COMPARISON OF THE INCIDENCE OF DEMENTIA IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND NON TYPE 2 DIABETES MELLITUS

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ABSTRACT

Introduction: Diabetes mellitus is a risk factor for dementia. People often assume that memory impairment or memory loss is a normal symptom or a normal process. Therefore, there is a lack of treatment for dementia in the community. Early detection needs to be done to determine the presence of dementia in patients with a history of type 2 diabetes mellitus and those without a history of type 2 diabetes mellitus.
Purpose: To determine the incidence of dementia in patients with type 2 diabetes mellitus compared to patients with non type 2 diabetes mellitus.
Method: The research design used in this research is observational analytic, with the research design used is cross sectional. The sampling technique used is probability sampling with simple random sampling. Selecting population members based on predetermined inclusion and exclusion criteria. With a sample of 58 people in the control group and 58 people in the case group.
Result: Samples were collected using secondary data obtained from medical records of patients with dementia at Abdoel Wahab Sjahranie Samarinda Hospital during the 2019-2021 period. The results of the study showed that 54 people (46,6%) developed dementia, of them with type 2 diabetes mellitus as many as 39 people, while non-diabetes mellitus type 2 as many as 15 people. Respondents without dementia were 62 people (53.4%), of them with type 2 diabetes mellitus as many as 19 people, while non-diabetes mellitus type 2 as many as 43 people. There was a significant difference in the incidence of dementia in patients with type 2 diabetes mellitus and non type 2 diabetes mellitus ($p = 0.000$).
Conclusion: There is a significant difference in the incidence of dementia in patients with type 2 diabetes mellitus and non type 2 diabetes mellitus.
Keyword: Dementia, Type 2 Diabetes Mellitus

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INTRODUCTION

Dementia is a disorder of cognitive function that affects memory, cognitive abilities, behavior, and is generally progressive. Risk factors for dementia include age, genetic factors, hypertension, heavy alcohol use, excess stress, nutritional factors, brain injury, and brain tumors. People often think that memory impairment or memory loss is a normal symptom or a normal process that occurs in every parent. Therefore, there is a lack of treatment for dementia in the community.[1]

Type 2 diabetes mellitus is a chronic disease that occurs when the body cannot use the insulin it produces effectively and can cause hyperinsulinemia, insulin resistance and hyperglycemia. Hyperglycemia causes hypovolemia which can eventually lead to changes in brain hemodynamics such as hypoperfusion, impaired cerebrovascular autoregulation, loss of normal hemodynamic response to nerve activity, and dysfunction of the blood brain barrier and cause impaired cognitive function.[1,2] Persistent impairment of cognitive function can progress to dementia.

Diabetes mellitus can be a factor in the onset of dementia. Lack of knowledge results in lack of treatment and can worsen dementia. Early detection needs to be done to determine the presence of dementia in patients with type 2 diabetes mellitus and non-diabetes mellitus type 2. This study aims to compare the incidence of dementia in patients with type 2 diabetes mellitus and non-diabetes mellitus type 2.

METHOD

This study will use an observational analytic research design with a cross sectional research design. The sample amounted to 116 respondents with probability sampling sampling technique, namely by simple random sampling. The sample of this study came from secondary data, namely the medical records of patients diagnosed with dementia and those who were not diagnosed with dementia with type 2 diabetes mellitus and non-diabetes mellitus type 2 who met the inclusion and exclusion criteria. The inclusion criteria in this study were: 1. patients diagnosed with dementia in the neurology department with a history of type 2 diabetes mellitus and non-diabetes mellitus type 2 in the period 2019-2021; 2. Patients who seek treatment at the neurology clinic but are not diagnosed with dementia with a history of type 2 diabetes mellitus and non-diabetes mellitus type 2 in the period 2019-2021. Samples from incomplete data and samples that did not meet the inclusion criteria were not included in the research sample. This research was conducted at Abdoel Wahab Sjahranie Hospital, Samarinda.

From 116 respondents, there were 58 patients with type 2 diabetes mellitus and 58 patients with non-diabetes mellitus type 2. From 58 patients with type 2 diabetes mellitus and 58 patients with non-diabetes mellitus type 2, it was then seen whether the patient had dementia or not suffering from dementia through medical record data.

The processed data was then analyzed using the chi square test. Data on patients with type 2 diabetes mellitus and non-diabetes mellitus type 2 were divided into two, namely patients with dementia and patients without dementia.

RESULTS

Table 1 Distribution of Respondents Characteristics by Age

Age range	Total (n)		Percentage (%)	P value
	Dementia	No dementia		
65-74	47	45	79.3	0.055
>75	7	17	20.7	
Total	54	62	100	

Table 2 Distribution of Respondents Characteristics by Gender

Gender	Total (n)		Percentage (%)	P value
	Dementia	No dementia		
Man	25	30	47.4	0.822
Woman	29	32	52.6	
Total	54	62	100.0	

Table 3 Chi Square Test Results

Dementia	Total (n)		Percentage (%)	P value
	Type 2 Diabetes Mellitus	Non Diabetes Mellitus Type 2		
Dementia	39	15	46.6	0.000
No dementia	19	43	53.4	
Total	58	58	100.0	

Table 1 shows that from 92 respondents with an age range of 65-74 years who experienced dementia as many as 47 respondents and 45 respondents who did not experience dementia, while from 24 respondents with age more than 75 years who had dementia as many as 7 respondents and who did not experience dementia as many as 7 respondents. 17 respondents. From the results of the data analysis, the probability value of 0.055 (p>0.05).

Table 2 shows that of the 55 male respondents who had dementia, there were as many as 25 respondents and 30 respondents who did not experience dementia, while of the 61 female respondents who had dementia, there were 29 respondents and 32 respondents who did not have dementia. From the results of the data analysis, the probability value is 0.822 (p>0.05).

In table 3 shows from 116 respondents obtained, dementia respondents were 54 people (46.6%), of them with type 2 diabetes mellitus as many as 39 people while non-diabetes mellitus type 2 were 15 people. Respondents without dementia were 62 people (53.4%), of them with type 2 diabetes mellitus as many as 19 people while non-diabetes mellitus type 2 as many as 43 people. The results of these data were analyzed by SPSS using the chi square test and the results were p = 0.000 (p<0.05) which indicated that there were significant differences in the incidence of dementia in patients with type 2 diabetes mellitus and non-diabetic patients with type 2 diabetes.

DISCUSSION

Based on the data on the distribution of respondents' characteristics by age, the results of data analysis using the chi square test with p = 0.055 (p>0.05) showed that there was no significant relationship between age and the incidence of dementia. The results of this analysis are in line with the research of Oana Albai (2019), which examined the risk factors for developing dementia in type 2 diabetes mellitus patients with mild cognitive impairment. From the results of the study stated that age was not a risk factor for dementia. According to the study, dementia is a disease that often appears in the elderly. However, several pathological conditions can promote or enhance cognitive decline at any age.[3]

Based on the data on the distribution of respondents' characteristics by gender, the results of data analysis using the chi square test with a value of p = 0.822 (p>0.05) showed that there was no significant relationship between gender and the incidence of dementia. According to research by Alsharif (2020) which examined the prevalence and incidence of dementia in people with diabetes in primary health care in the UK. The study stated that the prevalence of dementia was 1.5 times higher in female patients than in male patients.[4]Likewise with Saion Chatterjee's study which examined Type 2 diabetes mellitus as a risk factor for dementia in women compared to men. The results of the study stated that patients with type 2 diabetes had a 60% greater risk of developing dementia than those without diabetes. For vascular dementia, but not for nonvascular dementia, the risk of developing such dementia is greater in female patients.

Overall, women with diabetes had a 19% greater risk of developing vascular dementia than men. According to this study, the marked biological differences between women and men support the higher risk of vascular-related diabetes in women. For example,[5]

On the results of the analysis, Differences in the incidence of dementia in patients with type 2 diabetes mellitus and non type 2 diabetes mellitus The results obtained p = 0.000 (p <0.05) which indicates that there is a significant difference in the incidence of dementia in patients with type 2 diabetes mellitus and non-diabetic patients with type 2 diabetes. Several biological mechanisms that cause diabetes can increase the risk of dementia, namely vascular mechanisms, toxic effects of hyperglycemia, brain insulin resistance, the formation of advanced glycoslation end products (AGE) and a decrease in insulin-degrading enzyme (IDE) which results in a decrease in the degradation of amyloid beta, but this has not yet been confirmed. unequivocally proven. Hyperglycemia in diabetes is usually associated with AGE formation. The mechanism behind the increased risk of dementia may be due to the fact that AGE-mediated extracellular protein crosslinks to accelerate amyloid beta aggregation. In cases of hyperinsulinemia or insulin resistance, as a result of decreased function, there is a decrease in insulin receptors and a decrease in insulin entry into the brain. In hyperinsulinemia,[3]. In accordance with previous research, Alsharif's research (2020) which examined the prevalence and incidence of dementia in people with diabetes in primary health care in the UK, showed that there were differences in the incidence of dementia in people with diabetes mellitus and non-diabetes mellitus. This study states that there is an increase in the prevalence and incidence of dementia in people with diabetes mellitus. there is increasing evidence that multiple mechanisms may contribute to the development of dementia in patients with diabetes, including cerebrovascular lesions, oxidative stress and insulin resistance, and hyperglycemia leading to inflammation.[4]. according toresearch by Oana Albai (2019), which examined the risk factors for developing dementia in type 2 diabetes mellitus patients with mild cognitive impairment. According to this study, patients with type 2 diabetes mellitus can increase the risk of stroke and cardiovascular disease, affect HbA1c and fasting glucose levels, dyslipidemia including high LDLc, which are risk factors for developing cognitive decline. The results of this study indicate that the presence of diabetes mellitus can increase the risk of long-term dementia or the risk of cognitive decline that can be converted into dementia.[3] Likewise, Kapil Gudala's (2013) meta-analysis study conducted a prospective meta-analysis of observations of diabetes mellitus and dementia risk to investigate the relationship between diabetes and the risk of all types of dementia (ATD), Alzheimer's disease (AD) and vascular dementia (VaD). The study stated that a meta-analysis of 28 observational studies showed diabetes was associated with an increased risk of dementia compared to people without diabetes mellitus.[3]

This study has limitations such as many confounding factors that can be a risk for dementia such as age, genetic factors, hypertension, heavy alcohol use, excessive stress, nutritional factors, brain injury, and brain tumors. So that the incidence of dementia can be caused by these confounding factors, not from type 2 diabetes mellitus.

CONCLUSIONS

From a study entitled "Comparison of the incidence of dementia in patients with type 2 diabetes mellitus and non type 2 diabetes mellitus" It was found that there were more people with type 2 diabetes mellitus

than non-diabetes mellitus type 2 in dementia respondents. Meanwhile, in respondents without dementia, patients with type 2 diabetes mellitus were less likely than non-diabetics with type 2. In this study, there was a significant difference in the incidence of dementia in patients with type 2 diabetes mellitus and non-diabetic type 2 diabetes mellitus.

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