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# RISK ASSESSMENT OF DIABETIC PERSONS IN PALOMPON, LEYTE PHILIPPINES: IMPLICATIONS TO PROMOTE HEALTH EDUCATION PROGRAM

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***Abstract*— Abstract— The statistics on Diabetes mellitus in the Philippines continues to be unfavorable to the general population because of the continues rise in the number of Filipinos developing diabetes every year which adds to the number of people who cannot enjoy life and are becoming less productive due to this disease. The utilized the descriptive-normative cross-sectional survey method. Its samples consisted of diabetic persons identified within the locality of Palompon, Leyte Philippines. The data were statistically treated using simple percentage, Pearson product-Moment of correlation and t-test at α =**

**0.05 two-tailed. Hence, few national-level researches on diabetes are available and lack of researches have conducted with in the region. Thus, the objective of this study is to provide locally risk assessment in Palompon, Leyte attributable to diabetes. The findings of the study could also shed light on the understanding about diabetes and implementation towards health education program in Palompon, Leyte Philippines.**

**Key Words: Diabetes Mellitus, Risk Predictive Level, Health Education, Palompon**

## I. INTRODUCTION

Diabetes Mellitus (DM) is a disease in which the body does not produce or properly use insulin. Insulin is a hormone that is needed to convert sugar, starches and other food into energy needed for daily life. This is the reason why diabetics need an insulin injection if the disease is already severe.

Diabetes is a chronic disease where there are high levels of sugar in the blood, called hyperglycemia. According to the American Diabetes Association (ADA) diabetes is the 7th leading cause of death in the United States and the leading cause of both kidney disease and lower limb amputation. It is an expensive disease to treat, costing the Unites States around $ 174 billion in 2007.

In the United States alone, there are about 17 million have diabetes. Five to ten percent have Type I (juvenile) and the rest, Type II (adult onset) diabetes. Before insulin was discovered in the early 1920s, type I diabetes had 100% mortality and during the past 10 years, there has been a 33% increase in the number of diabetic patients [Chan-Cua, 2008].

However, the National Diabetes Acts of 1996, an act prescribing measures for the prevention and control of diabetes mellitus in the Philippines. Likewise, it shall provide for the development of strategies and programs, including awareness campaigns and the continuing education of health personnel and concerned individuals, to prevent diabetes mellitus and its complications.

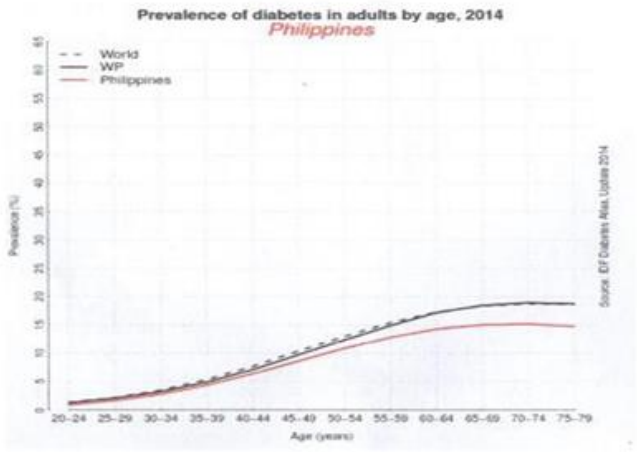
In the Philippines, the incidence of diabetes is also rising that one out every Filipinos living in the Philippines has diabetes. In 2008, diabetes was the seventh leading cause of mortality for all ages and was responsible for 4.9% of all deaths. In the same year the prevalence of diabetes among adult Filipinos

(25 years and above) was 4.8%, showing an increase of 1% from 1998 [WHO, 2012]. The statistics of diabetes mellitus in the Philippines continues to be unfavorable [Ward, 2012].

Moreover, the International Diabetes Federation/World Health Organization data, from Southeast Asians countries, including the Philippines had projections that the latest afflicted with diabetes and hypertension which continues to increase on the scale of medical records. It shows that statistics on Diabetes mellitus in the Philippines continues to be unfavorable to the general population because of the continues rise in the number of Filipinos developing diabetes every year which adds to the number of people who cannot enjoy life and are becoming less productive due to this disease. There are 387 million people have diabetes in the world and almost 138 million people in the World Prevalence (WP) region; by 2035 this will rise to 202 million. Now, there were 3.2 million cases of diabetes in the Philippines in 2014.

The figure below describes which age groups in the populations have the highest proportions of diabetes. The

dotted line is the distribution of diabetes prevalence by age for the world; the black line is the distribution for the region and the country distribution is plotted in the red line. Many middle- and low-income countries have more people under the age of 60 with diabetes compared to the world average. Meanwhile, for high-income countries, a growing population over the age of 60 makes up the largest proportion of diabetes prevalence [http://www.idf.org].




On the other hand, the lifetime medical costs for people with diabetes exceed those of otherwise similar people without diabetes. Previous studies of the economic consequences of diabetes prevention and have suggested that preventing diabetes, like preventing some other chronic diseases, would increase medical costs in part because of increased life spans. Other studies have found that diabetes prevention would lead to substantial long-term cost savings, despite the extended life expectancy [Zhuo and Zhang, 2014].

Hence, few national-level researches on diabetes are available and lack of researches have conducted with in the region. Thus, the objective of this study is to provide locally risk assessment in Palompon, Leyte attributable to diabetes. The findings of the study could also shed light on the understanding about diabetes and implementation towards health education program in Palompon, Leyte.

1. OBJECTIVES

This study attempted to undertake a diabetic risk assessment in Palompon, Leyte as basis to promote health education program.

Specifically, it attempted to find answers to the following questions.

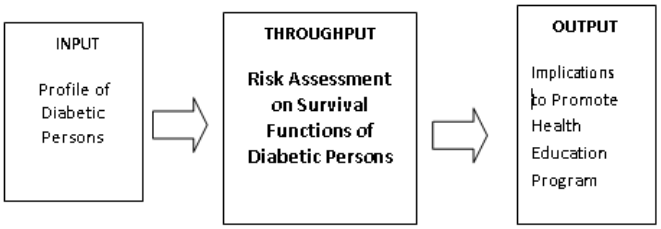
1. What is the profile of diabetic persons in terms of:
1.1 age
1.2 sex
1.3 location

2. What are the survival functions of diabetic persons in Palompon, Leyte:
2.1 with and without secondary disease,
2.2 risk predictive level?
3. Is there a significant relationship between the profile and the survival functions of diabetic persons in Palompon, Leyte:
3.1 with and without secondary disease
3.2 risk predictive level?
4. Is there a significant difference between the survival functions of diabetic persons to with or without secondary disease?
5. What implications can be drawn to promote health education program?

2. Hypotheses:

1. There is no significant relationship between the profile and the survival functions of diabetic persons in Palompon, Leyte to with or without a secondary disease and risk predictive?
2. There is significant difference between the survival functions of diabetic persons to with or without secondary disease?

3. Conceptual Framework




5. Significance of the Study

1. It provides valuable information to the community to promote health education program.
2. It changes individual life style towards proper dieting and good exercises
3. It can predict the demand of medical supplies in the next five years.
4. It provides data information and challenges our local health offices to disseminate publicly the alarming issue about diabetes.
5. It responds the national development goals in terms of health awareness program.

6. Related Literature and Studies

The national prevalence of diabetes mellitus in the Philippines shows that more diabetic found in the urban areas as compared in the rural areas. Likewise, the prevalence was 4 percent and 4.2 percent in the male and female, respectively. No definite trend may be noted among the diabetics with regard to their educational attainment. Among the diabetics, high blood pressure was observed in 20.1 percent of the males and 5.3 percent of the females [Azurin, JC et al, 2014].

Obesity is more common among diabetics than non-diabetic. Classical symptoms of diabetes mellitus, such as frequent urination, thirst sensation and weight loss were

observed. The relatives of diabetics were reported to be affected by the disease, particularly parents and siblings. Twenty-seven percent of the diabetics consulted private physicians and were treated with antidiabetic tablets.

Diabetes mellitus is not a single disease entity but rather a group of metabolic disorders sharing the common underlying feature of hyperglycemia. Hyperglycemia in diabetes results from defects in insulin secretion, insulin action, or most commonly, both. It is a leading cause of end- stage renal disease, adult- onset blindness and nontraumatic lower extremity amputations. It also increases the risks of developing coronary artery disease and cerebrovascular disease.

A person who has diabetes is defined as someone taking insulin or oral hypoglycaemic drugs, or with a fasting plasma glucose concentration above 7.0 mmol/l (126 mg/dl0 or a postprandial (approximately 2 hours after a main meal) plasma glucose concentration above 11.0 mmol/l (200 mg/l) on two separate occasions). For very low resource settings urine sugar test may be sued to screen for diabetes if blood glucose assay is not feasible. If urine sugar test is positive a confirmatory blood glucose test need to be arranged to diagnose diabetes mellitus [WHO, 2007].

Some individuals are at high cardiovascular risk because they have established cardiovascular disease or very high levels of individual risk factors. Risk satisfaction is not necessary for making treatment decisions for these individuals as they belong to the high risk category; all of them need intensive lifestyle interventions and appropriate drug therapy. They include people with established cardiovascular diseases, with type1 or 2 diabetes, with overt nephropathy or other significant renal disease.

The WHO/ISH risk prediction charts indicate 10-year risk of a fatal or non-fatal major cardiovascular event (myocardial infraction or stroke), according to age, sex, blood pressure, smoking status, total blood cholesterol and presence or absence of diabetes mellitus [WHO, 2007].

## 7. METHODOLOGY

This chapter presents the research design, research respondents, instruments, resources needs, data gathering procedure and statistical treatment of the data.

### Research design

A descriptive-normative cross-sectional survey method of investigation was used in this study. It was a method of describing phenomena based on the collection of data and statistical analysis of numerical values.

### Research Respondents

The samples of the study consisted of diabetic persons identified within the locality of Palompon, Leyte. The Rural Health Unit (RHU) of Palompon had collected data during the first quarter of year 2014 and they had monitored regularly diabetic patients identified with or without secondary diseases.

### Research Instrument

The main instrument of this study was the questionnaire used by physicians and non-physicians health workers from the RHU-Palompon issued by the Department of Health (DOH) Regional Office. This was provided a diabetic profile of the respondents and diabetes with or without secondary diseases.

### Resources needs

Human resources: Medical doctor or trained nurse/non-physician health worker

Equipment: Stethoscope, accurate blood pressure measurement device, measuring tape and weighing scale, equipment for testing urine glucose and urine albumin, and assay of blood glucose and blood cholesterol

Drugs: Thiazide diuretics, beta blockers, angiotensin converting enzyme inhibitors, calcium channel blockers, aspirin, metformin, insulin, statins

Other facilities: system for maintaining medical records, referral facilities Research procedure

After the approval of the request for permission to conduct the study, the researcher purposively selected the sample registered as diabetic persons with or without secondary diseases from the Rural Health Unit of Palompon, Leyte.

The data were stored in a spreadsheet database file in the researcher's personal computer and were utilized in the computations and statistical analysis.

Indices

The Age distribution of the diabetic persons with or without secondary diseases are based on the following:

20 years old– Below

21 years old– 40 years old

41 years old– 60 years old 61 years old- Above

The risk predictive factor is measured based on the WHO/ISH Risk Factors as shown below:

WHO/ISH Risk Factors (10–year risk of a fatal or non-fatal cardiovascular event by gender, age and presence or absence of diabetes mellitus)


Legend:

Risk < 10% = Individuals in this category are at low risk. Low risk does not mean "no" risk Risk 10% to <20% = Individuals in this category are at moderate risk

Risk 20% to <30% = Individuals in this category are at high risk Risks >30% = Individuals in this category are at very high risk

8. Statistical Treatment of Data

The data collected from this study were presented in spreadsheet tables designed by the researcher using Microsoft Excel. This database file storing the responses was exported to statistical software for query information.

All data were treated statistically following the formulas specified for each problem

1. To determine the profile and survival functions of diabetic persons, simple percentage was used. Simple calculation used conversion of the raw scores into percentage. This was done by dividing the total number of cases and the quotient was multiplied by 100.

The formula is:

% = No. of diabetic persons X 100 Total number of cases

2. To determine the relationship between the profile and the survival functions of diabetic persons in Palompon, Leyte to with or without a secondary disease and risk predictive, Pearson Product- Moment correlation was used.

rxy □

N□□xy - (□□x)(□□y)

□N□□x2 □□(□□x)2 □□N□□y2 □□(□□y)2 □

r x y = correlation between X and Y Σx = sum of score X

Σy = sum of score Y

Σxy = sum of the product of X and Y N = number of cases

Σx2 = sum of square X score Σy2 = sum of squared Y score

3. To determine difference between the survival functions of diabetic persons to with or without secondary disease, two-tailed test was used.

$$z = \frac{\overline{x1} - \overline{x2}}{\sqrt{\frac{s1^2}{n1} + \frac{s2^2}{n2}}}$$

Where $\overline{x1}$ = mean of the first sample

$\overline{x1}$ = mean of the second sample

$s1$ = variance of the first sample

$s2$ = variance of the second sample

$n1$ = number of cases in the first sample

$n2$ = number of cases in the second sample

9. RESULTS AND DISCUSSION

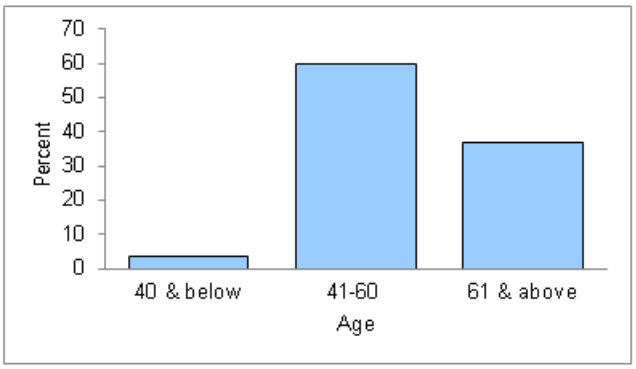
This chapter presents, analyzes and interprets the data on the diabetic profile of the respondents with or without secondary diseases. It also presents the relationships existing among the above-mentioned variables and the statistical testing of the data to establish the significance of the findings.

The age distribution of diabetic persons in Palompon, Leyte are shown in Table 1 and Figure 2. It has shown that 59.8% of diabetic persons in the different barangays with or without secondary diseases belongs to 41 to 60 years old.

Table 1. Age Distribution of Diabetic Persons in Palompon, Leyte

| Age | frequency | percent |
|---|---|---|
| 40 & below | 3 | 3.4 |
| 41-60 | 52 | 59.8 |
| 61 & above | 32 | 36.8 |
| | 87 | 100.0 |

Figure 2. Percentage Age Distribution of Diabetic Persons in Palompon, Leyte

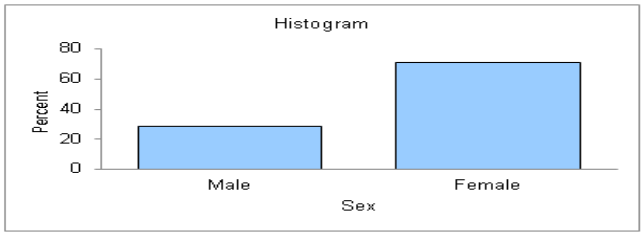



The sex distribution of diabetic persons in Palompon, Leyte are shown in Table 2 and Figure 3. It has shown that 71.3% are females and only 28.7% are males that has diabetic cases with or without secondary diseases.

Table 2. Sex Distribution of Diabetic Persons in Palompon, Leyte

| Sex | frequency | percent |
|---|---|---|
| Male | 25 | 28.7 |
| Female | 62 | 71.3 |
| | 87 | 100.0 |

Figure 3. Percentage Sex Distribution of Diabetic Persons in Palompon, Leyte

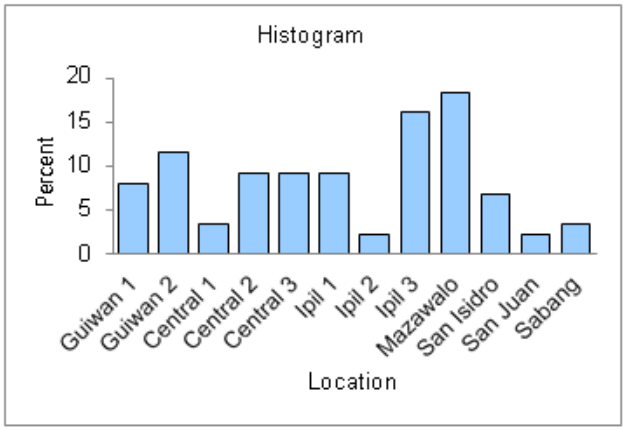



The total number of diabetic persons with or without secondary diseases as registered in the Rural Health Unit (RHU) of Palompon, Leyte during the first quarter of CY 2014. It has shown in Table 3 and Figure 4 that barangay Mazawalo and Ipil 3 got the highest number of cases on diabetes with or without secondary diseases of 18.4% and 16.1% respectively.

Table 3. Number of Diabetic Persons in the Different Barangays of Palompon, Leyte

| Location | frequency | percent |
|---|---|---|
| Guiwan 1 | 7 | 8.0 |
| Guiwan 2 | 10 | 11.5 |
| Central 1 | 3 | 3.4 |
| Central 2 | 8 | 9.2 |
| Central 3 | 8 | 9.2 |
| Ipil 1 | 8 | 9.2 |
| Ipil 2 | 2 | 2.3 |
| Ipil 3 | 14 | 16.1 |
| Mazawalo | 16 | 18.4 |
| San Isidro | 6 | 6.9 |
| San Juan | 2 | 2.3 |
| Sabang | 3 | 3.4 |
| | 87 | 100.0 |

Figure 4. Percentage Number of Diabetic Persons in the Different Barangays of Palompon, Leyte

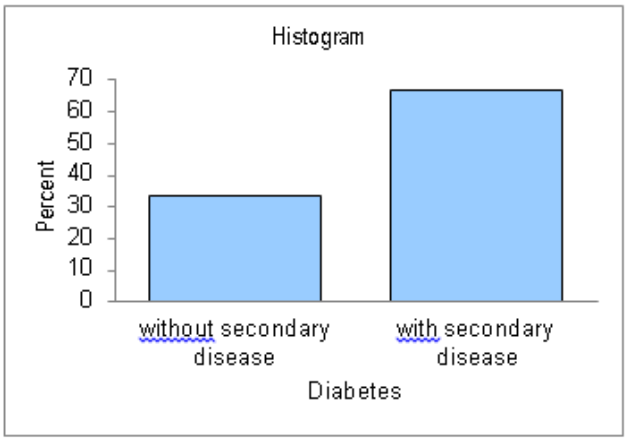



The classification of diabetic persons with and without secondary as registered in the Rural Health Unit (RHU) of Palompon, Leyte during the first quarter of CY 2014. It has shown in Table 4 and Figure 5 that 66.7% with secondary diseases and 33.3% without secondary diseases in Palompon, Leyte.

Table 4. Distribution of Diabetic Persons with and without secondary diseases.

| Diabetes | frequency | percent |
|---|---|---|
| without secondary disease | 29 | 33.3 |
| with secondary disease | 58 | 66.7 |
| | 87 | 100.0 |

Figure 5. Percentage Distribution of Diabetic Persons with and without secondary diseases.




with secondary disease

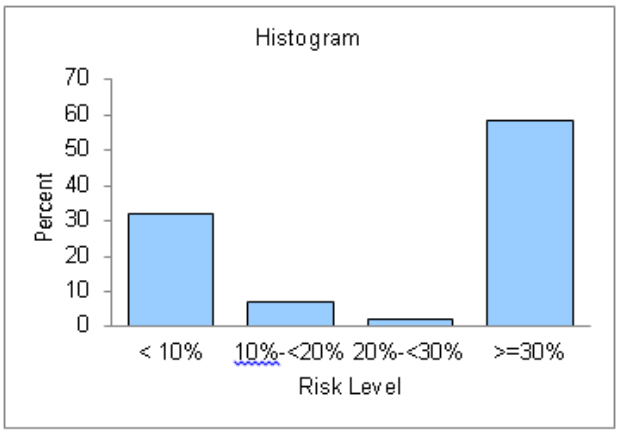
Diabetes

The Risk Predictive Levels of diabetic persons in Palompon, Leyte are shown in Table 5 and Figure 6. It has shown that 58.8% of diabetic persons in this category are at very high risk and only 32.2% Individuals in this category are at low risk.

Table 5. Distribution of Risk Predictive Level of Diabetic Persons in Palompon, Leyte.

| ***Risk Predictive Level*** | *frequency* | *percent* |
|---|---|---|
| < 10% | 28 | 32.2 |
| 10%-<20% | 6 | 6.9 |
| 20%-<30% | 2 | 2.3 |
| >=30% | 51 | 58.6 |
| | 87 | 100.0 |

Figure 6. Percentage Distribution of Risk Predictive Level of Diabetic Persons in Palompon, Leyte.




To determine the relationship between the profile and the survival functions of diabetic persons in Palompon, Leyte with or without secondary diseases and the risk predictive level. It has shown in Table to find out whether the profile and risk predictive level of diabetic persons are, in turn, influenced by some variables- age, sex and location. It has found out that location and sex have no significant relationship to the profile of diabetic persons and the risk predictive level.

Table 6. Relationship between the profile and the survival functions of diabetic persons in Palompon, Leyte with or without secondary diseases and the risk predictive level.

| Correlation | Profile | | | |
|---|---|---|---|---|
| | *Age* | *Sex* | *Location* | *Diabetes* |
| *Diabetes* | .216 | .090 | -.145 | 1 |
| *Risk Predictive Level* | .276 | .070 | -.191 | .357 |

Note:

87 sample size

Black Font Positive relationship

Red Font Negative relationship

± .211 Significant relationship at 5% level, if > 0.211 or < -0.211.

± .275 Significant relationship at 1% level, if > 0.275 or < -0.275.

From Table 6 shows the relationship between the age distribution and the survival functions of diabetic persons in Palompon, Leyte with and without secondary diseases. It has shown that it has significant relationship with the age profile to the diabetic persons with or without secondary diseases. This also support in Table 7, which means that as diabetic persons increasing his age, he is also susceptible to secondary diseases.

Table 7. Age profile and diabetic persons with and without secondary diseases in Palompon, Leyte.

| CrossTabulation | | Diabetes | | Total |
|---|---|---|---|---|
| | | without secondary disease | with secondary disease | |
| Age | 40 & below | 2 | 1 | 3 |
| | 41-60 | 20 | 32 | 52 |
| | 61 & above | 7 | 25 | 32 |
| | Total | 29 | 58 | 87 |

From Table 6 shows the relationship between the age profile and diabetic persons with and without secondary diseases in Palompon, Leyte. It has shown that it has significant relationship with the age profile to the risk predictive level of diabetic persons with or without secondary diseases. Thus, Table 8 supports that as diabetic persons increasing his age, his risk predictive level does also increasing.

Table 8. Age profile and the risk predictive level of diabetic persons in Palompon, Leyte with and without secondary diseases.

| Crosstabulation | | Risk Predictive Level | | | | Total |
|---|---|---|---|---|---|---|
| | | | 10%-<20% | 20%-<30% | >=30% | |
| Age | 40 & below | 2 | 0 | 0 | 1 | 3 |
| | 41-60 | 21 | 3 | 2 | 26 | 52 |
| | 61 & above | 5 | 3 | 0 | 24 | 32 |
| | Total | 28 | 6 | 2 | 51 | 87 |

From Table 6 shows the relationship between the risk predictive level and diabetic persons with or without secondary diseases in Palompon, Leyte. It has shown that it has significant relationship with the risk predictive level to diabetic persons with or without secondary diseases. Thus Table 9 supports that the risk predictive level is higher to diabetic person with secondary disease than without secondary disease.

Table 9. Risk predictive level and diabetic persons with or without secondary diseases in Palompon, Leyte

| Crosstabulation | | Risk Predictive Level | | | | Total |
|---|---|---|---|---|---|---|
| | | < 10% | 10%-<20% | 20%-<30% | >=30% | |
| Diabetes | without secondary disease | 17 | 1 | 0 | 11 | 29 |
| | with secondary disease | 11 | 5 | 2 | 40 | 58 |
| | Total | 28 | 6 | 2 | 51 | 87 |

To determine the significant difference between the survival functions of diabetic persons to with or without secondary disease is shown in Table10. It has shown that there is significant difference at 0.05 level of significance as in the risk predictive level of diabetic persons to with and without secondary diseases. Briefly, it means that, the difference of risk predictive level between the diabetic persons with or without secondary diseases are very significant.

Table 10. T-values Distribution of Risk Predictive Level of Diabetic Persons with and without secondary diseases in Palompon, Leyte.

| *T-test* | p-value | Interpretation |
|---|---|---|
| Risk Level between with & without secondary diseases | 0.0007 | Significant difference |

Note: * - significant difference, if below 5% level.

## 10. CONCLUSIONS

The researcher made the following conclusions based on the findings of the study:

1. Majority of diabetic persons in the different barangays with or without secondary diseases in Palompon, Leyte belong to 41 to 60 years old and mostly females.

2. Based on the findings, the diabetic persons as registered in the Rural Health Unit (RHU) of Palompon, Leyte during the first quarter of CY 2014 have secondary diseases.

3. The Risk Predictive Levels of diabetic persons in Palompon, Leyte shows that 58.8% of diabetic persons are at very high risk and only 32.2% Individuals in this category are at low risk.

4. The location has no significant relationship to the profile of diabetic persons and the risk predictive level.

5. The age profile has significant relationship to the diabetic persons with or without secondary diseases as well the risk predictive level.

7. Definitely, the risk predictive level is higher to diabetic person with secondary disease than without secondary disease.

8. The difference of risk predictive level between the diabetic persons with or without secondary diseases are very significant.

## 11. RECOMMENDATIONS

Based on the data obtained in the findings and conclusions of this study, the following are recommended:

12. Once the condition of the patient is assessed and stabilized, they must be given follow up in a primary care facility and need periodic reassessments in specialty care.

13. Boost the information and dissemination campaign program on health awareness in the locality and promote linkages to National or International Diabetes Federation

14. Apply this study to other locality of Leyte and Samar provinces as to provide us invaluable information in Region VIII related to diabetes assessment.

15. Since the DOH had just initiated the program on health awareness about diabetes, a similar study shall be conducted considering more relevant data are necessary in order to come up a modelling and data forecasting on diabetes profile in Region VIII.

## 16. IMPLICATIONS

Cost is one consideration—but certainly not the only one—when implementing diabetes prevention strategies. However, the costs that could potentially be avoided if a case of diabetes is prevented. Knowing lifetime excess medical costs attributable to diabetes provides a benchmark from which to measure the maximum future medical costs that could be avoided by preventing diabetes.

Diabetes treatment costs might change because of advances in medical technologies and increased longevity of people with

diabetes. Our estimated lifetime excess costs from diabetes may be biased if the costs of future medical treatments for diabetes and other diseases differ from those of current treatments. However, because people with diabetes have a higher mortality, if they also have higher medical costs associated with death, the excess lifetime medical costs of diabetes would be higher than those indicated by our current estimates [Zhuo et. al, 2014].

Because the prevalence of diabetes is higher among people aged ⩾65 years, the potential impact of the cost of diabetes prevention is particularly relevant to Medicare. Our analyses suggest that if diabetes could be efficiently prevented at age 65 years, the medical spending could potentially be saved over the remaining lifetime (excluding prevention costs). Furthermore, similar cost savings could potentially be achieved by preventing diabetes at even earlier ages (e.g., 60 years). Although preventing diabetes

among the current population aged ⩾65 years might immediately save money more, investments in prevention among people who are currently younger than 65 years of age and who are at high risk for type 2 diabetes may financially benefit Medicare in the long run.

However, health education is very crucial, it is not only concerned with the communication of information, but also with fostering the motivation, skills and confidence (self-efficacy) necessary to take action to improve health. Health education includes the communication of information concerning the underlying social, economic and environmental conditions impacting on health, as well as individual risk factors and risk behaviors, and use of the health care system.

According to Andrija Stampar "Health education has so far been carried out only by private initiative. The present time, however, calls for a more comprehensive participation. It would be a mistake if health education were restricted to the four walls of the classroom. Health education should continue and be carried out most intensively out-side walls, in the communities.

Thus, health education may involve the communication of information, and development of skills which demonstrates the political feasibility and organizational possibilities of various forms of action to address social, economic and environmental determinants of health [Denev et. al, 2007].

## 17. ACKNOWLEDGMENT

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