

CHAPTER 4

RESULTS

This chapter presented the data analysis and interpretation. The study results were explained including tables and graphs. It started with descriptive statistical analyses, scales reliability, inference statistics by which the study's response data were interpreted, and the results and evaluative statistical analyses, on which its (14) hypotheses were tested.

The first section summarizes descriptive analyses: response rate, demographic characteristics, the continuous variable, and scale reliability. The second presents results of the evaluative analyses, from the methods employed in this study: One way ANOVA, Pearson product moment correlation and Multiple Regression Analysis.

Descriptive statistics were used to examine the continuous variable characteristics of the respondents. One way ANOVA statistical methods was employed to compare means of Fasting Blood Glucose, compliance, diabetes knowledge score, age, calories burnt by exercise, BMI and eating behavior score between gender (male and female). A Pearson product moment correlation was used to examine the relationship between BMI, age, calories burnt by exercise, diabetes knowledge score, eating behavior score, compliance and Fasting Blood Glucose. Hierarchical Stepwise Multiple Regression Analyses was conducted to explore predictor model of Fasting Blood Glucose.

Data process (coding and computer entry) was done by the investigator. Test for entry error was done by double check, throughout the entire sample, of every response item against its initial keyboard entry.

4.1 Descriptive statistic analyses

4.1.1 Response rate

The study survey was conducted during the mid of January 2008 to the mid of March 2008 nearly eight weeks were consumed because of the samples of needs

respondents were 200. The samples were randomly sampling by computer from Saraburi Hospital database then called the selected sample in person, explained the concept of this study and asked for the inquiry along the questionnaire guideline. Final Return Rate was **100 %** (n= 200).

4.1.2 Demographic Characteristics

The sample (n=200) consisted of Type 2 diabetes patients who were prescribed Metformin® for diabetic treatment. The summary of the data obtained for various demographic data through the Type 2 diabetes patients study were shown in table 1. The demographic data included gender, marital/committed-cohabitation statuses, level of education, occupation and age.

Most of patients were female compared to male (138 against 62 or 69% against 31%). (The graphs as shown in Figure 1)

The marital/committed-cohabitation statuses of the respondents were married (182 or 91.00%). (The graphs as shown in Figure 2)

The level of education of the respondents were completed grade school at 98 (49%), completed high school at 46 (23%), completed junior high school at 36 (18%), technical school at 19 (9.5%) and just 1 bachelor degree (5%). (The graphs as shown in Figure 3)

For occupation, majority of the respondents were working as officer (60 or 30%), house maid (49 or 24.5%), civil servant (36 or 18%), and the fourth group were merchant (32 or 16%). Much lesser were farmer (19 or 9.5%) and employee (4 or 2%). (The graphs as shown in Figure 4)

The ages of respondents were presented as the followings: - the female ranged from 19.35 years old to 83.21 years old, the mean age of female was 59.82 ± 11.79 years old; the male ranged from 32.68 years old to 92.21 years old, the mean age of male was 59.13 ± 12.49 years old and the respondents ranged from 19.35 years old to 92.21 years

old, the respondents averaged 59.34 ± 11.99 years of age. The detail of age distribution was demonstrated in table 2 (The graphs as shown in Figure 5)

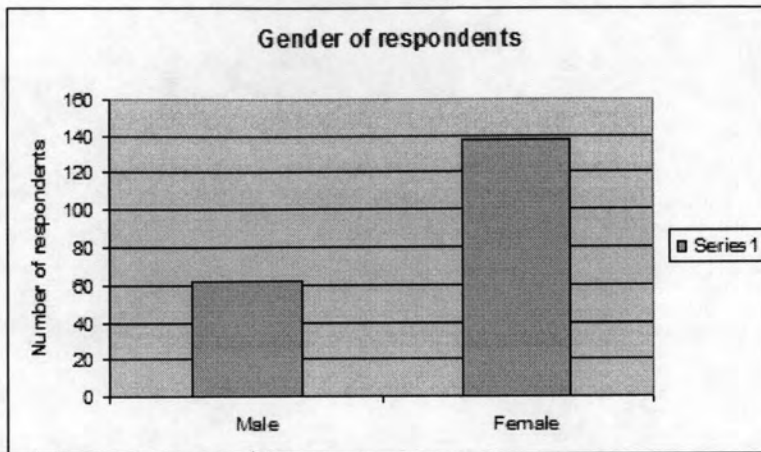
Table 1: Demographic data of the respondents (categorical data)

Demographic Characteristics	Frequency	Valid Percent
Gender		
Male	62	31.00
Female	138	69.00
Marital/committed-cohabitation Status		
Single	18	9.00
Married	182	91.00
Level of education		
Completed grade school	98	49.00
Completed high school	46	23.00
Completed junior high school	36	18.00
Technical school	19	9.50
Bachelor degree	1	0.50
Occupations		
Civil servant	36	18.00
Employee	4	2.00
Officer	60	30.00
Farmer	19	9.50
Merchant	32	16.00
House maid	49	24.50
Total	200	100.00

Table 2 Age distribution (n=200)

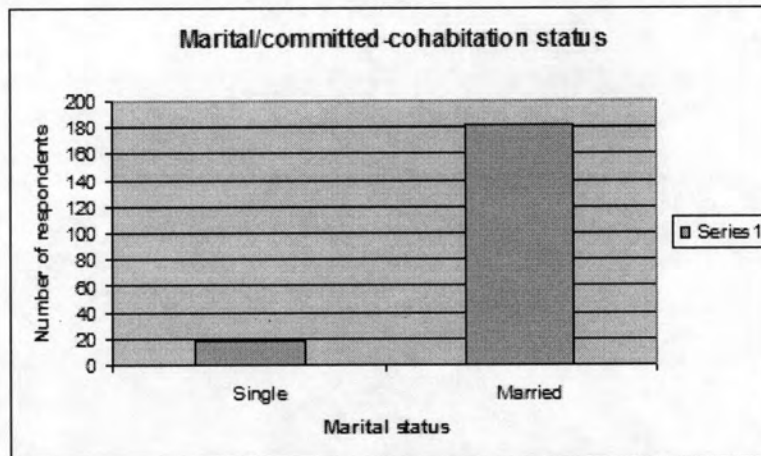
Age	Min	Max	Mean	SD
Male	32.68	92.21	59.13	12.49
Female	19.35	83.21	59.82	11.79
Average	19.35	92.21	59.34	11.99

Figure 1 showed Gender of respondents (n=200)



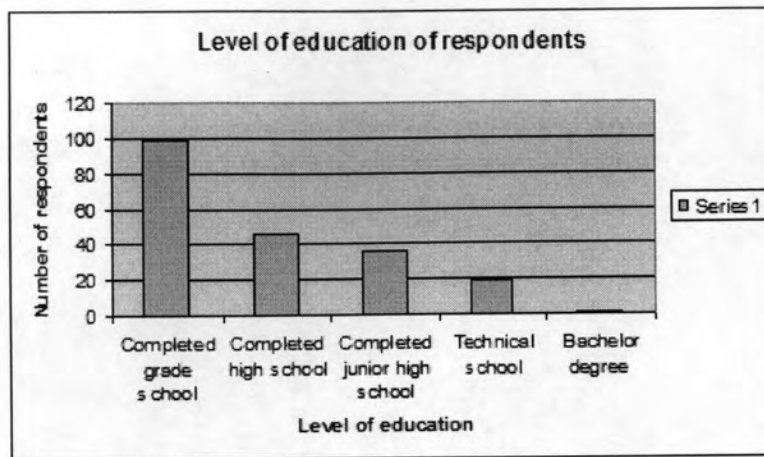
Note 69% of respondents were female; only 31% were male

Figure 2 showed Marital/committed-cohabitation Status of respondents (n=200)



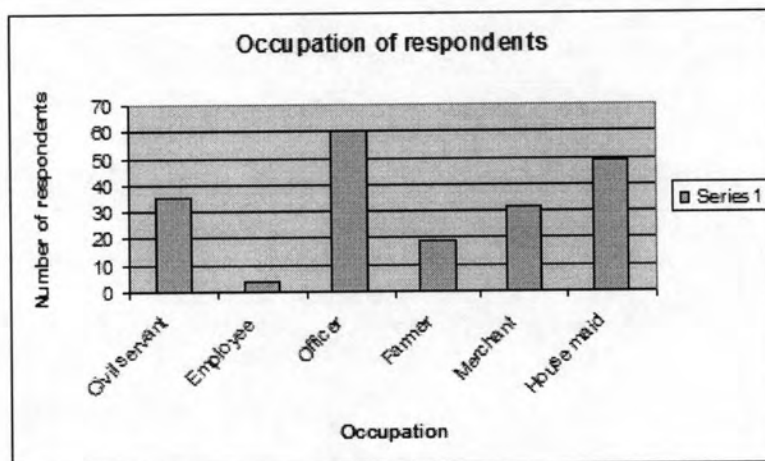
Note: 91.00% of respondents married; only 9.00% were single.

Figure 3 showed level of education of respondents (n=200)



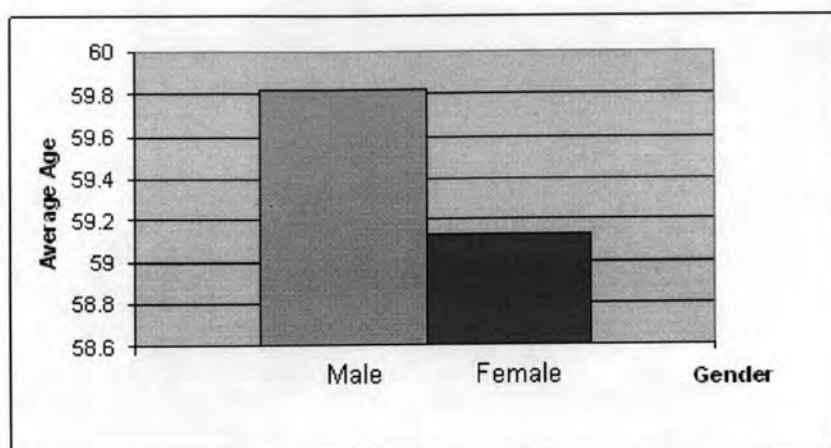
Note: The largest subgroup of respondents (49.00%) had completed grade school.

Figure 4 showed occupation of respondents (n=200)



Note: The occupation of respondents was officer (30%).

Figure 5 showed the average age of respondents



Note: The average age of female was 59.82 ± 11.79 years old and the average age of male was 59.13 ± 12.49 years old.

4.1.3 The continuous variable descriptive statistical

The continuous variables descriptive statistical were shown in Table 2. The mean of age of respondents were 59.34 ± 11.99 years old, the mean of Fasting Blood Glucose of respondents were 161.25 ± 54.10 mg/dL, the mean of diabetes knowledge score of respondents were 6.31 ± 1.57 point, the mean of calories burnt by exercise per week of respondents were $2,777.24 \pm 2,420.89$ kcal, the mean of smoking of respondents were 2.32 ± 5.13 roll per day, the mean of alcohol consumption of respondents were 3.39 ± 8.49 consumption per week, the mean of BMI of respondents were 26.79 ± 2.50 , the mean of compliance score of respondents were 12.37 ± 7.13 points and the mean of eating behavior score were 11.61 ± 2.20 points.

Table 3 showed the continuous variables descriptive statistics

	Mean	SD
age	59.34	11.99
Fasting Blood Glucose	161.25	54.10
diabetes knowledge score	6.31	1.57
calories burnt by exercise per week	2777.24	2420.89
smoking per day	2.32	5.13
alcohol consumption per week	3.39	8.49
Body Mass Index (BMI)	26.79	2.50
compliance score	12.37	7.13
eating behavior score	11.61	2.20

4.1.4 Scale Reliability

Consistency of these scales was assessed for internal reliability with Cronbach's Alpha coefficient. The reliability coefficients of Sorofman's Compliance scale version 2 for construct "right time" and construct "right amount" were 0.8157, and 0.8526.

4.2 The evaluative analyses

4.2.1 Analysis of Hypotheses

The first (1-7) hypotheses were:

Ho:

- | | | |
|---|---|---|
| (1) μ male FBG | = | μ female FBG |
| (2) μ male compliance | = | μ female compliance |
| (3) μ male diabetes knowledge | = | μ female diabetes knowledge |
| (4) μ male age | = | μ female age |
| (5) μ male calories burnt by exercise | = | μ female calories burnt by exercise |
| (6) μ male BMI | = | μ female BMI |
| (7) μ male eating behavior score | = | μ female eating behavior score |

For hypotheses 1 to 7, we used One way ANOVA statistical methods to compare means between male and female's (Fasting Blood Glucose, compliance, diabetes knowledge score, age, calories burnt by exercise, BMI and eating behavior score). The results were shown in Table 4 to 17.

Table 4 showed Fasting Blood Glucose

		N	Mean	SD
Glucose	Female	138.00	159.35	51.65
	Male	62.00	165.48	59.41
	Total	200.00	161.25	54.10

Conclusion: This study found that the means of Fasting Blood Glucose of male was 165.48 mg/dL and female was 159.35 mg/dL.

Table 5: One way ANOVA analysis of Fasting Blood Glucose

		Sum of Squares	df	Mean Square	F	Sig.
Glucose	Between	1610.71	1.00	1610.71	0.55	0.46
	Within	580746.79	198.00	2933.06		
	Total	582357.50	199.00			

The average Fasting Blood Glucose of male and female were not significantly different ($p > 0.05$)

Table 6 showed compliance score

		N	Mean	SD
Compliance	Female	138.00	7.67	1.54
	Male	62.00	10.84	6.01
	Total	200.00	8.65	2.51

Conclusion: This study found that the means of compliance score of male was 10.84 and female was 7.67.

Table 7: One way ANOVA analysis of compliance score

		Sum of Squares	df	Mean Square	F	Sig.
Compliance	Between	9846.87	1.00	9846.87	2.01	0.16
	Within	968962.00	198.00	4893.75		
	Total	978808.87	199.00			

Conclusion: The average compliance score of male and female were not significantly different ($p > 0.05$).

Table 8 showed diabetes knowledge score

		N	Mean	SD
Knowledge	Female	138.00	6.30	1.55
	Male	62.00	6.32	1.63
	Total	200.00	6.31	1.57

Conclusion: This study found that the means of diabetes knowledge score of male was 6.32 and female were 6.30.

Table 9: One way ANOVA analysis of diabetes knowledge score

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge	Between	0.03	1.00	0.03	0.01	0.92
	Within	490.37	198.00	2.48		
	Total	490.40	199.00			

Conclusion: The average knowledge score of male and female were not significantly different ($p > 0.05$)

Table 10 showed calories burnt by exercise per week

		N	Mean	SD
Calories burnt by exercise	Female	138.00	2222.30	2069.07
	Male	62.00	4012.42	2693.92
	Total	200.00	2777.24	2420.89

Conclusion: This study found that the means of calories burnt by exercise of male was 4,012.42 calories/week and female was 2,222.30 calories/week

Table 11: One way ANOVA analysis calories burnt by exercise per week

		Sum of Squares	df	Mean Square	F	Sig.
Calories burnt by exercise	Between	137090122.04	1.00	137090122.04	26.37	0.00
	Within	1029195651.92	198.00	5197957.84		
	Total	1166285773.96	199.00			

Conclusion: The average calories burnt by exercise of male was significantly bigger than female ($p < 0.01$).

Table 12 showed age of respondents

		N	Mean	SD
Age	Female	138.00	59.13	11.79
	Male	62.00	59.82	12.49
	Total	200.00	59.34	11.99

Conclusion: This study found that the means of age of male was 59.82 years old and female was 59.13 years old.

Table 13: One way ANOVA analysis of age

		Sum of Squares	df	Mean Square	F	Sig.
Age	Between	20.40	1.00	20.40	0.14	0.71
	Within	28564.73	198.00	144.27		
	Total	28585.13	199.00			

Conclusion: The average age of male and female were not significantly different ($p > 0.05$).

Table 14 showed Body Mass Index (BMI)

		N	Mean	SD
BMI	Female	138.00	26.70	2.83
	Male	62.00	27.01	1.50
	Total	200.00	26.79	2.50

Conclusion: This study found that the means of BMI of male 27.01 and female was 26.70.

Table 15: One way ANOVA analysis of BMI

		Sum of Squares	df	Mean Square	F	Sig.
BMI	Between	4.34	1.00	4.34	0.69	0.41
	Within	1235.39	198.00	6.24		
	Total	1239.73	199.00			

Conclusion: The average BMI of male and female were not significantly different ($p > 0.05$)

Table 16 showed eating behavior score

		N	Mean	SD
Eating behavior score	Female	138.00	11.76	2.16
	Male	62.00	11.29	2.27
	Total	200.00	11.61	2.20

Conclusion: This study found that the means of eating behavior score of male was 11.29 and female was 11.76 calories/week

Table 17: One way ANOVA analysis of eating behavior score

		Sum of Squares	df	Mean Square	F	Sig.
Compliance	Between	9.18	1.00	9.18	1.90	0.17
	Within	955.20	198.00	4.82		
	Total	964.38	199.00			

Conclusion : The average eating behavior score of male and female were not significantly different ($p > 0.051$, ANOVA)

Conclusion: One way ANOVA confirmed that Fasting Blood Glucose, compliance, diabetes knowledge score, age, eating behavior and BMI between male and female

patients were not significantly different ($p > 0.05$) but calories burnt by exercise between male and female patients were significantly different ($p < 0.05$).

For 8-13 hypotheses:

Hypotheses 8, 9, 10, 11, 12 and 13 had 2 continuous (Ratio scale) variables. The data for these hypotheses were analyzed via Pearson product moment correlation method. The statistic significant of Pearson product moment correlation ($p < 0.05$) indicated the independent variables with statistically significant influence on the dependent variable.

$$(8) \rho_{\text{BMI.FBG}} = 0$$

Table 18 showed Correlations between BMI and Fasting Blood Glucose

	Fasting Blood Glucose	BMI
Pearson Correlation	1.00	-0.04
p (1-tailed)		0.13
N	200	200

Correlation was not significant at the 0.05 level (1-tailed)

Conclusion: Our finding showed that there was a negative weak relationship but not significant between BMI and Fasting Blood Glucose. ($r = -0.04$, $p = 0.132$)

$$(9) \rho_{\text{age.FBG}} = 0$$

Table 19 showed Correlations between age and Fasting Blood Glucose

	Fasting Blood Glucose	age
Pearson Correlation	1.00	-0.14
p (1-tailed)		0.03
N	200	200

Correlation was significant at the 0.05 level (1-tailed)

Conclusion: Our finding showed that there was a negative weak relationship and significant between age and Fasting Blood Glucose. ($r = -0.14$, $p = 0.03$)

(10) ρ calories burnt by exercise. FBG = 0

Table 20 showed Correlations between calories burnt by exercise and Fasting Blood Glucose

	Fasting Blood Glucose	calories burnt by exercise
Pearson Correlation	1.00	-0.24
p (1-tailed)		0.000
N	200	200

Correlation was significant at the 0.01 level (1-tailed)

Conclusion: Our finding showed that there was a negative weak relationship and significant between calories burnt by exercise and Fasting Blood Glucose ($r = -0.24$, $p = 0.000$)

(11) ρ diabetes knowledge. FBG = 0

Table 21 showed Correlations between diabetes knowledge score and Fasting Blood Glucose

	Fasting Blood Glucose	diabetes knowledge
Pearson Correlation	1.00	-0.42
p (1-tailed)		0.000
N	200	200

Correlation was significant at the 0.01 level (1-tailed)

Conclusion: Our finding showed that there was a negative significant relationship between diabetes knowledge score and Fasting Blood Glucose ($r = -0.42$, $p = 0.000$)

$$(12) \rho_{\text{eating behavior score.FBG}} = 0$$

Table 22 showed Correlations between eating behavior score and Fasting Blood Glucose

	Fasting Blood Glucose	eating behavior score
Pearson Correlation	1.00	0.06
p (1-tailed)		0.19
N	200	200

Correlation was not significant at the 0.05 level (1-tailed)

Conclusion: Our finding showed that there was a weak positive relationship but not significant between Fasting Blood Glucose and Eating behavior score. ($r = 0.06$, $p = 0.19$)

$$(13) \rho_{\text{compliance.FBG}} = 0$$

Table 23 showed Correlations between compliance and Fasting Blood Glucose

	Fasting Blood Glucose	compliance
Pearson Correlation	1.00	-0.06
p (1-tailed)		0.21
N	200.00	200.00

Correlation was not significant at the 0.05 level (1-tailed)

Conclusion: Our finding showed that there was a weak negative relationship but not significant between Fasting Blood Glucose and compliance. ($r = -0.06$, $p = 0.21$)

Pearson's product moment correlation confirmed that age, calories burnt by exercise and diabetes knowledge score significantly inversely related with Fasting Blood Glucose ($r = -0.14, -0.24, -0.42$ with $p < 0.05, 0.01, 0.01$ respectively) meaning the older the patients were, the more patients exercised and had diabetes knowledge the less Fasting Blood Glucose they got.

Hypothesis 14 has 1 continuous (Ratio scale) dependent variable Fasting Blood Glucose and 7 independent variables—Male (gender), age, BMI, eating behavior score, compliance, calories burnt by exercise and diabetes knowledge score—described in this equation. Statistical analysis of this data was calculated via Hierarchical Stepwise Multiple Regression Analysis ($p < 0.05$). To identify appropriateness of the multiple regression model in explanation of the dependent variables,

Ho 14: Model predicted Fasting Blood Glucose

$$\text{FBG} = b_0 + b_1 \text{ male} + b_2 \text{ age} + b_3 \text{ BMI} + b_4 \text{ calories burnt by exercise} \\ + b_5 \text{ eating behavior} + b_6 \text{ compliance} + b_7 \text{ diabetes knowledge}$$

$$Z_{\text{FBG}} = b_1 Z_{\text{male}} + b_2 Z_{\text{age}} + b_3 Z_{\text{BMI}} + b_4 Z_{\text{calories burnt by exercise}} \\ + b_5 Z_{\text{eating behavior}} + b_6 Z_{\text{compliance}} + b_7 Z_{\text{diabetes knowledge}}$$

Table 24 showed Correlation matrix

	Fasting Blood Glucose	gender (male)	age	BMI	calories burnt by exercise	compliance	Diabetes knowledge	eating behavior score
Fasting Blood Glucose	1.00							
gender (male)	0.05	1.00						
age	*-0.14	0.03	1.00					
BMI	-0.04	0.06	-0.06	1.00				
calories burnt by exercise	** -0.24	**0.34	0.03	-0.09	1.00			
compliance	-0.06	*0.10	0.03	-0.01	*0.15	1.00		
diabetes knowledge	** -0.42	0.01	0.05	-0.07	0.11	-0.06	1.00	
eating behavior score	0.06	*-0.09	-0.09	*-0.16	0.03	-0.03	0.03	1.00
Mean	161.25	0.31	59.34	26.79	2777.24	12.37	6.31	11.61
SD	54.10	0.46	11.99	2.50	2420.89	7.13	1.57	2.20

* significant level at $p < 0.05$

** significant level at $p < 0.01$

Conclusion: There were 7 Independent variables in this model. The diabetes knowledge score had negative significantly largest correlation with Fasting Blood Glucose ($r = -0.42^{**}$). Calories burnt by exercise and age had significantly correlation with Fasting Blood Glucose as well. Calories burnt by exercise significantly correlated with Fasting Blood Glucose ($r = -0.24^{**}$), and age ($r = -0.14^*$). It meant that the more patient had diabetes knowledge score, the more they exercised and the older they were the less Fasting Blood Glucose they got.

Moreover, the value from correlation matrix also predicted relationship between calories burnt by exercise and gender, compliance and gender, eating behavior score and gender, compliance and calories burnt by exercise, eating behavior score and BMI.

Compliance correlated with calories burnt by exercise, it meant that the more patient complied the more they exercised ($r = 0.15$)

Eating behavior score correlated with BMI, it meant that the more patient had eating behavior score the less BMI ($r = -0.16$)

Table 25 showed Coefficients

	Model 1			Model 2			T	p
	b	SE	Beta	b	SE	Beta		
Constant	229.47	46.38		326.21	50.52		6.46	**0.00
gender	6.96	8.25	0.06	18.81	7.78	0.16	2.42	**0.00
age	-0.63	0.32	-0.14	-0.49	0.28	-0.11	-1.74	*0.04
BMI	-1.22	1.54	0.06	-2.19	1.38	-0.10	1.59	*0.05
calories burnt by exercise				-0.005	-0.02	-0.25	-3.64	**0.00
eating behavior score				1.75	1.56	0.07	1.12	0.13
compliance				-0.04	0.05	-0.06	-0.87	0.19
diabetes knowledge				-13.89	2.16	-0.40	6.42	**0.00
R ²				0.26				
R ² change				0.23				
F				15.54				

Dependent Variable: Fasting Blood Glucose

* significant level at $p < 0.05$

** significant level at $p < 0.01$

The Two steps of Hierarchical Stepwise Multiple Regression Analysis statistics were used to explore the relationships (predicted) of Fasting Blood Glucose and gender, age, BMI, calories burnt by exercise, eating behavior score, compliance score, and diabetes knowledge score. Given the directional nature of the hypotheses, one-tailed t-tests were used to assess for significance. Of the 200 participants in the study, all had no missing data for variables included in models predicting Fasting Blood Glucose. We found that the 5 most significant variables which predicted FBG were : diabetes knowledge (Beta = -0.40), calories burnt by exercise (Beta = -0.25), gender (Beta = 0.16), age (Beta = -0.11) and BMI (Beta = -0.10) respectively. Finally, the model yielded the Fasting Blood Glucose prediction equation as the followings:

$$\text{FBG} = 326.211 + 18.81 \text{ male}^{**} - 0.49 \text{ age}^* - 2.19 \text{ BMI}^* - 0.005 \text{ calories burnt by exercise}^{**} + 1.75 \text{ eating behavior score} - 0.04 \text{ compliance score} - 13.89 \text{ diabetes knowledge}^{**}$$

$$Z_{\text{FBG}} = 0.16Z_{\text{male}} - 0.11Z_{\text{age}} - 0.10Z_{\text{BMI}} - 0.25Z_{\text{calories burnt by exercise}} + 0.07Z_{\text{eating behavior score}} - 0.06Z_{\text{compliance score}} - 0.40Z_{\text{diabetes knowledge}}$$

* significant level at $p < 0.05$

** significant level at $p < 0.01$

Conclusion: gender ($p < 0.01$), age ($p < 0.05$), calories burnt by exercise ($p < 0.01$), diabetes knowledge ($p < 0.01$) score and BMI ($p < 0.05$) were the significant predictors of Fasting Blood Glucose in the model with $R^2 = 0.26$. Meaning: 26.00 percent variance of Fasting Blood Glucose could be explained by variance of all 7 predictors, in other words: the qualification of all 7 predictors was 0.26.