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Risk Factors Cannot Be Change In Diabetes Mellitus Disease In Ujung Kubu Health Center

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ABSTRACT

Diabetes mellitus (DM) is a chronic degenerative disease. This study is an analytical observational study with a case-control design that looks at the risk factors for irreversible diabetes mellitus at the Ujung Kubu Health Center in 2020. The population is all patients who have visited the Ujung Kubu Health Center. The sample consisted of 105 control groups and 110 case groups. Sampling technique with total sampling. The type of secondary data belongs to the Ujung Kubu Health Center. It was collecting data by analyzing raw data using a questionnaire. Diabetes mellitus was identified in 55.3% of the family history and relatively common in women 67.4%. The average age of DM patients was 42 years, with blood sugar levels of 184.55 Mg/dl (95% CI 176.27-193.94). DM is still a concern regarding risk factors, especially those that cannot be changed.

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1. INTRODUCTION

Diabetes mellitus (DM) is a degenerative disease with a chronic nature. Diabetes mellitus which in its course will continue to increase both in prevalence and the state of the disease starting from the initial stage or those at risk of Diabetes mellitus to advanced stages or complications occur. Diabetes is a serious non-communicable disease in which insulin cannot be produced optimally by the pancreas (Safitri , Y., Nurhayati, 2019).

Insulin is a hormone that regulates glucose. Insulin that does not work adequately will make glucose levels in the blood high. Normal blood glucose levels are 70-110 mg/dL when fasting. Diabetes is experienced by many people and is a global public health problem, so that at this time it has become a priority in solving health problems by world leaders (Global, 2016).

Diabetes mellitus (DM) is a state of chronic hyperglycemia accompanied by various metabolic disorders due to hormonal disorders that cause complications in the eyes, kidneys, nerves, and blood vessels. Types of Diabetes Mellitus are Type 1, Type 2, Gestational Type, and other types. Diabetes Mellitus Type 2 is a metabolic disorder disease characterized by increased blood sugar due to a decrease in insulin secretion by pancreatic beta cells and impaired insulin function or insulin resistance (RI, 2010). Diabetes Mellitus is not contagious whose a prevalence is increasing from year to year. Diabetes is experienced by many people and is a global public health problem, so that at this time, it has become a priority in solving health problems by world leaders (Global, 2016).

Diabetes Mellitus is the sixth leading cause of death globally; this is revealed by the World Health Organization (WHO). The data found that deaths caused by diabetes were around 1.3 million, and those who died before the age of 70 were 4 per cent. The majority of diabetes deaths at 45-54 years occur in urban residents compared to people living in rural areas (Kistianita, 2018). In 1980 there was a doubling of diabetes globally, from 4.7% to 8.5% in the adult population; this is also an indicator of an increase in obesity in recent decades (Ogurtsova, 2017).

WHO also states that around 150 million people worldwide have diabetes mellitus (Saputri, 2018). Patients who are increasing in number every year mostly come from developing countries. The American population suffers from diabetes as many as 29.1 million people, of which 21 million people are diagnosed with diabetes category, while as many as 8.1 million people are included in the undiagnosed diabetes category. The prevalence of diabetes in Indonesia is the seventh highest in the world after China, India, the USA, Brazil, Russia and Mexico (Megawati, 2020). Based on 2015 IDF data on DM sufferers, the Indonesian population experienced this disease is as many as 10 million people (Group, 2015). Currently, type II DM, which often occurs not only in adults but also at the age of children and adolescents, is also increasing (Fauziah, 2018).

Diabetes Mellitus is the sixth leading cause of death in the world, according to the World Health Organization (WHO)(Wicaksono, 2015).The data found that deaths caused by diabetes were around 1.3 million and those who died before the age of 70 were 4 percent. The majority of diabetes deaths at the age of 45-54 years occur in urban residents compared to people living in rural areas (Kistianita, 2018). IDF predicts DM will rank seventh in the world's deaths in 2030. Since 1980 there has been a doubling of diabetes sufferers in the world from 4.7% to 8.5% in the adult population, this is also an indicator of an increase in obesity in some this decade(Ogurtsova, 2017).

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million people of which 21 million people are diagnosed with diabetes category, while as many as 8.1 million people are included in the undiagnosed diabetes category (Aryastami, 2017).

DM is not diagnosed, it is estimated that as many as 21.3 million people in Indonesia have diabetes in 2030(Prabowo, 2015). In Indonesia, diabetes is still a serious health problem and even continues to increase in the number of sufferers every year along with the increase in population, age, increasing unhealthy lifestyles, unhealthy eating patterns, unhealthy diets and obesity (Aryastami, 2017).There are 483 million (8.3%) people with diabetes mellitus in the world. In Indonesia, DM is a threat to health development because it can cause stroke, heart disease, blindness, kidney failure(Pan A, 2015). Indonesia is 1 of 21 member countries of the Western Pacific (WP) (IDF, 2015).

The results of the Basic Health Research (Riskesdas) in 2007, 2013, and 2018 indicate that the prevalence of Non-Communicable Diseases such as diabetes, hypertension, stroke, and rheumatic diseases is increasing (Kementrian Kesehatan RI, 2018). In 2015, the North Sumatra Health Office recorded 151,939 hypertension sufferers between January and October. According to data from the Basic Health Research, hypertension is 29.19 percent prevalent in North Sumatra Province. This figure is quite high and, if not addressed immediately, quite dangerous (Kementrian Kesehatan RI, 2018). However, disease prevention efforts are frequently ineffective due to a lack of facilities and infrastructure for providing health care (Saragih et al., 2019). For hypertension, there are still many health centers that lack low blood pressure measurement equipment, which means that blood pressure tests cannot be performed routinely when performing services at home.

The causal factors related to the incidence of diabetes mellitus in general include heredity, age, education level, obesity, physical activity, and smoking (Isfandari, 2019; Siregar, 2020). In the course of the disease, DM can have both macro and micro effects. Macro effects such as ketoacidosis, hyperosmolar nonketotic coma and toxic acidosis can be treated with appropriate treatment. Meanwhile, micro-effects arise after several years such as microangiopathy, neuropathy, nephropathy, retinopathy, cardiovascular macro-angiopathy, and peripheral vascular (Akter, 2017).

Factors that cannot be modified are age, gender, and heredity (Ujani, 2016). DM risk factors will often appear after the age of 45 years. Until now, there is no clear mechanism regarding the relationship between gender and DM, but in the United States, many people with DM are female. DM is not a disease that can be transmitted, but this disease can be passed on to the next generation (Ramadhan, 2017). Someone whose biological family such as parents or siblings who have a history of DM sufferers will be at greater risk of developing DM (Sukmaningsih, 2016). DM cases at the Ujung Kubu Health Center have a rate of 67/10,000 population. This value shows the number of DM cases nationally. This makes researchers interested in looking at risk factors that cannot be changed in diabetes mellitus.

2. Research Methode

This research is an analytic observational study with a case control design. The study was conducted at the Ujung Kubu Public Health Center in December 2020-August 2021. The population, namely all patients who had visited the sample, were patients with a minimum age of 15 years. The sample was calculated using the two-population hypothesis formula in a case-control design with 105 cases and 110 controls. Sampling was taken by total sampling technique. The type of data used is secondary data belonging to the Puskesmas Ujung Kubu. The research instrument is a questionnaire. The procedure for

collecting data was by analyzing the raw data of the PTM Puskesmas Ujung Kubu report. Analysis of the data used is univariate analysis by looking at the frequency distribution of the determinants of DM incidence at the Ujung Kubu Health Center.

3. RESULT AND ANALYSIS

Table 1 Distribution Frequenc of Risk Factors for Diabetes Mellitus

Variable Name	Min	Max	mean	median	CI Of Mean	
					Lower	Upper
Current Blood Sugar Levels (Mg/dl)	102	387	184.55	163.00	176.27	193.94
Age(Years)	23	72	42.26	41.00	30.39	44.30

Table 1 shows that the average blood sugar level is 184.55 Mg/dl with the highest value of 367 Mg/dl and the lowest being 102 Mg/dl with a CI Of Mean 176.72-193.94. In addition, the average age of the respondents is 42 years with the highest age being 72 years and the lowest being 23 years. Another thing was found that the CI Of Mean at age was the highest 44 years and the lowest was 30 years.

Table 2 of Frequency Distribution of Risk Factors for Diabetes Mellitus

Variable	N	%	95% Confidence Interval Of Mean	
			Lower	Upper
DM history				
There is	119	55.3	47.4	62.3
There is not any	96	44.7	37.7	52.6
Total	215	100		
Gender				
Woman	145	67.4	61.1	73.3
Man	70	32.6	26.7	38.9
Total	215	100		

Table 2 explains that there are 119 respondents who have a history of DM from a family of 55.3% with a 95% CI 47.4-62.3 and no history of DN from a family 44.7% with a 95% CI (37.7-52.6). In addition, it can also be seen that the proportion of respondents was mostly female, namely 67.4% 95% CI (61.1-73.3) compared to only 32.6% male with 95% CI (26.7-38.9).

4. Discuss

The average age in this study was 42 years with a median value of 41 years and was found to be highest at an average age of 44 years. Because in this study a minimum age of 15 years and there is no maximum age group. In another study, it was found that the average age was 54.06 years (Santi, 2018). Because in this study the focus on age> 40 years. This means that the majority of the age in this study was young compared to other studies.Theoretically, this risk factor cannot be changed because the older the age, the direction of the body's metabolic processes where the work of the body's organs begins to decrease with age, especially if you never do exercise regularly. This also occurs in the process of glucose metabolism in the body.

Kurniaty's research conducted in Lampung also stated the same thing that old age is more at risk of developing DM than young age (Kurniawaty, 2016). Research conducted by Palimbungan stated that the odds ratio for age was 5.86, the results obtained were almost the same as this study with an odds ratio of 5.6 (Palimbunga, 2017). The 2013 basic health research report also stated that most people with diabetes were in the 45-54 year age group(Kementrian Kesehatan RI, 2018). Not only based on basic health research reports, the Endocrinology Association also states that age > 45 years is one of the triggering factors for DM. Research conducted in Negeria states that the risk of experiencing type II DM tends to increase since entering the age of 46 years .

The results of the study also showed that there were some respondents who were less than 45 years old also experienced the incidence of DM. This also shows that it is not only from the age factor alone but there are other factors that can cause the incidence of DM. But statistically in this study it is shown that the older a person is, the higher the prevalence of diabetes(Utami, 2019). Blood sugar levels during this study had an average of 184.55 Mg/dl. However, another study stated that blood sugar levels were relatively higher than the results of this study, namely 240.09 Mg/dl (Utami, 2019). This situation indicates that blood sugar levels have been given treatment so that blood sugar levels are low. Another risk factor found that more DM patients were found from patients who had a history of DM (55.3%).

Another study explained that family history is one of the risk factors for the incidence of type II DM, someone with a family history of DM will be at greater risk of experiencing DM than those without a family history of DM. DM is a type of disease with heredity. It is appropriate that the risk of a child, if one parent has diabetes is 15% and the risk is 75% if both parents have diabetes.

Rohmi in the DM risk survey stated that family history is a risk factor for DM in the Padang community, so that people with a family history of DM have a greater chance of experiencing DM (Yosmar, 2018).Research in the Padang community also shows the same thing as research conducted at Percut Sei Tuan that family history is a risk factor for DM. The results obtained an odds ratio of 4.7 where a person with a family history of DM will be five times more at risk of experiencing DM. The results of Imelda's research at the Harapan Raya Health Center the factors that most influence the occurrence of diabetes mellitus include genetic history, unhealthy patterns of meaning and lack of physical activity (Imelda, 2019). Risk factors for DM occurrence at the Cengkareng District Health Center with fisher exact test analysis include family history of age, stress, cholesterol levels, blood pressure and physical activity. Another study stated that family history had an odds ratio of 7.875 so that the risk factor from a family history of DM was 8 times higher than those without.

In this study, almost all of the patients suffering from diabetes mellitus had families suffering from diabetes mellitus, so that the theory was in accordance with the results of the research conducted. The theory also states that the risk factors thought to play a role in the incidence of diabetes mellitus are: heredity, age, gender, education and smoking. Diabetes Mellitus is a chronic disease whose complications can be life-threatening. Diabetes mellitus can be influenced by various factors, there are factors that cannot be changed and factors that can be changed. Heredity is an irreversible factor. Factors that cannot be changed include a family history of disease or heredity, where if the person's family has diabetes mellitus, the person is at risk of 4 times greater risk of suffering from diabetes mellitus.

Family history of disease can be a detector for people who have a family with diabetes mellitus. The theory states that this disease is associated with chromosomes 3q, 15q, and 20q, and identifies 2 potential loci, namely 7p and 11p that may be a genetic risk for diabetes mellitus in the community. Diabetes mellitus is a disease because the body is unable to

control the amount of sugar, or glucose, in the bloodstream. This causes hyperglycemia, a state of dangerously high blood sugar. Genetic and environmental factors are trigger factors for diabetes. Hereditary factors are also believed to play a role in the emergence of this disease. The proportion of people with diabetes mellitus was higher in women (67.4%). In line with the results of Riskesdas, it shows that the proportion of people with DM in Indonesia is relatively high, 2.4% for women and 1.7% for men .

Women are more at risk of suffering from DM than men (Tarigan, 2021). This situation occurs because in women there is a process of menopause which can lead to an increase in the amount of body fat that is very easy to accumulate (Shih, 2017). It was also found that in women there is a comparison of the composition between estradiol which later makes the Estrogen Receptor (ER) and Estradiol Receptor (ER) genes activated, this situation can cause metabolic processes to work and the two genes will coordinate in insulin sensitivity and increase glucose uptake in the blood (Shih, 2017).

5. Conclusion

Many diabetes mellitus disease comes from factors that cannot be changed such as history of DM and gender. The government needs to educate and track cases in individuals who have a family history with an early detection program by checking blood sugar levels through the working area health center. Further researchers need to conduct research related to bivariate analysis to determine valid risk factors, especially factors that cannot be changed. It is hoped that the community will be able to implement a healthy lifestyle by being a good fatner between the health government in supporting ongoing health programs in order to achieve health status.

6. References

Akter, S., Goto, A., & Mizoue, T. (2017). Smoking And The Risk Of Type 2 Diabetes In Japan :A Systematic Review And Meta Analysis. *Journal Of Epidemiology*, *27*(12), 533–561.

Aryastami, N. K., & Tarigan, I. (2017). Kajian kebijakan dan penanggulangan masalah gizi stunting di Indonesia. *Buletin Penelitian Kesehatan, 45(4), 233–240. JOUR.*

Fauziah, I., & Anggraeni, D. N. (2018). Prevelensi Penderita Diabetes Melitus Tipe II pada Pasien di Puskesmas Kota Blangkejeren, Kecamatan Blangkejeren, Kabupaten Gayo Lues Tahun 2015-2017. *JOUR.*

Global, T. B. (2016). Methods Used by WHO to Estimate the Global Burden of TB Disease, Glaziou P., Sismanidis C., Zignol M., Floyd K., Global TB Programme, WHO, Geneva, Switzerland. JOUR. *Report 2016.*

Group, I. D. F. D. A. (2015). Update of mortality attributable to diabetes for the IDF Diabetes Atlas: Estimates for the year 2013. *Diabetes Research and Clinical Practice, 109(3), 461–465. JOUR.*

IDF. (2015). IDF Diabetes Atlas 7th Edition. *Brussels: International Diabetes Federationhttp://Www.Diabetesatlas.Org/. [Sitasi: 15 Oktober 2020]. [Sitasi: 9 Februari 2017]. [Sitasi Pada 18 November 2016.*

Imelda, S. I. (2019). Faktor-Faktor yang Mempengaruhi Terjadinya Diabetes Melitus di Puskesmas Harapan Raya Tahun 2018. *Scientia Journal, 8(1), 28–39. JOUR.*

Isfandari, S. Hanafi, I. N. (2019). Terapi Rumatan Metadone: ketanggapan pasien, Sikap Staff Dan Penerimaan Masyarakat. *Balitbangkes, RI.*

Kementrian Kesehatan RI. (2018). *Riset Kesehatan Dasar Tahun 2018.*

Kistianita, A. N., Yunus, M., & Gayatri, R. W. (2018). Analisis faktor risiko diabetes mellitus tipe 2

pada usia produktif dengan pendekatan WHO stepwise step 1 (core/inti) di Puskesmas Kendalkerep Kota Malang. *Preventia: The Indonesian Journal of Public Health, 3(1), 85–108. JOUR.*

Kurniawaty, E., & Yanita, B. (2016). Faktor-Faktor yang Berhubungan dengan Kejadian Diabetes Melitus Tipe II. *Majority*, *5*(2), 27–31.

Lathifah, N. L. (2017). Hubungan durasi penyakit dan kadar gula darah dengan keluhan subyektif penderita diabetes melitus. *Jurnal Berkala Epidemiologi, 5(2), 231–239. JOUR.*

Megawati, F., Agustini, N. P. D., & Krismayanti, N. L. P. D. (2020). Studi Retrospektif Terapi Antidiabetik Pada Penderita Diabetes Melitus Rawat Inap Di Rumah Sakit Umum Ari Canti Periode 2018. *Jurnal Ilmiah Medicamento*, *6*(1), 28–32.

Ogurtsova, K., da Rocha Fernandes, J. D., Huang, Y., Linnenkamp, U., Guariguata, L., Cho, N. H., ... Makaroff, L. E. (2017). IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes Research and Clinical Practice*, *128*(1), 40–50.

Palimbunga, T. M., Ratag, B. T., & Kaunang, W. P. J. (2017). FaktorFaktor Yang Berhubungan dengan Kejadian Diabetes Melitus Tipe 2 di RSU Gmim Pancaran Kasih Manado. *Media Kesehatan, 9(3). JOUR.*

Pan A, W. Y. (2015). Relation of active, passive, and quitting smoking with incident type 2 diabetes: a systematic review and meta-analysis. *Lancet Diabetes Endocrinol ;3(12):958e967.*

Prabowo, A., & Hastuti, W. (2015). Hubungan pendidikan dan dukungan keluarga dengan kepatuhan diit pada penderita diabetes mellitus di wilayah Puskesmas Plosorejo Giribangun Matesih Kabupaten Karanganyar. *Jurnal Keperawatan GSH, 4(2). JOUR.*

Ramadhan, M. (2017). Faktor yang Berhubungan dengan Kejadian Diabetes Mellitus di RSUP Wahidin Sudirohusodo dan RS Universits Hasanuddin Makassar Tahun 2017. *Makassar: Fakultas Kesehatan Masyarakat Universitas Hasanuddin. JOUR.*

RI, D. (2010). *Tahun 2030 prevalensi diabetes melitus di indonesia mencapai 21,3 juta orang. Depkes,Jak.*

Safitri , Y., Nurhayati, I. K. A. (2019). Pengaruh Pemberian Sari Pati Bengkuang (Pachyrhizus Erosus) Terhadap Kadar Glukosa Darah Pada Penderita Diabetes Mellitus Tipe Ii Usia 40-50 Tahun Di Kelurahan Bangkinang Wilayah Kerja Puskesmas Bangkinang Kota Tahun 2018. *Jurnal Ners, 3(1), 69–81. JOUR.*

Santi Herlina, S. S. (2018). Determinan Efikasi Diri Pada Pasien Diabetes Mellitus. *Jurnal Ilmiah Ilmu Keperawatan Indonesia*, *Vol. 8 No.*

Saputri, E. G., Setiani, O., & Dewanti, N. A. Y. (2018). Hubungan Riwayat Pajanan Pestisida Dengan Kejadian Diabetes Melitus Tipe 2 Pada Petani Penyemprot Di Kecamatan Ngablak Kabupaten Magelang. *Jurnal Kesehatan Masyarakat (e-Journal), 6(1), 645–653. JOUR.*

Saragih, I. D., Falefi, R., Pohan, D. J., & Elliandy, S. R. H. (2019). Analisis Indikator Masukan Program Pemberantasan Demam Berdarah Dengue Di Dinas Kesehatan Provinsi Sumatera Utara. *Scientific Periodical of Public Health and Coastal Health*, *1*(1), 32–41. https://doi.org/10.30829/contagion.v1i01.4821

Shih, K. C.-L. (2017). A Systematic Review on The Impact of Diabetes Mellitus on The Ocular Surface. *Journal Nutrition & Diabetes, 7(3): 25(Http://Doi.Org/10.1038/Nutd.2017.4).*

Siregar, P. A. (2020). Aktivitas Fisik, Konsumsi Makanan Asin dan Kejadian Hipertensi Masyarakat Pesisir Kota Medan. *Jurnal Ilmiah Kesehatan (JIKA)*, *2*(1), 1–8. https://doi.org/doi.org/10.36590/jika.v2il.34

Sukmaningsih, W. R., Heru SubarisKasjono, S. K. M., & Werdani, K. E. (2016). Faktor Risiko Kejadian Diabetes Mellitus Tipe II di Wilayah Kerja Puskesmas Purwodiningratan Surakarta. *DISS, Universitas Muhammadiyah Surakarta.*

Tarigan, A. R. (2021). Analysis of Family Support and Diet Compliance in Hypertension Patients. *Contagion : Scientific Periodical of Public Health and Coastal Health*, *3*(1), 16–28. https://doi.org/10.30829/contagion.v3i1.9123

Ujani, S. (2016). Hubungan antara usia dan jenis kelamin dengan kadar kolesterol penderita obesitas rsud abdul moeloek provinsi lampung. *Jurnal Kesehatan, 6(1). JOUR.*

Utami, T. P. (2019). Hubungan Indeks Massa Tubuh Dan Tekanan Darah Pada Pasien Diabetes Mellitus Tipe 2. *Archives Pharmacia, 1 No 1, Ja.*

Wicaksono, A. P. (2015). Pengaruh pemberian ekstrak jahe merah (zingiber officinale) terhadap kadar glukosa darah puasa dan postprandial pada tikus diabetes. *Jurnal Majority, 4(7), 97– 102. JOUR.*

Yosmar, R., Almasdy, D., & Rahma, F. (2018). Survei Risiko Penyakit Diabetes Melitus Terhadap Masyarakat Kota Padang. *Jurnal Sains Farmasi & Klinis, 5(2), 134–141. JOUR.*