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REPRESENTATION OF DETERMINANT FACTORS IN DIABETES MELITUS TYPE 2 PATIENTS IN SANGLAH GENERAL HOSPITAL, 2018-2019

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Abstract: **Diabetes mellitus (DM) or endocrine disease is a degenerative disease that is damage to pancreatic beta cell function and insulin resistance. There are several risk factors from diabetes mellitus Type 2 including age, age, sex, history of hypertension, nutritional status, smoking. The purpose of this study was to determine the determinant factors such as age, sex, historyof hypertension, nutritional status, smoking and physical activity with the relationship of type 2 Diabetes Mellitus in Sanglah General Hospital in 2018-2019. This research was conducted by descriptive method using cross sectional study. Samples were selected from secondary data, namely medical records based on inclusion and exclusion criteria. Data processing and analysis using SPSS software version 22. The results showed the determinant factor in Type 2 Diabetes Mellitus patients in Sanglah Central General Hospital Denpasar at the age of >65 years (35.8%), dominated by 77 female sex people (64.2%) and have a history of hypertension (69.1%), with nutritional status of fat (44.1), the majority do not have smoking status (53.3%). This finding is useful because it can provide insight into the deteminants of diabetes mellitus type 2 in patients treated at Sanglah Central General Hospital Denpasar, Bali. Further analytic research is needed to look for relationships between various characteristic variables.**

Keywords: **Factors Determinant, Diabetes Melitus Type 2.**

I. INTRODUCTION

Diabetes mellitus (DM) or often referred to in Indonesia as diabetes is a degenerative disease that is a decrease in tissue function as a result of changes in the tissue itself, or other material deposits from the network, diabetes mellitus is an endocrine disease caused by elevated levels of chronic blood sugar (hyperglycemia) that arise due to insulin differentiation or caused by factors that fight insulin.

Diabetes Mellitus (DM) consists of several types, namely Diabetes Mellitus type 1, Diabetes Mellitus type 2, Secondary Diabetes Mellitus caused by several factors such as genetic defects in beta cell function, genetic defects in insulin work, endocrinopathy and caused by Rubella infection and gestational diabetes mellitus.[1]

The prevalence of Diabetes Mellitus sufferers in Bali according to the Basic Health Research in Numbers (Riskesdas) 2013 in the Province of Bali states that based on the diagnosis of doctors / health workers is 1.3 percent, and based on diagnosis or symptoms is 1.5 percent, and in that year the population in Bali is 4 million people.[2] Diabetes mellitus is mainly caused by two things, namely blood sugar levels, and lack of insulin production. Increased blood sugar levels can be caused by increased intake of nutrients that enter the body, especially carbohydrate intake. Meanwhile, the lack of insulin production can be caused by two things, namely insulin deficiency and insulin resistance. Insulin resistance is caused by body tissues that become less sensitive to the effects of insulin. This causes blood sugar does not leave blood, and instead enter the body's cells. Meanwhile, insulin deficiency is caused by the inability of insulin to meet the levels needed by the body.[1]

The risk factor for Type 2 Diabetes Mellitus is this obesity because fat in the abdominal organs seems more easily formed to get energy. Levels of fatty acids in the blood increases. High fatty acids in the blood increase resistance to insulin through its action on the liver and body muscles. A history of hypertension which is an important comorbidity in diabetes

Dyslipedemia is a lipid abnormality in the bloodstream which includes high triglyceride levels (100-300md / dl), low HDL levels (<30 mg / dl) and qualitative changes in LDL.[4] Smoking is a risk factor for Type 2 Diabetes Mellitus because of exposure to membrane lipid proxidation by free radicals that cause cell membrane damage and cause cell death. Cell damage can affect the regulation of metabolism.[5] Alcohol contains a lot of carbohydrates and calories. The regulation of blood glucose becomes more difficult when consuming alcohol. Against the body, alcohol can cause fatty liver that can chronically damage the liver, damage the stomach, damage the pancreas, increase the risk of gastrointestinal cancer, reduce sperm production, increase blood pressure, cause heart failure, reduce the body's immune system against infections, affect the body's electrolyte balance and many other consequences.[4]

Caffeine is thought to increase blood sugar levels, so we need to watch out for sufferers of Diabetes Mellitus. There is a relationship between coffee consumption with diabetes mellitus, the higher the consumption of coffee, the greater the risk of Type 2 Diabetes Mellitus is increasing. The higher the consumption of coffee, the incidence rate of Type 2 Diabetes Mellitus is increasing.[6]

Looking at the risk factors outlined above, these risk factors can affect Type 2 Diabetes Mellitus. Researchers conduct research on an overview of determinants such as age, sex, hypertension status, nutritional status and smoking status in patients with Type 2 Diabetes Mellitus who was treated at the Sanglah General Hospital Denpasar, Bali in 2018-2019.

II. METHODS

The study is a descriptive observational study with a cross sectional study design and was conducted in November to December 2019 in the inpatient and outpatient room of Sanglah General Hospital, Denpasar. The sample of study was diabetes mellitus type 2 patients with who were registered and diagnosed in Sanglah General Hospital in January 2018 to December 2019. The study used purposive sampling technique to collect primary and secondary data of samples. The data collected will then be processed using a computer program, analysed descriptively, and presented in the form of a narrative table.

Data obtained using instruments in the form of medical records. In this study medical record data referring to the patient's age, gender, history of hypertension, nutritional status and smoking status to determine the determinant factors in Type 2 Diabetes Mellitus patients. Laptops or portable computers to conduct data analysis. After being coded and edited, the data is entered into the SPSS 22 application in a format that has been strengthened and performed data cleaning. Then univariate analysis is performed on the data that has been collected using SPSS 22 data processing. Presentation of the data on the results of these studies in the form of tables.

III. RESULT AND DISCUSSION

A. Result

The results showed, the age group> 65 years (seniors) was the largest age group with a sample of 43 people (35.8%). In the next age group is 56-65 years there were 32 people recorded (26.6%). The age group of 46-55 years was recorded as many as 26 people (21.6%) and subsequently the age group of 36-45 years as many as 19 people (15.8%) were recorded. Gender distribution from data obtained in patients with Type 2 Diabetes Mellitus in Sanglah Hospital in 2018-2019 were 43 men (35.8%) and 77 women (64.2%). The results of the data can be seen in Table 1

Table 1: Patients Characteristic with Diabetes Mellitus Type 2 in Sanglah General Hospital 2018-2019.

Variable	Category	Frequency (n=120)	%
Age (years)	36-45	19	15,8
	36-55	26	21,6
	56-65	32	26,6
	>65	43	35,8
Gender	Women	43	35,8
	Men	77	64,2

The results showed, based on data obtained, the majority of Type 2 Diabetes Mellitus patients treated at Sanglah Hospital in 2018-2019 had a history of hypertension of 83 people (69.1%) and recorded 37 people did not have a history of hypertension (30.8%). The distribution of nutritional status in patients with Type 2 Diabetes Mellitus treated, showed that the majority of patients had fat nutritional status totaling 53 people (44.1%), some patients had normal nutritional status of 42 people (35%) and the rest of the sample had lean nutritional status as much 25 people (30.8%). characteristics of the majority of the sample do not have smoking status or history of 64 people (53.3%) and there are 56 people (46.6%) have a history or smoking status. The results of the data can be seen in Table 2.

Table 2: Patients Characteristic with Diabetes Mellitus Type 2 in Sanglah General Hospital 2018-2019.

Variable	Category	Frequency (n=120)	%
Hypertension	Yes	83	69,1
	No	37	30,8
Nutritional Status	Thin	25	20,8
	Normal	42	35
	Fat	53	44,1
Status of Smoking	Yes	56	46,6
	No	64	53,3

Based on the results of the cross tabulation test using the Chi Square method of significant determinants where, the age variable with sex, age <55 years in women there are 51.1% with age <55 years in men there are 48.8%. At age> 56 years with female sex there were 49.3% and 44% at age> 56 years with male gender. This study obtained a significance value (p value) of 0.005 so that the value was below the value of α (0.05). This shows that the data obtained has significant results. In patients with a history of hypertension and female sex found 35 people (42.1%) and a history of hypertension in men as many as 48 people (57.8%). Female patients without a history of hypertension were 21 people (56.7%) and male patients without a history of hypertension were 16 people (43.2%). This study obtained a significance value (p value) of 0.007 so that the value was below the value of α (0.05). This shows has significant results. smoking status by gender. The results of this study found that as many as 11 people (19.6%), namely women, had smoking status and the rest in 45 male patients (80.3%) had smoking status. As many as 41 people (64.0%) with female sex did not have smoking status and as many as 23 people (35.9%) men did not have smoking status. This study obtained a significance value (p value) of 00006 so that the value is below the value of α (0.05). This shows that the data obtained has significant results. In table 3 we can see the results of the study.

Table 3: Cross Tabulation Variables with Gender on Patients with Diabetes Mellitus Type 2 in Sanglah General Hospital 2018-2019.

Variable	Women (n=43)	Men (n=77)	P
Age			
<55 years old	23 (51,1)	22 (48,8)	0,005
>56 years old	37 (49,3)	33 (44)	
Hypertension			
Yes	35 (42,1)	48 (57,8)	0,007
No	21 (56,7)	16 (43,2)	
Nutritional Status			
Thin	8 (53,3)	7 (46,6)	0,004
Normal	24 (57,1)	8 (42,2)	
Fat	39 (73,5)	14 (26,4)	
Smoking Status			
Yes	11 (19,6)	45 (80,3)	0,006
No	41 (64)	23 (35,9)	

B. Discussion.

The determinants of determinants of Type 2 Diabetes Mellitus in Sanglah Central Denpasar Bali General Hospital in 2018-2019 are based on the characteristics of the age that has the highest number in the age range> 65 years, which is 43 people (35.8%). This is in line with research conducted mentioning that in developing countries, the majority of people with type 2 diabetes mellitus are at the age of 45 to 64 years. A person's risk for suffering from type 2 diabetes mellitus will increase with age, especially over the age of 45 years. This is because the number of productive beta cells decreases with age.[7]

The number of women suffering from diabetes mellitus compared to the number of men is greater. This is because the level of sensitivity to the action of insulin in the muscles and liver. Estrogen is a hormone that belongs to women. Increased and decreased levels of the hormone estrogen which can affect blood glucose levels. When estrogen levels increase, the body becomes resistant to insulin.[8, 9]

The case of Type 2 Diabetes Mellitus in Sanglah Central Denpasar Bali General Hospital in 2018 based on the history of hypertension characteristics showed that the majority had a history of hypertension of 83 people (69.1%). This is consistent with previous research. According to research, about the Management of Hypertension in Type 2 Diabetes Mellitus, it is stated that hypertension in patients with Type 2 Diabetes Mellitus can cause accelerated complications in the heart and kidneys.

Characteristics of Type 2 Diabetes Mellitus cases at Sanglah Central Denpasar Bali General Hospital in 2018 based on the nutritional status characteristics found that the majority have the majority nutritional status is fat with a total of 53 people (44.1%). The same thing was found in Irawan's 2010 study, which stated that people who were overweight were 1.52 times more likely to suffer from Type 2 Diabetes Mellitus than people who were not overweight. Increased risk of Diabetes Mellitus in overweight and obesity is caused by an increase in free fatty acids which decreases the translocation of glucose into the plasma membrane, and ultimately causes insulin resistance in muscle tissue and adipose.[11]

Characteristics of Type 2 Diabetes Mellitus cases at Sanglah Central Hospital Denpasar Bali in 2018-2019 based on smoking status characteristics, that 64 people (53.3%) did not have a history or smoking status. A study, states that smoking has not been proven to increase the incidence of Type 2 Diabetes Mellitus. The results of other studies show that the effect of nicotine on cigarette smoke can stimulate the adrenal glands and can increase blood glucose levels, passive smoking is associated with a 28% increase in the incidence of Type 2 Diabetes Mellitus Smaller increases were seen in passive smokers, but both worked significantly with an increase in Type 2.[13]

In the results of this study, it was found that in patients> 56 years of age with the sexes of women and men, especially in women> 56 years of age are groups who have a risk of having Type 2 Diabetes Mellitus. The results of this study are in line with Sharma's research, R & Prajapati, in 2016, the largest subject experienced diabetes mellitus in the age group 51-60 years (≥45 years) in women.[14] Physical strength and defense mechanisms especially in women tend to decrease with age compared to men because of the body women who are no longer able to deal with unhealthy lifestyle choices, which ultimately results in manifestations of diseases such as diabetes. Increased age causes changes in carbohydrate metabolism and changes in insulin release that are influenced by glucose in the blood and inhibits the release of glucose entering the cells because it is affected by insulin.[8]

In the results of this study, it was found that the majority of hypertension was found in 48 men (57.8%) and 35 women (42.1%). This result is not in line with research conducted at Riskedas in 2013, which states that the proportion of hypertension in women is higher (55.4%) compared to men (45.8%). This shows that women are more susceptible to hypertension. In another study, it was found that there were more hypertension sufferers with female sex compared to male sex which amounted to 545 people (58%) and men amounted to 396 (42%).[15]

In the results of this study, it was found that the majority nutritional status was obese in women with a total of 39 people (73.5%). This study is in line with research conducted by Wu Ying in 2013, where the nutritional status of fat is more often found in Type 2 Diabetes Mellitus patients, especially women who have had a history of pregnancy.16 Excessive fat tissue can disrupt the metabolic process so that it plays a role in the mechanism of insulin resistance in Pathophysiology of Type 2 Diabetes Mellitus In Asian populations, the risk of Type 2 Diabetes Mellitus increases at BMI 22 to 25 kg / m2 while high risk appears at BMI values of 26 to 31 kg / m2.[17]

This study found that the majority of smoking status was dominated by male sex as many as 45 people (80.3%) and the majority of women did not have 41 smoking status (64.0%). A meta-analysis states that 25 cohort studies found that active smoking was associated with a 44% increase in Type 2 Diabetes Mellitus.[18]

IV. CONCLUSION

Conclusions from this study can be obtained that the determinant factors in Type 2 Diabetes Mellitus in Sanglah Hospital in 2018-2019 are dominated by the age range> 56 years, female sex, have a history of hypertension, with nutritional status in the fat category and have smoking status.

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