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The Relationship Between Age and Blood Sugar Levels in Patients with Type 2 Diabetes Mellitus Outpatient at Wonogiri Health Center, North Lampung in 2024

Erma Septya Wardhani[1], Dera Elva Junita[1], Desti Ambar Wati[1], Masayu Dian Khairani[1]

[1] *Universitas Aisyah Pringsewu, Lampung, Indonesia*

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Corresponding Author :

Erma Septya Wardhani

E-mail :

ermaseptyawardhani@gmail.com

ABSTRACT

Background & Objective: The purpose of this study was to determine the relationship between nutritional status, carbohydrate intake, and fiber intake on blood sugar levels of type 2 diabetes mellitus patients at Wonogiri Health Center. **Method:** This study was conducted in December 2024. This research design uses analytic observational quantitative research with a cross sectional approach. The sample of this study were patients diagnosed with type 2 diabetes mellitus in the Wonogiri Health Center work area as many as 57 respondents. Bivariate analysis of this study using the Spearman Rho test. **Result:** his study shows that there is no significant relationship between age and blood sugar levels of respondents (Sig. > 0.05). This happens because each individual has differences regarding other risk factors such as lifestyle, physical activity that may affect the condition of type 2 diabetes mellitus patients. **Conclusion:** There is a significant relationship between age and blood sugar levels of respondents.

Introduction

Diabetes Mellitus is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin action or both. In type 2 diabetes, the body is unable to make enough insulin or even if there is enough insulin, the body has problems using insulin (insulin resistance), or both. If there is not enough insulin in the body or it cannot work properly, glucose cannot be converted into energy, over time glucose will accumulate in the blood and not enter the cells, causing high blood glucose levels (hyperglycemia) (PERSAGI ASDI, 2019).

Diabetes mellitus is currently one of the global health threats. Based on the cause, diabetes mellitus is classified into 4 groups, namely type 1 DM, type 2 DM, gestational DM and other types of DM. Over a long period of time, diabetes mellitus can cause

complications in sufferers. Complications that occur due to diabetes mellitus can be in the form of blood vessel disorders both macrovascular and microvascular, as well as disorders of the nervous system or neuropathy. These disorders can occur in people with type 2 diabetes mellitus who have long suffered from the disease or who are newly diagnosed (PERKENI, 2019). Complications of diabetes mellitus that can cause death are acute and chronic complications. According to Santoso, there is a percentage of mortality due to acute complications of diabetes mellitus, namely Ketoacidosis as much as 24.9% and Hypoglycemia as much as 10%. (Nabil, 2009 in Siboro, 2010).

Factors that influence the occurrence of diabetes mellitus are a person's characteristics (age, gender and genetics), nutritional knowledge, stress, lifestyle, physical activity, unhealthy diet, good nutritional status, and obesity. Someone who is obese is always associated with insulin resistance. The incidence of obesity in people with diabetes can also increase the risk of complications such as cardiovascular disease, stroke and type 2 diabetes mellitus (Sapang, 2018).

The International Diabetes Federation (IDF) organization estimates that there are at least 463 million people aged 20-79 years in the world with diabetes in 2019, equivalent to a prevalence rate of 9.3% of the total population of the same age. Based on gender, IDF estimates the prevalence of diabetes in 2019 to be 9% in women and 9.65% in men. The prevalence of diabetes is expected to increase as the population ages to 19.9% or 111.2 million people aged 65-79 years. The International Diabetes Federation (IDF) report in 2019 ranked Indonesia as the 7th country in the number of people with diabetes mellitus reaching 10.7 million. This figure is predicted to continue to increase until it reaches 578 million in 2030 and 700 million in 2045 (Kemenkes RI, 2020).

Based on the 2018 Basic Health Research report by the Ministry of Health, there was an increase in the prevalence of diabetes mellitus to 10.9%. Meanwhile, according to Lampung Province Riskesdas data in 2018, the number of diabetes mellitus diagnosed by doctors was 1.37%. The prevalence of diabetes mellitus in North Lampung district is in the 6th highest position with 1.31% (Ministry of Health, 2018). The number of patient visits suffering from diabetes mellitus at Wonogiri Health Center in 2023 was included in the top 10 diseases with a total of 298 patients with type 2 diabetes mellitus.

Uncontrolled diabetes mellitus will result in health problems with long-term damage, dysfunction and failure of several organs, especially the eyes, kidneys, nerves, heart and blood vessels (PERKENI, 2019). Based on this statement, the researcher is interested in examining the relationship between age and blood sugar levels in patients with type 2 diabetes mellitus.

Objective

The purpose of this study was to determine the relationship between age and blood sugar levels of outpatients with type 2 diabetes mellitus at the Wonogiri Health Center in North Lampung.

Method

This research was conducted in December 2024. This research design uses quantitative observational analytic research with a cross sectional approach. The sample of this study were patients diagnosed with type 2 diabetes melitis in the Wonogiri Health

Center work area as many as 57 respondents. The bivariate analysis of this study used the Spearman Rho test.

Results

Characteristics of Respondents

The results of this study used a sample of 57 respondents who were diagnosed with type 2 diabetes mellitus in the Wonogiri Health Center Working Area. The results of the characteristics of respondents in this study can be seen in Table 1.

TABLE 1. Characteristics of Respondents

Characteristics	Frequency (N)	Percentage (%)
Gender		
Male	25	43,9
Female	32	56,1
Total	57	100
Age		
40-50	22	38.6
51-60	23	40.4
61-70	12	21.1
Total	57	100
Occupation		
retired civil servant	5	8.8
Housewife	17	29.8
Civil Servant	14	24.6
Farmer	2	3.5
Self-Employed	6	10.5
Laborer	12	21.1
Military	1	1.8
Total	57	100.0

Source: Primary Data 2024

In table 4.1, it is known that the most respondents were female as many as 32 (56.1%), 25 (43.9%) male respondents. The most respondents were around 51-60 years old as many as 23 (40.4%), 40-50 years old as many as 22 (38.6%) and 61-70 years old (21.1%). Most respondents' occupations were housewives as many as 17 (29.8%), retired civil servants 5 (8.8%), active civil servants 14 (24.6%), laborers 12 (10.5%), self-employed 6 (10.5%), farmers 2 (3.5%) and military 1 (1.8%).

Distribution of Average Blood Sugar Levels in the Working Area of Wonogiri Health Center North Lampung Year 2024

TABLE 2. Mean Distribution of Blood Sugar, Fiber Intake, Carbohydrate Intake

Variabel	N	Mean	Std. Deviation
Blood Sugar	57	173.84	52.372

Source: Primary Data 2024

Based on Table 2, it is known that the average blood sugar of 57 respondents is 173.84 with a standard deviation of 52.372.

Relationship between Age and Respondents' Timed Blood Sugar

TABLE 3. Relationship between Nutritional Status and Respondents' Timed Blood Sugar

			Age	Blood Sugar
Spearman's rho	Age	Correlation Coefficient	1.000	-.023
		Sig. (2-tailed)	.	.868
		N	57	57
	Blood Sugar	Correlation Coefficient	-.023	1.000
		Sig. (2-tailed)	.868	.
		N	57	57

Based on Table 3, the results of Spearman correlation analysis show that there is no significant relationship between age and blood sugar levels of respondents (Sig. 0.868).

Discussion

Characteristics of Respondents

Based on table 4.1, it is known that most of the respondents were female, 32 respondents (56.1%). Research conducted by Suprapti (2017) women have a higher risk because women have a greater chance of developing physically, body mass index, premenstrual syndrome and increased post-menoupouse distribution and body fat accumulates more easily due to hormone processes in women. Respondents diagnosed with type 2 diabetes mellitus were mostly aged around 51-60 years as many as 23 (40.4%), and the most respondents' occupations were housewives. This is in line with Susilawati's research (2019) that there is a relationship between age and the incidence of type 2 diabetes mellitus, meaning that the incidence of type 2 diabetes mellitus in patients ⩾45 years old has a risk of 18.143 times compared to patients aged ⩽45 years.

Mean Distribution of Blood Sugar Levels

Based on Table 4.3, it is known that the average blood sugar of 57 respondents is 173.84 mg/dl, this blood sugar is normal blood sugar. Type 2 diabetes mellitus is a metabolic disorder because the body is able to produce insulin, but not in normal levels or cannot respond to the effects of insulin, causing hyperglycemia. If sugar levels are not controlled, it will cause chronic complications in the form of microvascular disease. Based on the results of the study of respondents diagnosed with diabetes mellitus in the Wonogiri Health Center Working Area, there were respondents who had an average blood sugar level of 173.84 mg/dl.

Relationship between Age and Blood Sugar Levels

Based on table 4.1, it can be seen that there are patients aged 40-50 years as many as 22 people (38.6%), aged 51-60 years as many as 23 people (40.4%) and aged 61-70 years as many as 12 people (21.1%) who suffer from type 2 diabetes mellitus, based on the incidence of type 2 diabetes mellitus, namely 57 respondents after being tested

using the spearmen correlation test, the results were obtained (sig: 0.868) which means that there is no relationship between age and blood sugar levels of outpatient type 2 diabetes mellitus patients at Wonogiri Health Center. This happens because each individual has differences regarding other risk factors such as lifestyle, physical activity that may affect the condition of type 2 diabetes mellitus patients.

This is in line with research conducted by Betteng, Pangemanan, Mayulu (2014) which explains that type 2 diabetes mellitus can develop at all ages even in childhood. This is because currently there are more and more people with obesity due to unhealthy lifestyle patterns, so that more and more people with type 2 diabetes mellitus at a relatively young age. This is in line with research conducted by Rahayu (2020) which shows that as a person gets older, the risk of developing diabetes mellitus increases, because the relationship between age and the incidence of diabetes mellitus is positive so that the risk increases. People who start living an unhealthy lifestyle at a young age will experience accelerated aging as they age, thereby increasing the risk of developing type 2 diabetes mellitus.

The results of other research conducted by Widiasari, Wijaya, Suputra (2021) show that there is a relationship between increasing age and the development of type 2 diabetes mellitus. This shows that respondents in the pralansia category aged 45-59 years or who are included in the pralansia category have a greater chance of developing type 2 diabetes mellitus by 1.75 times compared to respondents in the elderly category aged 60 years and over or who are included in the elderly category. People who are over 45 years old are considered to be in the high risk category for diabetes mellitus. This is because people often pay less attention to their health conditions at a young age, so that the chances of developing type 2 diabetes mellitus increase with age (Rosita et al., 2022). When more than 40 years old, a person's body often begins to experience a rapid decline in function. A person's physiology and metabolism, particularly the metabolic function of the pancreas, will slow down with age. The pancreas is responsible for controlling blood sugar levels. The risk of insulin resistance and type 2 diabetes mellitus increases with the decline in pancreatic metabolism as it impacts blood sugar levels (Milita, Handayani, Setiaji., 2021).

According to Nurayati and Adriani (2017) the age of 41-60 years is the largest age group with uncontrolled HbAIc levels, namely 32 people (69.9%). The results of other studies show that those aged >45 years have a 1.4-fold risk factor for having abnormal fasting blood sugar levels compared to respondents aged 45 years who have the greatest risk of increasing blood sugar. This is based on the observation that aging can increase the risk of type 2 diabetes mellitus by decreasing insulin sensitivity, which can alter blood glucose levels. Humans generally experience a sharp and rapid physiological decline after the age of forty, and this decline impacts the pancreas (Sihite, Silitonga, Tarigan., 2022). Researchers have shown that various variables increase the likelihood of an elderly person developing diabetes mellitus. These include increasing age, leading an unhealthy lifestyle, and having a family history of the disease. Poor lifestyle and family history of diabetes are risk factors for developing the condition (Gayatri, 2019).

Based on the diagnosis criteria, according to research conducted by Arania et al. (2021) patients over 45 years of age have slightly higher hbA1c levels, fasting blood sugar levels, and temporary blood sugar levels than patients under 45 years of age. This is due to physical, physiological, and medical variations associated with aging. Elderly patients may experience a natural decline in glucose tolerance as part of the

aging process. This means that OGTT results in elderly patients may indicate prediabetes or type 2 diabetes sooner than in younger patients (Suci and Ginting., 2023).

Conclusion

The characteristics of female respondents were 32 people more than male respondents, totaling 25 people, with the age of respondents ranging from 51-60 as many as 23 people, and the most respondents' occupations were housewives.
The average blood sugar level of respondents in the Wonogiri Health Center work area is 174 mg/dl.
There is no significant relationship between age and blood sugar levels of respondents (Sig. > 0.05).

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References

1. Abdilla Fajar, Suratman. 2019. Handbook CAGI AZURA edisi 3. Jakarta: PERSAGI
2. Achadi, Endang L. 2011. Gizi dan Kesehatan Masyarakat. Jakarta: PT Raja grafindo Persada.
3. Almatsier, S. 2009. Prinsip Dasar Ilmu Gizi. PT Gramedia Pustaka Utama. Jakarta.
4. Amanina, Azka. 2015. Hubungan Asupan Karbohidrat dan Serat dengan Kejadian Diabetes Melitus Tipe 2 di Wilayah Kerja Puskesmas Purwosari. Skripsi. Universitas Muhammadiyah Surakarta.
5. Azitha, Mala., Aprilia, Dinda., Ilhami., Yose Ramda. 2018. Hubungan Aktifitas Fisik dengan Kadar Glukosa Darah Puasa pada Pasien Diabetes Melitus yang Datang ke Poli Klinik Penyakit Dalam Rumah Sakit M. Djamil Padang. Jurnal Kesehatan Andalas.
6. American Diabetes Association (ADA). 2015. Diagnosis and Classification of Diabetes Melitus. Diabetes Care Journal. Vol 38: 8-16.
7. Edy, Erniyani. 2017. Hubungan Asupan Makronutrien Dengan Nilai Kadar Glukosa Darah Pada Pasien Diabetes Melitus Tipe 2 di Rumah Sakit Umum Panembahan Senopati Bantul Yogyakarta. Skripsi. Stikes Jendral Achmad Yani Yogyakarta.
8. Enggarningsih, Ria. 2019. Hubungan Status Gizi dan Lingkar Pinggang dengan Kadar Glukosa Darah Lansia di Desa Bolon. Skripsi. Institusi Teknologi Sains dan Kesehatan PKU Muhammadiyah Surakarta.
9. Fathmi, Ain. 2012. Hubungan Indeks Massa Tubuh Dengan Kadar Gula Darah Pada Penderita Diabetes Melitus Tipe 2 di Rumah Sakit Umum Daerah Karanganyar. Skripsi. Universitas Muhammadiyah Surakarta.
10. Fox, Charles dan Anne Klivert. 2010. Bersahabat Dengan Diabetes Tipe-2. Depok: Penobar Plus.
11. Gibney, Michael J, Barrie, Jhon, Lenore. 2009. Gizi Kesehatan Masyarakat. Jakarta: Buku Kedokteran EGC.

12. Hartono, Andry. 2012. Terapi Gizi dan Diet Rumah Sakit. Jakarta: Buku Kedokteran EGC.
13. Hartono, Budiman., Fitriani. 2016. Hubungan Indeks Masa Tubuh dengan Diabetes Melitus Tipe 2 di RSUD Dr. Adjidarmo Rankasbitung. Jurna Kedokteran Medialek Volume 24.
14. Jalal, F., Liputo, NI., Susanti, N., Oenzil, F. 2008. Lingkar Pinggang, Kadar Glukosa Darah, Trigliserida dan Tekanan Darah Pada Etnis Minang di Kabupaten Padang Pariman Sumatra Barat. Media Medika Indonesia. Universitas Fakultas Kedokteran.
15. Kemenkes RI. 2020. Infodatin: Pusat Data dan Informasi Kementrian Kesehatan RI 2020. Jakarta.
16. Kemenkes RI. 2018. Riset Kesehatan Dasar (RISKESDAS) Provinsi Lampung 2018. Jakarta.
17. Kurniali, Peter C. 2013. Hidup Bersama Diabetes. Jakarta: PT Elek Media Komputindo.
18. Lemeshow, S., David, W.H., Janelle, K., Stephen K. 1997. Besar Sampel Dalam Penelitian Kesehatan Pramono, D. Yogyakarta: Gajah Mada University Press.
19. Leony. 2012. Hubungan Umur, Asupan Protein, dan Faktor Lainnya dengan Kadar Gula Darah Puasa Pada Pegawai Satlantas dan Sumda di Polresta Depok. Skripsi. Depok: Universitas Indonesia.
20. Maenasari, Dia., Soviana, Elida. 2019. Asupan Serat, Beban Glikemik dan Kadar Glukosa Darah pada Pasien Dibetes Melitus Tipe 2. Universitas Muhammadiyah Surakarta.
21. Masruroh, Eny. 2018. Hubungan Umur dan Status Gizi dengan Kadar Gula Darah Penderita Diabetes Melitus Tipe 2. Jurnal Kesehatan Masyarakat.
22. Menkes RI. 2014. Keputusan Mentri Kesehatan RI. Nomor 41 Tentang Pedoman Gizi Seimbang.
23. Notoadmodjo, Soekidjo. 2010. Metodologi Penelitian Kesehatan. PT Rineka Cipta. Jakarta.
24. Paruntu, Olga L. 2012. Asupan Gizi dengan Pengendalian Diabetes Pada Diabetes Melitus Tipe-2 Rawat Jalan di Blu Prof.Dr.R.D. Kandou Manado. Gizido: Vol 4.
25. Perkeni. 2019. Konsesus Pengelolaan dan Pencegahan Diabetes Melitus Tipe-2 di Indonesia 2019.
26. Perkeni. 2015. Konsesus Pengelolaan dan Pencegahan Diabetes Melitus Tipe-2 di Indonesia 2015.
27. Permenkes RI No.41 Tahun 2014. Pedoman Gizi Seimbang. Jakarta.
28. Persatuan Ahli Gizi Indonesia, ASDI. 2019. Penuntun Diet dan Terapi Gizi. Edisi ke 4. Jakarta: Penerbit Buku Kedokteran EGC.
29. Prijadi, Bambang, Fuadiyah, Rudi. 2012. Hubungan Asupan Serat Larut dan Aktivitas Fisik dengan Kejadian Diabetes Melitus Tipe 2 Pasien Rawat Jalan di RSUD Dr. Rubini Menpawah Kalimantan Barat.
30. Sapang, Mertein., Darwati, P., Laras S. 2018. Hubungan Indeks Masa Tubuh (IMT) dan Rasio Lingkar Pinggul dengan Kadar Glukosa Darah Puasa Pada Penderita Diabetes Melitus Tipe 2 di Puskesmas Kebayoran Lama. Jakarta Selatan Nutrire Diaita,
31. Siboro, Junita I. L. 2010. Tingkat Pengetahuan Pasien Tentang Komplikasi Diabetes Melitus di RSUD Haji Adam Malik Medan. Skripsi. Medan: Universitas Sumatra Utara.

32. Sufiati dan Erma. 2012. Asupan Serat Dengan Kadar Glukosa Darah, Kadar Kolesterol Total dan Status Gizi Pada Pasien Diabetes Melitus Tipe 2 di Rumah Sakit Roemani Semarang. LPPM Unimus.
33. Sugiyono. 2018. Metode Penelitian Kuantitatif, Kualitatif, Dan Kombinasi (Mixed Methods). Bandung : Alfabeta.
34. Sunarti. 2017. Serat Pangan Dalam Penanganan Sindrom Metabolik. Yogyakarta: Gadjah Mada University Press.
35. Supariasa DN dan Handayani. Asuhan Gizi Klinik. Jakarta: EGC: 2019.
36. Sutanto T. Diabetes, Pencegahan, Pengobatan. Yogyakarta: Buku Pintar; 2013.
37. Werdani, Aprilya Roza dan Triyanti. 2014. Asupan Karbohidrat Sebagai Faktor Dominan yang Berhubungan dengan Kadar Gula Darah Puasa. Jurnal Kesehatan Masyarakat Vol 9.
38. World Health Organization. 2014. IDF Diabetes Atlas: Seventh Edition.
39. Witasari, Ucik Setyaningrum, Siti. 2009. Hubungan Tingkat Pengetahuan Asupan Karbohidrat dan Serat dengan Pengendalian Kadar Glukosa Darah Pada Penderita DM Tipe 2. Jurnal Penelitian Sains Teknologi: Vol 10