Awareness of the Risk Factors, Complications and Treatment Compliance of Patients with Diabetes Mellitus in Metro Vigan, Ilocos Sur

Larguita P. Reotutar

ABSTRACT

The study aimed to determine the level of awareness of the risk factors, complications, and extent of treatment compliance of patients with Diabetes Mellitus in Metro Vigan, Ilocos Sur. It also tried to look into the profile of the respondents in terms of their personal-related factors, health-related factors, and their lifestyle. Further, it tried to determine the significant relationship between the extent of treatment compliance to diabetes and the socio-demographic factors, health-related factors, and the level of awareness of the risks factors of Diabetes Mellitus.

The study utilized the descriptive-correlational method of research. The respondents were 143 patients from Metro Vigan who were diagnosed with Diabetes Mellitus (DM) and confined at the Gabriela Silang General Hospital, St. James Hospital, and Metro Vigan Cooperative Hospital during the Calendar Year 2011.

Findings showed that most of the respondents are 50 years old and above, female, married, high school graduates, unskilled workers, and have a family monthly income of Php 5,000.00 and below. Almost one-half of the respondents are 1.51-1.6 meters tall, weighing 51-60 kilograms, and most are Type II Diabetes Mellitus, with co- morbid condition of hypertension, and have complications of neuropathy. There is a "low" level of awareness of Diabetes Mellitus along risk factors and complications. They are "moderately aware" that family history and hypertension are risk factors, but "unaware" that polycystic ovarian syndrome can also be a risk factor. The respondents are "moderately aware" that neuropathy and retinopathy are complications. But they are "unaware" that diabetic ketoacidosis and hyperglycemia are also complications. The extent of treatment compliance to Diabetes Mellitus is "Low" along Diagnostics and Treatment and Lifestyle Modification. They "always" religiously take in their medications at the right time as prescribed by their physicians. Sometimes, they submit themselves for monitoring of their blood pressure and blood glucose level; but "often" visit their

physicians when symptoms occur or worsen. There is a significant relationship between extent of treatment compliance of the respondents and the following variables: personal-related factors in terms of age, educational attainment and: monthly family income; type of DM; and awareness of the risk factors and complications.

Keywords: awareness, risk factors, health, treatment, compliance, *diabetes mellitus*

INTRODUCTION

Diabetes Mellitus is a disorder of metabolism, most prominently carbohydrate metabolism. It is a disease characterized by persistent hyperglycemia or high glucose blood sugar and is a metabolic disease that requires medical diagnosis, treatment, and lifestyle changes.

Diabetes is a chronic disease, which occurs when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycemia). Type 1 diabetes, previously known as insulin-dependent or childhood-onset diabetes, is characterized by a lack of insulin production. Type 2 diabetes, formerly called non-insulin-dependent or adult-onset diabetes is caused by the body's ineffective use of insulin. It often results from excess body weight and physical inactivity. Gestational diabetes is hyperglycemia that is first recognized during pregnancy (http://www.who.int/).

Based on the Centers for Disease Control and Prevention [CDCP] 2008 report, diabetes is becoming more common in the United States. From 1980 through 2002, the number of Americans with diabetes more than doubled and increased in all age groups. Currently, it is estimated that more than 23 million people in the United States have diabetes, although almost one-third of these cases are undiagnosed. The number of people newly diagnosed with diabetes increases by about 1 million people per year (Smeltzer, et. al., 2010).

Moreover, according to Smeltzer, by 2010 the number of cases is expected to exceed 30 million. In 2000 the worldwide estimate of the prevalence of diabetes was 171 million people and by 2030 this is expected to increase to more than 360 million. According to the World Health Organization report in 2008, Diabetes is especially prevalent in the elderly; as many as 50 percent of people older than 65

years of age have some degree of glucose intolerance. People 65 years and older account for almost 40 percent of people with diabetes.

The prevalence of diabetes was relatively consistent across the income groupings of countries. The high income countries showed the lowest prevalence rate (7% for both sexes), possibly reflecting better dietary and other nonmedical interventions. The lower middle income countries showed the highest prevalence rate of 10 percent for both sexes (http://www.who.int/).

According to the Provincial Health Office (PHO) of Ilocos Sur, 58 persons died in 2006 because of diabetes mellitus, ranking 9" as the leading cause of death in Ilocos Sur and 10" cause of death in 2007 (PHO Report, 2008). This triggered the researcher to conduct this study.

The study aimed to determine the level of awareness of the risk factors, complications, and the extent of treatment compliance of patients with Diabetes Mellitus in Metro Vigan, Ilocos Sur.

Specifically, this study determined the profile of the respondents in terms of personal–related factors, health-related factors, and lifestyle, relationship between the extent of treatment compliance of diabetes mellitus and the personal-related, health-related and lifestyle factors, and the respondents' level of awareness of the factors and complications of diabetes mellitus. It also looked into the extent of treatment compliance of diabetes mellitus in terms of diagnostics and treatment, and lifestyle modifications.

In order to have a deeper understanding of study, the researcher reviewed related readings and studies of local, national and foreign setting.

About 347 million people worldwide have diabetes. There is an emerging global epidemic of diabetes that can be traced back to rapid increases in overweight, obesity, and physical inactivity. Diabetes is predicted to become the seventh leading cause of death in the world by the year 2030. Total deaths from diabetes are projected to rise by more than SO percent in the next 10 years. Cardiovascular disease is responsible for between 50 percent and 80 percent of deaths of people with diabetes. Diabetes has become one of the major causes of premature illness and death in most countries, mainly through the increased risk of cardiovascular disease (CVD). Eighty percent of diabetes deaths occur in low- and middle-income countries. In developed countries most people with diabetes are above the age of retirement, whereas in developing countries those most frequently affected are

between ages 35 and 64 years. Diabetes is a leading cause of blindness, amputation, and kidney failure. Lack of awareness about diabetes, combined with insufficient access to health services and essential medicines, can lead to complications such as blindness, amputation, and kidney failure (http://www.who.int/features/factfiles/diabetes/facts/en/index9 .html).

Type 1 diabetes (sometimes called insulin-dependent, juvenile, or childhood-onset diabetes) occurs when the pancreas does not produce enough insulin, a hormone that regulates blood sugar. The cause is not known, but it is thought to be the result of a combination of genetic and environmental factors. Many countries are documenting higher numbers of newly diagnosed cases of type 1 diabetes, particularly in younger children. Interestingly, some disease patterns among children resemble infectious disease epidemics. Currently, there is no known way to prevent type 1 diabetes.

Type 2 diabetes (sometimes called non-insulin-dependent or adult-onset diabetes) happens when the body cannot effectively use the insulin it produces. Often preventable, it can result from excess body weight and physical inactivity, and sometimes, a genetic predisposition. Recently, type 2 diabetes has increasingly been reported in children and adolescents, so much so that in some parts of the world type 2 diabetes has become the main type of diabetes in children. The global rise of childhood obesity and physical inactivity is widely believed to play a crucial role. Healthy eating and lifestyle habits are a strong defense against the disease (http://www.who.int/).

Regardless of the specific cause, the destruction of the beta cells results in decreased insulin production, unchecked glucose production by the liver, and fasting hyperglycemia. In addition, glucose derived from food cannot be stored in the liver but instead remains in the bloodstream and contributes to postprandial (after meals) hyperglycemia. If the concentration of glucose in the blood exceeds the renal threshold for glucose, usually 180 to 200 mg/dL (9.9 to 11.1 mmol/L), the kidneys may not reabsorb all of the filtered glucose; the glucose, then, appears in the urine (glycosuria). When excess glucose is excreted in the urine, it is accompanied by excessive loss of fluids and electrolytes. This is called osmotic diuresis. Because insulin normally inhibits glycogenolysis (breakdown of stored glucose) and gluconeogenesis (production of new glucose from amino acids and other substrates), these processes occur in an unrestrained fashion in people with insulin deficiency and contribute further to hyperglycemia. In addition, fat breakdown occurs, resulting in an increased production of ketone bodies, which are the byproducts of fat breakdown (Smeltzer, et. al., 2010).

Still according to Smeltzer, ketone bodies are acids that disturb the acid–base balance of the body when they accumulate in excessive amounts. The resulting diabetic ketoacidosis (DKA) may cause signs and symptoms such as abdominal pain, nausea, vomiting, hyperventilation, a fruity breath odor, and, if left untreated, altered level of consciousness, coma, and death. Initiation of insulin treatment, along with fluid and electrolytes as needed, is essential to treat hyperglycemia and DKA and rapidly improves the metabolic abnormalities. Type 2 diabetes affects approximately 90 percent to 95 percent of people with the disease (CDC, 2008). It occurs more commonly among people who are obese and older than 30 years of age (National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK], 2005), although its incidence is rapidly increasing in younger people because of the growing epidemic of obesity in children, adolescents, and young adults (CDC, 2008). The two main problems related to insulin in type 2 diabetes are insulin resistance and impaired insulin secretion.

Glycemia and diabetes are rising globally, driven both by population growth and ageing and by increasing age-specific prevalence. Effective preventive interventions are needed and health systems should prepare to detect and manage diabetes and its sequelae {The Lancet.com, 2011).

Raised blood glucose was estimated to result in 3.4 million deaths in 2004, equivalent to 5.8% of all deaths. Impaired glucose tolerance and impaired fasting glycemia are risk categories for future development of diabetes and cardiovascular disease. In some age groups, people with diabetes have a twofold increase in the risk of stroke. Diabetes is the leading cause of renal failure in many populations in both developed and developing countries. Lower limb amputations are at least 10 times more common in people with diabetes than in non-diabetic individuals in developed countries; more than half of all non-traumatic lower limb amputations are due to diabetes. Diabetes is one of the leading causes of visual impairment and blindness in developed countries. People with diabetes require at least 2-3 times the health care resources compared to people who do not have diabetes, and diabetes care may account for up to 15 percent of national healthcare budgets.

The prevalence of hyperglycemia depends on the diagnostic criteria used in epidemiological surveys. Defined as a fasting plasma glucose value ⩾ 7.0 mmol/L (126 mg/dl) or on medication for raised blood glucose), the global prevalence of diabetes in 2008 was estimated to be 9 percent. There was little variation in prevalence rates across WHO regions. The prevalence of diabetes was highest in the Eastern Mediterranean Region (11% for both sexes) and lowest in the WHO European Region (7% for both sexes). The magnitude of diabetes and other abnormalities of glucose

tolerance will be considerably higher than the above estimates if the categories of "impaired fasting" and "impaired glucose tolerance" are included (http://www.who.int/).

The mortality rate of Diabetes Mellitus increased significantly from 9.8 deaths per 100,000 population in 1995 to 18.1 deaths per 100,000 population in 2005. In 2008 the prevalence among adults, as indicated by the high fasting blood sugar, has increased by 23 percent since 1998. The prevention and control of the different risk factors in the development of this disease should be intensified and persons with a family history of diabetes mellitus should undergo lifestyle modification (DOH National Health Objectives: 2012).

METHODOLOGY

The study was conducted in the Year 2012 and utilized the descriptive research design. The respondents were the 143 patients from Vigan City (37), Bantay (31), Caoayan (29), Sta Catalina (25), and San Vicente (21) who were diagnosed with Diabetes Mellitus (DM) as their primary disease and were confined at the Gabriela Silang General Hospital, St. James Hospital, and Metro Vigan Cooperative Hospital during the Calendar Year 2011. After identifying the patients based from the records of the three hospitals, the patients were visited in their residences for the interview.

The study made use of a questionnaire-checklist which was adapted from the study of Palacpac (2005). The questionnaire was translated in the vernacular for the respondents to understand easier the items. The researcher designated data collectors who were briefed as to how they should ask the items. Further, the researcher made herself available through mobile communication to assist whenever queries for clarification arose. The data were treated and analyzed with the use of frequency and percentage, mean, and simple linear correlation analysis.

RESULTS AND DISCUSSION

Personal Profile of the Respondents

Majority (105 or 73.4%) of the respondents are 50 years old and above; while the least (2 or 1.4%) are at 21- 30 age range. Out of the 143 respondents, 94 (65.7%) are female in contrast to the male which comprise 49 (34.3%). A great percentage (71 or 49.7%) of the respondents are married, 61 (42.7%) are single, and 11 (7.7%)

are widower. There are 38 (26.6%) of the respondents who are high school graduates, but two (1.4%) never had formal schooling. The greater number (61 or 42.7%) of the respondents are unskilled workers; three (2.1%) have no job. Lastly, the largest portion (67 or 46.9%) of the respondents have a monthly income of 5,000 Php and below; however, four (2.8%) are earning 20,001 – 30,000.00 Php monthly.

On **Health-Related Factors**

Out of the 143 respondents, 66 (46.2%) are 1.51–1.6 meters tall, while five (3.5%) are above 1.7 meters tall. More respondents (53 or 37.1%) weigh 51-60 kilograms, while seven (4.9%) weigh 40 kgs and below. Majority (74 or 51.7%) of the respondents are classified as Type II or Non-Insulin Dependent Diabetes Mellitus (NIDDM) and 69 (48.3%) are Type I or Insulin Dependent Diabetes Mellitus (IDDM). Most (105 or 73.9%) of the respondents are hypertensive while suffering from diabetes and two (1.4%) have tuberculosis. There are 78 (54.54%) of the respondents who developed neuropathy; but only one (0.7%) has Diabetic Ketoacidosis (DKA).

On **Lifestyle**

Table 1. Distribution of respondents in terms of their lifestyle.

Variables	f	%
Smoker		
Yes	**44**	30.8
No	99	69.2
Total	**143**	**100.0**
Alcohol Intake		
Yes	38	26.6
No	105	73.4
Total	**143**	**100.0**

Most {99 or 69.2%) of the respondents are non-smokers, while 44 (30.8%) are smokers. Majority (105 or 73.4%) of the respondents drink alcoholic beverages while 38 (26.6%) do not drink alcoholic beverage.

Level of Awareness of Diabetes Mellitus

Table 2.   Mean ratings showing the respondents' level of awareness of the risk factors of diabetes mellitus.

Items	Mean	DR
Am Aware of the following Risk Factors of DM:		
a. Family History of DM	2.62	Moderately Aware
b. Obesity	2.25	Moderately Aware
c. Age – above 45 years old	2.06	Aware
d. Previously Identified IFG9 Plasma glucose level =>7 mmol/L or ,126 mg/dL) or IGT (7.8—11.1 mmol/L or 140-200mg/dL)	1.72	Aware
History of gestational Diabetes	1.32	Unaware
Hypertension	2.29	Moderately Aware
HDL cholesterol.90mmol/L	1.64	Aware
Polycystic ovarian Syndrome	1.21	Unaware
Overall	1.89	**Low**

The overall mean rating of 1.89 indicates the respondents' "low" level of awareness of the risk factors of DM. They are "moderately aware" that family history and obesity are risk factors of DM, but "unaware" that polycystic ovarian syndrome can also be a risk factor.   The respondents have low level of awareness of the risk factors of Diabetes Mellitus as most belong to the older groups and have not pursued higher educational level. They have low level of awareness that people with positive health history of the disease are twice at risk than those with no history {Public Health Nursing, 2006).

On Complications

Table 3 shows the mean ratings showing the respondents' level of awareness of the complications of DM. It can be observed in the table that the respondents have a "low" level of awareness of the complications of DM as manifested by an overall mean rating of 1.79.

The respondents are "moderately aware" of neuropathy and retinopathy as complications of DM. But they are "unaware" of diabetic ketoacidosis (DKA) and hyperglycemia as complications of DM.

Table 3.   Mean ratings showing the respondents' level of awareness
of the complications of diabetes mellitus.

Items	Mean	DR
1. I am aware that the following are complications of OM		
a. Coronary Artery Diseases	1.73	**Aware**
b. Peripheral Vascular Disease, foot ulcers, poor wound healing	2.28	Moderately Aware
c. Diabetic Neuropathy	.621	Aware
d. Retinopathy	2.25	Moderately Aware
e. nerve tingling, numbness, weakness	2.39	Moderately Aware
£. Stroke	1.79	Aware
g. Gastroparesis, Nausea, anorexia, Diarrhea etc.	1.90	**Aware**
h. Sexual Dysfunction	1.38	Unaware
i. Diabetic Keto Acidosis	1.34	Unaware
j. Non-Ketotic Hyperosmolar State	1.62	Aware
K. Hyperglycemia	1.38	Unaware
Overall	1.79	**Low**

Table 4 presents the summary of the respondents' level of awareness of
Diabetes Mellitus.

Table 4. Summary of the respondents' level of awareness
of diabetes mellitus.

Dimensions	**Mean**	DR
Risk Factors	1.89	Low
Complications	1.79	Low
Overall	1.94	**Low**

Generally, the respondents' level of awareness of DM is "low" as indicated by the overall mean of 1.94. When taken singly, a "low" level of awareness among the respondents is also observed along risk factors (5=1.89) and complications (⇐1.79)

The low level of awareness of the risk factors and complications of DM is associated with many factors. It is said that although functional literacy rate is high,

folk beliefs, misconceptions, and practices detrimental to health are still rampant . Sociocultural barriers to health are prevalent and more apparent in indigenous communities (DOH, 1999).

Treatment Compliance to Diabetes Mellitus

On Diagnostics and Treatment

The overall mean rating of 3.5 suggests a "High" extent of compliance of the respondents to treatment on OM along diagnostics and treatment (Table 5). They "always" religiously take in their medications prescribed by their physicians and they take in their medications at the right time as prescribed. They "sometimes" submit themselves for the monitoring of their blood pressure and blood glucose level but "often" visit their physicians when symptoms occur or worsen.

Failure to comply with proper treatment is a serious transgression in OM type 2.

Table 5. Mean ratings showing the extent of treatment compliance
of respondents to DM in terms of diagnostic and treatment.

Items	Mean	DR
I submit myself weekly for BP monitoring	3.27	Sometimes
I submit myself for laboratory exams every six months.	2.64	Sometimes
I monitor my blood glucose level daily	2.50	Sometimes
I religiously take the medications prescribed by my doctor	4.28	Always
I take my medication at the right amount/dosage as prescribed	4.28	Always
I take my medications at the right time	4.12	Always
I visit my doctor regularly as advised	3.43	Often
I visit my doctor when symptoms occur or worsen	3.85	Often
I visit my doctor when time and resources are available	3.11	Often
Overall	3.5	**High**

On lifestyle Modification

Table 6 shows that there is a "low" extent of treatment compliance on DM among the respondents in terms of lifestyle modification as suggested by the overall mean of 3.28. They "always" find time to rest and exercise, but they "often" smoke and drink alcoholic beverages.

One of the key areas for prevention and control of DM is to advice cessation for active smokers and prevent exposure to secondhand smoke. Smoking among diabetics increases risk for heart attack and stroke {Public Health Nursing, 2007).

Table 6. Mean ratings showing the extent of treatment compliance
of respondents to DM in terms of lifestyle modification.

Items	Mean	DR
1. I perform exercise such as playing, bicycle riding, dancing etc.	3.38	Always
2. I still drink alcoholic beverages	3.59	Often
3. I still smoke cigarette or tobacco	3.61	Often
4. I still socialize with my friends	3.50	Often
5. I still have time for rest and recreation	**4.45**	Always
6. I limit my intake of carbohydrate rich foods	**2.87**	Sometimes
7. I prefer to drink water and sugar free drinks	3.13	Sometimes
Overall	3.50	**Low**

Generally, the respondents' extent of treatment compliance on Diabetes Mellitus is "Low" as indicated by an overall mean rating of 3.50 (Table 7). When taken singly, a "High" extent of treatment compliance on DM along diagnostics and treatment and lifestyle modification was observed.

Table 7. Summary table on the extent of treatment compliance and treatment
of respondents to DM in terms of diagnostic and treatment.

Dimensions	Mean	DR
Diagnostics and treatment	3.50	High
Lifestyle Modification	3.50	High
Overall	3.50	High

Relationship between the Extent of Treatment Compliance to Diabetes Mellitus and Personal-Related Factors

Table 8 presents the correlation between the extent of treatment compliance and personal-related factors along age, sex, civil status, educational attainment, occupation, and monthly family income.

Table 8. Correlation coefficients between the extent of treatment compliance to diabetes mellitus and personal-related factors.

Variables	r-value	r-prob	Decision
Age	-0.2265	0.0065	Reject Ho
Sex	-0.0681	0.4189	Do not Reject Ho
Civil Status	0.2006	0.0163	Do not Reject Ho
Educational Attainment	0.2159	0.0096	Reject Ho
Occupation	0.0819	0.3309	Do not Reject
Monthly Family Income	0.2337	0.0050	Reject Ho

Significant at .05 level

There is a significant relationship between the extent of treatment compliance and age (r=-2265); educational attainment (r=.2159), and monthly family income (r=0.2337). This implies that the younger the individual, the more compliant she is to the treatment regimen. This could be attributed to the modern technology where these young people could access information about the serious complications of DM. Likewise, those with higher educational attainment have higher extent of treatment compliance. This further means that higher education gives better understanding of the disease condition and this improves the treatment compliance of patients.

Family monthly income is also found to have a significant relationship with the treatment compliance to DM. This means that being financially capable, they tend to adhere to the prescribed treatment regimen along diagnostics and treatment and lifestyle modification.

**Relationship Between the Extent of Treatment Compliance to
Diabetes Mellitus and Health-Related Factors**

Table 9 presents the correlation coefficients between the extent of treatment compliance and the health-related factors in terms of height, weight, and type of Diabetes Mellitus, co-morbid conditions and complications, and lifestyle such as smoking and intake of alcohol.

Table 9. Correlation coefficients between the extent of treatment compliance
and the health-related factors and lifestyle.

Variables	r-value	r-prob	Decision
Height	0.0595	0.4800	Do not Reject H,
Weight	0.0316	0.7075	Do not Reject H,
Type of DM	0.3058	0.0002	Reject H,
Co-morbid conditions	-0.1002	0.2339	Do not Reject H,
Complications	0.0732	0.3852	Do not Reject H,
Smoking	0.0746	0.3759	Do not Reject H,
Alcohol Intake	-0.0006	0.9945	Do not Reject H,

Table 9 reveals that there is a significant relationship between the extent of treatment compliance and type of DM (r=.3058). This indicates that those who were classified as type II diabetic patients tend to comply better with their treatment regimen. This is so because this disease is more serious than type I Diabetes Mellitus.

The management of type 2 diabetes mellitus is complex, continuous, and demanding and affects approximately 90 to 95 percent of people with the disease occurring more commonly among people who are obese and older than 30 years of age (Smettzer, et. al., 2010).

Relationship Between the Extent of Treatment Compliance and Awareness on Diabetes Mellitus

Overall, there is a significant relationship between the extent of treatment compliance and the level of awareness of OM as manifested by the overall computed r-value of .3830 (Table 10).

Table 10. Correlation coefficients between the extent of treatment compliance and awareness of DM in terms of risk factors and complications.

Variables	r-value	r-prob	Decision
Risk Factors	0.32298	0.0001	Reject H,
Complications	0.3695°	0.0000	Reject H,
Overall	0.3830	0.0000	Reject H,

Significant at .05 level

A significant relationship existed between the extent of treatment compliance and level of awareness of the risk factors (r=.3229) and complications (r=.3695) of DM. This means that there is higher compliance to the treatment of OM by the patients when they have a higher level of awareness of the risk factors and complications.

CONCLUSIONS

Most of the respondents are 50 years old and above, female, married, high school graduates, unskilled workers, and have a family monthly income of Php 5000 and below. Almost one-half of the respondents are 1.51–1.6 meters tall, weighing 51-60 kilograms, and most have Type II Diabetes Mellitus, with co-morbid condition of hypertension and complication of neuropathy; most of the respondents are non-smokers and do not drink alcoholic beverages. There is a "low" level of awareness of the respondents to Diabetes Mellitus along risk factors and complications. The extent of treatment compliance of the respondents to Diabetes Mellitus is "Low" in terms of Diagnostics and Treatment and Lifestyle Modification. There is a significant relationship between extent of treatment compliance of the respondents and socio-demographic factors in terms of age, educational attainment, and monthly family income. There is a significant relationship between extent of treatment compliance and health-related factors particularly on Type II of DM. There is a significant relationship between extent of treatment compliance and level of awareness of OM in terms of risk factors and complications.

RECOMMENDATIONS

To ensure a very high compliance to treatment of diabetes mellitus, massive information dissemination should be conducted by health personnel not only to diabetic patients but to the community people as well; emphasis should be on the risk factors and complications of the disease.

People suffering from diabetes mellitus should adhere strictly to the prescribed treatment and to the healthy lifestyle practices for diabetics so that they will not suffer from the adverse effects of the complications such as retinopathy, neuropathy, uropathy, and nephropathy and other more serious conditions.

The Department of Health should initiate programs that will regularly monitor the health status and lifestyle practices of high-risk individuals and most especially the diabetic patients through the barangay health personnel, making available the materials and supplies for the assessment of blood pressure and blood sugar level. Diabetic cases with age 50 and above should be the priority age for the program.

Inclusion in the school health curricula of the secondary and tertiary levels about the disease causation and complications is also recommended. This would make the young people aware of it to improve their health practices which may be altered by pressures in the environment.

LITERATURE CITED

Book

Public Health Nursing. (2006). *Causes and risk factors of major non communicable diseases.* (1O ed). Publications Committee, NLPGN.

Smeltzer, s. C., Bare, B. G., Hinkle, J. L., Cheever, K. H. (2010). *Assessment and management of patients with diabetes mellitus: epidemiology.* Brunner and Suddarth's Textbook of Medical-Surgical Nursing, 12" Edition, 1197-1199.

Unpublished Material

Palacpac, K., A. (2004). *Compliance behavior of diabetic patients in metro Vigan.* Unpublished Mastera! Thesis, University of Northern Philippines.

Reports

Department of Health. (1999). *National health objectives for health in the Philippines,* 1999-2004.

Department of Health. (2012). *National health objectives for health in the Philippines,* Provincial Health Office Field Report, 2008, Provincial Health Office, Ilocos Sur.

Internet Sources

World Health Organization website. Diabetes facts. Retrieved Nov. 14, 2012 from http://www.who.int/features /factfiles/diabetes/facts/en/index9.html

World Health Organization website. Diabetes features. Retrieved Nov. 14, 2012 from http://www.who.int/features/qa/65/en/index.html

The Lancet, Volume 378, Issue 9785. (2011). Retrieved Nov. 14, 2012 from http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)60679-X/abstract)

World Health Organization website. Diabetes risk factors. Retrieved Nov. 14, 2012 from http://www.who.int/gho/ncd/risk_factors/blood_glucose_prevalence_text/en/index.html