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Factors Related to the Incidence of Diabetes Mellitus in the Kebon Baru Primary Health Center in South Jakarta in 2020

Ruth Tabitha^{1*}, Syahrizal Syarif², Tri Yunis Miko Wahyono³¹Program Magister Epidemiologi Fakultas Kesehatan Masyarakat Universitas Indonesia, Lantai 1 Gedung A, Kampus UI Depok, Indonesia^{2,3}Departemen Epidemiologi Fakultas Kesehatan Masyarakat Universitas Indonesia, Lantai 1 Gedung A, Kampus UI Depok, Indonesia*Corresponding Author: ruthtabiitha@gmail.com

ABSTRACT

Introduction: Diabetes Mellitus is a health problem encountered in Indonesia as well as in the world, it can be seen from the number of sufferers that continues to increase every year. Data from the International Diabetes Federation (IDF) shows that the number of people with Diabetes Mellitus in 2015 has reached as many as 415 million people and increased in 2017 to 425 million people worldwide. The Basic Health Research (*Riskesdas*) showed an increase in the prevalence of Diabetes Mellitus in Indonesia from 6.9% in 2013 to 8.5% in 2018. At the Kebon Baru Health Center, Diabetes Mellitus was among the top 10 diseases in 2019 with 529 cases. Various counseling programs to prevent non-communicable diseases are carried out, the priority program is by organizing the Chronic Disease Management Program (Pronalis) and by counseling.

Objective: The aim of this study is to determine the factors associated with the incidence of Diabetes Mellitus at the Kebon Baru Community Health Center, South Jakarta, in 2020.

Method: This study used a quantitative approach with cross sectional design by analyzing the secondary data of the monthly report of Non-Communicable Diseases at Kebon Baru Primary Health Center in 2020. These data were collected in 2020 and analyzed in 2021.

Result: The prevalence of Diabetes Mellitus at Kebon Baru Primary Health Care in 2020 was 16.5% with the average blood sugar level of 153 mg/dL. The variables that were proven to have a relationship with the incidence of Diabetes Mellitus were the variable age with a p value of 0.001 (OR 3.15; 95% CI 1.56-6.36) and the variable history Diabetes Mellitus with a p value of 0.00 (OR 5.3; 95% CI 2.74-10.37).

Conclusion: Patients who go to Kebon Baru Primary Health Care at the age ranging from 45 years and over have a 3.15 times risk of suffering from Diabetes Mellitus than those in the age group under 45 years. In addition, patients who go to the Kebon Baru Primary Health Center and have family members suffering from Diabetes Mellitus have a risk of 5.33 times to suffer from DM than those who do not.

Keywords: Diabetes Mellitus; Risk Factors; Primary Health Care

INTRODUCTION

Diabetes mellitus is one of the biggest health problems of concern in Indonesia and the world. In 2021, as many as 537 million people in the world or 10.5% of the adult population aged 20-79 years in the world have diabetes and is estimated to increase to 643 million people in 2023 and 783 million people in 2045 [1]. In Indonesia, Diabetes Mellitus has a prevalence of 10.6% and ranks fifth in the world with 19.47 million people [1]. The prevalence of Diabetes Mellitus in Indonesia also tends to increase from 5.7% in 2007 to 6.9% in 2016 with a total of 12.2 million people. Indonesia is the country with the seventh highest Diabetes Mellitus sufferers in the world and the second highest country with deaths from Diabetes Mellitus [2].

Diabetes Mellitus is a group of metabolic diseases characterized by a state of high blood sugar, or so-called hyperglycemia, which causes defects in insulin secretion, insulin performance, or both. In chronic hyperglycemia conditions in diabetes, it can cause long-term damage and organ dysfunction, especially the eyes, kidneys, nerves, liver and blood vessels [3].

Diabetes Mellitus is a problem that needs more attention. Based on Infodatin 2018, the prevalence of Diabetes Mellitus based on doctor's diagnosis at the age of > 15 years is highest in DKI Jakarta province (3.4%) and increased from 2.5% in 2013. This figure is also higher than the prevalence in Indonesia (2%) [4]. DKI Jakarta is the highest province because of the large population and blood sugar testing facilities are widely available and easily obtained [5]. Of the total population of 10.5 million people in Jakarta, about 250.000 people have Diabetes Mellitus [6].

In 2020, based on the Jakarta Health profile, the number of people with Diabetes Mellitus was 233.918 people and the number increased in 2021 to 260.666 people [7,8]. Meanwhile, in 2021, South Jakarta has the second highest number of people with Diabetes Mellitus, namely 73.698 people after East Jakarta with 77.369 people [7]. Based on the highest number of cases per sub-district in 2017, the highest order was occupied by Cengkareng District with a total of 10.317 sufferers, followed by Pulogadung District with a total of 8.545 sufferers and in third place was occupied by Tebet District with 8.503 sufferers [6].

At the Kebon Baru Primary Health Center, Diabetes Mellitus was included in the top 10 list of diseases in 2019 with a total of 529 cases. The high number of people with Diabetes Mellitus at the Kebon Baru Primary Health Center and is projected to increase every year and there has been no research that identifies the risk factors for diabetes at the Kebon Baru Primary Health Center, so researchers want to examine the factors associated with the incidence of Diabetes Mellitus at the Kebon Baru Primary Health Center, South Jakarta in 2020.

METHOD

This study used a cross-sectional study design with secondary data from the Non-Communicable Disease (NCD) register of Puskesmas Kebon Baru, South Jakarta in 2020 which was analyzed in 2021. The population of this study is the people of the South Jakarta city area who live in the working area of the Kebon Baru Primary Health Center, South Jakarta. The sample used in this study was total sampling, namely all respondents recorded in the monthly non-communicable disease report of the Kebon Baru Primary Health Center, South Jakarta. The inclusion criteria for this research sample are all male and female residents who live in the Kebon Baru Primary Health Center working area, South Jakarta. While the exclusion criteria in this study are people who are not examined and incomplete or missing data. The sample calculation used the proportion estimation formula with a precision of 2% and $Z = 1.96$ and obtained a minimum of 316 samples.

The type of data used is secondary data from the results of the monthly Non-Communicable Disease report at Kebon Baru Community Health Center, South Jakarta in 2020. Sampling using total sampling. The analysis in this study used univariate and bivariate analysis. Univariate analysis is presented using frequency distribution. Bivariate analysis using p value and Odd Ratio (OR).

RESULTS

Table 1 Statistics of Blood Sugar Levels of Patients Treated at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Mean | Median | Min-Max | Range |
|-------------------|------|--------|---------|-------|
| Blood Sugar Level | 153 | 120,5 | 74-540 | 466 |

Based on the data above, the average blood sugar level of 334 patients who sought treatment at the Kebon Baru Primary Health Center in 2020 was 153 mg/dL, with a median of 120.5 mg/dL. The lowest sugar level was 74 mg/dL and the highest was 540 mg/dL.

Table 2. Prevalence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Total | Percentage (%) |
|--------------------------------|-------|----------------|
| Incidence of Diabetes Mellitus | | |
| Non- Diabetes Mellitus | 279 | 83,5 |
| Diabetes Mellitus | 55 | 16,5 |
| Total | 334 | 100 |

Based on the data above, of the total 334 patients who sought treatment at the Kebon Baru Primary Health Center in 2020, 279 patients did not suffer from Diabetes Mellitus (83.5%) and the remaining 55 patients were patients with Diabetes Mellitus (16.5%).

Table 3. Age Statistics of Patients Treated at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Mean | Median | Min-Max | Range |
|----------|-------|--------|---------|-------|
| Age | 46.86 | 49 | 16-85 | 44 |

The average age of patients who sought treatment at the Kebon Baru Primary Health Center in 2020 was 46.9 years with a median of 49 years. The youngest patient was 16 years old and the oldest was 85 years old. A total of 230 patients were aged 45 years and over (59.9%) and the rest were still in the age group below 45 years (40.1%).

Table 4. Summary of Diabetes Mellitus Risk Factor Overview at Kebon Baru Primary Health Center, South Jakarta in 2020 (n=334)

| No | Variable | Category | Total | Percentage (%) |
|----|---------------------|------------------|-------|----------------|
| 1 | Gender | Man | 129 | 38,6 |
| | | Woman | 205 | 61,4 |
| 2 | Age | <45 years old | 134 | 40,1 |
| | | ≥45 years old | 200 | 59,9 |
| 3 | Blood Pressure | Hypertension | 215 | 64,4 |
| | | Non-hypertension | 119 | 35,6 |
| 4 | Waist Circumference | Normal | 219 | 65,6 |
| | | Above Normal | 115 | 34,4 |
| 5 | Body Mass Index | Underweight | 16 | 4,8 |
| | | Normal | 69 | 20,7 |
| | | Overweight | 62 | 18,6 |
| | | Obesity | 187 | 56,0 |
| 6 | Smoking Behavior | Smoking | 260 | 77,8 |
| | | Non-Smoking | 74 | 22,2 |
| 7 | Physical Activity | Adequate | 208 | 62,3 |
| | | Inadequate | 126 | 37,7 |

| | | | | |
|----|----------------------------------|------------|-----|------|
| 8 | Vegetable and Fruit Diet Pattern | Adequate | 214 | 64,1 |
| | | Inadequate | 120 | 35,9 |
| 9 | Alcohol Consumption | No | 332 | 99,4 |
| | | Yes | 2 | 0,6 |
| 10 | History of Diabetes Mellitus | No | 284 | 85,0 |
| | | Yes | 50 | 15,0 |

Based on the table above, it can be explained that based on gender characteristics, of the 334 patients who sought treatment at the Kebon Baru Primary Health Center, 205 patients were female (61.4%) and the remaining 129 patients were male (38.6%). The average age of patients who seek treatment at the Kebon Baru Primary Health Center in 2020 was 46.9 years old with a median of 49 years old. The youngest patient was 16 years old and the oldest was 85 years old. A total of 230 patients were aged 45 years old and over (59.9%) and the rest were still in the age group under 45 years old (40.1%). Based on blood pressure characteristics, of the 334 patients who seek treatment at the Kebon Baru Primary Health Center in 2020, 119 patients had hypertension or blood pressure above 140/90 mmHg (35.6%), the remaining 215 did not have hypertension.

Based on the characteristics of abdominal circumference, patients who sought treatment at the Kebon Baru Primary Health Center in 2020 were categorized into normal and above normal groups. There are 219 patients who seek treatment and have normal abdominal circumference (65.6%). Based on the characteristics of Body Mass Index (BMI), patients who sought treatment at the Kebon Baru Primary Health Center in 2020 were categorized into underweight, normal, overweight, and obese groups. The group with the largest percentage was obese at 56% and then the group with normal BMI was 20.7%.

Based on the characteristics of smoking habits, patients who sought treatment at the Kebon Baru Primary Health Center in 2020 were grouped into those who smoked and did not smoke. A total of 260 patients who sought treatment were non-smokers (77.8%) and the rest were smokers, namely 74 patients (22.2%).

Based on the characteristics of physical activity, patients who seek treatment are grouped into groups with sufficient physical activity and those with less. A total of 208 patients who sought treatment at the Kebon Baru Primary Health Center in 2020 had sufficient physical activity (62.3%) and the remaining 126 patients were still classified as lacking physical activity.

Based on the characteristics of vegetable and fruit dietary patterns, patients who seek treatment are grouped into groups that have adequate vegetable and fruit dietary patterns and groups that are lacking. Of the 334 patients who sought treatment at the Kebon Baru Primary Health Center in 2020, 214 patients had a good fruit and vegetable diet (64.1%) and the remaining 120 patients were classified as having a poor fruit and vegetable diet. Based on the characteristics of alcohol consumption at the Kebon Baru Primary Health Center in 2020, there were only 2 patients who sought treatment and consumed alcohol (0.6%). The remaining 332 patients who sought treatment did not consume alcohol (99.4%).

Based on the characteristics of the family history of Diabetes Mellitus, out of a total of 334 patients who sought treatment at the Kebon Baru Primary Health Center in 2020, 50 patients who sought treatment had family members with a history of Diabetes Mellitus (15.0%) and the remaining 284 patients did not have family members with a history of Diabetes Mellitus (85.0%).

Table 5. Analysis of the Relationship between Gender and the Incidence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|----------|--------------------------------|-----------------------|-----------|---------|----------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |

| Gender | | | | 0,326 | 1,36 |
|-----------|------------|-----------|-----------|-------|-------------|
| Man | 111 (86,0) | 18 (14,0) | 129 (100) | | (0,74-2,51) |
| Woman | 168 (82,0) | 37 (18,0) | 205 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to gender characteristics, the percentage of the incidence of Diabetes Mellitus at the Kebon Baru Primary Health Center in 2020 was the largest experienced by the female group, namely 18%. The p-value obtained is 0.326, which means that there is no statistically significant relationship between gender and the incidence of Diabetes Mellitus at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 6. Analysis of the Relationship between Age and Diabetes Mellitus Incidence at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|---------------|--------------------------------|-----------------------|-----------|---------|---------------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| <45 years old | 123 (91,8) | 11 (8,2) | 134 (100) | 0,001 | 3,15 (1,56-6,36) |
| ≥45 years old | 156 (78,0) | 44 (22,0) | 200 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to age characteristics, the percentage of Diabetes Mellitus incidence at the Kebon Baru Primary Health Center in 2020 is 8.2% in the age group under 45 years or as many as 11 people and as many as 44 people in the age group ranging from 45 years and over (22%). Age has a statistically significant relationship with the incidence of Diabetes Mellitus with a p value of 0.001. When viewed from the magnitude of the risk, the group of patients who seek treatment at the puskesmas and are in the age group ranging from 45 years and over have a 3.15 times risk of suffering from Diabetes Mellitus compared to those in the age group under 45 years (OR = 3.15; 95% CI = 1.56-6.36).

Table 7. Analysis of the Relationship between Blood Pressure and the Incidence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|------------------|--------------------------------|-----------------------|-----------|---------|---------------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| Blood Pressure | | | | 0,67 | 1,14 (0,63-2,07) |
| Non-hypertension | 181 (84,2) | 34 (15,8) | 215 (100) | | |
| Hypertension | 98 (82,4) | 21 (17,6) | 119 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, it can be seen that according to the characteristics of blood pressure, the largest percentage of patients who sought treatment at the Kebon Baru Primary Health Center in 2020 who experienced the incidence of Diabetes Mellitus was in the group who experienced hypertension or blood pressure ranging from 140/90 mmHg, namely 17.6%. The p value obtained is 0.67, which means that there is no statistically significant relationship

between blood pressure and the incidence of Diabetes Mellitus at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 8 Analysis of the Relationship between Abdominal Circumference and the Incidence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|---------------------|--------------------------------|-----------------------|-----------|---------|---------------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| Waist Circumference | | | | 0,74 | 1,11 (0.61-2,02) |
| Normal | 184 (84,0) | 35 (16,0) | 219 (100) | | |
| Above normal | 95 (82,6) | 20 (17,4) | 115 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, it can be seen that according to the characteristics of abdominal circumference, the largest percentage of patients who sought treatment at the Kebon Baru Primary Health Center in 2020 who experienced the incidence of Diabetes Mellitus was in the group with abdominal circumference above normal, namely 17.4%. The p value obtained is 0.74, which means that there is no statistically significant relationship between abdominal circumference and the incidence of Diabetes Mellitus at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 9. Analysis of the Relationship between BMI and the Incidence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|-----------------|--------------------------------|-----------------------|------------|---------|-------------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| Body Mass Index | | | | 0,62 | |
| Underweight | 15 (93,8) | 1 (6,3) | 16 (4,8) | | 1 |
| Normal | 59 (85,5) | 10 (14,5) | 69 (20,7) | | 2.54 (0,30-21,44) |
| Overweight | 52 (83,9) | 10 (16,1) | 62 (18,6) | | 2.89 (0,34-24,40) |
| Obesity | 153 (81,8) | 34 (18,2) | 187 (56,0) | | 3.33 (0,43-26,10) |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to the characteristics of Body Mass Index (BMI), the largest percentage of patients seeking treatment at the Kebon Baru Primary Health Center in 2020 who experienced the incidence of Diabetes Mellitus was the obese group with a percentage of 18.2%. The second highest group is patients with overweight Body Mass Index, which is 16.1%. The p value obtained is 0.62, which means that there is no statistically significant relationship between Body Mass Index (BMI) and the incidence of Diabetes Mellitus at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 10. Analysis of the Relationship between Smoking Habits and the Incidence of Diabetes Mellitus at the Kebon Baru Primary Health Center, South Jakarta 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|------------------|--------------------------------|--------------------------|-----------|---------|----------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| Smoking Behavior | | | | 0,137 | 0,55 |
| Smoking | 213 (81,9) | 47 (18,1) | 260 (100) | | (0,25-1,22) |
| Non-Smoking | 66 (89,2) | 8 (10,8) | 74 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to the characteristics of smoking habits, the largest percentage of patients who sought treatment at the Kebon Baru Primary Health Center in 2020 and experienced the incidence of Diabetes Mellitus was in the non-smoking group, namely 18.1%. The p value obtained is 0.137, which means that there is no statistically significant relationship between smoking habits and the incidence of Diabetes Mellitus in patients who seek treatment at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 11. Analysis of the Relationship between Physical Activity and the Incidence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|-------------------|--------------------------------|--------------------------|-----------|---------|----------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| Physical Activity | | | | 0,49 | 1,23 |
| Adequate | 176 (84,6) | 32 (15,4) | 208 (100) | | (0,68-2,21) |
| Inadequate | 103 (81,7) | 23 (18,3) | 126 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to the characteristics of physical activity, the largest percentage of patients who sought treatment at the Kebon Baru Primary Health Center in 2020 and experienced the incidence of Diabetes Mellitus was in the group who did less physical activity, namely 18.3%. The p-value obtained is 0.49, which means that there is no statistically significant relationship between physical activity and the incidence of Diabetes Mellitus in patients who seek treatment at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 12. Analysis of the Relationship between Vegetable and Fruit Diet Patterns and the Incidence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta in 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|----------|--------------------------------|--------------------------|-----------|---------|----------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |

| | | | | 0,11 | 1,61 |
|----------------------------------|------------|-----------|-----------|------|-------------|
| Vegetable and Fruit Diet Pattern | | | | | |
| Adequate | 184 (86,0) | 30 (14,0) | 214 (100) | | (0,90-2,90) |
| Inadequate | 95 (79,2) | 25 (20,8) | 120 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to the characteristics of vegetable and fruit dietary patterns, the largest percentage of patients who sought treatment at the Kebon Baru Primary Health Center in 2020 and experienced the incidence of Diabetes Mellitus was in the group that was lacking in their vegetable and fruit dietary patterns, namely 20.8%. The magnitude of the p value obtained is 0.11, which means that there is no statistically significant relationship between dietary patterns of vegetables and fruits and the incidence of Diabetes Mellitus in patients treated at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 13. Analysis of the Relationship between Alcohol Consumption and the Incidence of Diabetes Mellitus at Kebon Baru Primary Health Center, South Jakarta 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|---------------------|--------------------------------|-----------------------|-----------|---------|----------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| Alcohol Consumption | | | | 1,00 | - |
| No | 277 (83,4) | 55 (16,6) | 332 (100) | | |
| Yes | 2 (100) | 0 (0) | 2 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to the characteristics of alcohol consumption, there were no patients who sought treatment at the Kebon Baru Primary Health Center in 2020 who experienced the incidence of Diabetes Mellitus and consumed alcohol. The p value obtained is 1.00, which means that there is no statistically significant relationship between alcohol consumption and the incidence of Diabetes Mellitus in patients who seek treatment at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Table 14 Analysis of the Relationship between History of Diabetes Mellitus Disease and the Incidence of Diabetes Mellitus at Puskesmas Kebon Baru, South Jakarta in 2020

| Variable | Incidence of Diabetes Mellitus | | Total (%) | P-value | OR (95% CI) |
|------------------------------|--------------------------------|-----------------------|-----------|---------|----------------|
| | Non-Diabetes Mellitus (%) | Diabetes Mellitus (%) | | | |
| History of Diabetes Mellitus | | | | 0,00 | 5,33 |
| No | 250 (88,0) | 34 (12,0) | 284 (100) | | (2,74-10,37) |
| Yes | 29 (58,0) | 21 (42,0) | 50 (100) | | |
| Total (%) | 279 (83,5) | 55 (16,5) | 334 (100) | | |

Based on the table above, according to the characteristics of Diabetes Mellitus disease history in the family, the largest percentage of patients who sought treatment at the Kebon Baru Primary Health Center in 2020 and experienced the incidence of Diabetes Mellitus was in the group who had family members with a history of Diabetes Mellitus disease, namely 42%. The p value obtained is 0.00, which means that there is a statistically significant relationship between a family history of Diabetes Mellitus and the incidence of Diabetes Mellitus in patients seeking treatment at the Kebon Baru Primary Health Center, South Jakarta in 2020.

Based on the risk magnitude value, patients who seek treatment at the puskesmas and have family members who suffer from Diabetes Mellitus have a 5.33 times risk of suffering from Diabetes Mellitus compared to those who do not have family members with a history of Diabetes Mellitus (OR = 5.33; 95% CI = 2.74-10.37).

DISCUSSION

In the age variable, univariate results show that most patients are at an age ranging from 45 years and over with a percentage of 60%. Meanwhile, the results of the bivariate analysis show that there is a statistically significant relationship between age and the incidence of Diabetes Mellitus seen from a p-value of 0.001 and an OR value of 3.15 (95% CI = 1.56-6.36), which means that patients who seek treatment at the health center at an age ranging from 45 years and over have a 3.15 times risk of suffering than those in the age group under 45 years. These results are in line with the results of research conducted by Rahmawati, Rista & Susilawati (2021) which concluded that there is a relationship between age and the incidence of Diabetes Mellitus disease in patients at the Tugu Health Center, Depok City in 2019. This is also in line with the results of the 2018 Basic Health Research (Riskesdas) which shows that the prevalence of Diabetes Mellitus sufferers in Indonesia is increasing with increasing age [10].

In the variable history of Diabetes Mellitus, univariate results show that most patients do not have family members with a history of Diabetes Mellitus with a percentage of 85%. Meanwhile, the results of bivariate analysis show that there is a statistically significant relationship between the history of Diabetes Mellitus seen from a p-value of 0.00 and an OR value of 5.33 (95% CI = 2.74-10.37) which means that patients who go to the puskesmas and have family members suffering from Diabetes Mellitus have a 5.33 times risk of suffering from Diabetes Mellitus compared to those who do not. This is also in line with research conducted by Rediningsih, Dwi and Lestari, Ita (2021) which states that there is a significant relationship between family history and Diabetes Mellitus in the Kemambang Village community in 2019-2020 [9].

In the gender variable, the univariate results showed that most of the patients who sought treatment at the Kebon Baru Primary Health Center were female (61.4%) and the rest were male. Meanwhile, the bivariate analysis showed that there was no significant relationship between gender and the incidence of Diabetes Mellitus as seen from the p-value of 0.326 and OR of 1.36 (95% CI = 0.74-2.51). However, this is in line with research conducted by Rahmawati, Rista & Susilawati (2021) which states that there is no significant relationship between gender and the incidence of Diabetes Mellitus at Puskesmas Tugu, Depok City, as indicated by a p-value of 0.519 [10]. Women have a greater risk of suffering from Diabetes Mellitus than men because women experience pregnancy which can be a risk factor for Diabetes Mellitus. Physically, women are also more at risk of developing diabetes due to a high increase in Body Mass Index (BMI) (Komariah, 2020) [11].

In blood pressure variables, the results of univariate analysis showed that most patients were categorized as having hypertension or blood pressure above 140/90 (35.6%) and the rest did not experience hypertension. While the bivariate analysis showed that there was no statistically significant relationship between blood pressure and the incidence of Diabetes Mellitus seen from the p-value of 0.67 (95% CI = 0.63-2.07). In addition, this also contradicts research conducted by Rediningsih, Dwi and Lestari, Ita (2021) which states that there is a significant relationship between hypertension and the incidence of Diabetes Mellitus in the Kemambang Village community in 2019-2020 [9].

In the abdominal circumference variable, the results of univariate analysis showed that most patients who sought treatment at the Kebon Baru Primary Health Center, South Jakarta had normal abdominal circumference (65.6%). Meanwhile, the bivariate analysis showed that there was no statistically significant relationship between abdominal circumference and the incidence of Diabetes Mellitus as seen from the p-value obtained of 0.74 (95% CI = 0.61-2.02). This is in line with research conducted by Haruni & Nugroho (2019) which states that there is no significant relationship between abdominal circumference and the incidence of Diabetes Mellitus in the Palaran Health Center working area of Samarinda City in 2019 [12]. In addition, the results of this study are also in line with the research of Mafudzoh, et al (2019) which shows that there is no significant relationship between central obesity and the incidence of type 2 Diabetes Mellitus at the Janti Health Center, Malang City [13].

In the Body Mass Index variable, the results of univariate analysis showed that most patients were categorized as obese, namely 56% and then followed by the category of groups with normal BMI of 20.7%. The results of this study are in line with those conducted by Haruni & Nugroho (2019) which states that there is no significant

relationship between BMI and the incidence of Diabetes Mellitus in the Palaran Health Center working area of Samarinda City, 2019 which is shown with a p-value of 0.737 [12].

In the smoking habit variable, univariate results show that more patients who seek treatment at the Kebon Baru Primary Health Center do not smoke (77.8). The bivariate results showed a p-value of 0.137 (95% CI = 0.25-1.22) which indicates that there is no statistically significant relationship between smoking habits and the incidence of Diabetes Mellitus. The results of this study are not in line with Choirunnisa, et al (2022) which states that there is a significant relationship between smoking habits and the incidence of Diabetes Mellitus at the Gading Raya Health Center in 2022. Smoking habits can cause damage to endothelial function and damage beta cells in the pancreas caused by an increase in free radicals in the body. Damage to beta cells can affect insulin production and inhibit the entry of glucose into cells and cause blood sugar levels to increase. This will cause Diabetes Mellitus (Choirunnisa, 2022) [14].

In the physical activity variable, univariate results show that patients who visit the health center mostly do sufficient physical activity (62.3%) and the rest are still classified as lacking physical activity. While the bivariate results show that there is no statistically significant relationship between physical activity and the incidence of Diabetes Mellitus, this can be seen from the p-value of 0.49 (95% CI = 0.68-2.21). This is inversely proportional to research by Mahfudzoh, et al (2019) which shows that there is a significant relationship between physical activity and the incidence of Diabetes Mellitus [13]. In addition, these results are also inversely proportional to research by Sari and Purnama (2019) which shows that there is a significant relationship between the relationship between physical activity and the incidence of Diabetes Mellitus [15].

In the variable of fruit vegetable diet patterns, univariate results show that patients who seek treatment at the Kebon Baru Primary Health Center, South Jakarta mostly have good fruit and vegetable diet patterns (64.1%) and the rest are classified as lacking. While the bivariate results show that there is no statistically significant relationship between dietary patterns of vegetables and fruit with the incidence of Diabetes Mellitus, this is indicated by a p-value of 0.11 (95% CI = 0.90-2.90). This is not in line with research by Kistianita (2018) which shows that there is a significant relationship between adequate fruit and vegetable consumption and the incidence of type 2 Diabetes Mellitus [16]. Adequate consumption patterns of vegetables and fruits can prevent Diabetes Mellitus because fruits and vegetables contain a lot of water and fiber and have energy density, causing a long feeling of satiety and reducing energy intake (Ali, 2019) [17].

In the variable of alcohol consumption, univariate results show that patients who seek treatment at the Kebon Baru Primary Health Center, South Jakarta almost all do not consume alcohol, only two do not consume alcohol. While the bivariate results show that there is no statistically significant relationship between alcohol consumption and the incidence of Diabetes Mellitus in patients who seek treatment at the health center, this can be seen from the p-value which shows the number 1. Basically, chronic and excessive alcohol consumption is a risk factor for type 2 Diabetes Mellitus, which can disrupt the homeostatic of glucose and is associated with the development of insulin resistance. Chronic excessive alcohol consumption can worsen glucose tolerance and insulin resistance, it can also be one of the mechanisms involved in the main effects of alcohol that can cause Diabetes Mellitus [18]. Based on the research of Sao Da, et al (2023), it is stated that there is a significant relationship between alcohol consumption and the incidence of Type 2 Diabetes Mellitus in Ende City Health Center [19]. The same results were also shown by research from Yu, et al (2016) which stated that alcohol consumption was associated with early exposure to Diabetes Mellitus [20].

There are several limitations in this study. First, the data used in this study are secondary data taken from puskesmas data so that researchers cannot control the quality of the data directly, and the variables analyzed are only limited to the available data. Second, the research design used in this study is a cross-sectional design so that there is no clear temporal time relationship so that the incidence of type 2 Diabetes Mellitus and its independent variables can precede each other and cause the quality aspect to be ambiguous. Third, in some risk factors, recall bias occurs when respondents are interviewed based on their memories in the past (restrospective), so that the accuracy of the answers depends on the patient's memory and the patient's willingness to answer questions truthfully.

CONCLUSION

Based on the results of the study, it was found that the variables that had a statistically significant relationship with Diabetes Mellitus were the age variable (p value 0.001; OR 3.15; 95% CI 1.56-6.36) and the variable history of Diabetes Mellitus (p value 0.00; OR 5.3; 95% CI 2.74-10.37) and there was no statistically significant relationship between the variables of gender, blood pressure, abdominal circumference, Body Mass Index, smoking habits, physical activity, fruit vegetable diet, alcohol consumption).

SUGGESTION

This study recommends that the Non-Communicable Disease Program Manager at the Puskesmas be able to prioritize health facilities to provide education and counseling on the risk factors and dangers of Diabetes Mellitus. In addition, Program Managers need to prioritize non-communicable disease prevention programs, especially diabetes with various implementation strategies so that people can be aware of Diabetes Mellitus prevention.

It is recommended for health workers to always maintain services according to standards, especially in Diabetes Mellitus, continue to screen for Diabetes Mellitus, especially in patients aged > 45 years and who have a history of Diabetes Mellitus.

For the community, it is hoped that it can be information related to the factors of Diabetes Mellitus and become a stimulus to increase awareness and early vigilance of their health conditions by routinely checking blood sugar levels to the health center and willing to make efforts to prevent Diabetes Mellitus, especially by carrying out the GERMAS (Gerakan Masyarakat Hidup Sehat/Healthy Living Community Movement) in everyday life.

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