Knowledge, Health Practices, and Diabetes Mellitus II Tendency

Eunice Carpizo and Dina Galang

Adventist University of the Philippines **eunicemcarpiz_2015@yahoo.com**

Abstract

This study determined relationship of knowledge and health practices of the respondents to diabetes mellitus II tendency. It further determined the influence of the demographic and health profile to diabetes mellitus II tendency. Data from 101 respondents were analyzed using descriptive and inferential statistics. Results of the correlation analysis reveal that demographic profile such as education and income has a strong positive correlation but age has negative correlation to knowledge. Knowledge is strongly correlated to health practices when treated as a whole. However, when knowledge was correlated with the individual dimensions of health practices, only dietary intake emerged to be related. Age, body mass index, and waist-to-hip ratio showed a positive relationship and education indicated a negative relationship when demographic and health profiles were correlated to diabetes mellitus II tendency. However, health practices and their dimension, when correlated to diabetes mellitus II tendency, did not show any relationship. The predictors of diabetes mellitus II tendency, based on the model generated by AMOS, were age and body mass index . When the two are combined as one variable, it could explain a total of 22% of the magnitude of variance in diabetes mellitus II tendency.

Keywords: knowledge, health practices, Diabetes Mellitus II

I.	Introduction

Diabetes is one of the most significantly increasing diseases in the world that causes more than 3.8 million deaths every year. According to the latest research, more than 366 million people worldwide suffer from diabetes and it is estimated to become 552 million by 2030 (Khardori, 2015). In the United States, 5.7 million of the 17.9 million people who have diabetes are unaware that they have the disease.Approximately 60 million people in Europe live with diabetes, of whom more than 50% are unaware of their condition (American Diabetes Association, 2008). About 89 million Asians are thought to be diabetic and it is expected to hit 170 million by 2025 (TimeAsia.com, 2008). From the data presented by the International Diabetes Federation (IDF) in its Diabetes Atlas for 2009, the number of Filipino adults with Type II or acquired diabetes is 3.4 million out of a 51-million adult population with 4.9 million more on the brink of developing diabetes (Pazzibugan, 2009) and about 65 percent are not aware that they have diabetes.Studies show that most of the morbidity and mortality in type 2 diabetes arise from long-term complications. Therefore, early detection and prevention would be expected to have a tremendous beneficial human, social, medical, and economic impact (Abdul-Ghani, Tripathy, & DeFronzo, 2006; Abdul-Ghani, Jenkinson, Richardson, Tripathy, & DeFronzo, 2006).The study done by Nisar, Khan, Qadri, and Sher (2008) on knowledge about diabetes mellitus among 198 non-diabetics attending primary health care centers at Gadap town, Karachi, Pakistan, found that 44% of non-diabetics coming to primary health care centers were prone towards diabetes mellitus. They attributed this to the respondents' lack of knowledge regarding the causes, signs, symptoms, and complications. Likewise, most of the diabetic patients encountered by the researcher in the hospital were saying that if only they knew earlier about diabetes and its possible causes, they could have avoided the occurrence of their disease. The importance of proper nutrition and physical activity in reducing rates of disease and death from chronic diseases has been well established (National Diabetes Fact

Sheet, United States, 2005). Moreover, American Diabetes Association (2008) stated that the recently completed Diabetes Prevention Program (DPP) study showed that people with pre-diabetes can prevent the development of type II diabetes with dietary changes and increasing their level of physical activity. They may even be able to return their blood glucose levels to the normal range. The DPP also showed that some medications may delay the development of diabetes but diet and exercise worked better. Just 30 minutes a day of moderate physical activity, coupled with a 5-10% reduction in body weight, produced a 58% reduction in diabetes.Objectives of the study This study determined relationship of knowledge and health practices of the respondents to diabetes mellitus II tendency of the respondents. Specifically, the study aimed to attain the following objectives: (1) determine the knowledge level of the respondents on diabetes mellitus II; (2) determine the demographic profile of the respondents in terms of age, educational attainment, and income; (3) determine the health profile of the respondents in terms of ody mass index and waist-to-hip ratio; (4) determine the health practices of the respondents in terms of smoking, dietary intake, and physical activities; (5) determine the respondents' tendency to possibly have diabetes mellitus II; (6) determine the relationship of demographic profile and the level of knowledge, knowledge level and health practices, and demographic profile, health profile and health practices to diabetes mellitus II tendency; and (7) determine the best predictor of diabetes mellitus II tendency.

II. METHOD

Research Design The study used correlational research. There were 101 respondents in the study who were male and female aged 20 – 55; willing to fast for eight to 10 hours; not yet diagnosed to have diabetes mellitus and willing to be pricked for blood screening.Demographic Profile Age. Twenty eight(27.42%) of the respondents were from age brackets 20-29, 16 (15.84%) came from age bracket 30-39, 36 (35.64%) from 40-49, and 21 (20.79%) from 50-55 years old. Majority of the respondents come from the age bracket 40-49 years old. According to Kolatkar (2009), diabetes is usually diagnosed among persons of this age bracket.Educational attainment. The results of the study revealed that 1% of the respondents had no formal education, 27%

had elementary education, 50% had attained secondary education, 14% were either undergraduate college level or college graduate, and 5% had postgraduate education. All of the respondents were literate, they can read and write, but more than half of them have only attained the lower level of education.Occupation. The data show that most (58%) of the respondents are not employed (housewives, students, and unemployed) and 42% are employed (clerks, salesmen, drivers, etc). This can be attributed to the fact that most of the respondents have low educational attainment on which lack of education can limit job opportunities, including prospects for higher income, and personal and professional satisfaction.Income. The biggest group of respondents (51%), in terms of income, belonged to the income bracket of 5,000 and below. The second (32%) comes from the income bracket 5,001 – 10,000. The study revealed that 88% of the respondents had an income below the poverty level and only about 12% of them had an income within or above the poverty level.The poverty level as of 2006, according to NSO (2009), is PhP15,057 per month. Using this classification, the researcher would say that most of the respondents were considered poor. Instrumentation. The instruments used in this study were glucometer, weighing scale, tape measure, height chart, and survey questionnaire. Accu-chek Advantage glucometer was used for measuring the glucose level in the blood taken from the respondents. Health-O-Meter weighing scale was used to determine the weight or mass of the individual respondents. A flexible plastic tape measure that consists of markings up to 50 inches or 150 centimeters was used to take the waist and hip circumferences of the respondents. Laminated paper height chart which consists of markings up to six feet and five inches was used to measure the respondent's height. For the purpose of data gathering, the researcher adopted the questionnaire of Castillo (2003) for knowledge. Instruments for health practices were self-constructed based on previous studies and literature.The data were treated using Excel statistics functions, SPSS and Analysis of Moment Structures (AMOS) software. Frequencies, percentages, mean and standard deviation were used to describe the variables included in the study. Pearson-correlation, through SPSS was the statistical

treatment used to determine the relationship among independent, moderator, and dependent variables. Structural Equation Modeling (SEM), through AMOS, was used to determine the best predictor of diabetes mellitus II tendency.

III. RESULTS

Respondents' Knowledge on Diabetes Mellitus II. The scores of the respondents are summarized in Table 1. The average score of the respondents' knowledge on diabetes mellitus is 24.88. The respondents' score on concepts related to diabetes mellitus II was very low and got a low score on the topics on what causes diabetes.

Table 1
Average Scores of the Respondents

Questions	Perfect Score	Aver. Score	%	Interpre-tation
1. What is diabetes?	4	1.8712	46.78	Very Low
2. What causes diabetes?	9	4.8811	54.23	Low
3. Who are the people who are likely to have diabetes?	5	3.9405	78.81	High
4. What are the warning signs and symptoms of diabetes?	5	3.5148	70.30	Moderate
5. Can you prevent diabetes	1	0.8910	89.10	Very High
6. What can you do to prevent diabetes?	6	4.3762	72.94	Moderate
7. Is the disease controllable?	1	0.8514	85.14	High
8. How can diabetes be controlled?	6	4.5544	75.91	High
Total Score	37	24.881	67.25	Moderate

Note: 88-100 = Very High 75-86 = High 62-74 = Moderate 49-61 = Low below 49 = Very Low

Translating their total average raw score (24.88) into percentage, the percentage is 67.25. Using the scale indicated in Table 1, the knowledge level of the respondents on diabetesmellitus II is moderate.It was evident that the respondents knew the people who were likely to have diabetes and that diabetes can be prevented and can be controlled; however, they still lack sufficient knowledge whether diabetes is contagious, incurable, inherited, or fatal. They also lack knowledge about the causes of diabetes. This could be attributed to the fact that most of them are elementary and high school graduates. This is supported by the profile which shows that 77% of the respondents attained low level of education.

Health Profile of the Respondents Body mass index.

The body mass index (BMI) of male and female respondents was computed and were tabulated as presented in Table 2 using the Rating Scale for Body Mass Index of Philippine Academy of Family Physicians as guide. Table 2 reveals that 56 of the

respondents have BMI levels above the healthy normal range. Of these, 27 have a BMI level of 23-24.9 and are considered at risk; 20 have a BMI level of 25-29.9 and are considered as obese I, and 9 have a BMI of above or equal to 30 and considered as obese II. On the other hand, only 38 have a BMI of 18.5-22.9 and classified as normal and seven have a BMI of less than 18.5 and are classified as underweight.

BMI	N	Asia-Pacific Classification	Risk of Comorbidities
>=30	9	Obese II	Severe
25 - 29.9	20	Obese I	Moderate Increase
23 - 24.9	27	At risk	
18.5 - 22.9	38	Healthy (Normal Range)	Average Low
< 18.5	7	Underweight	

Table 2
Tabulated BMI Results

Waist-to-hip ratio. Another means of checking if the individual is at risk for diabetes is measuring waist to hip ratio. The waist-to-hip ratio of the respondents was computed. The results in Table 3 show that out of 21 males, only two males have more than 1.0 ratio and out of 80 females, 56 females have more than 0.85 ratio which indicates that 58 (57.43%) of the respondents have high risk of having diabetes and most of them were women.

Table 3
Tabulated Waist-to-Hip Ratio Results

Male	Number of Males	Female	Number of Females	Health Risk
0.95 or below	18	0.8 or below	12	Low
0.96 to 1.0	1	0.81 to 0.85	12	Moderate
1.0 +	2	0.85 +	56	High

Health Practices of the RespondentsSmoking. Out of the 101 respondents, there were only 20 who are smoking, 10 males and 10 females. They have smoked an average of nine sticks a day for an average period of 15 years.Dietary. Table 4 summarized the dietary intake of the respondents according to food groups. Data clearly convey that in a day the respondents have five servings of meat, meat products, fish, and dried beans, five servings of bread, rice, and noodles, two servings of vegetables, oneserving of fruits, and just enough sweets are included in their daily meal.

Table 4
Dietary Intake of the Respondents Based on the Food Groups

Food Group	Dietary Intake Per Day	Recommended Dietary Intake Per Day
Meat, Poultry, Fish, Dry		3 to 4 servings

Beans, and Eggs		4 servings
Meat Products (Sausages, Cheese)	2 to 3 servings	1 servings
Bread, Rice, and Noodles	5 to 8 servings	5 servings
Vegetables	3 to 4 servings	2 servings
Fruits	2 servings	1 servings
Sweet (sugar)	5-8 tabl spoon	< 1 serving

The recommended number of servings is based on the Daily Nutritional Guide Pyramid for Filipinos (Claudio, Leocadio, & Escudero, 2008). In order to maintain health and have a low risk of developing chronic illnesses such as diabetes, healthy diet should consist of 40% to 60% of calories from carbohydrates, 20% from protein and 30% or less from fat. It should be low in cholesterol, low in salt and low in added sugar (Diabetes & Nutrition, n.d.) The results in Table 4show that the respondents' daily intake per serving for the body building food is sufficient with an average of five servings which is within the recommended five to seven servings per day. The consumption of energy giving food is also sufficient with an average of five servings a day wherein five to eight serving is the ecommended amount per day. Sweets were taken sparingly which is a sign of a healthy diet. However, the intake of body regulating food (vegetables and fruits) is insufficient. It lacks one to two servings each day.

Table 5
Liquid Intake Per Day

Liquid	Intake
Water	5-6 glasses
Fruit juice	3-4 glasses
Fruit-flavored juice	3-4 glasses
Soft drinks (8 oz)	3-4 bottles

Table 5 reveals that all of the respondents were drinking water with an average of five to six glasses a day. It is speculated that they supplement their fluid intake with fruit juices and soda drinks in an average of five to four glasses/bottles per day.
Physical activity. Of the 101 respondents, 78 were engaged in physical activities, while the 23 respondents did not indicate any engagement in any form of physical activities.The respondents were engaged in the following physical activities: running, aerobics, biking, gardening, jogging, walking, swimming, mall touring, and dancing. Most of them spent 15 minutes for their physical activities, some for 30 minutes, and few beyond 30 minutes.
Diabetes Mellitus II Tendency
Using the chart for glucose level provided by the American Diabetes Association, data in Table 8 shows that 47 of the respondents have normal fasting blood sugar, 37 have impairedfasting glucose and 17 are probably diabetic.

Table 6
Glucose Level of Respondents

Glucose	Respondents with	Indication

Level	Fasting Blood Sugar	
70 to 99 mg/dL	47	ormal Fasting Glucose
100 to 125 mg/dL	37	Impaired Fasting Glucose (Pre-diabetic)
126 mg/dL and above	17	Diabetic

The result revealed that most of the respondents' fasting blood sugar level is already beyond the normal range. It implies that those who have impaired fasting glucose are at risk of having diabetes in the future. Seventeen are, perhaps, already diabetic and they are unaware of it.

Relationship of Demographic Profile and Knowledge

Table 7 shows that there is a negative relationship between age and knowledge and a positive relationship of education and income to knowledge.This means that younger respondents are more knowledgeable about diabetes mellitus II. Further, those with high educational attainment and high income are more knowledgeable of diabetes mellitus II.

Table 7
Correlation of Demographic Profile and Knowledge

Demographic Profile	Knowledge	P-Value
Age	-.233(*)	.019
Education	.422(**)	.000
Income	.289(**)	.003

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Relationship of Knowledge and Health Practices
The result of correlation in Table 7 indicates that knowledge is significantly related to health practices when considered as a whole.

However, when knowledge was correlated with the dimensions of health practices, only dietary intake is positively related (p=.012) with knowledge.

	Smoking	Diet Intake	Physic Activities	Health Practice
Pearson r	-.051	.249(*)	.084	.231(*)
P-value	.612	.012	.405	.020

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

The results imply that a person who is knowledgeable about diabetes mellitus is more likely to be engaged in healthful practices and tend to eat healthy and nutritious food.

Correlates of Diabetes Mellitus II Tendency
Age, education, body mass index, and waist-to-hip ratio, were among the dimensions of health and demographic profile in Table 9 that indicates significant relationship to diabetes mellitus tendency. Age, body mass index, and waist-to-hip ratio showed a positive relationship, while education showed a negative relationship. Health practices did not indicate relationship with diabetes mellitus tendency.

Table 9
Correlates of Tendency Mellitus II Tendency

Correlates of Tendency Mellitus II

	Diabetes Mellitus Tendency	
	-.002	
	.029	
	-.120	
	-.043	
	.240(*)	.016
	-.202(*)	.043
	-.074	.459
	-.008	.938
	.247(*)	.012
Waist-to-Hip	.258(**)	.019
Health Profile	.250(*)	.012

The result of the correlation means that, older respondents with low educational attainment, with higher body mass index, and waist-to-hip ratio, are more likely to have diabetes

Predictors of Diabetes Mellitus

The predictors of diabetes mellitus tendency were determined using Structural Equation Modeling (SEM) through AMOS (Analysis of Moment Structures) software. Among the demographic and health profile and health practices, as shown in Figure 1, only age and body mass index emerged to be the predictors of diabetes mellitus tendency. Age is

directly (0.36) and indirectly (0.20*0.23 = 0.046) related to diabetes mellitus tendency. The total effect of age to diabetes mellitus tendency is 0.406 or 40.6% (0.36 + 0.046) and the direct effect of body mass index is 0.23 or 23%.
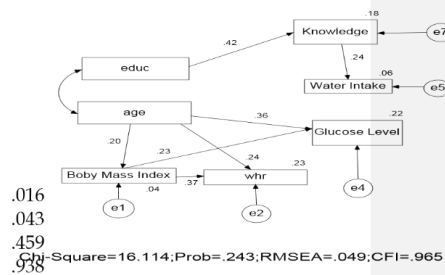

Chi-Square=16.114;Prob=.243;RMSEA=.049;CFI=.965

Figure 1 Structural Equation Model of the Predictors of Diabetes Mellitus Trend

IV. DISCUSSION

The result of the study shows that age, education, and income are significantly related to knowledge. The result explains the reason why the respondents got an average score in knowledge because half of them finished secondary level of education, have an average level of education, 40 years of age and above (57%), have low level of income (51% of them were earning 5,000 and below). It also explains why most of them scored low on the basic concepts and causes of diabetes. According to the study of Mehrotra, Bajaj, Kumar, and Singh (2000) and Al Shafaee et al. (2008), education is the most significant predictor of knowledge regarding risk factors, complications, and the prevention of diabetes. In a separate

Study done by Maty, Averson-Rose, Haan, Raghunathan, and Kaplan (2005) on education, income and incidence of type II diabetes mellitus, the study showed that education and income were associated with increased diabetic risk. Education is an important social determinant of health. Income is another important factor that interacts in many important ways with education as influences on health.People who are wealthy and well educated and who have high-paying jobs are much more likely to be healthier than the poor people. As economic status increases, so does their health status (Feinstein, Sabates,Anderson., Sorhaindo, & Hammond,2006).When knowledge and health practices are correlated, the only dimension of health practices that is related to knowledge is dietary intake as shown in Table 4. The result implies that when a person is knowledgeable he/she is engaged in healthful practices and tends to eat healthy nutritious food that will contribute to his/her wellness, or will not put him at risk to develop diabetes mellitus. Looking into the health practices of the respondents, particularly on the dietary intakes, Table 4 shows that daily intake per serving for body building food and consumption of energy giving food were just enough (5 servings per day) compared to the recommendednumber of servings which is 5-7 servings per day. The intake of body regulating food (vegetables and fruits) is insufficient. It lacks 1-2 servings each day. Bazzano (2008) said that adequate consumption of green leafy vegetables and fruits was associated with a lower hazard of diabetes. The respondents has low consumption of vegetables and fruits because most of them do not know that low consumption of green leafy vegetables and fruits increases the hazard of diabetes as indicated by their low scores in the basic concepts and causes of diabetes. Among the dimensions of demographic and health profile and health practices that were correlated to diabetes mellitus tendency, only age, education, body mass index and waist-to-hip ratio indicated significant relationship with diabetes mellitus tendency. Results in Table 9 imply that as age, body mass index, and waist-to-hip ratio of a person become higher and the lower the education a person has, the higher is the tendency to have diabetes mellitus. It explains the reason why out of 101 respondents in Table 6, 37 (36.63%) of them have impaired fasting glucose (pre-diabetic) and 17 (16.83%) are, perhaps, already diabetic and they are unaware of it because their knowledge level on diabetes mellitus is moderate. American Diabetes Association (2008), TimeAsia.com (2008), and the Magee (1999) stated that many people have diabetes but are not aware that they have the disease. Most of these respondents have a BMI of 23 and above (55.45%) and waist-to-hip ratio of 0.85 and above for the women (55.45%) and 1.00 and above for men (1.98%) which indicate that they are at risk of diabetes mellitus. According to WHO (2010), obesity and overweight pose a major risk for chronic diseases, including type II diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. Overweight especially obesity, particularly at younger ages, substantially increases lifetime risk of diagnosed diabetes, while their impact on diabetes risk, life expectancy, and diabetes duration diminishes with age (Narayan, Boyle, Thompson, Gregg, & Williamson, 2007). Vasquez (2007) and her companions had analyzed 32 studies out of 432 publications. Their analysis showed that waist-to-hip ratio and body mass index were among the variables associated with type II diabetes.The result of Structural Equation Modeling (SEM) through AMOS (Analysis of Moment Structures) software in Figure 1showed that the best predictors of diabetes mellitus are age and body mass index. Age is directly (0.36) and indirectly (0.20*0.23 = 0.046) related to diabetes mellitus tendency. The total effect of age to diabetes mellitus tendency is 0.406 or 40.6% (0.36 + 0.046) and the direct effect of body mass index is 0.23 or 23%. Age and body mass index are consistent indicators of diabetes mellitus in all the results of the studies. This study supports the study of Kazumasa (2003), and Vasquez (2007) that body mass index is associated with type II diabetes; the study of Akazawa (1999) and Kolatkar (2009) that the risk for developing type II diabetes increases with age; and the study of Chien (2009) in China that age and body mass index were among the strong predictors of diabetes mellitus.

CONCLUSION

The respondents in this study have moderate knowledge on diabetes mellitus II. Most of them were overweight and obese. Their dietary intake is sufficient in energy giving and body building food groups but they lack in body regulating food group. Most of them

have elevated fasting blood sugar which classifies them to be pre-diabetic and diabetic. Age, education, and income were related to knowledge. The more knowledgeable the person the better is the dietary practice. When age, education, body mass index and waist-to-hip ratio are correlated to diabetes mellitus, the correlation was significant. Age and body mass index were the predictors of one's tendency to develop diabetes mellitus II.

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