The Relationship Between Obesity and Diabetes Mellitus (DM)

Arinil Hidayah[1(✉)], Edy Sujoko[2], Febrina Angraini Simamora[2], and Nanda Masraini Daulay[2]

[1] Public Health Department, Universitas Aufa Royhan, Padang Sidempuan City, Indonesia
arinilhidayah1987@gmail.com

[2] Nursing Department, Universitas Aufa Royhan, Padang Sidempuan City, Indonesia

Abstract. Introduction: Diabetes Mellitus includes as one of the top ten causes of death in the world. There were 415 million adults with diabetes in 2018, a four-fold increase from 108 million in 2015. It is estimated that the number will increase up to 642 million in 2040. The population of Indonesian age over 20 years is 133 million diabetics. The prevalence of Diabetes Mellitus in urban areas is 14.7% and in rural areas is 7.2%. Obese people have diabetes mellitus (DM) 2.9 times more often than non-obese people. Obesity is the main cause of DM. **Objective**: The purpose of the study was to find out how the relationship between obesity and Diabetes Mellitus. **Method**: The type of research used descriptive analytic with a cross sectional research design. The population was 114 respondents and the number of samples in the study was 88 people. **Result:** The results showed that there was a relationship between obesity and the incidence of diabetes with p value $= 0.008$ ($p < 0.05$). **Conclusion**: It is hoped that the community can implement healthy lifestyle behaviors to avoid obesity as a risk factor for diabetes.

Keywords: Obesity · diabetes mellitus

1 Introduction

Diabetes Mellitus is a health disorder in the form of a collection of symptoms caused by an increase in blood glucose levels due to insulin resistance. Lack of insulin is the main cause of Diabetes Mellitus. It is characterized by not being susceptible and the inability of the organs to use insulin so that insulin does not function optimally in regulating glucose metabolism and results in increased blood glucose levels [1].

Diabetes mellitus is basically divided into 2 types, namely type I; Insulin Dependent Diabetes Mellitus (IDDM) and type II; Non-Insulin Dependent Diabetes Mellitus (NIDDM). According to WHO records, it is estimated that from these two types of diabetes more than 50 percent of people with type II diabetes is not diagnosed. They are generally only discovered when treatment for other diseases. This causes in serious diabetes complications which include loss of consciousness, high blood pressure, heart disease, visual disturbances to blindness, tissue damage (gangrene) so that it must be amputated in order to not spread to other tissues [2].

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Diabetes Mellitus includes as one of the top ten causes of death in the world. In 2018, there were 415 million adults with diabetes, a four-fold increase from 108 million in 2015. By 2040, it is estimated that the number will be 642 million. Nearly 80% of people with diabetes can be found in low- and middle-income countries. One of them is Indonesia. Indonesia was in the seventh rank in the world along with China, India, USA, Brazil, Russia, and Mexico with an estimated number of 10 million people with Diabetes Mellitus [3].

It is estimated that 133 million Indonesians over the age of 20 were diabetic (The Indonesian Central Statistics Agency, 2018). The prevalence of Diabetes Mellitus in urban areas was 14.7% and in rural areas was 7.2%. Diabetes had an impact on the quality of human resources and a large increase in health costs. Cases of diabetes mellitus in Indonesia were 259,073 patients with a prevalence rate of 80.97 per 1000 population with type 2 diabetes mellitus as many as 72.56 per 1000 population and insulin-dependent diabetes mellitus (type 1) as many as 8.41 per 1000 population [4].

Basic Health Research showed that the prevalence of diabetes mellitus in 2018 increased by 2.6% compared to 2013. The prevalence of DM for the South Labuhan Batu Regency area reached 68% compared to other diseases [4].

2 Method

This study used an analytical descriptive research design with a cross-sectional study approach. The study was conducted at the Ulumahuam Health Center by taking samples of all elderly people who were treated at the Ulamahuam Health Center at the time of the study as many as 88 people. Data collection were in the form of a questionnaire to measure the BMI value in determining the obesity status of respondents and an observation sheet for the respondent's diabetes mellitus status based on the doctor's diagnosis recorded in the patient's medical record. Data analysis used chi-square test.

3 Result

The results of data analysis showed that from 88 respondents were found the majority of women 50 people (56%), farmers 34 people (38.6%), in Junior High School 32 people (36%) (Table 1).

Based on Table 2, it could be seen that the distribution of the majority respondents was obese with 55 people (62.5%).

Based on Table 3, it showed that the distribution of respondents who had DM and non-DM were the same, 44 people (50%).

Table 1. Frequency distribution according to respondents' characteristics

Characteristics	N	f
Gender		
Male	38	43.2
Female	50	56.8
Age		
Elderly	64	72.7
Young	24	27.3
Job		
Housewife	32	36.4
Farmer	34	38.6
Civil Servant	8	9.1
Labor	14	15.9
Education		
Elementary School	30	34.1
Junior High School	32	36.4
Senior High School	18	20.5
Diploma/Bachelor	8	9.1
Total	88	100.0

Table 2. Distribution of Respondents' Characteristics Based on BMI

No	IMT	N	%
1	**Obesity**	33	37.5
2	**Non-Obesity**	55	62.5
	Total	88	100.0

Table 3. Distribution of Respondents' Characteristics Based on DM Status

No	IMT	Jumlah	Persen
1	**DM**	44	50,0
2	**Non-DM**	44	50,0
3	**Total**	88	100,0

Table 4. The Relationship between Obesity and Diabetes Mellitus (DM)

Obesity	Diabetes Mellitus (DM)				*Total*		*P_value*
	DM		Non-DM				
	n	f	n	f			
Obesity	23	26,1	10	11,3	33	37,5	0,008
Non-Obesity	21	23,9	34	38,7	55	62,5	
Total	44	50,0	44	50,0	88	100,0	

3.1 Bivariate Analysis

Table 4 showed that from 33 obese respondents 23 had diabetes mellitus and from non-obese 55 respondents, 21 people were found to be obese. The results of the analysis showed that there was a relationship between obesity and the incidence of diabetes mellitus (p value (0.008) < a (0.05)).

4 Discussion

The results of data analysis showed that from the 88 respondents, the majority of respondents in the elderly category were 64 people (72.7%), respondents' occupations as farmers were 34 people (38.6%), and graduated from elementary school was 30 people (34.1%). The results of statistical tests showed that there was a relationship between obesity and Diabetes Mellitus (p value (0.008) < (0.05).

Based on researchers conducted in Denmark, the distribution of obesity with a population background of the same age was about 40%. Obesity seemed to precede DM and might influence DM in a genetic predisposition. Diet and lifestyle are conditions that lead to obesity and its effect is obvious on the development of DM. There is a shift on diet in big cities from traditional to western diet which is too high in calories, lots of protein, fat, sugar but low in fiber causing diabetes mellitus, diabetes, diabetes, and other risk factors [5].

Obesity is related to insulin resistance, so it is likely that glucose disorders and diabetes are the result of obesity. It is estimated that obesity and DM increase dramatically as a result of lifestyle changes with low physical activity accompanied by increased consumption of energy and fat. The DM prevalence is in line with the increasing prevalence of obesity. BMI > 25 is the main risk factor of increasing DM. The development of DM progressively increased with the increase of adipose tissue deposits as measured by BMI. Every one kilogram gain in body weight will increase the risk of DM by 4.5%. Central obesity is also an independent risk factor for DM [6]. This is in line with previous research by Destriana that found there was a relationship between obesity and DM.

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Authors' Contributions. In accordance with the results obtained, it is hoped that the community will implement a healthy and balanced lifestyle with physical activity in order to avoid the risk of obesity as one of the risk factors for diabetes mellitus. Thank you to all respondents who had been willing to participate in this research and thank you to all parties who researchers cannot mention one by one. Hopefully this research can provide benefits for the development of public health.

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