

DETERMINANTS OF DIABETES MELITUS IN PATIENTS OF GENERAL HOSPITAL IN KEEROM DISTRICT KWAINGGA IN 2017

Nova F.Rumaropen¹, Sarni R. Bela²

Faculty of Public Health, Cenderawasih University

Email: faletinarumaropen@gmail.com

ABSTRACT

Diabetes mellitus (DM) is a health disorder in the form of a collection of symptoms caused by an increase in blood sugar (glucose) levels due to lack or insulin resistance. The case of diabetes mellitus is still relatively high in Keerom Regency which is inseparable from various supporting factors such as consumption of foods that are high in sugar and carbohydrates because the majority of the population's work is as farmers. The purpose of this study was to determine the determinants of the incidence of diabetes mellitus in outpatients in Kwaingga General Hospital, Keerom Regency. Type of analytic descriptive research with Cross Sectional design. The population in this study amounted to 517 outpatients. The number of samples is 96 samples. Data obtained using a questionnaire. Analysis of relationship test using chi-square statistical test and multivariate analysis using logistic regression. The results showed no relationship between age and incidence of diabetes mellitus (p-value = 0.110), there was a relationship between genetics and the incidence of diabetes mellitus (p-value = 0,000), there was no association between obesity and the incidence of diabetes mellitus (p-value = 0.545), there is a correlation between eating patterns and the incidence of diabetes mellitus (p-value = 0.039), there is a relationship between mild physical activity and the incidence of diabetes mellitus (p-value = 0.052) and based on multivariate analysis that the dominant factor in outpatient diabetes mellitus in Kwaingga General Hospital, which is genetic (EXP B / OR = 21,239; p-value = 0,001).

Keywords: *Determinants of Diabetes Mellitus.*

1. PRELIMINARY

Diabetes mellitus (DM) is a health disorder in the form of a collection of symptoms caused by an increase in blood sugar (glucose) levels due to lack or insulin resistance. Diabetes mellitus is a type of degenerative disease that is increasing every year in countries around the world. At present in developing countries there has been a shift in the main causes of death, from infectious diseases to non-communicable diseases. This transition tendency is influenced by changes in lifestyle, urbanization and globalization. One type of non-communicable disease is congenital disease or degenerative disease. This causes an increase in the concentration of glucose in the blood (Bustan MN, 2015).

There are several types of DM, namely Type I DM, Type II DM, Gestational Type DM and other types of DM. The most common type of DM is Type II DM. Type II DM is a metabolic disorder characterized by an increase in blood sugar due to decreased insulin secretion by pancreatic beta cells and impaired insulin function or insulin resistance (MOH , 2005 in Trisnawati SK, 2012).

Glucose conformity, impaired insulin metabolism, overweight, abdominal fat distribution, and mild fever and hypertension that have to do with the development of type II diabetes mellitus and cardiovascular disease have given rise to the concept of metabolic syndrome and also known as insulin. Insulin resistance is considered a fundamental abnormality in this syndrome. The pathogenesis of this syndrome is unclear, although environmental factors such as diet and physical activity have been known (Reaven GM , et. Al , 1988). The cause of a person suffering from diabetes mellitus is a lack of the hormone insulin which functions to allow glucose to enter the cell to be metabolized (burned) and used as an energy source. The result is glucose accumulated in the blood (hyperglycemia) and finally excreted through the urine without being used (glicosuria). Therefore, urinary production is greatly increased and patients often urinate, feel very thirsty, lose weight and feel tired. Another cause is the decline in cell receptor sensitivity to insulin (insulin resistance) caused by overeating and obesity (overweight). On average 1 , 5-2% of all world population suffer from declining (familial) diabetes (Tan HT et al., 2007).

The results of a previous study conducted by Trisnawati SK (2012) concerning the risk factors for the incidence of type II diabetes mellitus in the cengkareng sub-district health center in West Jakarta, showed that the age, family history, physical activity, blood pressure, stress and cholesterol levels were associated with DM Type survival. 2. Variables that are strongly associated with the incidence of Type 2 DM are Body Mass Index. People who are obese are at risk 7 , 14 times to suffer from Type 2 diabetes compared to people who are not obese.

The World Health Organization (World Health Organization) estimates that the number of people with diabetes in Indonesia will continue to surge, from the original 8.4 million sufferers in 2000 to around 21.3 million in 2030. Whereas from the Ministry of Health data, the number of inpatient and outpatient diabetes patients in the hospital ranks first in all endocrinal diseases (Maulana M, 2016).

According to the International of Diabetic Ferderation (IDF, 2015) the level of global prevalence of DM patients in 2014 amounted to 8.3% of the total population in the world and experienced an increase in 2014 to 387 million cases. The incidence of DM according to Riskesdas (2013) data shows an increase from 1.1% in 2007 to 2.1% in 2013 from a total population of 250 million and 0.8% in Papua.

The latest data in 2015 indicated by the Society of Endocrinology (PERKENI) states that the number of diabetics in Indonesia has reached 9, 1 million people. Indonesia has moved up from the 7th rank to the top 5 in the countries with the most number of diabetics in the world. Because Indonesia is still ranked 10th in 2011. (Perkeni, 2015). The Ministry of Health has set a national policy on PTM control since 2005. Prevention of PTM can be done by avoiding four main risk behaviors, namely tobacco (cigarette) and alcohol consumption, lack of physical activity, unhealthy diet and hypertension (RI Ministry of Health 2009-2011).

Based on the results of surveys and preliminary data collection at Kwaingga Hospital, Keerom Regency regarding Diabetes Mellitus. The number of visits of Diabetes Mellitus patients in Kwaingga General Hospital Keerom Regency in 2014 was 265 patients, in 2015 there were 183 patients, in 2016 as many as 181 patients and in 2017 recorded from January to February as many as 31 patients, the amount was based on data that had been recap month. Whereas based on the

number of visits of poly patients in 2016 amounted to 1043 patients with 181 cases of DM. In 2017 it was recorded from January to May totaling 517 patients in the poly room who underwent road treatment. From these data it can be assumed that each year there is a decrease in the number of patients with diabetes mellitus, but the case is still relatively high. (Profile of RSUD Kwaingga, 2016).

Comparison with national data, the number of cases of DM every year is very different, where the number of cases of DM as a whole has increased every year with a range of patients from thousands to millions of people with DM. While in Kwaingga Hospital, the number of cases of DM has decreased every year. But the number of cases of DM still ranges from hundreds every year, so the case is still classified quite high even though it is still far from the comparison with national data.

Keerom Regency Regional General Hospital is a hospital located in Asyaman Village, Arso District. The villages that are located adjacent to the Asyaman village are Yuwanain Village, Yamua Village, Yaturaharja Village and Wulukubun Village which are included in the Skanto District working area. So that when calculated the number of closest residents who can access referral health services in Keerom District Hospital is 10,591 people who enter the work area of Arso Kota Health Center, West Arso Health Center, and Arso III Health Center. The average outpatient visit at Kwaingga Hospital in Keerom Regency every day ranges from 250 to 350 patients, while hospitalizations between 40-60 patients with various disease complaints with 100 beds. (Profile of RSUD Kwaingga, 2016).

Cases of diabetes mellitus patients found at Kwaingga Hospital in Keerom Regency are inseparable from various supporting factors such as consumption of foods that are high in sugar and carbohydrates, because food commonly consumed as a source of carbohydrates in the form of rice, cassava, corn, betatas, bête, cassava . Because the source of carbohydrates is always available, so the people of Keerom Regency tend to eat foods high in carbohydrates.

2. METHOD

The type of research used is descriptive analytical research and analyzing relationships, namely research conducted on a set of objects that aims to see a picture of phenomena (including

health) that occur in a particular population (Notoadmodjo, 2010). The research design used was Cross Sectional (cross approach). This study is a study where the variables studied both independent and dependent variables were measured almost simultaneously. This research will be conducted at Kwaingga Hospital, Keerom Regency and the research time will be conducted in July 2017. Poulasi is a generalization area consisting of objects / subjects that have certain qualities and characteristics set by the researcher to be studied and then followed by conclusions (Sugiyono, 2010).

Calculation of sample size in this study was calculated based on the categorical descriptive formula:

Information :

n = sample size

Z α = Raw deviate alpha

P = precision research

Q = 1-P

d = precision

So, based on calculations using diats formula, the number of samples is 96 patients. The sample technique used was purposive sampling. Purposive sampling is a sampling technique for a specific purpose made by researchers based on criteria and number of samples that have been previously known, so that the sample represents the characteristics of the population that has been known previously (Hasmi, 2016).

a) Inclusion Criteria:

- 1) Outpatients who suffer from DM disease and those who do not suffer from DM disease who are in the work area of Kwaingga Regional Hospital, Keerom District, are willing to be the study sample or respondent.
- 2) Aged adults \geq 35 years and above.

The population in this study were outpatients at Kwaingga Hospital, Keerom Regency, which took the total number of outpatients in the general poly room in 2017 from January to May, which was 517.

The sample is part of the number of characteristics possessed by the population. If a large population and research are not able to learn all that exists in the population, the researcher can use the sample for reasons of financial limitations, energy, time and what is learned in the sample can be generalized to the population, provided that samples taken from the population are truly representative (Sugiyono, 2010).

$$n = \frac{z^2 \alpha^2 PQ}{d^2}$$

$$n = \frac{1.96^2 \times 0.5 \times (1-0.5)}{0.1^2}$$

$$n = \frac{3.8416 \times 0.5}{0.01}$$

$$n = \frac{0.9604}{0.01}$$

$$n = 96.04 \text{ (rounded to 96).}$$

Ho: There is a relationship between age and the incidence of diabetes mellitus.

Ha: There's relationship between age and the incidence of diabetes mellitus premises.

Ho: There is no relationship between genetics or offspring with the incident diabetes mellitus.

Ha: There is a relationship between genetic or human with the incidence of diabetes Mellitus

Ho: There is no relationship between obesity and the incidence of diabetes mellitus.

Ha: The relationship between obesity and the incidence of diabetes mellitus.

Ho: There is no relationship between diet and the incidence of diabetes mellitus.

Ha: there's relationship between dietary habits with the incidence of diabetes mellitus.

Ho: There is no association between fission activity and the incidence of diabetes mellitus.

Ha: The relationship between physical activity and the incidence of diabetes mellitus.

Hypothesis

Variables, Operational Definitions, Measurements, Criteria and Scale

Table 3.1. Variables, Operational Definitions, Measuring Tools , Objective Criteria , and Scale

No.	Variabel	Definition Operations	Measuring instrument	Objective Criteria	Scale
1	Age	Age of respondent seen by document (medical record)	Quizon	1. Old age > 40 years old 2. Young age ≤ 40 years (Budiyanto , 2002).	Nominal
2	Genetics	The presence or absence of family members suffering from DM disease	Quizon	There is: family history Nothing: family history (Jon W. Tangka, FIK UI, 2009).	Nominal
3	Overweight based on the calculation of BB (kg) / TB ² (cm) Or obesity	BMI (Body Mass Index)	1. Obesity: if BMI > 25 (kg / m ²) 2. Not obese: if BMI is ≤ 25 (kg / m ²) (Ministry of Health, 2008)	Ordinal	Overweight based on the calculation of BB (kg) / TB ² (cm)
4	Dietary habit	The feeding situation of respondents is seen from the type of food and frequency of eating. (types of food in the form of white rice, sugar, white bread, soft drinks).	<i>Food Frequency Questionnaire (FFQ)</i>	1. Often , if you consume ≥ 3 types and amount of food ingredients with a frequency of > 3 times a day. 2. Rarely , if you consume < 3 types and amount of food ingredients with a frequency < 3 times a day.	Ordinal
5	Physical Activity	Respondent activities carried out every day	Quizon	1. Light with PAL value ≤ 1.40-1.69 2. As for the PAL value 1.70-2.40 (FAO / WHO / UNU, 2001)	Nominal
6	Diabetes mellitus	Increased blood glucose levels in adult patients in general poly.	Laboratory examination results	1. Suffering from DM: GDS ≥ 200mg / dL. 2. Don't suffer from DM: GDS < 200mg / dL. (Bustan.MN, 2015)	Nominal

3. DATA SOURCE

Primary data

Primary data is data obtained directly in the field when fetching data, which is the result of the laboratory examination in diabetes mellitus, diet (type and frequency of consumption) by using the form *Food Frequency Questionnaire (FFQ)*.

1. Secondary data

Secondary data is data obtained indirectly and supportive in research. As researchers get data that has been prepared collected by other parties, such as records of the number of outpatient visits and the number of DM data in Kwaingga Regional Hospital, Keerom Regency.

Research Instrument

1. The results of the DM examination in the Kwaingga Hospital laboratory in Keerom Regency in 2017.
2. Research Questionnaire.
3. Stationary.
4. Camera (documentation).

Data collection

The collection of respondent data was conducted by interviewing each respondent directly using a questionnaire and anthropometric measurements were carried out, namely height and weight.

Data Processing Techniques, Data Analysis and Presentation

1. Data processing

After the data is collected, the next step is processing data. The process of processing data from Notoadmojo (2010), is:

a. Editing

Editing is an activity of checking for possible errors. This *editing* process will provide the opportunity for researchers believe that the data to be processed is correct.

b. Coding

Chi Square formula:

$$\chi^2 = \frac{\sum(f_o - f_e)^2}{f_e}$$

Information:

χ^2 : Chi-square value

f_o : Expected frequency

f_e : Frequency obtained / observed

Cross Sectional studies on relative risk estimation were obtained by calculating prevalence risk. Following is the formula for Prevalence Ratio:

$A / A + B$ = The proportion (prevalence) of subjects who have risk factors that experience effect, whereas $C / C + D$ = Proportion (prevalence) subject without risk effect.

Effect

Coding is a way to facilitate researchers when processing data by giving a specific code to the answers to each question. Such as genetic / hereditary, there is a history of descendants coded 1 and no history of descent given code 2.

c. Processing (input data)

Processing is a way to answer data from each respondent in the form of "code" (an example or letter) entered into the program or "software" (SPSS 16).

D. Data compilation (Tabulation)

Data compilation is organizing data in such a way so that it is easily summed, arranged and organized to be presented and analyzed.

2. Data analysis

A. Univariate Analysis

Analysis of the data used in this study to use Univariate data analysis, namely the analysis carried out on a variable. In a study, both obtained through observation, interviews, questionnaires and documentation. This analysis was carried out on each variable of the research results, namely age, genetic / hereditary variables, obesity, diet and physical activity. A univariate analysis can be presented in the form of frequency distribution, t endensi sentral and the value of a variable spread (Hasmi, 2016).

B. Bivariate Analysis

Bivariate analysis is an analysis carried out on two variables. This test used can be in the form of a difference test and a relationship test and the magnitude of the risk. Bivariate analysis was used to see the relationship of risk factors for age, genetics, obesity, diet and physical activity with Diabetes Mellitus. The statistical test used *Chi Square* test with the provisions of significance, if $p < 0.05$ indicates that the relationship is edible or H_0 is accepted, if $p > 0.05$ shows the relationship is not meaningful or H_0 is rejected (Notoadmojo, 2010).

	DM	Not DM	Total
Risk	A	B	A+B
Not risk	C	D	C+D
	A+C	B+D	A+B+C+D

The prevalence ratio must be accompanied by the desired confidence interval (Confidence interval), which determines whether the prevalence ratio is meaningful or not. The confidence interval will show the range of prevalence ratio values obtained in affordable populations if sampling is repeated.

Interpretation of results:

1) If the value of the prevalence ratio = 1 means that the variable suspected to be a risk factor has no effect on the effect, in other words it is neutral.

2) If the prevalence ratio > 1 and lower and upper values > 1 (95% confidence) means that the variable is a risk factor for the emergence of certain diseases.

3) If the value of the prevalence ratio < 1, it means that the studied factor actually reduces the $P = 1/(1 + e^{-y})$

Information:

- P = Probability for an event to occur)
 e = Natural number = 2,7
 y = Constants + a₁ x₁ + + a_i x_i
 a = Coefficient value of each variable
 x = value of independent variable

Multivariate analysis was performed using the SPSS 16 application to get the best model. Before carrying out a multivariate test, bivariate tests were carried out using the *chi square* test. Next, do a multivariate analysis if a variable with p value < 0,25 is obtained. Candidate variables that can be included in a multivariate test provided that the value of p value is < 0,25. The selected variable is entered into the model and the highest p value is released from the model one by one until all variables get the p value < 0.05. After getting the greatest EXP (B) value, then the variable is the most influential variable. This analysis uses the enter model.

4. RESULTS

General Description of Hospital Location

- 1.
2. Geographical and Demographic
 The Regional General Hospital of Keerom Regency is a hospital located in Kampung Asyaman, Arso District, which is located adjacent to the Asyaman village, namely Kampung Yuwanain, Kampung Yamua, Kampung Yaturaharja and Kampung Wulukubun which are

incidence of disease, in other words the variable under study is a protective factor.

Multivariate Analysis

Multivariate analysis was used to determine the effect of exposure together from several dominant factors determining the incidence of diabetes mellitus in outpatients in Kwaingga Hospital, Keerom District. The test used is logistic regression to analyze the relationship of one or several independent variants to a dichotomous / binary categorical dependent variable. The categorical dichotomous variables are variables that have two values of variation (Hasmi, 2016).

In logistic regression, the general formula used is:

included in the Skanto District working area. So if you count the number of closest residents who can access the referral service at the District Hospital. Keerom as many as 10,591 people entered the work area of Arso Kota Health Center, West Arso Health Center and Arso III Health Center. While the total population of Keerom Regency as a whole is 85,000 people. It is expected that with the establishment of the Keerom District General Hospital all Keerom people can access referral services from all Puskesmas or Pustu in Keerom District.

There are 9 Puskesmas and 48 Pustu under the coordination of the Keerom District Health Office. The Keerom District consists of 7 Districts namely Arso District, Skanto District, Waris District, Senggi District, Web District, East Arso District, and Towe Black District with an area of 8,390 km².

Research Result

The results of this study are based on three tests, namely the results of univariate analysis, bivariate analysis and multivariate analysis.

1. Characteristics of Respondents

Table 4.1. Distribution of Frequency of Characteristics of Respondents

Characteristics	n	%
Age		
Ages > 40 years old	75	78.1
Young age ≤ 40 years	21	21.9
Totally	96	100
Gender		
Man	38	39.6
Women	58	60.4
Totally	96	100
Education		
No school	10	10.4
Not completed in primary school	10	10.4
Elementary school	42	43.8
Junior high school	5	5.2
High school	22	22.9
College	7	7.3
Totally	96	100
Work		
Civil servants	7	7.3
Private	10	10.4
Farmer	58	60.4
IRT	21	21.9
Totally	96	100

(Source: Primary Data, 2017)

Based on table 4.1 the total number of respondents is as many as 96 respondents who were interviewed directly. The characteristics of the respondents above were based on the highest age at the age of > 40 years, namely 75 respondents (78, 1 %) and young age muda 40 years as many as 21 respondents (21.9%). The sexes are mostly found in women, namely 58 respondents (60, 4 %) and men as many as 38 respondents (39.6%). Most education is found in elementary schools, namely 42 respondents (43, 8) and the least education is in junior high school, 5 respondents (5.2%). While the most work is on

farmers, namely 58 respondents (60, 4 %) and the fewest jobs are in civil servants, namely 7 respondents (7.3%).

2. Univariate Analysis

This analysis was carried out on each variable of the research results, namely age, genetic / hereditary variables, obesity, diet and physical activity. This analysis is conducted to determine the number of frequencies for each variable.

a. Distribution of Respondents by Genetic / hereditary, Laboratory Results, Obesity, Diet, and Physical Activity.

Table 4.2 . Distribution of Respondents Based on Genetics, Laboratory Results, Obesity, Diet, and Physical Activities in the Kwaingga District Hospital Keerom District in 2017

Variabel	n	%
Genetics		
There is a history	9	9.4
There is no history	87	90.6
Totally	96	100
Laboratory Results		
Suffering from D M	18	18.8

Does not suffer from diabetes		
	78	81.2
Totally	96	100
Obesity		
Obesity		
	29	30.2
No Obesity		
	67	69.8
Totally	96	100
Dietary habit		
Often		
	51	53.1
Rarely		
	45	46.9
Totally	96	100
Physical activity		
Light		
	32	33.3
Is being		
	64	66.7
Totally	96	100

(Source: Primary Data, 2017)

Based on table 4.2 above it can be concluded that the highest number of genetics is in the no history category as many as 87 respondents (90, 6%) and there is a history of 9 respondents (9.4%). The results of the most laboratory examinations were in the category of not suffering from DM as many as 78 respondents (81, 2%) and those suffering from DM as many as 18 respondents (18.8%). Most obesity is in the category of not obese, as many as 67 respondents (69, 8%) and those who are obese as many as 29 respondents (30.2%). Most diets are in the frequent category, namely 51 respondents (53, 1%) and rare categories as many as 45 respondents (46.9%). While the most physical activity is in the moderate category, namely as many as 64 respondents (66, 7%) and light categories as many as 32 respondents (33.3%).

Table 4.3 . Age Relationship with Diabetes Mellitus Occurrence in Kwaingga Regional Hospital Working Area Keerom District 2017

		Lab Result		Totally	p- Valu e	RP	CI
		DM	Not DM				
Umur	Old age	17 22.7%	58 77.3%	75 100.0%	0.110	4.760	0.672- 33.721
	Young age	1 4.8%	20 95.2%	21 100.0%			
Total		18 18.8%	78 81.2%	96 100.0			

(Source: Primary Data, 2017)

3. Bivariate Analysis

After univariate analysis to describe each variable, then bivariate analysis will be conducted to find out whether there is a relationship between the independent variable and the dependent variable.

a. Age Relationship with Diabetes Mellitus

Bivariate analysis was carried out to determine the relationship of age with the incidence of diabetes mellitus in the Kwaingga District Hospital Keerom District. The relationship between these variables was tested by statistical analysis with the *Chi-Square* test at a significant level 0, 05 .

Based on table 4.7. It is known that out of 96 respondents obtained 75 respondents (100%) old age with 17 respondents (22.7%) experiencing DM and 58 respondents (77.3%) not having DM. At a young age there were 21 respondents (100%) with 1 respondent (4.8%) who had DM and as many as 20 respondents (95.8%) who did not experience DM.

A statistical analysis using chi square test known value ($p\text{-value} = 0.110 > 0.05$) and the value of RP (prevalence ratio) 4.760 (95% CI 0.672 to 33.721). Thus H_0 is accepted which means there is no significant relationship between age and DM

Table 4.4 . Genetic Relationship with the incidence of Diabetes Mellitus in the Work Area of Kwaingga Regional Hospital, Keerom Regency in 2017

		Lab.Result		Totally	p- Val ue	RP	CI
		DM	Not DM				
Genetic	There's history	7 77.8%	2 22.2%	9 100.0%	0.000	6.152	3.200-11.824
	No history	11 12.6%	76 87.4%	87 100.0%			
Total		18 18.8%	78 81.2%	96 100.0			

(Source: Primary Data, 2017)

Based on table 4.4 . It is known that out of 96 respondents 9 respondents (100%) had a family history with 7 respondents (77.8%) having DM and 2 respondents (22.2%) not having DM. While those who did not have a family history of 87 respondents (100%) with a total of 11 respondents (12.6%) who experienced DM and as many as 76 respondents (87.4%) who did not experience DM.

A statistical analysis using chi-square test known value ($p\text{-value} = 0.000 \leq 0, 05$) and the value of RP (Prevalence Ratio) 6,152 (95% CI 3,200-11,824). Thus H_0 is rejected which means that there is a significant relationship between genetics and the incidence of DM in Kwaingga General Hospital, Keerom Regency. While the value of RP shows that there is

Table 4.5 . Relationship between Obesity and the incidence of Diabetes Mellitus in the Kwaingga Regional Hospital in Keerom District in 2017

		Lab		Total	p- V al ue	RP	CI
		DM	Not DM				
Obesity	Obesitas	7 24.1%	22 75.9%	29 100.0%	0.545	1.470	0.634-
	No obese	11 16.4%	56 83.6%	67 100.0%			

incidence in Kwaingga General Hospital, Keerom Regency. While the RP value shows that the old age has a 4,760 times greater opportunity not to get DM .

b.Genetic Relationship with Diabetes Melitus

Bivariate analysis was carried out to determine the genetic relationship with the incidence of diabetes mellitus in the Kwaingga District Hospital Keerom District. The relationship between these variables was tested by statistical analysis with the *Chi-Square* test at a significant level of 0, 05 .

a history DM has a 6.152 times greater chance of developing DM compared with no history of DM. .

c.Relationship between Obesity and the incidence of Diabetes Mellitus.

Bivariate analysis was performed to determine the relationship of obesity to the incidence of diabetes mellitus in the Kwaingga Regional Hospital Working Area, Keerom District. The relationship between these variables was tested by statistical analysis with the *Chi-Square* test at a significant level of 0.05 . To find out the BMI of each respondent using the calculation of dividing the weight by height squared. Body weight is calculated using units of kg (kilograms), while height is in units of m (meters).

Total	18 18.8%	78 81.2%	96 100.0	3.41 1
-------	-------------	-------------	-------------	-----------

(Source: Primary Data, 2017)

Based on table 4.5. It is known that from 96 respondents 29 respondents (100%) were obese with 7 respondents (24.1%) experiencing DM and 22 respondents (75.9%) not having DM. While those who were not obese were 67 respondents (100%) with 11 respondents (16.4%) who had DM and as many as 56 respondents (83.6%) who did not experience DM.

A statistical analysis using chi-square test known value ($p\text{-value} = 0.545 > 0, 05$) and the value of

d. Relationship between Diet and Diabetes Mellitus

Bivariate analysis was carried out to determine the relationship between diet and the incidence of diabetes mellitus in the Kwaingga Regional Hospital Working Area, Keerom District. The

Table 4.6 . Relationship between Diet and Diabetes Mellitus in the Kwaingga Regional Hospital in Keerom District in 2017

		Lab. Result		Totally	p- Valu e	RP	CI
		DM	NotDM				
Dietary habit	often	14 27.5%	37 72.5%	51 100.0%	0.039	3.088	1.096- 8.708
	rarely	4 8.9%	41 91.1%	45 100.0%			
Total		18 18.8%	78 81.2%	96 100.0			

(Source: Primary Data, 2017)

Based on table 4.6 . It is known that out of 96 respondents obtained 51 respondents (100%) who have a frequent diet with a number of 14 respondents (27.5%) having DM and 37 respondents (72.5%) not having DM. While those who have a rare diet are 45 respondents (100%) with 4 respondents (8.9%) who experience DM and as many as 41 respondents (91.1%) who do not experience DM.

A statistical analysis using chi-square test known value ($p\text{-value} 0.039 \leq 0, 05$) and the value of RP (prevalence ratio) 3.088 (95% CI 1.096 to 8.706). Thus H_0 is rejected which means that there is a significant relationship between genetics and the incidence of DM in Kwaingga General

Table 4.7 . Relationship between Physical Activity and the incidence of Diabetes Mellitus in the Work Area of Kwaingga Regional Hospital, Keerom Regency in 2017

		Lab. Result		Totally	p- Valu e	RP	CI
		DM	Not.DM				
Actifity	light	10 31.2%	22 68.8%	32 100.0%	0.052	2.500	

RP (Prevalence Ratio) 1.470 (95% CI 0.634-3.411). Thus H_0 is accepted which means that there is no significant relationship between genetics and the incidence of DM in Kwaingga General Hospital, Keerom Regency. While the RP value shows that those who are obese have a chance of 1,470 times greater for developing diabetes compared to those who are not obese.

relationship between these variables was tested by statistical analysis with the *Chi-Square* test at a significant level of 0, 05. The method used to determine the respondent's diet is *FFQ* (*Food Frequency Questionnaire*).

Hospital, Keerom Regency. While the value of RP shows that eating patterns often have an opportunity of 3.088 times greater for DM.

e. Relationship between Physical Activity and the incidence of Diabetes Mellitus

Bivariate analysis was performed to find out the relationship between physical activity and the incidence of diabetes mellitus in the Kwaingga District Hospital Keerom District. The relationship between these variables was tested by statistical analysis with the *Chi-Square* test at a significant level of 0, 05. The calculation used to determine the physical activity of each respondent is to use the PAL formula / level of physical activity that has the value of the provisions.

	medium	8 12.5%	56 87.5%	64 100.0%	
Total		18 18.8%	78 81.2%	96 100.0	1.093- 5.717

(Source: Primary Data, 2017)

Based on table 4.7 . It is known that out of 96 respondents obtained 32 respondents (100%) who had mild physical activity with a total of 10 respondents (31.2%) experiencing DM and 22 respondents (68.8%) not having DM. While those who have moderate physical activity are 64 respondents (100%) with 8 respondents (12.5%) who experience DM and as many as 56 respondents (87.5%) who do not experience DM.

A statistical analysis using chi-square test known value ($p\text{-value} = 0.052 \leq 0, 05$) and the value of Rp 2,500 (95% CI 1.093-5,717). Thus H_0 is rejected which means that there is a significant relationship between genetics and the incidence of DM in Kwaingga General Hospital, Keerom Regency. While the value of RP shows that mild

physical activity has an opportunity of 2,500 times more to be affected by DM.

4.Multivariate Analysis

Getting dominant variable effect on the incidence of diabetes mellitus, it is necessary to multivariate analysis using the Test *Regression Logistic* double .Variables that meet the requirements to enter the *multiple logistic regression* test are $p < 0, 25$. The model of the test used was the enter model, so that the results of the bivariate analysis test found 4 variables that met the requirements to be tested in *logistic regression* were age variables ($p\text{-value}$ 0.110), genetic ($p\text{-value}$ 0.000), diet ($p\text{-value}$ 0.034) and physical activity ($p\text{-value}$ 0.052).

Table 4.8. Results of Bivariate Analysis

No	Variabel	P value
1	Ages	0.110
2	Genetic	0.000
3	Obesity	0.545
4	Dietary habits	0.039
5	Physical activity	0.052

(Source: Primary Data, 2007)

From table 4.8. it can be seen that variables that have a p value < 0.25 are variables of age, genetics, diet and physical activity. While the obesity variable has a value of $p > 0, 25$ which is

0.545, so that the obesity variable cannot be included in the multivariate test phase using the *Logistic Regression* analysis

Table 4.9 . Results of Multiple *Logistic Regression* Analysis Stage 1

No	Variabel	B	p-value	EXP(B)/OR	95% C.I.for EXP(B)	
					Lower	Upper
1	Ages	1.048	0.352	2.852	0.314	25.918
2	Genetic	2.810	0.002	16.617	2.809	98.323
3	Dietary habits	1.154	0.092	3.170	0.828	12.138
4	Physic actiftiy	0.733	0.253	2.082	0.592	7.320

(Source: Primary Data, 2017)

From table 4.9. showed that after 4 variables (age, genes, diet and physical activity) were analyzed together, the meaningful $p\text{-value}$ value was in the gene variable ($p\text{-value}$: 0.002)

eating pattern variable ($p\text{-value}$: 0.092) , physical activity variable ($p\text{-value}$: 0.253). While the age variable ($p\text{-value}$: 0.352) becomes meaningless

Table 4.10 . Results of Phase 2 Multiple Logistics Analysis

No	Variabel	B	p-value	EXP(B)/OR	95% C.I.for EXP(B)	
					Lower	Upper
1	Gen	2.975	0.001	19.589	3.342	114.813
2	Pola makan	1.112	0.104	3.039	0.797	11.595

3	Aktifitas fisik	0.936	0.131	2.551	0.756	8.608
---	-----------------	-------	-------	-------	-------	-------

Source: Primary Data, 2017)

From table 4.10. showed that after 3 variables (genes, diet and physical activity) were analyzed together, the significant p-value value was in the gene variable (*p-value* : 0.001) and eating pattern

variable (*p-value* : 0.104). While the physical activity variable (*p-value* : 0.131) becomes meaningless.

Table 4.11 . Final Results of Multiple Logistics Analysis

No	Variabel	B	p-value	EXP(B)/OR	95% C.I. for EXP(B)	
					Lower	Upper
1	Gen	3.056	0.001	21.239	3.729	120.993
2	Pola makan	1.187	0.078	3.279	0.876	12.268

(Source: Primary Data, 2017)

From table 4.11 . showed that after 2 variables (genes and diet) were analyzed together, the *p-value* value that was significantly significant was only in the gene variable (*p-value* : 0.001) with EXP (B): 21.239, meaning the gene variable has a 21,239 chance of being affected by diabetes

mellitus. While the dietary variable (*p-value* : 0.078) with an EXP (B) value: 3.279, meaning that the dietary pattern becomes meaningless.

To find out the confounding variable, namely by the formula:

$$\begin{aligned} \text{Dominan variable} &= \frac{\text{Result EXP(B)ends} - \text{Result EXP(B)start}}{\text{Result EXP(B)start}} \times 100\% \\ \text{Genetic} &= \frac{21,239 - 16,617}{16,617} \times 100\% \\ &= \frac{4,622}{16,617} \times 100\% \\ &= 0,27 \\ &= 27 \% > 10\% \end{aligned}$$

So, the prevalence ratio of EXP (B) = 27% > 10% so that the variables included in the category of confounding variables are variables of age, diet and physical activity.

women are at risk of developing type 2 diabetes mellitus (Damayanti S , 2015) .

c. Education Respondents

5. DISCUSSION

1. Univariate Analysis

a. Age of Respondents

Based on table 4.1. the age of respondents was found to be the most at the age of > 40 years as many as 75 respondents (78.1%) and young age as many as 21 respondents (21.9%). D ith the increasing age of a person then the network's ability to take a blood glucose decreased. This diabetes mellitus is more common in people over 40 years of age than younger people (Budiyanto et al, 2002).

Based on table 4.1. the highest number of respondents found in elementary school education was 42 respondents (43.8%) and the least was found in junior high school education, namely 5 respondents (5.2%). Hal is likely caused because the respondent at most only completed primary school education, so that people with low education have also lower knowledge, including knowledge of health and affect the behavior of healthy living .

b. Gender of Respondents

Based on table 4.1. The highest number of respondents' sex was found in female sex, namely 58 respondents (60.4%) and male sex as many as 38 respondents (39.6%). P omen higher risk of developing diabetes mellitus than the right to laki-men because women are more at risk of developing the disease diabetes mellitus because of the physical woman has an increased chance of a body mass index greater. Post-menopausal monthly cycle (premenstrual syndrome) syndrome that makes the distribution of body fat easily accumulated due to the hormonal process so that

The level of education has an influence on the incidence of Type Diabetes Mellitus . People with high levels of education will usually have a lot of knowledge about health. With this knowledge, people will have an awareness in maintaining their health. Education of the majority of respondents was graduated from elementary school (Irawan, 2010).

One's education is one of the processes of behavior change, the higher one's education, the more calculated the choice of places of health care. With high education, someone usually has a lot of knowledge about health. Therefore, someone is expected to be able to behave in a healthy manner such as preventing himself from a disease such as diabetes mellitus.

d. The work of the Respondents

Based on table 4.1. the majority of respondent's work is in farmers, 58 respondents (60.4%) and the least number of jobs are 7 civil servants (7.3%). The majority of respondents' jobs are as farmers, because Keerom District is a transmigration area. The type of work is also closely related to the incidence of DM so that a person's work can also affect the level of physical activity.

e. Genetic / family history

Based on table 4.2. the highest number of genetics was in the category of no family history as many as 87 respondents (90.6%) and there was a family history of 9 respondents (9.4%).

Respondents who have a family of people with diabetes mellitus need to pay close attention to the condition of their family. If one of his parents has diabetes mellitus, he will have a risk of 15%. If both parents have diabetes mellitus, the risk of developing diabetes mellitus is 75%.

f. Laboratory Results

Based on 4.2 . the most laboratory results were in the category of not suffering from diabetes mellitus by 78 respondents (81.2%) and those suffering from diabetes mellitus by 18 respondents (18.8%).

g. Obesity

Based on table 4.2 . most respondents were in the category of not obese as many as 67 respondents (79.8%) and respondents who were obese as many as 29 respondents (30.2%).

BMI (Body Mass Index) is obtained by way of dividing weight by height squared. Body weight is calculated using units of kg (kilograms), while height is in units of m (meters). Obesity can also be associated with an imbalance between the portion of height and weight, where weight exceeds a certain percentage size. Generally the size of the weight is simply said to be normal if the height in centimeters is reduced by one hundred to minus ten percent. Obesity is an independent factor (Sarwono W , et al, 2002) .

h. Respondents Diet

Based on table 4.2 . patterns of eating most are in the category of diet often as many as 51 respondents (53.1%) and eating patterns are rarely as much as 45 respondents (46.9%). Most of the many respondents who never regulate their diet than those who regulate their diet. Changes in lifestyle and excessive eating patterns cause disruption of metabolism of food substances in the

form of carbohydrates, proteins and fats that cause diabetes mellitus (Fibrina, 2005).

i. Respondents Physical Activity

Based on table 4.2. most physical activity is in the moderate category, which is 64 respondents (66.7%) and mild as many as 32 respondents (33.3%).

Physical activity can reduce weight and improve sensitivity to insulin, so it can improve the control of glucose in the blood in people with diabetes mellitus (Misnadiarly, 2006).

2. Bivariate Analysis

a. Relationship of age with the incidence of diabetes mellitus

b.

The results of the study on outpatients in the poly disease in Kwaingga Hospital, Keerom District showed that patients with diabetes mellitus who had age in the old age category were 17 respondents (22.7 %) and those who did not have diabetes were as many as 58 respondents (77.3 %), while there were 1 respondent (4.8 %) from young people with diabetes mellitus and 20 respondents who did not suffer from diabetes mellitus (95.8 %).

Based on the results of statistical tests obtained $p\text{-value} = 0.110$ ($p\text{-value} > 0.05$), so there is no relationship between age and incidence of diabetes mellitus and the results of the analysis obtained RP (Prevalence Ratio) that is 4.760 (95% CI: 0.672-33,721) .

Increased diabetes mellitus will be at risk as we get older, especially at the age of more than 40 years, because at that age there is an increase in glucose intolerance. The existence of the aging process causes reduced ability of pancreatic β cells to produce insulin. In addition, in older individuals there is a reduction in mitochondrial activity in muscle cells by 35%. This is related to an increase in muscle fat levels by 30% and triggers insulin resistance (Sunjaya, 2009).

This study is inversely proportional to the research conducted by Bella Yanita and Evi Kurniawaty in 2016, namely by getting the calculation results of $p\text{-value} = 0.001$ ($p\text{-value} \leq 0,05$) then H_0 is rejected. The conclusions obtained based on the results of the study showed that there was a relationship between age and the incidence of type II diabetes mellitus.

b. Genetic / hereditary relationship with the incidence of diabetes mellitus

The results of the study on outpatients in the poly disease in Kwaingga Hospital, Keerom Regency showed that patients with diabetes mellitus who did not have a family history of 11 respondents (12, 6%) and those who did not suffer from diabetes were 76 respondents (87.4%), while patients with diabetes mellitus who have a family history of 7 respondents (77.8%) and those who do not suffer from diabetes mellitus but have a family history of malaria as many as 2 respondents (22.2%).

Based on the results of the table statistical test, the value of $p\text{-value} = 0,000$ ($p\text{-value} > 0,05$), H_0 is rejected so that there is a relationship between genetics / heredity and the incidence of diabetes mellitus and analysis of RP Prevalence ratio i) obtained 6,152 (95% CI 3,200 -11,824).

Based on these results show that the number of respondents who did not have a family history and did not experience DM was more than 76 respondents. While those who have a family history and experience DM as many as 7 respondents. A family history of type 2 diabetes mellitus will have a 15% chance of suffering from DM and the risk of glucose intolerance, which is the inability to metabolize carbohydrates normally by 30%. Genetic factors can directly affect beta cells and change their ability to recognize and disseminate insulin secretory stimuli. This situation increases the individual's vulnerability to environmental factors that can alter the integrity and function of pancreatic beta cells. Genetically, the risk of DM can be inherited from parents to children. The gene that causes diabetes mellitus will be taken by the child if his parents suffer from diabetes mellitus. The inheritance of this gene can reach his grandson even squeak even though the risk is very small (LeMone & Burke, 2008).

This study is in line with research conducted by Shara Kurnia in Cengkareng, West Jakarta HealthCenter in 2012. The results show the value $p\text{-value} = 0.038$ ($p\text{-value} \leq 0,05$), the results showed no relationship between genetic / descent with the incidence of diabetes mellitus.

c. Relationship between Obesity and the incidence of Diabetes Mellitus

The results of the study in outpatients in the polydiseases in Kwaingga Hospital, Keerom Regency showed that patients with diabetes mellitus who were not obese were 11 respondents (16.4%) and those who did not suffer from diabetes were 56 respondents (83.6%), while

those who did not suffer from diabetes . suffered from diabetes mellitus that had obesity as many as 7 respondents (24.1%) and those without diabetes mellitus as many as 22 respondents (75.9%).

Based on statistical tests obtained $p\text{-value} = 0.545$ ($p\text{-value} > 0,05$), so that there is no relationship with the incidence of diabetes mellitus and the results of the analysis obtained RP (Prevalence ratio i) that is 6,152 (95% CI: 3,200-11,824).

BMI (Body Mass Index) is obtained by way of dividing weight by height squared. Body weight is calculated using units of kg (kilograms), while height is in units of m (meters) (Supariasa I, et al, 2001).

Obesity or obesity is overweight > 20% of ideal body weight or BMI (*Body Mass Index*) > 27kg / m². Obesity causes a reduction in the number of insulin receptors that can work in cells in skeletal muscles and fat tissue. This is called peripheral insulin resistance. Obesity also damages the ability of beta cells to release insulin when an increase in blood glucose (Damayanti S, 2015).

Obesity can also be associated with an imbalance between the portion of height and weight, where weight exceeds a certain percentage size. Generally the size of the weight is simply said to be normal if the height in centimeters is reduced by one hundred to minus ten percent. Obesity is an independent factor (Sarwono W, et al, 2003 in Alfiyah SW, 2010).

Results research is not in line with research conducted oleh Wahyu Sri ie showed no correlation between obesity and the incidence of diabetes mellitus. Respondents who were sampled both those who had diabetes mellitus and those who did not have diabetes mellitus had different results of BMI calculations . In diabetics who did not have diabetes mellitus, there were 29 respondents who were obese, while those who were not obese were more than 67 respondents.

d. Relationship between Diet and Diabetes Mellitus

The results of the study on outpatients in the polydiseases in Kwaingga Hospital, Keerom Regency showed that people with diabetes mellitus had a more frequent dietary pattern, namely 14 respondents (27, 5%) and those who did not suffer from diabetes, 37 respondents (72.5%) while diabetes mellitus sufferers who have a diet of as many as 4 respondents (8.9%) and those who do

not have diabetes meelus as many as 41 respondents (91.1 %).

Based on statistical tests obtained p -value = 0,39 (p -value \leq 0.05), respondents who have diabetes mellitus do have the habit of eating more and snacking frequently, so based on this analysis there is a relationship between diet and incidence of diabetes mellitus and the results of the analysis obtained RP (Prevalence Ratio) which is 3,088 . So that respondents who have a diet often have a chance of 3.088 times more likely to develop DM compared to respondents who have a rare diet.

The habit of eating respondents is to consume food in small but frequent quantities. Even though they have eaten heavy foods like rice, they will eat other foods in a short distance. This habit can be done 3-5 times a day. Food and drinks are commonly consumed is in the form of white rice, sugar, white bread, soft drinks, tea, sweet variety of snacks such as getuk lindri, cakes. These foods are foods belonging to the high glycemic index because they are a source of carbohydrates such as rice which is processed quickly by the body and causes blood sugar levels to increase rapidly. This is because certain carbohydrates are easier and faster to digest the body into sugars that the body uses as an energy source. So that when consuming foods and drinks that contain sugar, the higher the glycemic index. As well as the more number and portion of carbohydrate foods consumed, the easier it is to influence the rise in blood sugar levels.

Diet is a description of the type, amount, and composition of food ingredients that are eaten every day by one person who is a characteristic of a particular community group (Hartono, 2000). Diet is a way or effort in regulating the number and type of food with certain intentions such as maintaining health, nutritional status, preventing or helping cure diseases (MOH, 2009). A diet that is wrong and excessive or exceeds the amount of calories needed by the body can spur the emergence of diabetes mellitus. Consumption of excessive food and not balanced with adequate secretion of insulin can cause blood sugar levels to increase and certainly will cause diabetes mellitus (HRHasdianah , 2012).

This research is not in line with the research conducted by Kunthi Wandansari in 2013 by obtaining the results of calculations using the *chi-square* test , p -value = 0.359 (p -value $>$ 0 , 05). So that there is no significant relationship between diet and the incidence of diabetes mellitus.

e. Relationship between Physical Activity and the incidence of Diabetes Mellitus

The results of the study on outpatients in the poly disease in Kwaingga Hospital, Keerom Regency showed that patients with diabetes mellitus who had physical activity were 10 respondents (31 , 2 %) and those without diabetes mellitus as many as 22 respondents (68.8 %), while people with diabetes mellitus who had moderate physical activity were 8 respondents (12.5 %) and those who did not have diabetes melusus were as many as 56 respondents (87.5 %).

Based on statistical tests obtained p -value = 0.052 (p -value \leq 0.05), respondents who experienced their diabetes mellitus said that if they did work even though it was only for a while and could be categorized as light work they were very tired, so they can't do heavy types of work. S ehingga after analysis showed no relationship between physical activity and the incidence of diabetes mellitus and analytical results obtained by RP (Prevalence Ratio i) is 2.500 (95% CI: 1.093 to 5717).

The usual physical activity is gardening such as cutting grass, planting, and harvesting because the majority of respondents work as farmers. Various respondents who experienced diabetes mellitus said that they could not do long jobs and were categorized as heavy. Because they feel tired and tired . They can only do physical activities that are relatively mild, such as walking relaxed and sitting. But for respondents who do not experience DM they do physical activity as usual, when they feel tired and tired they will rest. On average they work in the category of moderate physical activity.

Physical activity is basically all physical activities carried out by a person, whether in daily activities to work, exercise or be creative. Any active activity can only be done with the energy needed for the activity. M akin weight or more and active itas physically the more energy is needed, the reverse maki n mild and brief increasingly active itas fewer physical energy y ang needed. Lack of physical activity is a risk factor for disease in abetes mellitus. Even physical activity is regular and long-term. Exercise can control blood cholesterol, diabetes and obesity, also control blood pressure (Dede Kusumana, 2006 inWahyuni S , 2007).

According to Plotnikoff (2006) in the *Canadian Journal of Diabetes* , physical activity is key in the management of diabetes mellitus primarily as a blood sugar controller and improving cardiovascular risk factors such as reducing

hyperinsulinemia, increasing insulin sensitivity, reducing body fat, and lowering blood pressure. Regular moderate physical activity is associated with a reduction in mortality rates of around 45-70% in the population of type 2 diabetes mellitus as well as decreasing levels of HbA1c to levels that can prevent complications from occurring. At least 150 minutes of physical activity every week consisting of aerobic exercise, endurance training and a combination of both are associated with a decrease in HbA1c levels in type 2 diabetes mellitus patients (Umpierre et al., 2011).

Physical activity can control blood sugar. Glucose will be converted into energy during physical activity. Active physical factors can cause insulin to increase so that blood sugar levels will decrease. In people who rarely exercise, food substances that enter the body are not burned but are buried in the body as fat and sugar. If Insulin is insufficient to convert glucose into energy, DM will arise (Ministry of Health, 2010). Factors risk of diabetes mellitus is a style of life that is not active healthy as lack of its physical, unhealthy diet and not balanced as well as obesity. So from that the most important thing about controlling diabetes mellitus is controlling risk factors (Anani et al., 2012). The important goal of managing diabetes mellitus is to restore metabolic disorder so that all metabolic processes return to normal (Arisman, 2011).

This research is in line with the research conducted by Sri Widayanti Alfiyah in the Central Hospital of DR KARIADI Semarang in 2010. Research conducted using the *chi-square* test showed the results of $p\text{-value} = 0.012$ which means there is a relationship between physical activity and the incidence of diabetes mellitus.

3. Multivariate Analysis

The results of the analysis on gene variables indicate that respondents who have genetic / offspring in the family will cause diabetes mellitus has a chance of 21,239 greater than respondents who do not have genetic / hereditary factors in the family.

The results of the analysis on dietary variables indicate that respondents who have a diet often will have a chance of 3.279 greater than respondents who have a rare diet. While the results of the analysis on the variables of physical activity showed that respondents who had mild activity had a 2,551 chance of being affected by diabetes mellitus compared to respondents who had rare physical activity.

Respondents who have a family of people with diabetes mellitus need to pay close attention to the condition of their family. If both parents have diabetes mellitus, the risk of developing diabetes mellitus is 75%. The risk for getting diabetes mellitus from mothers is 10-30% greater than fathers who suffer from diabetes mellitus. This is due to a decrease in genes when in the womb is greater than the mother. If siblings suffer from diabetes mellitus, the risk of suffering from diabetes mellitus is 10% and 90% if those who suffer are identical twins. For people who has families who suffer from diabetes mellitus, should immediately check the levels of blood sugar because of the risk of suffering from diabetes mellitus is a big chance (diabetes UK, 2010).

This is consistent with the theory put forward by Daniel W Foster (2000) that this decline is estimated to be autosomal dominant, recessive, and mixed. Family tree analysis showed a low prevalence of direct vertical transmission in a series of 35 families in which there was one classic insulin dependent diabetes mellitus child, only four of the index cases had diabetes mellitus parents and 2 had grandmothers or grandparents who diabetes mellitus. And the siblings of diabetes mellitus sufferers, only 6 who have clear diabetes mellitus as a whole, the chance of children suffering from type I diabetes mellitus if another sibling has a level of diabetes mellitus is only 5 to 10 percent (Daniel W Foster, 2000: 2197). This study is in line with research conducted by Shara Kurnia in Cengkareng, West Jakarta Health Center in 2012. The results show the value $p\text{-value} = 0.038$ ($p\text{-value} \leq 0, 05$), the results showed no relationship between genetic / descent with the incidence of diabetes mellitus.

6. CONCLUSION

Based on the results and the discussion taken as follows:

1. Patients diabetes mellitus in hospital outpatient Kwa ingga Keerom are in the category of old age > 40 years of the 17 respondents (17.7%) and who did not have diabetes mellitus were 58 respondents (60.4%), whereas the younger age categories ≤ 40 years with diabetes mellitus as many as 1 respondent (1.0%) and those who did not have diabetes mellitus by 21 respondents (21.9%).
2. The incidence of diabetes mellitus does not have a history of descent, namely as many as 11 respondents (11.5%) and those who did not administer DM as many as 76 respondents (79.2%),

while those with a family history of 7 respondents (7.3%) and those without suffered from DM by 2 respondents (2.1%).

3. The incidence of diabetes mellitus is not obese as many as 11 respondents (11.5%) and those without diabetes mellitus were 56 respondents (69.8%), while those with diabetes mellitus who were obese were 7 respondents (7.3%) and those who did not have diabetes were 22 respondents (22.9%).

4. The incidence of diabetes mellitus has a more frequent diet, namely 14 respondents (14.6%) and 37 people who do not suffer from diabetes mellitus (38.55), while those with diabetes mellitus who have a rare diet are as many as 4 respondents (4.2%) and those who did not have diabetes mellitus were 41 respondents (42.7%).

5. Patients diabetes mellitus who have mild physical activity as much as 10 respondents (10.4%) and diabetes mellitus who have not experienced a total of 32 respondents (33.3%), whereas diabetes mellitus patients who have moderate physical activity as much as 8 respondents (8.3%) and those who did not have diabetes mellitus were 56 respondents (58.3%).

6. There was no relationship between age and the incidence of diabetes mellitus in outpatients in Kwaingga Hospital Keerom District with p-Value values obtained $0.110 > 0,05$ and RP (Prevalence Ratio) 4,760 (95% CI 0.672-33,721).

7. There is a relationship between genetic / descent with the incidence of diabetes mellitus in patients in hospital outpatient Kwaingga Keerom with p-Value obtained $0,000 \leq 0,05$ and the value of RP (Prevalence Ratio) 6.152 (95% CI 3.200 to 11.824).

8. There is no relationship between obesity and the incidence of diabetes mellitus in earat road sufferers in Kwaingga General Hospital, Keerom District with a p-Value value of $0.545 > 0.05$ and a value of RP (Prevalence Ratio) of 1.470 (95% CI 0.634-3.411).

9. There is a relationship between eating patterns often with the incidence of diabetes mellitus in outpatients in Kwaingga Hospital Keerom Regency with a p-Value value of $0.039 > 0.05$ and RP (Prevalence Ratio) of 3.088 (95% CI 1,096-8,708).

10. There is a relationship between mild physical activity and the incidence of diabetes mellitus in outpatients in Kwaingga General Hospital, Keerom

District with a p-Value value of $0.052 > 0.05$ and RP values (Prevalence Ratio of 2.500 (95% CI 1.093-5.717)).

11. The dominant factor in the incidence of diabetes mellitus in outpatients in Kwaingga Hospital Keerom Regency is a genetic / hereditary variable.

BIBLIOGRAPHY

- Alfiyah, SW.,2010. Risk Factors Associated with Diabetes Mellitus in Outpatients at Dr. Central General Hospital Kariadi Semarang. The Semarang State University Thesis (Online) is accessed on April 9, 2017.
- Anani, S., Udiyono, A., Ginanjar, P.,2012. The Relationship between Diabetes Control Behavior and Blood Sugar Level Outpatients in Diabetes Mellitus (Case Study in Arjawinangun Hospital, Cirebon Regency). Journal of Public Health . 1: 466-478
- Arisman., 2011. Obesity, Diabetes Mellitus, and Dyslipidemia. Jakarta: EGC .
- Bella Y & Evy K.,2016. Factors Associated with the Occurrence of Type II Diabetes Mellitus, (volume 5 number 2 , April). (Online) accessed on March 16, 2017.
- Budiyanto , M & Agus Krisno., 2002, Gizidan Health, Byu Media and UMM Malang.
- Bustan , MN.,2015. *Management of Control of Non-Communicable Diseases* . Rineka Cipta, Jakarta.
- Damayanti S.,2015. Diabetes Melitus and Nursing Management, Nuha Medika, Yogyakarta.
- Daniel W. Foster.,2000. Harrison Prinsip-Principles of Internal Medicine. Jakarta: EGC
- Indonesian Ministry of Health.,2008 , Diabetes Mellitus Threats to Humanity in the World RI. (2009). National Policies and Strategies for Prevention and Control of Non-Communicable Diseases. Jakarta. House of Representative of Indonesia Republic.
- UK Diabetes.,2010. Diabetes in the UK: Key Statistics on Diabetes.
- Fibriana, D.,2005. Relationship between Diet and Blood Sugar Levels in Patients with Diabetes Mellitus at Klinik Pratama Pekalongan Analysis [Thesis]. Semarang: UNDIP Medical Faculty.
- Hasmi.,2016 , Health Research Methods, IN MEDIA, Jayapura.
- HR Hasdianah.,2012, Understanding Diabetes Mellitus in Adults and Children with Herbal Solutions, Nuha Medika, Yogyakarta.

14. International Diabetes Federation (IDF). IDF Diabetes Atlas Sixth Edition. International Diabetes Federation (IDF). 2015
15. Subekti priest., 2005. Integrated Management of Diabetes Mellitus: Script Buana, Jakarta.
16. Irawan, Dedi., 2010. Prevalence and Risk Factors for the Occurrence of Type 2 Diabetes Mellitus in Urban Areas of Indonesia (Risksdas 2007 Secondary Data Analysis). University of Indonesia Thesis.
17. Ministry of Health, RI., 2009-2011. Towards a Healthy and Independent Healthy Society. (Online) on October 4, 2016. 2010. Technical Guidelines for Measurement of Risk Factors for Diabetes Mellitus.
18. Kunthi W, 2013., Relation of Eating Patterns and Physical Activity to the incidence of Type II Diabetes Mellitus in DR MOEWARDI Hospital Surakarta. (Online) accessed on March 23, 2017.
19. Kurniali, PC., 2013. Living with Diabetes: Elex Media Komputindo, Jakarta.
20. Lemone & Burke., 2008. *Medical Surgery Nursing: Critical Thinking in Client care. Edition 6*. New Jersey: Prentice Hall Health.
21. Maria S., 2013. Relationship between Peripheral Artery Disease and Cardiovascular Risk Factors in Type II DM Patients in RSUP. Prof. Dr. RD Kandau Manado (volume 1 number 1, March). (Online) accessed on May 17, 2017.
22. Maulana M., 2016, Practical Guide to Diabetes, Yogyakarta.
23. Misnadiary., 2006. Ulcers, Gangrene, Diabetes Mellitus Infection. Jakarta: Popular Torch Torch
24. Notoadmojo, S., 2010. *Health Research Methods*: Rineka Cipta, Jakarta.
25. Indonesian Endocrinology Association., 2015 Practical Instructions: Insulin Therapy in Diabetes Mellitus Patients, PB. PERKENI. Jakarta.
26. Plotnikoff, R., 2006. Physical Activity in the Management of Diabetes: Population-based Perspectives and Strategies. *Canadian Journal of Diabetes*. 30: 52-62.
27. Riskesdas., 2013. Health Research and Development Agency (Online) accessed on September 28, 2016.
28. Profile of Kwaingga Regional Hospital, Keerom Regency., 2016.
29. Reaven GM. *et.al.*, 1988. Role of insulin resistance in human disease. *Diabetes* 1988 ; 37: 1595 –607.
30. Sarwono W. dkk., 2002. Pedoman Diabetes Mellitus Diet. First print. Jakarta: Hall of Publishers of the Faculty of Medicine, University of Indonesia.
31. Soegondo S, et al., 2009, Management of integrated diabetes mellitus: Balia Publisher FKUI, Jakarta.
32. Suiroaka, IP., 2012, Getting to Know, Preventing and Reducing Risk Factors 9 Degenerative Disease, Nuha Medika, Yogyakarta.
33. Sudoyo, AW et al., 2006. Textbook on Internal Medicine. (edition 3): Publisher Center of the Internal Medicine Department FKUI, Jakarta.
34. Sugiyono., 2010. Statistics For Research: Alfabeta, Bandung.
35. Sujaya, I Nyoman., 2009. "Pattern of Traditional Balinese Food Consumption as a Risk Factor of Type 2 Diabetes Mellitus in Tabanan." *Jurnal Skala Husada* Vol. 6 No.1 things: 75-81.
36. Sutanto., 2010, Block (Prevent and Avoid) Modern Diseases : Hypertension , Stroke, Heart, Cholesterol and Diabetes (symptoms, Prevention and Control), ANDI Publishers, Yogyakarta.
37. Supriasa I, et al., 2001, Assessment of Nutritional Status: Medical Book Publishers EGC, Jakarta.
38. Tan HT et al., 2007, Important Medicines: efficacy, use, and side effects, Gramedia, Jakarta.
39. Tandra, 2010, *Directly Slim, Jaring Pena*, Surabaya.
40. Trisnawati SK., 2012, Genesis Risk Factors for Diabetes Mellitus Type II In the District Health Center Cengkareng Jakarta Barat. *artikel% 25202.% 2520vol% 25 205% 2520no% 25201_shara.pdf*. (Online) accessed on March 16, 2017.
41. Umpierre et al., 2011. Physical Activity Adjusted Only or Structured Exercise Training and Association with HbA1C Levels in Type 2 Diabetes. *American Medical Association*. 35: 107