

CORRALATION BODY MASS INDEX (BMI) WITH THE DIABETES MELLITUS INCIDENT

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ABSTRACT

Body mass index (BMI) values are obtained from measurements of body weight (BW) in kilograms and height (KH) in meters. Next measurement result are calculated based on the IMT formula. Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormal insulin secretion, insulin action or both. The influencing factors include body mass index, abnormal circumference, history of DM and others.

The purpose of this study was to determine the relationship between body mass index (BMI) with the prevalence of diabetes mellitus in Leuwiliang Distric Hospital, Bogor.

This type of research uses quantitative analytical research methods with a retrospective design. The method of sampling in this study was using total sampling technique which amounted to 30 respondents. The unifariate and bivariate data analysis used is the spearman rank rest.

Based on the results of the study concluded that there is a significant relationship between body mass index (BMI) with the includence of diabetes mellitus. Furthermore, known correlation coefficient of 0,000, this value indicates a high relationship between body mass index with the incidence of diabetes mellitus in Leuwiliang district hospital in Bogor Regency in 2019 with a p Value of $0,000 \leq 0,05$. One of the factors that influence the occurrence of DM is BMI, body mass index with obesity category tends to be more likely to develop diabetes mellitus, and most respondents who suffer from DM in Leuwiliang District Hospital with obesity BMI. Therefore it is expected that all respondents to improve their lifestyle, especially improve their diet, so they do not experience an increase in body mass index which will increase the chance of developing diabetes mellitus.

Keywords : BMI, DM incident

PRELIMINARY

Diabetes mellitus (DM) is a collection of symptoms that arise in a person caused by an increase in blood glucose levels due to a progressive decrease in insulin secretion due to insulin resistance.

World Health Organization (WHO) classifies DM sufferers in five clinical categories, namely insulin dependent DM (type 1 DM), insulin dependent DM (type 2 DM), DM related to malnutrition (MRDM), DM due to impaired glucose intolerance (IGT), and DM due to pregnancy (GDM). WHO predicts an increase in the number of people with diabetes mellitus in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030, while the International Diabetes Federation Agency (FDI) in 2009 estimates an increase the number of people with diabetes mellitus from 7.0 million in 2009 to 12.0 million in 2030.²

Body Mass Index (BMI) is the most recommended measurement as an

evaluation of obesity and overweight in children and adults. This is because in addition to being easy and inexpensive, BMI levels are associated with body fat and risk factors for type II DM. Research that specifically examines the relationship between BMI and DM events on a large scale is still not widely done, so researchers feel the need to research the relationship between BMI and DM events in adult populations in Indonesia. by analyzing data from wave 5.3 of the Indonesian Family Life Survey (IFLS).

Globally, an estimated 422 million adults lived with diabetes in 2014, compared with 108 million in 1980. The prevalence of diabetes in the world (with standardized age) has nearly doubled since 1980, increasing from 4.7% to 8.5% in the adult population. This reflects an increase in risk related factors such as being overweight or obese. Diabetes caused 1.5 million deaths in 2012. Blood sugar higher than the maximum limit resulted in an additional 2.2 million deaths, by increasing the risk of cardiovascular and other diseases. Forty-three percent (43%) of these 3.7 million deaths occurred before the age of 70 years. The percentage of deaths due to diabetes that occurs before age 70 is higher in low and middle income countries than in high income countries.⁴

The number of diabetics in Southeast Asia has increased rapidly and is very worrying. The South China Morning Post released a report stating that the number of diabetics in Southeast Asia had increased by as much as 20 percent. Approximately 96 million people from the Southeast Asian population which reaches 670 million. One in 14 people suffer from diabetes, the majority suffer from type 2 diabetes, the type that can actually be prevented and avoided. That is, 450 million diabetics around the world, 20 percent of whom are from Southeast Asia, most of whom live in Indonesia, Malaysia, Singapore and Thailand.

Indonesia also faces a situation with the threat of diabetes similar to the world. The International Diabetes Federation (IDF) Atlas 2017 reports that the Diabetes epidemic in Indonesia is still showing an increasing trend. Indonesia is the sixth ranked country in the world after China, India, the United States, Brazil and Mexico with the number of people with diabetes aged 20-79 years around 10.3 million people. In line with this, Basic Health Research (Riskesdas) shows a significant increase in the prevalence of Diabetes, from 6.9% in 2013 to 8.5% in 2018 so that the estimated number of sufferers in Indonesia reaches more than 16 million people who then the risk of other diseases, such as heart attacks, strokes, blindness and kidney failure can even cause paralysis and death. Indonesia experiences a double burden of health problems, where infectious diseases have not managed to reach the target of decreasing cases, and non-communicable diseases are increasing in prevalence. Non-communicable diseases (PTM) cause more deaths than any other cause, and it is projected that this number will continue to increase from 38 million deaths in 2012 to 52 million deaths in 2030. The four main PTMs are cardiovascular disease, cancer, chronic breathing, and diabetes mellitus (DM).

One of the PTM with a fairly high proportion in Indonesia and is the sixth highest cause of death in Indonesia is DM. The increase in the number of DM cases

is closely related to a healthy lifestyle, including maintaining ideal body weight. In the world and Indonesia, graphs of obesity rates tend to increase. This can lead to serious health problems because obesity is associated with metabolic, cardiovascular, hepatic, kidney, inflammatory response, and diabetes mellitus disorders.²

In West Java alone the incidence of diabetes tends to increase. The prevalence of DM according to the consensus of the arts of 2011 for residents aged over 15 years in 2013 was 6.9%, in 2018 8.5%. The prevalence of diabetes mellitus is based on the diagnosis of doctors in the population aged over 15 years by province 2013 to 2018 in 2013, 1.4%, in 2018 as much as 1.9%.⁴

The Bogor City Health Office (DHO) notes that the number of people with diabetes mellitus (DM) in Bogor is increasingly worrying. Now reaching 2,138 people. This number increased from 2016 which was only 2,093 people. Head of non-communicable diseases mental health city of health (DHO) Bogor city, dr. Firy explained, that number could change, because it was only based on residents seeking treatment at the puskesmas. This number does not include residents who seek treatment at the hospital.⁶

In Leuwiliang District Hospital itself the incidence of diabetes mellitus is quite high and tends to increase every month. At the beginning of 2019 alone, based on data from January to June 2019 the incidence of diabetes mellitus in Leuwiliang District Hospital reached 2,615 people.

In accordance with the data above, it can be concluded that the incidence of diabetes mellitus is increasingly increasing, therefore researchers intend to conduct a study entitled "The Relationship of Body Mass Index (BMI) to the Occurrence of Diabetes Mellitus". The research site was conducted at Leuwiliang District Hospital. Based on this background the conclusion of the formulation of the problem in this study is "Is there a relationship between body mass index (BMI) with the incidence of diabetes mellitus in RSUP Leuwiliang in 2019?" The purpose of this study was to determine the relationship between body mass index and the incidence of diabetes mellitus in Leuwiliang District Hospital in 2019.

RESEARCH METHODS

This type of research uses quantitative analytics. Analytical research that tries to explore how and why health phenomena occur. Analytical research can be done quantitatively so that statistical analysis can be done. This method is called quantitative method, because the research data in the form of numbers and analysis using statistics.

For the design of this study using a retrospective approach that is research that tries to look back (backward looking), meaning that data collection starts from the effects or effects that have occurred. Then the effect is traced back about the cause or the variables that influence the effect. In other words, in this retrospective study departing from the dependent variable, then the independent variable is sought.⁷

This research was conducted at Leuwiliang District Hospital in 2019. The population in this study were patients suffering from diabetes mellitus in the internal

medicine room at Leuwiliang District Hospital as many as 30 people.⁸This research variable consists of independent variables with the dependent variable. The independent variables are body mass index (BMI) and the dependent variable is diabetes mellitus. Data processing and data analysis using computerized with SPSS version 17. Data analysis consists of univariate and bivariate analysis, where bivariate analysis uses spearman rank statistical tests to analyze the relationship between body mass index and the incidence of diabetes mellitus in Leuwiliang District Hospital in 2019.

RESEARCH RESULT

1. Univariate Analysis

Based on the table of the distribution of BMI frequencies in Leuwiliang District Hospital above it is known that from 30 respondents the frequency distribution results obtained with excess body mass index categories were 12 people with a percentage of 40.0%.

Based on the frequency distribution table above it is known that the frequency distribution of the incidence of diabetes mellitus there are 18 (60.0%) respondents, with type 2 diabetes mellitus.

2. Bivariate Analysis

The Relationship between Body Mass Index (BMI) and the incidence of diabetes mellitus in Leuwiliang District Hospital Bogor. In 2019 it was known that the number of respondents was 30 respondents, there were 9 (30%) respondents who had type 2 diabetes with obesity BMI.

Significant relationship value using computerization obtained p value $0,000 \leq 0.05$ (alpha), meaning that H_a is accepted and H_0 is rejected. From these values, the results of the analysis state that there is a relationship between body mass index and the incidence of diabetes mellitus in Leuwiliang District Hospital in 2019.

DISCUSSION

1. Univariate Analysis

a. Body mass index

Based on research results from 30 respondents, stated that the majority of respondents with a body mass index were 13 (43.3%) and respondents with diabetes mellitus were 18 (60.0%). Body mass index is the value obtained from measurements of body weight (BW) in kilograms and height (TB) in meters.

Body mass index can be used to determine whether a person's body weight is ideal or not. Factors Affecting BMI are age, this condition is suspected due to slow metabolic processes, reduced physical activity, and frequency of more frequent food consumption, both sexes, BMI with overweight categories is more common in men, but the incidence of obesity is higher in women compared to men, the third is genetic, BMI is very closely related to the first generation of families, then eating patterns, fast food contribute to an increase

in body mass index so that a person can become obese, and the last activity physical, weight loss or prevention of weight gain can be done with physical activity about 60 minutes a day. Based on research results from 30 respondents, stated that the majority of respondents with a body mass index were 13 (43.3%) and respondents with diabetes mellitus were 18 (60.0%).

This is supported by Lindayati's research (2018) with the title Relationship of Body Mass Index with Blood Sugar Levels in Type 2 Diabetes Mellitus Patients in Wringinom Village, Kuripan Subdistrict, Probolinggo District, it was found that from half of the respondents the body mass index was 13 people (46.4 %). The above evidence is that most respondents are obese. This shows that the fat in the body is not good because someone who has never known how to measure a normal body mass index, it will have an impact on fat mass in the body so that a lot of people are obese, increased body weight and blood sugar levels in the body will be high quickly.¹¹

Based on the theory and the results of research that researchers have done in patients with body mass index who suffer from diabetes mellitus in Leuwiliang District Hospital in 2019 with 30 respondents that the majority of respondents with excess body mass index were 13 (43.3%). It was concluded that body mass index with excess body weight was 23-24.⁹

It was concluded that respondents at Leuwiliang District Hospital were mostly obese, whereas respondents who were obese were caused by age and sex. Where the dominant respondent's age is more than 50 years, respondents who are 50 years old tend to be obese due to lifestyle and gender factors. Lifestyle and gender are factors of obesity, where women are more dominant with negative lifestyles, such as frequent consumption of fast food, junk food and rarely do activities such as sports.

b. The incidence of diabetes mellitus

Based on the results of research from 30 respondents, stated that the majority of patients suffering from diabetes mellitus as many as 18 respondents (60.0%) with type 2 diabetes mellitus. Definition according to the American Diabetes Association, diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormal insulin secretion, insulin action or both.

Diabetes mellitus is also accompanied by disorders of carbohydrate, fat and protein metabolism caused by a relative or absolute deficiency of the insulin hormone. Factors affecting diabetes mellitus are body mass index, abdominal circumference, family history of DM, birth weight, stress, physical activity, exposure to cigarette smoke, alcohol consumption, sex, age, education, occupation, cholesterol level, and blood pressure.

Based on the results of Purwo Setiyo Nugroho's research, Anisa Catur Wijayanti (2018) with the title Body Mass Index and its Relationship with Diabetes Mellitus at Age > 15 Years in Indonesia, Study Data Survey of

Indonesian Family Life V based on research shows that the results of frequency analysis on diabetes mellitus variables get that respondents with diabetes mellitus were 229 (0.8%), the determination of the category of diabetes mellitus was based on a history of consuming diabetes mellitus drugs. While on the obesity variable, it was found that the obese respondents were 6,536(21.7%), the determination of the obesity category was based on the Body Mass Index (Kg / m²) calculation.

Based on the results of the research and theory above, the research at Leuwiliang District Hospital with the results of the study conducted that of 30 respondents found 18 (60.0%) respondents with type 2 diabetes. It was concluded that respondents at Leuwiliang District Hospital mostly had type 2 diabetes, where respondents who suffer from type 2 diabetes were caused by BMI, age and sex. BMI with obesity category tends to have type 2 diabetes. Where the dominant age of respondents is more than 50 years, respondents who are more than 50 years old tend to have diabetes mellitus because the function of their organs has begun to decrease. Gender is also a factor in the occurrence of DM, where women are more dominant due to negative lifestyle, such as frequent consumption of fast food, junk food and rarely do activities such as sports.

2. Bivariate analysis

Bivariate analysis results obtained from 30 respondents, it is known there are 9 (30.0%) of respondents experiencing type 2 diabetes with obesity BMI with a p value of $0.000 \leq 0,05$. Which means there is a relationship between body mass index with the incidence of diabetes mellitus.

Body mass index is the value of body mass index (BMI) obtained from measurements of body weight (BB) in kilograms and height (TB) in meters.⁹ Factors that influence BMI are age, this condition is suspected because of the slow process metabolism, reduced physical activity, and frequency of food consumption that is more frequent, both sexes, BMI with overweight category is more common in men, but the incidence of obesity is higher in women compared to men, the third is genetic, BMI is very closely related to the first generation of family, then eating patterns, fast food contribute to the increase in body mass index so that a person can become obese, and finally physical activity, weight loss or prevention of weight gain can be done with physical activity around 60 minutes a day.¹⁰

Definition according to the American Diabetes Association, diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormal insulin secretion, insulin action or both. Diabetes mellitus is also accompanied by disorders of carbohydrate, fat and protein metabolism caused by a relative or absolute deficiency of the insulin hormone.

Factors affecting diabetes mellitus are body mass index, abdominal circumference, family history of DM, birth weight, stress, physical activity, exposure to cigarette smoke, alcohol consumption, sex, age, education, occupation, cholesterol level, and blood pressure.

This is supported by NineLuthansa's research, Dibyو Pramono (2017) based on the research conducted found that the most respondents in this study were mostly women totaling 16,015 respondents (53.1%). Women have a high risk of developing diabetes mellitus because pregnancy has a risk of developing diabetes mellitus, besides that women have the opportunity to have a risk of having a greater body mass index. Table 2 explains that most respondents are aged <40 years, but the risk of developing diabetes mellitus increases with age starting from 35 years.⁵

Based on the results of the research and theory above, the researchers conclude that there is a harmony between the theory and the results of the study, namely that known Correlation Coefficient (correlation coefficient) of 0.598, this value indicates a high relationship between body mass index with the incidence of diabetes mellitus in Leuwiliang District Hospital, Bogor Tahun 2019 significant value (2-tailed) is 0,000. There were 9 (30%) respondents who had type 2 diabetes with obesity BMI.

CONCLUSION

1. It is known that the frequency distribution of body mass index is 13 (43.3%) respondents.
2. It is known that the frequency of diabetes mellitus distribution is 18 (60.0%) respondents.
3. The relationship between Body Mass Index (BMI) and the incidence of diabetes mellitus in Leuwiliang District Hospital Bogor. In 2019 it is known that the number of respondents is 30 respondents, there are 9 (30%) respondents who have type 2 diabetes with obesity BMI. Based on the results of bivariate analysis using the Spearman rank test, the value of p value is $0,000 \leq 0.005$ (alpha) so that H_a is accepted. Shows that there is a relationship between body mass index and the incidence of diabetes mellitus in Leuwiliang District Hospital, Bogor Regency in 2019.

SUGGESTION

1. For Educational Institutions
It is expected to provide reference material and reading material for surgical medical nursing courses, as well as a reference in carrying out further research on body mass index with diabetes mellitus.
2. For Research Sites
Can provide the latest knowledge that can be used in hospitals especially Leuwiliang Regional Hospital generally other hospitals and can provide knowledge for patients seeking treatment at Leuwiliang District Hospital.

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