Research Article

FACTORS RELATED TO HYPERTENSION AND OBESITY AND THE INCIDENCE OF DIABETES MELLITUS AT THE BANJARMASIN HOSPITAL

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ABSTRACT

Hyperglycemia, a metabolic condition caused by either impaired insulin secretion, impaired insulin action, or both, is a hallmark of diabetes mellitus. Age, gender, nationality and ethnicity, heredity, history of giving birth to babies weighing more than 4000 grams at birth, history of gestational diabetes, obesity, inactivity, hypertension, stress, diet, pancreatic diseases (pancreatitis, neoplasms, cystic fibrosis), and alcohol are risk factors that can lead to diabetes mellitus. In the world, in Indonesia, and in the Internal Medicine Polyclinic at the Banjarmasin Hospital, diabetes mellitus is a health issue. Research on the correlation between characteristic variables, obesity, and hypertension and the occurrence of diabetes mellitus is therefore crucial. The purpose of this study is to ascertain the correlation between the occurrence of diabetes mellitus in outpatients at the Internal Medicine Polyclinic, Banjarmasin Hospital, and characteristic characteristics, such as obesity and hypertension. Research Methods: Explanatory research is the nature of this kind of study. This study was carried out at the Internal Medicine Polyclinic at the Banjarmasin Hospital using a cross-sectional survey method that involved direct patient interviews as well as measurements of blood pressure, weight, height, and laboratory test results. All outpatients at the Internal Medicine Polyclinic at the Banjarmasin Hospital beginning in October 2022 made up the study's population. 69 individuals made up the sample. As long as they agree to participate in the sample process, a quota sampling technique is used. The Chi Square test results indicated that there is no significant correlation between the incidence of diabetes mellitus and gender, hypertension and the incidence of diabetes mellitus, and obesity and the incidence of diabetes mellitus. However, there is a significant relationship between the incidence of diabetes mellitus and age (p value <0.05), and there is no significant relationship between gender (p value > 0.05). In conclusion, there is no significant correlation found between the incidence of diabetes mellitus and gender, age and the disease's incidence, hypertension and the disease's incidence, and obesity and the disease's incidence. However, there is a significant correlation found between the age and the disease's incidence.

Keywords : Family Support, Hypertension, Hypertension Management

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia caused by impaired insulin secretion, impaired insulin action or both. This metabolic disease is chronic and can cause long-term damage, decline in the function of the body's organs, namely damage to the eyes, kidneys, nerves, heart and blood vessels. 1,2 Diabetes mellitus is classified into four, namely type 1 diabetes mellitus, type 1 diabetes mellitus 2, gestational diabetes and other types of diabetes. 2,3 Risk factors associated with the onset of diabetes are age1,4,5 , sex6 , nation and ethnicity1,4, heredity1,2,7, history of giving birth to babies with birth weight more than 4000 grams 4, 8, history of gestational diabetes 4, 5, 8 , obesity 2, 5, 9 , lack of physical activity 4, 5, 6, hypertension 4, 8, 10, stress 1 , diet 1 , diseases of the pancreas (pancreatitis, neoplasms, cystic fibrosis)8 , and Alcohol.11 Humans experience a physiological decline after the age of 40 years. As you get older, the risk of suffering from diabetes mellitus will increase, especially at the age of ≥ 45 years (high risk group). 1,4,5 Based on research in the United States shows that more women suffer from diabetes mellitus than men. High blood pressure (hypertension) is also a risk

factor for diabetes mellitus (unmodifiable risk factor). High blood pressure, one of which can cause insulin resistance which is the main cause of increased blood glucose, so that people who suffer from hypertension have a risk of suffering from diabetes mellitus. obesity has a risk of suffering from diabetes mellitus. 2,5,9 Diabetes mellitus is a health problem both in the world and in Indonesia. Based on WHO data, the prevalence of diabetes mellitus in the world reaches 30-40%. Indonesia has the 4th largest number of diabetes mellitus sufferers in the world after India, China and the United States with a prevalence of 8.6% of the total population. Based on Riskesdas 2007 data, the prevalence of diabetes mellitus in Indonesia based on a diagnosis by health workers or with symptoms is 1.1%. The highest prevalence was in DKI Jakarta at 2.6%, while in Central Java at 1.3%. 7,9,12 Based on a survey conducted by researchers, it was found that the number of outpatient patients at the Internal Medicine Polyclinic at Banjarmasin Hospital in May 2011 was 1859 patients. The number of patients suffering from diabetes mellitus was 450 patients (24.2%). Based on this description, the incidence of diabetes mellitus both in the world and in Indonesia is quite high, as well as in the Internal Medicine Polyclinic at the Banjarmasin Hospital. On that basis, it is necessary to conduct research on the relationship between characteristic factors, hypertension and obesity with the incidence of diabetes mellitus in outpatients at the Internal Medicine Clinic, Banjarmasin Hospital. The purpose of this study was to determine the relationship between characteristic factors, hypertension and obesity with the incidence of diabetes mellitus in outpatients at the Internal Medicine Clinic, Banjarmasin Hospital. The benefits of this research are expected to be able to add scientific information about the relationship between characteristic factors, hypertension and obesity with the incidence of diabetes mellitus, and can be used as information material for the public to be able to make efforts to prevent diabetes mellitus.

METHODS

This research was conducted at the Internal Medicine Polyclinic at the Banjarmasin Hospital from October 2011 to completion. The type of research used is explanatory research. The method used was a survey method conducted by interviewing patients directly, and measuring blood pressure, weight, height, and laboratory examinations with a cross-sectional approach. 13 The population in this study were all outpatient patients at the Internal Medicine Polyclinic at Banjarmasin Hospital. starting from October 2011. Based on sample calculations using the formula, the sample size in this study was 69 people with the inclusion criteria being new outpatients at the Internal Medicine Polyclinic at Banjarmasin Hospital starting from October 2011, and the inclusion criteria were patients refusing to be examined to be used as a sample. 14 The sampling technique used is the quota sampling technique, with the condition that they are willing to be respondents. The independent variables in this study were characteristic factors (age, gender), hypertension and obesity. The dependent variable is the incidence of diabetes mellitus. The data collected is in the form of primary data obtained from interviews, measurements of blood pressure, weight, height, and laboratory tests. Materials and tools used in conducting this research include: mercury tensimeter (mercurial sphygmomanometer brand), stethoscope, weighing device, height meter, blood glucose meter (Nesco brand glucose meter), piercing device (lancing device)), test strips, cotton, 70% alcohol, awl (Lancet), calculator, and stationery. The analysis used was univariate analysis which was carried out to see the description of the respondents according to the variables studied in the form of a frequency distribution table, and bivariate analysis which was carried out to see the relationship between the independent variables and the dependent variable. The analysis technique uses the Chi Square statistical test. The entire process of data processing and analysis uses computer aids.

RESULTS AND DISCUSSION

Univariate analysis

Characteristics of Respondents

Age

The average age of the respondents in this study was 53.55, with the lowest age being 18 years and the highest being 74 years. The age variable in this study was divided into two categories, namely age with low risk (< 45 years) and age with high risk (≥ 45 years) for the incidence of

diabetes mellitus. The age frequency distribution of the respondents is as shown in table 1 below.

Table 1. Age Frequency Distribution of Respondents

Age	Frequency	Percentage (%)
Low risk (<45 years)	14	20,3
High risk (≥ 45 years)	55	79.7
Amount	69	100.0

Frequency distribution based on age in this study showed that most of the respondents had a high risk (≥ 45 years) of suffering from diabetes mellitus, namely 55 respondents (79.7%).

Gender

The frequency distribution of the respondent's gender is as shown in table 2 below. Table 2 Frequency Distribution of Respondents' Gender

Gender	Frequency	Percentage (%)
Man	28	40,6
Woman	41	59,4
Amount	69	100.0

The frequency distribution based on the gender of the respondents in this study indicated that there were more female respondents than male respondents, namely 41 respondents (59.4%).

Hypertension

Hypertension or high blood pressure is a condition where the Systolic Blood Pressure (TDS) ≥ 140 mmHg or Diastolic Blood Pressure (TDD) ≥ 90 mmHg. Blood pressure was measured using a mercury sphygmomanometer and stethoscope twice, and then the average value was recorded. Blood pressure measurements for respondents were carried out between ± 09:00 – 12:00 WIB.

Hypertension according to JNC-7 is classified into: Normal (TDS < 120 mmHg, and TDD < 80 mmHg), Prehypertension (TDS 120-139 mmHg, or TDD 80-89 mmHg), stage 1 hypertension (TDS 140-159 mmHg, or TDD 90-99 mmHg), and stage 2 hypertension (TDS ≥ 160 mmHg, or BP ≥ 100 mmHg). 15, 16 In this study the blood pressure categories were simplified to hypertension and not hypertension. It is said to be hypertension if TDS ≥ 140 mmHg, or BP ≥ 90 mmHg, while not hypertension if TDS < 140 mmHg, or BP < 90 mmHg. The frequency distribution of respondents' hypertension is as shown in table 3 below.

Table 3 Frequency Distribution of Respondents' Hypertension

Hypertension	Frequency	Percentage (%)
Hypertension	31	44.9
Not hypertension	38	55,1
Amount	69	100.0

The frequency distribution based on the incidence of hypertension in respondents in this study indicated that there were 38 respondents (55.1%) who did not suffer from hypertension.

Obesity

Obesity is a condition in which a person is overweight with a BMI ≥ 25 kg/m2 (BMI Classification According to Asia Pacific Criteria). 17,18.

Respondents' body weight was measured using a weighing scale for two measurements. The measurement of the tool was carried out after each tool was used to measure the weight of five respondents, while the height was measured using a height meter.

BMI (Body Mass Index) based on Asia Pacific criteria is classified into: underweight (BMI < 18.5), Normal (BMI 18.5-22.9), overweight (BMI ≥ 23.0), obesity 1 (BMI 25.0-29.9), and obesity 2 (BMI ≥ 30.0). 19 In this study the BMI category was simplified into obese and not obese. It is said to be obese if BMI ≥ 25.0, and not obese if BMI < 25.0. 19

Obesity frequency distribution of respondents as shown in table 4 below.

Table 4 Respondents' Obesity Frequency Distribution

Obesity	Frequency	Percentage (%)
Obesity	38	55,1
Not Obese	31	44.9
Amount	69	100.0

The frequency distribution based on the incidence of obesity in respondents in this study indicated that there were more respondents who were obese than those who were not obese, namely 38 respondents (55.1%).

Diabetes mellitus

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia caused by impaired insulin secretion, impaired insulin action or both. This metabolic disease is chronic and can cause long-term damage, decline in the function of the body's organs, namely damage to the eyes, kidneys, nerves, heart and blood vessels. , unexplained weight loss, and blood sugar test results. Blood sugar level checks for respondents were carried out between ± 09:00 – 12:00 WIB. It is said diabetes mellitus if the blood sugar level is ≥ 200 mg/dL, and not diabetes mellitus if the blood sugar level is < 200 mm/dl.4,8

The distribution of the frequency of diabetes mellitus of the respondents is as shown in table 5 below.

Table 5 Frequency Distribution of Respondents Diabetes Mellitus

Diabetes Mellitus	Frequency	Percentage (%)
Diabetes mellitus	20	29.0
Not diabetes mellitus	49	71.0
Amount	69	100.0

Frequency distribution based on the incidence of diabetes mellitus from respondents in this study that respondents who suffer from diabetes mellitus are smaller than those who do not suffer from diabetes mellitus, namely as many as 20 respondents (29.0%).

Bivariate Analysis

The relationship between age and the incidence of diabetes mellitus

The results of the analysis of the relationship between age and the incidence of diabetes mellitus found that out of 14 respondents who had a low risk (<45 years) none had an incidence of diabetes mellitus, and of the 55 respondents who had a high risk (≥ 45 years) there were 20 respondents (36, 4%) who have diabetes mellitus.

The relationship between age and the incidence of diabetes mellitus was carried out through the Chi Square test as shown in table 6 below.

Table 6. The Relationship Between Age and the Incidence of Diabetes Mellitus

Age	Incidence of Diabetes Mellitus						*P*
	No DMs		DM		Total		
	n	%	n	%	n	%	
Low Risk (<45 years)	14	100	0	0	14	100	0.007
High risk (≥ 45 years)	35	63,6	20	36,4	55	100	
Amount	49	71.0	20	29.0	69	100	

The results of the statistical test obtained a value of p = 0.007 (p <0.05) meaning that there is a significant relationship between age and the incidence of diabetes mellitus.

The Relationship Between Gender With The Incidence Of Diabetes Mellitus

The relationship between gender and the incidence of diabetes mellitus was carried out through the Chi Square test as shown in table 7 below.

Table 7 Relationship Between Gender and Diabetes Mellitus

Gender	Incidence of Diabetes Mellitus						*P*
	No DMs		DM		Total		
	n	%	n	%	n	%	
Man	23	81.1	5	17,9	28	100	0.157
woman	26	63 4	15	36,6	41	100	
Amount	49	71.0	20	29.0	69	100	

The results of the analysis of the relationship between gender and the incidence of diabetes

mellitus were obtained from 28 respondents with the type

There were 5 male respondents (17.9%) who had diabetes mellitus, and of the 41 female respondents, 15 respondents (36.6%) had diabetes mellitus.

The statistical test results obtained p value = 0.157 (p > 0.05) meaning that there was no significant relationship between gender and the incidence

diabetes mellitus.

Relationship Between Hypertension and Incidence Diabetes Mellitus

Connection between hypertension withincident diabetes mellitus done by test Chi Square like Which listed in table 8 underThis.

Table 8 The relationship between hypertension and the incidence of diabetes mellitus

Gender	Incidence of Diabetes Mellitus						*P*
	No DMs		DM		Total		
	n	%	n	%	n	%	
Not Hypertension	28	73,7	10	26,3	38	100	0.784
Hypertension	21	67,7	10	32,3	31	100	
Amount	49	71.0	20	29.0	69	100	

Results analysis obtained relationship between hypertension with incident diabetes mellitus obtained that from 38 respondent Which No suffer hypertension There is 10 respondent (26,3 %)Which experience incident diabetes mellitus, And of the 31 respondents who suffered from hypertension there were 10respondent (32,3 %) Which experience incident diabetes mellitus.

Statistical test results obtained p value = 0.784 (p > 0.05) It means No There is connection Which meaning between hypertension with incident diabetes mellitus.

Relationship Between Obesity and Diabetes Mellitus

Relationship between obesity and incidence Diabetes mellitus is done through the *Chi Square test* like Which listed in table 9 under This.

Table 9 Relationship Between Obesity and Diabetes Mellitus

Gender	Incidence of Diabetes Mellitus						*P*
	No DMs		DM		Total		
	n	%	n	%	n	%	
Not obese	25	80.6	6	194	31	100	0.185
obesity	24	63,2	14	36,8	38	100	
Amount	49	71.0	20	29.0	69	100	

Results analysis connection between obesity with the incidence of diabetes mellitus obtained that of 31 respondents who were not obese there were 6 respondents (19.4%) who experienced the incident diabetes mellitus, And from 38 respondent Which experiencing obesity there are 14 respondents (36.8%) who experience incident diabetes mellitus.

Statistical test results obtained *p value* : 0.185 (*p.s* > 0.05) It means No There is connection Which significant relationship between obesity and diabetes mellitus.

DISCUSSION

Disease diabetes mellitus is group of metabolic diseases characterized byhyperglycemia Which caused Because disturbance secretion insulin, disturbance Work insulin or both of them. Disease metabolic This going on chronic and can cause long-term damage long, decline function organs body namely damage eyes, kidneys, nerves, heart, and vessels blood. 2,4,8

Disease diabetes mellitus can caused by several risk factors, including: factor Which No can modified, covers : age factor, especially age ≥ 45 years 1,4,5, type sex especially female6, nation And ethnic 1,4, factor descendants 1,2,7, history give birth to baby

With a birth weight of more than 4000 grams 4.8 history suffer diabetes gestational 4,5,8,whereas factor Which can modified, includes: obesity2,5,9, activity physique Which less4,5,6, hypertension4,8,10, stress1, pattern eat1, disease on pancreas (pancreatitis, neoplasm, fibrosis cystic) 8, and Alcohol.11

The relationship between age and the incidence of diabetes mellitus in outpatients at the Disease Polyclinic In House Sick Banjarmasin found that there is a relationship Which significant between age with incident diabetes mellitus. The

results of this study are in accordance with theory Which There is that man experience decline physiological after age 40 year. Diabetes mellitus often appear after man enter age vulnerable the. The more increase age, so risk suffer diabetes mellitus will increase especially age ≥ 45 year (group risk tall). 1,4,5 Results This study is in accordance with the results of research that carried out by Riskesdas in 2007, namely There is trend prevalence disease Diabetes Mellitus increase with increase age, However, the prevalence tends to decrease again after age 65 years. At the age of 45-54 prevalence Diabetes Mellitus reach 2.7%, age 55-64 Diabetes mellitus reaches 3.7%, age 65-74 reaches 3.4%, age >75 reaches 3.2 (12).

Gender relationship with events diabetes mellitus in outpatients at the Poly Banjarmasin Hospital Internal Medicine obtained results No There is connection Which significant between type sex with diabetes mellitus. Research result This No in accordance with theory Which There is that sufferer diabetes mellitus more Lots happen on Woman than man (in America Union). However, the linking mechanism type sex with incident diabetes mellitus Not yet clear.6 Results study This in accordance with results of research in Indonesia conducted by Riskesdas on year 2007, ie prevalence diabetes mellitus No different according to type sex. Results study Riskesdas obtained that prevalence diabetes mellitus For type sex Woman And man result The same that is as big 1.1%.12

Connection hypertension with incident diabetes mellitus in outpatients at the Poly Banjarmasin Hospital Internal Medicine obtained results No There is significant association between hypertension and incident diabetes mellitus. Results study This not in accordance with the existing theory that hypertension is happen in period time Which long (chronicle) can raises stroke, disease heart coroner, disturbance function kidney, disturbance vision, insulin resistance and is wronga risk factor for diabetes mellitus. Will however, the mechanism associated with hypertension with resistance insulin Still Not yet clear, although Already clear that resistance insulin is reason main enhancement rate glucose blood. 4,8,10

Connection obesity with incident diabetes mellitus in outpatients at the Poly Banjarmasin Hospital Internal Medicine obtained results No There is significant relationship between obesity and incidence of diabetes mellitus. The results of this study are not according to the existing theory that obesity is a predisposing factor for resistance insulin. The more Lots network fat on body, the body becomes increasingly resistant to work insulin, especially when body fat or excess weight collects in the central area or abdomen (central obesity). Fat can block Work insulin, so that glucose No can transported enters cells and accumulates in blood vessels resulting in an increase in blood glucose levels. Obesity is factor risk happening diabetes mellitus type 2 Where around 80-90% sufferer have obesity. 2,5,9

Weakness in study This, between others: Blood pressure measurement and measurement rate glucose blood when to respondent done between hours ± 09:00 – 12:00 WIB. Matter This can affect the measurement results, because measurement pressure blood And measurement rate glucose blood can changed every time. For reduce bias, so should measurement done on O'clock Which The same or maximum with range time ± 1 O'clock.

CONCLUSION

The conclusions from this study, among others: age respondent average is 53.55 with age Lowest 18 year And age highest 74 year, majority type gender Woman as many as 41 respondents (59.4%), respondent who suffer hypertension as much 38 respondent (55.1%), respondent Which suffer obesity as many as 38 respondents (55.1%), respondent who suffering from diabetes mellitus as many as 20 respondents (29.0%), there is a significant relationship between age with incident diabetes mellitus, No There is connection Which significant between type sex with incident diabetes mellitus, No There is significant association between hypertension and incidence of diabetes mellitus, and there is no relationship Which significant between obesity with incident diabetes mellitus on patient treat Road in Internal Medicine Poly Hospital Banjarmasin

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