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Prevalence of Hypertension in Type 2 Diabetes Mellitus in the Working Area of Jatibaru Community Health Center in 2023

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The World Health Organization (WHO) predicts an increase in the number of diabetes mellitus sufferers in Indonesia from 8.4 million people in 2000 to around 21.3 million people in 2030. The prevalence of type 2 diabetes increases with age and changes in unhealthy lifestyles. Several studies show that the incidence of hyperglycemia in diabetes is closely related to hypertension. According to the American Diabetes Association (ADA) 2017, two out of three people with diabetes have high blood pressure. At the Jatibaru Community Health Center, based on 2023 data, it is known that hypertension and diabetes are always included in the data on the 10 most common diseases every month. Based on this background and related to the incidence of Hypertension and type 2 diabetes mellitus is still relatively high, so researchers are interested to knowing the picture hypertension in type 2 diabetes mellitus in the Jatibaru. This research is a descriptive study with a cross-sectional approach using secondary data taken from Non-Communicable Disease data. The population in this study were all adult and elderly respondents registered in the noncommunicable disease program register, who based on anamnesis, physical and laboratory examination, were diagnosed with type 2 diabetes mellitus and hypertension. The sample was taken by purposive sampling. In this research, it was found that people with hypertension and diabetes mellitus were found in all adult and elderly age categories. The distribution of hypertension and type 2 diabetes mellitus patients continues to increase with increasing age, the prevalence of sufferers being more female than male. As many as 65% of the total type 2 diabetes mellitus sufferers also experience hypertension.

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1. Introduction

Diabetes mellitus (DM) is a world health problem, around 9% of adults in the world suffer from diabetes, and an estimated 1.5 million people in the world die from diabetes every year. The epidemiological transition of the main cause of death from infectious disease to degenerative disease makes diabetes mellitus one of the metabolic diseases to be wary of. Diabetes is a non-communicable degenerative disease whose numbers will increase in the future.1,2

The International Diabetes Federation (IDF) estimates that in 2017 there were 424 million people suffering from diabetes between the ages of 20-79 years. In 2045, this number is expected to increase to 686 million people. The World Health Organization (WHO) predicts an increase in the number of diabetes mellitus sufferers in Indonesia from 8.4 million people in 2000 to around 21.3 million people in 2030. The prevalence of type 2 diabetes increases with age and changes in unhealthy lifestyles.2,3,4,5

Type 2 diabetes mellitus (DM 2) is a disorder of insulin secretion and insulin action resulting in hyperglycemia. Several studies show that the incidence of hyperglycemia in diabetes is closely related to hypertension. According to the American Diabetes Association (ADA) 2017, two out of three people with diabetes have high blood pressure. The American Heart Association (AHA) states that diabetes mellitus is a risk factor for hypertension which is mediated by age, gender and length of time suffering from diabetes mellitus. This situation is strengthened by research on type 2 diabetes mellitus sufferers with a risk of hypertension of 28% and more in women as much as 64%. 3,6,7,8

Hypertension is a risk factor for complications in patients with diabetes. Several studies show that lowering blood pressure is very important for diabetes patients. Apart from that, providing therapy must also be based on the patient's condition and availability of resources.1,9

Cardiovascular disease is a common cause of death in diabetes patients. Several studies have confirmed that hypertension is a major risk factor for the development of cardiovascular disease which is closely related to diabetes. Therefore, early detection and good management of elevated blood pressure is an important part of comprehensive clinical management for diabetes patients.1,9

At the Jatibaru Community Health Center, based on 2023 data, it is known that hypertension and diabetes are always included in the data on the 10 most common diseases every month. This certainly requires special attention from Community Health Center staff to provide comprehensive therapy so that it can prevent the emergence of various complications, especially cardiovascular disease. Based on this background and related to the incidence of Hypertension and type 2 diabetes mellitus is still relatively high, so researchers are interested to knowing the picture hypertension in type 2 diabetes mellitus in the Jatibaru community health center working area.

2. Method

This research is a descriptive study with a cross-sectional approach using secondary data taken from Non-Communicable Disease data in the Jatibaru Community Health Center working area, which includes the five sub-districts of Ule, Melayu, Jatiwangi, Jatibaru and East Jatibaru. The population in this study were all adult and elderly respondents registered in the non-communicable disease program register, who based on anamnesis, physical and laboratory examination, were diagnosed with type 2 diabetes mellitus and hypertension. The sample was taken by purposive sampling, respondents were not limited based on body mass index, gender and duration of suffering from diabetes. The duration of this research is 12 months (January – December 2023). There were no visits and the data obtained was recorded during routine visits and examinations at the community health center. The diagnosis obtained for the disease is the diagnosis that has been asked by the examining doctor. The definition of type 2 diabetes mellitus is a condition where the body cannot produce the insulin hormone as needed or the body cannot optimally utilize the insulin produced, resulting in a spike in blood sugar levels above normal. Sugar levels are said to be above normal if a random blood sugar test results are > 200 mg/dl and a fasting blood sugar test results are > 126 mg/dl. Hypertension is defined as an increase in systolic blood pressure of 140 mmHg or more and/or diastolic blood pressure of 90 mmHg or more on two measurements at different times. Data was collected and analyzed using a descriptive design.

3. Result and Discussion

Table of Type 2 Diabetes Mellitus and Hypertension Patients in the Jatibaru CommunityHealth Center Work Area in 2023.

| DIAGNOSIS/ | 20-44 | | 45-54 | | 55-59 | | ≥60 | | ГОТАТ |
|------------|-------|----|-------|-----|-------|-----|-----|-----|-------|
| AGE | Μ | F | Μ | F | Μ | F | Μ | F | |
| HT | 26 | 88 | 63 | 138 | 112 | 155 | 190 | 204 | 976 |

| DM 2 | 30 | 66 | 49 | 95 | 77 | 106 | 149 | 208 | 780 |
|-----------|----|----|----|----|----|-----|-----|-----|-----|
| HT + DM 2 | 4 | 21 | 30 | 51 | 56 | 82 | 86 | 176 | 506 |



Figure 1. Distribution of Hypertension

in the Jatibaru Community Health Center Working Area in 2023



Figure 2. Distribution of Type 2 Diabetes Mellitus in the Jatibaru Health Community Center Working Area in 2023



Figure 3. Distribution of Hypertension in Type 2 Diabetes Mellitus Patients in the Jatibaru Community Health Center Working Area



Figure 4. Percentage of Hypertension in Type 2 Diabetes Mellitus Patients In the Jatibaru Community Health Center area in 2023

The definition of diabetes according to the American Diabetes Association (ADA) is an increase in blood glucose levels on one examination accompanied by clinical symptoms, or an increase in blood glucose levels on two examinations, which can be in the form of:

- a) fasting plasma glucose \geq 7.0 mmol/l (126 mg/dl), or
- b) with a glucose tolerance test, two hours after oral administration of glucose, plasma glucose level $\geq 11.1 \text{ mmol/l} (200 \text{ mg/dl}) 10, 11, 12$

Type 2 diabetes is caused by a lack of insulin production by beta cells in a state of insulin

resistance. Insulin resistance is the inability of cells to respond to normal insulin levels, especially in muscle, liver and fat tissue. In the liver, insulin is usually responsible for suppressing glucose release. However, in conditions of insulin resistance, the liver releases glucose abnormally into the blood. The proportion of insulin resistance versus beta cell dysfunction varies in each individual. Some patients may have marked insulin resistance with only a slight defect in insulin secretion while others may have only mild insulin resistance but markedly reduced insulin secretion.12

Other important mechanisms possibly associated with type 2 diabetes and insulin resistance include: increased lipid breakdown in fat cells, incretin resistance and deficiency, high levels of glucagon in the blood, increased salt and water retention by the kidneys, and impaired metabolic regulation by the central nervous system. . However, not everyone who experiences insulin resistance develops diabetes, because this condition must also be accompanied by impaired insulin secretion by pancreatic beta cells.12

Hypertension is divided into primary (essential) hypertension or secondary hypertension. About 90–95% of cases are classified as "primary hypertension", meaning high blood pressure without an obvious medical cause. Other conditions affecting the kidneys, arteries, heart, or endocrine system account for another 5-10% of cases (secondary hypertension). Hypertension is a major risk factor for stroke, myocardial infarction (heart attack), heart failure, arterial aneurysm (eg aortic aneurysm), peripheral arterial disease, and chronic kidney disease. A person who has experienced high blood pressure, under normal conditions, may experience blood pressure again and this is something to be wary of. 12,13

In people aged 18 years and over, hypertension is defined as systolic and/or diastolic blood pressure measurements that consistently exceed acceptable normal values (currently systolic 139 mmHg, diastolic 89 mmHg. Several recent international guidelines on hypertension have also created categories below the hypertension range to indicate ongoing risk of blood pressure higher than the normal range JNC7 (2003) uses the term pre-hypertension for blood pressure in the range of 120–139 mmHg systolic and/or 80–89 mmHg diastolic, whereas the ESH Guidelines. -ESC (2007) and BHS IV (2004) use optimal, normal, and high normal categories to divide systolic pressure below 140 mmHg and diastolic pressure below 90 mmHg. Primary (essential) hypertension is the most common type of hypertension, including as many as 90–95 % of all cases of hypertension. Secondary hypertension occurs due to a known cause. Kidney disease is the most common secondary cause of hypertension.12,14

One of the complications of diabetic macroangiopathy can occur due to changes in blood sugar levels, high blood sugar will stick to the walls of blood vessels. After that, an oxidation process occurs where blood sugar reacts with proteins from the blood vessel walls which causes AGEs. Advanced Glycosylated Endproducts (AGEs) are substances formed from excess sugar and protein that are linked together. This situation damages the inner walls of blood vessels, and attracts saturated fat or cholesterol to stick to the walls of blood vessels, so that an inflammatory reaction occurs. White blood cells (leukocytes) and blood clotting cells (thrombocytes) as well as other materials combine to form a plaque clot, which causes the blood vessel walls to become hard, stiff and eventually blockages occur which result in changes in blood pressure, which if it exceeds normal limits is called hypertension.15

In this research, it was found that people with hypertension and diabetes mellitus were found in all adult and elderly age categories. The distribution of hypertension patients continues to increase with increasing age, in the 20-44 year age group there are 114 patients, 201 in the 45-54 year old group, 267 patients in the 55-59 year old group, 394 patients aged \geq 60 years old, with more women. compared to men.

The number of diabetes mellitus sufferers also shows the same trend as hypertension. In the 20-44 year age group there were 96 patients, 144 patients in the 45-54 year age group, 183 patients in the 55-59 year age group, 357 patients in the \geq 60 year age group, with more women than men. Of the total 780 DM patients, there were 65% (506 people) who suffered from DM and hypertension.

4. Conclusion

Based on data from patients with hypertension and diabetes mellitus collected during 2023 at the Jatibaru Community Health Center, it can be concluded that hypertension and diabetes begin to occur at the age of 20 years and above. The prevalence of sufferers being more female than male. As many as 65% of the total type 2 diabetes mellitus sufferers also experience hypertension.

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