of Exercise’s Preventive Health Action Level

Exercise’s Preventive Health			
Action Level (Points)	Number (n=350)	Percentage (100%)	
Inappropriate (4-10)	188	53.7	
Appropriate (11-13)	84	24.0	
Highly Appropriate (14-16)	78	22.3	
Minimum=4	Maximum=16	Mean=9.4	S.D.=4.43

Stress Management’s Preventive Health Action: The answers recorded from stress management’s preventive health action level part of the questionnaire, included a total of 4 items. The total score ranged from 4 to 16 points. The average stress management’s preventive health action was 12.2, SD was 2.68, Minimum was 5 and Maximum was 16. The majority of the study population had an appropriate stress management preventive health action level at 37.1%, followed by a highly appropriate level at 34.9% and an inappropriate level at 28% of the study population (Table 4.8). Most of the respondents had regularly practiced preventive health actions aimed at stress management. They realized that many problems can be solved by the techniques they use. The details of the data are shown in Appendix D.

Table 4.8 : Distribution of Stress Management's Preventive Health Action Level

Stress Management's Preventive Health Action Level (Point)	Number (n=350)	Percentage (100%)
Inappropriate (4-10)	98	28.0
Appropriate (11-13)	130	37.1
Highly appropriate (14-16)	122	34.9
Minimum=5 Maximum=16 Mean=12.2 S.D.=2.68		

Part 6. Prevalence of DM

Prevalence of DM from blood sugar level

From blood sugar data analysis, the majority of the subjects, 340, (97.1%) in this study had a blood sugar level of lower than 200 mg/dl. The remaining ten subjects of the study population had a blood sugar level of at 200 mg/dl and over (2.9%). The average blood sugar level was 118.3 mg/dl, with the standard deviation of blood sugar level at 40.7 mg/dl, minimum blood sugar level at 58 mg/dl, and the maximum blood sugar level at 463 mg/dl (Table 4.9).

Table 4.9 : Blood Sugar Level

Blood Sugar (mg/dl)	Number (n=350)	Percentage (100)
<200	340	97.1
≥200	10	2.9
Mean=118.3 mg/dl SD=40.77 mg/dl Min=58 mg/dl Max=463 mg/dl		

Demographic characteristic of prevalence of DM

Ten persons from the 350-study population had of blood sugar level of ≥ 200 mg/dl. The results show that: 1.8% of the respondents 60 years old or younger had DM and 0.1% of the respondents over 60 years old had DM. Breaking it down by gender, 5.1% of the males had DM and 1.4% of the females had DM. In terms of marital status, 3.5% of the widowed and 2.8% of the married respondents had DM. As far as their occupation, 5.1% of the housekeepers, 5% of the employees and 2.8% of the agriculture related had DM. Breaking it down by education, 8.3% with no formal education, 3.5% with a secondary school education and 2.7% with a primary school education had DM. In the family history classification of DM, 4.7% had parents with DM and 5.2% had sibling with DM while 2.6% had no family history of DM. In terms of ailments of DM patients, 60% of the respondents with DM had uncontrolled blood sugar and 0.3% had no ailments. In terms of the body mass index (B.M.I.), 2.7% that had normal B.M.I. had DM and 4.5% of $>25 \text{ Kg/m}^2$ of B.M.I. had DM. As far as the last physical examination, 6.2% of the population that had had a physical examination within the past six month had DM and 0.7% of the population had never had a physical examination had DM (Table 4.10).

Table 4.10 : Demographic Characteristics and blood Sugar Level

Characteristic	Number (n=350)	Blood Sugar (%)	
		≥ 200 mg/dl	<200 mg/dl
Age			
<60 years	266	1.8	98.2
≥60 years	84	0.1	99.9
Gender			
Female	213	1.4	98.6
Male	137	5.1	94.9
Marital Status			
Married	313	2.8	97.2
Widowed	28	3.5	96.5
Single	6	0.0	100.0
Divorced/Separated	3	0.0	100.0
Occupation			
Agriculture	250	2.8	97.2
Housekeeper	39	5.1	94.9
Employee	20	5.0	95.0
Commercial	29	0.0	100.0
Government Officer	6	0.0	100.0
Other	6	0.0	100.0
Education			
Primary School	217	2.7	97.3
No formal education	36	8.3	91.7
Secondary School	28	3.5	96.5
Bachelor's Degree or higher	8	0.0	100.0
Certificate/Diploma	7	0.0	100.0

Table 4.10 : (Cont.) Demographic Characteristics and blood Sugar Level

Characteristic	Number (n=350)	Blood Sugar (%)	
		≥ 200 mg/dl	<200 mg/dl
Family History of DM			
Parents have DM	21	4.7	95.3
Sibling have DM	19	5.2	94.8
Grandfathers/Grandmother	4	0.0	100.0
No Family History	306	2.6	97.4
Ailment			
Diabetes Mellitus	15	60.0	40.0
Heart Disease	7	0.0	100.0
Hypertension	19	0.0	100.0
No Ailment	309	0.3	99.7
Body Mass Index (Kg/m²)			
<18.5	47	0.0	100.0
18.5 – 25	215	2.7	97.3
>25	88	4.5	95.5
Last Physical Examination			
Within the last 6 months	145	6.2	93.8
More than 6 months ago	70	0.0	100.0
Never had an examination	135	0.7	99.3

Blood Sugar Level by History of DM

Fifteen persons from the 350 respondents had a history of DM (or DM's patient from diagnosis by physician). Nine patients or 60% of the population with a history of DM cannot control their blood sugar (at 200 mg/dl and over) and six patients or 40% of the population history of DM can control their blood sugar (lower

200 mg/ml). In the people who have no history of DM, I found that one person or 0.29% of study population with no history of DM had a blood sugar level of more than 200 mg/dl (Table 4.11).

Table 4.11 : Percentage of Blood Sugar by History of DM

History of DM	Blood Sugar Level		Number
	≥200 mg/dl (%)	<200 mg/dl (%)	
Have DM	9 (60.00)	6 (40.00)	15
Don't have DM	1 (0.29)	334 (99.70)	335
Total	10 (2.90)	340 (97.10)	350

Part 7. Association between Knowledge, Attitude, and Modifying Factors with Preventive Health Action of DM

The association among knowledge, attitude, and modifying factors with preventive health action of DM will be presented in 3 sections as follows:

- 7.1 The association between the knowledge level and the preventive health action level of DM
- 7.2 The association between the attitude level and the preventive health action level of DM
- 7.3 The association between the modifying factors level and the preventive health action level of DM

7.1 Association between Knowledge Level and Preventive Health Action Level of DM

From the analysis of the research data the following was concluded: Knowledge of DM is not significantly associated with preventive behavior ($p>0.05$). The results showed that, the study population at Wangkeeree Sub-District had a low knowledge level of DM but they had an appropriate preventive health action and high appropriate preventive health action. Therefore, preventive health action of DM is not associated with knowledge of DM (Table 4.12).

Table 4.12 : Association between Knowledge Level and Preventive Health Action Level of DM

Knowledge Level	Preventive Health Action Level (%)			Total (%)	Chi-Square	P-Value
	Highly Appropriate					
	Inappropriate	Appropriate	Highly Appropriate			
Low	14 (29.7)	29 (61.7)	4 (8.6)	47 (100)	1.333	0.856
Moderate	23 (32.4)	39 (54.9)	9 (12.7)	71 (100)		
High	65 (29.1)	136 (58.6)	31 (13.3)	232 (100)		
Total	102 (29.1)	204 (58.2)	44 (12.5)	350 (100)		

7.2 Association between Attitude Level and Preventive Health Action Level of DM

Attitude of DM is significantly associated with preventive health actions ($p<0.05$). The results showed that the study population had a low attitude level and

also had inappropriate preventive health actions. The study population had a moderate attitude and high attitude level; they had appropriate preventive health actions and highly appropriate preventive health action. Therefore, preventive health action of DM is associated with the attitude towards DM (Table 4.13).

Table 4.13 : Association between Attitude level and Preventive Health Action Level of DM

Attitude Level	Preventive Health Action Level (%)			Total (%)	Chi-Square	P-Value
	Inappropriate	Appropriate	Highly Appropriate			
Low	34 (77.2)	9 (20.4)	1 (2.2)	44 (100)	41.415	0.001
Moderate	46 (21.5)	142 (66.6)	25 (11.7)	213 (100)		
High	22 (23.6)	53 (56.9)	18 (19.6)	93 (100)		
Total	102 (21.9)	204 (58.3)	44 (12.6)	350 (100)		

7.3 Association between Modifying Factors and Preventive Health Action of DM

Modifying factors of DM are associated with preventive behavior ($p < 0.05$). The results showed that the study population who had a low modifying factor level had an inappropriate preventive health action, and those with high modifying factor level had an appropriate preventive health action. Therefore, preventive health actions of DM are associated with modifying factors of DM (Table 4.14).

Table 4.14 : Association between Modifying Factors and Preventive Health Action of DM

Modifying Factors Level	Preventive Health Action Level (%)			Total (%)	Chi-Square	P-Value
	Inappropriate	Appropriate	Highly Appropriate			
Low	93 (35.2)	138 (52.3)	33 (12.5)	264 (100)	41.415	0.001
Moderate	9 (12.5)	59 (81.9)	4 (5.6)	72 (100)		
High	0 (0)	7 (50.0)	7 (50.0)	14 (100)		
Total	102 (29.1)	204 (58.2)	44 (12.7)	350 (100)		

Part 8. Association between Preventive Health Actions of DM and the Prevalence of DM

The association between the preventive health actions of DM and the prevalence of DM are presented as follows:

- 8.1 The association between the total preventive health action and blood sugar level
- 8.2 The association between the nutrition's preventive health action and blood sugar level
- 8.3 The association between exercise's preventive health action level and blood sugar level
- 8.4 The association between stress management's preventive health action level and blood sugar level

8.1 Association between Total Preventive Health Action Level and Blood Sugar Level

The study found that blood sugar level is not associated with preventive behavior ($p>0.05$). The study population at Wangkeeree Sub-District showed inappropriate preventive health action and appropriate preventive health action but they had normal blood sugar levels. (lower 200 mg/dl) Therefore, the preventive health action of DM is not associated with blood sugar level (Table 4.15).

Table 4.15 : Association between Preventive Health Action Level and Blood Sugar Levels

Preventive Health Action Level (Points)	Blood Sugar Level (%)		Total (%)	Chi- Square	P- Value
	<200 mg/dl	≥200 mg/dl			
Inappropriate (15-37)	101 (99.0)	1 (1.0)	102 (100)	1.821	0.173
Appropriate (38-60)	239 (96.4)	9 (3.6)	248 (100)		
Total	340 (97.1)	10 (2.9)	350 (100)		

8.2 Association between Nutrition's Preventive Health Action Level and Blood Sugar Levels

From the analysis of the research data, blood sugar level is not associated with nutrition's preventive behavior ($p>0.05$). The results showed that the study population at Wangkeeree Sub-District either had inappropriate nutrition's preventive health action or appropriate nutrition's preventive health action and they had normal blood sugar levels. (lower than 200 mg/dl) Therefore, nutrition's

preventive health action of DM is not associated with blood sugar levels (Table 4.16).

Table 4.16 : Association between Nutrition's Preventive Health Action Level and Blood Sugar Level

Nutrition's Preventive Health Action Level (Points)	Blood Sugar Level (%)		Total (%)	Chi-Square	P-Value
	<200 mg/dl	≥200 mg/dl			
Inappropriate (7-18)	96 (99.0)	1 (1.0)	97 (100)	1.616	0.249
Appropriate (19-28)	244 (96.4)	9 (3.6)	203 (100)		
Total	340 (97.1)	10 (2.9)	350 (100)		

8.3 Association between Exercise's Preventive Health Action Level and Blood Sugar Levels

The analysis of the research data found that blood sugar level is not significantly associated with exercise's preventive behavior ($p>0.05$). The results showed that the study population at Wangkeeree Sub-District had inappropriate exercise's preventive health action and appropriate exercise's preventive health action and they had normal blood sugar levels (lower 200 mg/dl). Therefore, reported exercise's preventive health action of DM is not associated with blood sugar levels (Table 4.17).

Table 4.17 : Association between Exercise's Preventive Health Action Level and Blood Sugar Levels

Exercise's Preventive Health Action Level (Points)	Blood Sugar Level (%)		Total (%)	Chi-Square	P-Value
	<200 mg/dl	≥200 mg/dl			
Inappropriate (4-10)	185 (98.4)	3 (1.6)	188 (100)	2.321	0.134
Appropriate (11-16)	155 (95.7)	7 (4.3)	162 (100)		
Total	340 (97.1)	10 (2.9)	350 (100)		

8.4 Association between Stress Management's Preventive Health Action Level and Blood Sugar Level

The analysis of research data did not reveal a significant association between stress management's preventive health action level and blood sugar level ($p > 0.05$). The results showed that, the study population at Wangkeeree Sub-District had inappropriate stress management's preventive health action and appropriate stress management's preventive health action levels; they had normal blood sugar levels (lower 200 mg/dl). Therefore, the stress management's preventive health action of DM is not associated with blood sugar levels (Table 4.18).

Table 4.18 : Association between Stress Management's Preventive Health Action Level and Blood Sugar Level

Stress Management's Preventive Health Action Level (Points)	Blood Sugar Level (%)		Total (%)	Chi- Square	P- Value
	<200 mg/dl	≥200 mg/dl			
Inappropriate (4-10)	96 (98.0)	2 (2.0)	98 (100)	0.323	0.566
Appropriate (11-16)	244 (96.8)	8 (3.2)	252 (100)		
Total	340 (97.1)	10 (100)	350 (100)		