

## LITERATURE REVIEW : RELATIONSHIP BETWEEN STRESS LEVELS AND RANDOM BLOOD SUGAR IN DIABETES MELLITUS PATIENTS

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### ABSTRAK

Penyakit tidak menular saat ini merupakan salah satu tantangan utama dalam bidang kesehatan yang perlu diwaspadai. Fenomena ini dipengaruhi oleh tingginya prevalensi serta angka mortalitas penyakit tidak menular di seluruh dunia. Diabetes melitus merupakan salah satu penyakit tidak menular yang banyak diderita masyarakat dan termasuk ke dalam empat besar penyakit tidak menular yang menyebabkan kematian terbanyak. IDF (*International Diabetes Federation*) melaporkan lebih dari 536 juta orang di dunia hidup dengan diabetes, dan Indonesia diprediksi akan mengalami kenaikan jumlah penderita diabetes melitus yang signifikan. Berdasarkan aspek fisiologis, stres dapat memicu terjadinya perubahan dalam fungsi sistem tubuh, termasuk ketidakseimbangan hormonal. Kondisi stres menyebabkan tubuh menghasilkan hormon kortisol berlebih dan menstimulasi kelenjar adrenal untuk memproduksi hormon epinefrin yang menyebabkan kadar glukosa darah meningkat. Tujuan dari penelitian ini adalah untuk mengidentifikasi dan menganalisis berbagai artikel yang membahas tentang tingkat stres dan kadar gula darah acak pada penderita diabetes melitus. Penelitian ini merupakan *literature review* yang memanfaatkan tiga basis data, yaitu Google Scholar, PubMed, dan Crossref. Beberapa artikel yang telah didapat akan diseleksi secara bertahap dan disesuaikan dengan kriteria peneliti. Berdasarkan tujuh artikel yang dilakukan review di dapatkan hasil terdapat hubungan antara kedua variabel yang bernilai positif. Stres berkontribusi terhadap terjadinya fluktuasi kadar glukosa darah yang tidak stabil, walaupun sudah dilakukan pengelolaan melalui aktivitas fisik, diet, dan terapi obat yang sesuai. Dapat disimpulkan bahwa ada hubungan antara stres dengan kadar gula darah acak pada pasien diabetes melitus.

**Kata kunci** : diabetes melitus, gula darah, hubungan, stres

### ABSTRACT

*Non-communicable diseases are currently one of the main challenges in the health sector that need to be addressed. This phenomenon is influenced by the high prevalence and mortality rates of non-communicable diseases worldwide. Diabetes mellitus is one of the most common non-communicable diseases and is among the top four non-communicable diseases that cause the most deaths. The International Diabetes Federation (IDF) reports that more than 536 million people worldwide live with diabetes, and Indonesia is predicted to experience a significant increase in the number of people with diabetes mellitus. Based on physiological aspects, stress can trigger changes in bodily functions, including hormonal imbalances. Stress causes the body to produce excess cortisol and stimulates the adrenal glands to produce epinephrine, which causes blood glucose levels to rise. The purpose of this study was to identify and analyze various articles discussing stress levels and random blood sugar levels in diabetes mellitus patients. This study is a literature review that utilizes three databases., namely Google Scholar, PubMed, and Crossref. Several articles obtained were selected gradually and adjusted to the researcher's criteria. Based on the review of seven articles, the results show a positive relationship between the two variables. Stress contributes to unstable blood glucose fluctuations, even when managed through physical activity, diet, and appropriate drug therapy. It can be concluded that there is a relationship between stress and random blood sugar levels in patients with diabetes mellitus.*

**Keywords** : blood sugar, diabetes mellitus, relationship, stress

## INTRODUCTION

Non-communicable diseases are now a major concern in the field of health, as the prevalence and mortality rates of these diseases are showing an upward trend worldwide. About 41 million people die each year from noncommunicable diseases (NCDs), which is equivalent to about 71% of total global deaths (Widiasari et al., 2021). One type of non-communicable disease that is widely suffered by the community is diabetes mellitus. In the modern era, diabetes mellitus remains a significant health issue (Dinata & Yasa, 2021). Diabetes mellitus (DM) is a group of metabolic disorders characterized by elevated blood glucose levels (hyperglycemia), which can occur due to impaired insulin secretion, reduced body sensitivity to insulin, or a combination of both (Hardianto, 2021). According to a 2021 report by the International Diabetes Federation (IDF), more than 536 million people worldwide live with diabetes, and this number is expected to increase by 2045 (Webber, 2021). In general, diabetes mellitus can be classified into four main types, including type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM), gestational diabetes mellitus, and specific types of diabetes that are related to other causes (Perkeni, 2021).

According to estimates by the International Diabetes Federation, Indonesia will experience an increase in the number of people with diabetes mellitus from 10.7 million in 2019 to around 13.7 million in 2030. Type 2 diabetes mellitus accounts for about 90% of all diabetes cases (Okaniawan & Agustini, 2021). Initial efforts in diabetes prevention involve minimizing risk factors that could potentially trigger the disease. Previous studies have shown that lifestyle, sociodemographic factors, and physical and mental health conditions have an impact on the incidence of diabetes mellitus (Milita et al., 2021). One of the medical or mental conditions that plays a role in this is stress. Diabetes mellitus is a chronic disease that requires lifelong monitoring and management. As a result, individuals who experience it are often at risk of stress. Stress is a common phenomenon in everyday life, almost every individual has experienced it, and it is difficult to avoid. From a psychological point of view, stress is a situation characterized by the emergence of pressure and tension in an individual's mental aspects. According to a 2018 report by the Mental Health Foundation, approximately 74% of the world's population is reported to experience severe stress levels (Dea et al., 2025).

The highest prevalence of stress is found in patients with chronic diseases, such as metabolic diseases (diabetes mellitus), cardiovascular diseases, respiratory diseases, degenerative diseases, chronic liver disorders, and chronic kidney disease, with a rate of 68.7% (Swathi et al., 2023). During times of stress, the hormonal system is activated, causing an increase in catecholamine, glucocorticoid, and glucagon levels, with cortisol being one of the glucocorticoid hormones in the body. Stress causes the body to produce higher than normal amounts of cortisol. When a person experiences stress, the body stimulates the process of glycogenesis, which causes the release of glucose into the bloodstream.

Physiologically, stress can cause changes in body functions, including hormonal imbalances and immune system disorders. This condition is caused by stimulation of the adrenal glands due to stress, which induces the release of epinephrine. This hormone plays an important role in accelerating the process of gluconeogenesis in the liver, resulting in the release of large amounts of glucose into the bloodstream and causing an increase in blood glucose levels. In individuals with diabetes, insulin resistance occurs due to disorders or damage to the pancreas. This condition results in glucose not being able to be used effectively as an energy source, causing glucose to accumulate in the blood. Based on this, a literature review study was conducted with the aim of identifying and analyzing relevant articles on the relationship between stress levels and random blood sugar levels in patients with diabetes mellitus.

## METHODS

This study is a literature review that aims to analyze several articles with titles or topics that match the researcher's criteria. In this study, the author selected research articles with a *cross-sectional* or *case-control* design that sought to identify the relationship between stress levels as an independent variable and blood sugar levels as a dependent variable. The researchers used Google Scholar, PubMed, and Crossref as databases to obtain articles related to the research topic. In searching these sources, the authors used keywords in Indonesian and English, namely: relationship, stress, blood sugar, diabetes mellitus. In obtaining articles, researchers used three databases. Searching through Google Scholar and Crossref, researchers entered keywords in Indonesian and English, namely: relationship, stress, blood sugar, diabetes mellitus. Meanwhile, on PubMed, researchers entered keywords in English in the PubMed search engine, namely: relationship, stress, blood sugar, diabetes mellitus. Next, researchers recorded the number of articles obtained in the initial stage before the screening process. After obtaining a number of articles, researchers applied restrictions to the search engine based on the year of publication, limiting it to the last five years (2020-2025). Next, researchers recorded the number of articles that had been filtered.

Then, the researchers identified article titles and themes that matched the title or theme, namely those related to stress and blood sugar levels. The researchers then downloaded the articles, identified and analyzed those that matched the title or theme by reading the abstracts and relevant sections, and adjusted them to the inclusion and exclusion criteria. Articles that met the researchers' criteria were then combined and summarized, including the name of the researcher, year of publication, research objectives, country of research, research design, research instruments, analysis methods, number of samples, sampling techniques, and a summary of the research results or findings. In answering the research objectives, the data from the articles that have been collected will be examined for similarities and differences in order to provide an understanding of the two variables. The results and discussion will be useful as a guide for further research. The inclusion and exclusion criteria for the study are presented in Table 1.

**Table 1. Inclusion Criteria and Exclusion Criteria**

No	Inclusion Criteria	Exclusion Criteria
1.	Research is a primary research article in which the author conducts the research directly.	Research articles in the form of theses and dissertations, not in the form of published articles
2.	The article uses a cross-sectional or case-control research design	Research articles that do not discuss topics that meet the researcher's criteria.
3.	Articles published within the last 5 years (2020-2025)	
4.	Articles in Indonesian or English	
5.	The article discusses the relationship between stress levels and random blood sugar levels in diabetes mellitus patients.	

## RESULT

Through the article selection and identification process, the researchers obtained seven articles that met the inclusion and exclusion criteria. The seven articles used consisted of four articles from the Google Scholar database and three article from the Crossref database. The seven articles used were studies by Putra et al (2023), Febriani et al (2024), Ellyn Rochmiati & Ika Silvitasari (2024), Khoirudin et al (2024), Ludiana et al (2022), Wahyuni et al (2024), and Suri et al (2024). The five articles used are Indonesian-language and two articles used are English language that examine the relationship between stress levels and random blood sugar levels. A summary of the articles' information regarding the researchers' names, year of publication, research objectives, country of research, research design, research instruments, analysis methods, sample size, sampling techniques, and a summary of the results or findings used in this literature is attached in Table 2. All articles were presented and reviewed in depth, and the results of the research were found to be consistent, showing a relationship between stress levels and random blood sugar levels.

**Table 2. Article Identification**

No	Researcher, Year, Title	Research Objectives	Design, Instrumentation, Analysis Methods	Sample Size, Sampling Technique	Research findings
1.	Dimas Hendri Putra, Yosi Oktarina, Andika Sulistiawan (2023), The Relationship Between Stress Levels and Blood Sugar Levels in Diabetes Mellitus Patients at the Simpang IV Sipin Community Health Center (Putra et al., 2023).	Assessing the relationship between the two variables, namely the independent variable (stress level) and the dependent variable (random blood sugar level).	A quantitative method was used in this study with a cross-sectional approach.. In measuring variables using two research instruments, namely the Diabetes Distress Scale questionnaire and a glucometer. Data analysis uses univariate and bivariate analysis. Frequency distribution is used in univariate analysis, and bivariate data analysis uses Pearson's correlation test.	Samples were collected using purposive sampling. The sample size was 80 respondents, calculated using the Lameshow formula.	There is a correlation between the two variables measured, namely stress levels and random blood sugar levels, as determined by Pearson's correlation analysis ( $p=0.000$ ) and $r = 0.650$ .
2.	Dita Hanna Febriani (2024), The Impact of Perceived Stress on Elevated Random Blood Glucose Levels in Type 2 Diabetes Mellitus Patients (Febriani, 2024).	To determine whether there is a relationship between stress and random blood sugar levels.	This was a cross-sectional study, with data collected from October to November 2022. The research instruments used were the Perceived Stress Scale (PSS) questionnaire and a glucometer. Data analysis was performed using the Spearman's rho test.	The sample size was 150 patients. The sampling technique used was purposive sampling.	There is a significant relationship between the two variables with $p$ -value $0.047$ and $r = 0.162$ .

3.	Ellyn Rochmiati, Ika Silvitasari (2024), The Relationship Between Stress Levels and Blood Sugar Levels in People with Diabetes Mellitus at the Banyuanyar Community Health Center in Surakarta City (Ellyn Rochmiati, 2024).	Understanding the relationship between stress levels and random blood sugar levels in people with diabetes mellitus	The type of research used was quantitative, analytical, correlational, with a <i>cross-sectional</i> approach. The research instrument used the PSS (Perceived Stress Scale) questionnaire to measure stress levels, as well as blood sugar level measurements using a glucometer. Data analysis used the Spearman test.	The sample size was 70 respondents using total sampling technique.	There is a significant relationship between the two variables with a p-value of 0.000.
4.	Khoirudin, Heny Siswanti, Umi Faridah (2024), The Relationship Between Stress Levels and Sleep Quality with Blood Sugar Levels in Diabetes Mellitus Patients at the Kedung 2 Community Health Center in Jepara (Khoirudin et al., 2024).	To determine the relationship between stress levels and sleep quality with random blood sugar levels in patients with diabetes.	Correlative analytical studies are used in research designs with a cross-sectional approach. The research instruments used were the Depression Anxiety and Stress Scale (DASS) questionnaire and a glucose meter. Data analysis was performed using the Spearman Rho statistical test.	The sample size was 44 respondents using purposive sampling technique.	There is a relationship between stress levels and blood sugar levels in patients with diabetes mellitus at the Kedung 2 Community Health Center in Jepara (p=0.000) and r = 0.645
5.	Ludiana, Uswatun Hasanah, Senja Atika Sari, Nury Luthfiyatil Fitri, Sri Nurhayati (2022), Stress and Depression Factors with Blood Sugar Levels in Type 2 Diabetes Mellitus Patients (Ludiana et al., 2022)	Assessing the relationship between psychological factors such as stress and depression with blood sugar levels.	This study is a correlation study with a population of type 2 diabetes mellitus patients who visited the Ganjar Agung Health Center in two months from February 2022 to March 2022. The research instrument used in this study was the DASS questionnaire. The analysis used the Pearson product-moment correlation test.	The sample size was 45 people. Samples were taken using accidental sampling.	The results show that stress levels have a significant relationship with blood sugar levels in patients with diabetes mellitus. The average stress symptom score for patients with diabetes mellitus was 14.56 and random blood sugar measurements showed an average random blood sugar score of 251.93 mg/dL.
6.	Lutfi Wahyuni, Ilya Krisnana, Rizma Dwi Ramadina (2024), Relationship Between Stress Levels and Changes in	This study aims to evaluate the relationship between two variables, namely stress levels and changes in	This study used a correlational analytical method with a cross-sectional design. Data analysis was performed using the Spearman Rho statistical test.	The number of samples in this study was 67 respondents. The sampling technique used was purposive sampling.	The Spearman Rho test yielded a (p-value = 0.001), suggesting a correlation between independent and dependent



	Random Sugar random blood Levels in Patients sugar levels. with Diabetes Mellitus at Mentikan Public Health Center, Mojokerto City (Wahyuni et al., 2024).				variable. Meanwhile, the correlation coefficient showed a value of $r = 0.663$ .
7.	Silvia Intan Suri, Wisnatul Izzati, Endang (2024) Indonesia The Relationship Between Stress Levels and Blood Sugar Levels in Diabetes Mellitus Patients at Ibnu Sina Islamic Hospital in Padang Panjang (Suri et al., 2024).	Understanding the relationship between the two variables in patients with diabetes mellitus.	The research design used was descriptive analytical using a cross- sectional approach. The research instrument used was the DASS 42 questionnaire to measure stress levels, and blood sugar levels were obtained from laboratory test results in patients' medical records. Data analysis used the Spearman rank test.	The sample size was 70 people using accidental sampling technique.	There is a correlation between the two variables with a p- value of 0.042. The mean random blood sugar level of respondents was 222 mg/dL, with a minimum of 110 mg/dL and a maximum of 386 mg/dL.

## DISCUSSION

Based on the seven articles analyzed, there is a relationship between the two variables. Five articles, namely Putra et al, Febriani, Khoirudin et al, Wahyuni et al, and Ludiana et al, also explain that the values of the independent and dependent variables have a positive correlation. This shows that the higher the stress level in patients, the higher their blood sugar levels. In diabetes patients, stress contributes to unstable fluctuations in blood glucose levels, even when managed through diet, exercise, and appropriate drug therapy. When a person experiences a stressor, certain glands respond to this stressor, namely the adrenal glands and the pituitary gland. These glands influence each other, causing the hypothalamic-pituitary-adrenal (HPA) axis to occur. It starts with the hypothalamus secreting corticotropin-releasing factor (CRF), which stimulates the release of adrenocorticotrophic hormone (ACTH) by the pituitary gland. The ACTH hormone circulates in the blood to the adrenal cortex. The cortex of the adrenal gland produces and releases corticosteroid hormones, which consist of glucocorticoids, including cortisol, and mineralocorticoids, including aldosterone. The main purpose of increased cortisol secretion is to ensure that sufficient glucose is available for energy metabolism. However, if stress persists for a long time, continuously increasing cortisol levels can damage the body's physiological systems, particularly in terms of blood sugar (Seaward, 2018).

The characteristics of respondents in several articles consist of gender, age, education, and occupation. Based on gender characteristics, it was found that more people with diabetes mellitus are women. This is influenced by the majority of respondents being female. In line with Ciarambino's (2022) research, this condition correlates with menopause, which causes a decrease in estrogen production. A decrease in estrogen production causes a reduction in the amount of estrogen hormone, which can affect the decrease in the sensitivity of target organs and tissues to insulin and changes in insulin secretion in the pancreas, which can worsen hyperglycemia in people with diabetes mellitus (Ciarambino et al., 2022). Then, based on age characteristics, it was found that people with aged between 45 and over 65 years were more likely to suffer from diabetes mellitus. The aging process is associated with adipose tissue

dysfunction. During the aging process, there is a decrease in adipogenesis and preadipocyte replication, accompanied by an increase in the production of proinflammatory cytokines and chemokines.

Based on seven articles, more than half of the articles, namely the first, second, third, fourth, and sixth articles, found that the level of stress dominated by people with diabetes mellitus was moderate stress. In the first article, 50 respondents (62.5%) experienced moderate stress; In the second article, stress levels were measured using the Perceived Stress Scale questionnaire, and the average stress level of all respondents was 16.13, which falls into the moderate stress category; in the third article, 43 respondents (68.3%) experienced moderate stress; in the fourth article, 28 respondents (63.6%) experienced moderate stress; and in the sixth article, 46 respondents (65.7%) experienced moderate stress. The fifth article shows that the average stress score of diabetes mellitus patients is 14.56 with the lowest score being 6 and the maximum being 25, as measured using the DASS questionnaire. In the seventh article, the stress levels of patients were dominated by very severe stress, with 25 respondents (37.3%) and 15 respondents (22.3%) experiencing severe stress. Moderate stress lasts for a longer period of time, ranging from several hours to several days. Moderate stress is generally indicated by characteristics such as abdominal pain, anxiety, muscle tension, and changes in sleep patterns. Severe stress is a form of chronic stress that lasts for a long period of time, ranging from several weeks to years. The response to severe stress can trigger digestive problems, increased heart rate, difficulty breathing, tremors, and feelings of anxiety and fear.

Based on these seven articles, it appears that there is variation in the random blood sugar levels of respondents. In the first article, the number of respondents experiencing hyperglycemia (random blood sugar  $\geq 200$  mg/dL) was 61 respondents. The second article found that the average random blood sugar level of all respondents was 162.34 mg/dL. In the third article, it was shown that the majority of respondents had normal blood sugar ( $< 200$  mg/dL), totaling 52 respondents, while 11 respondents experienced hyperglycemia. The fourth article shows that the most of respondents had moderate random blood sugar levels (100-200 mg/dL), totaling 24 respondents, while 15 respondents experienced hyperglycemia. The fifth article found that the most of respondents had high random blood sugar levels (hyperglycemia), namely 54 respondents. The sixth article showed that random blood sugar test results had an average of 251.93 mg/dl, with the lowest value being 189 mg/dl and the highest being 316 mg/dl. The results indicate that the average random blood sugar level of the respondents was hyperglycemic. The seventh article shows that most respondents had moderate random blood sugar levels, totaling 11 respondents, and 4 respondents had poor random blood sugar levels. The average random blood sugar level was  $222.06 \pm 59.792$ .

Blood glucose levels reflect the presence of carbohydrates, including glucose, fructose, and galactose, in the blood, measured in mg per 100 ml of blood. According to PERKENI, random blood glucose levels within the normal range are  $< 200$  mg/dL, while uncontrolled random blood glucose levels are  $\geq 200$  mg/dL. Several factors can affect blood sugar levels, including stress, irregular eating patterns (diet), and lack of physical activity. Based on the articles above, researchers assume that the high number of diabetes mellitus patients with uncontrolled blood sugar levels indicates that management is influenced by various factors, including stress levels, age, gender, and physical activity. When diabetes mellitus patients experience uncontrolled and prolonged stress, there will be poor physiological system compensation, which can affect blood sugar levels in the body.

## CONCLUSION

Based on the results of reviewing several articles and discussions from articles analyzing the correlation between stress levels and random blood sugar levels in patients with diabetes

mellitus, it can be concluded that there is a relationship between the two variables. Some articles also explain that the relationship between the two variables is positive, meaning that the greater the stress level in diabetic patient, the higher their random blood sugar level will be. People with diabetes mellitus who experience prolonged and uncontrolled stress can cause adverse physiological responses, which ultimately affect blood sugar levels.

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## REFERENCES

- Chia, C. W., Egan, J. M., & Ferrucci, L. (2019). *Age-related Changes in Glucose Metabolism, Hyperglycemia, and Cardiovascular Risk. American Heart Association Journals*, 123(7), 886–904. <https://doi.org/10.1161/CIRCRESAHA.118.312806>. Age-related
- Ciarambino, T., Crispino, P., Leto, G., Mastrolorenzo, E., Para, O., & Giordano, M. (2022). *Influence of Gender in Diabetes Mellitus and Its Complication. International Journal of Molecular Sciences*, 23, 1–13.
- Dea, K., Puspita, N., Putu, N., Sri, D., & Suparna, K. (2025). Hubungan tingkat stres dengan kualitas tidur lansia di panti sosial tresna werdha wana seraya. *Ganesha Medicina Journal*, 5(1), pp 53-57.
- Dinata, I. G. S., & Yasa, A. A. G. W. P. (2021). Tatalaksana terkini infeksi kaki diabetes. *Ganesha Medicina Journal*, 1 *Ganesha M*(2), 91–96.
- Ellyn Rochmiati, I. S. (2024). Hubungan Tingkat Stres dengan Kadar Gula Darah Pada Penderita Diabetes Melitus di Puskesmas Banyuanyar Kota Surakarta. *Jurnal Kesehatan STIKes Buleleng*, 9(1), 13–18.
- Febriani, D. H. (2024). *The Impact Of Perceived Stress On Elevated Random Blood Glucose Levels In Type 2 Diabetes Mellitus Patients. Medical-Surgical Journal of Nursing Research*, 3(1), 33–41.
- Hardianto, D. (2021). Telaah Komprehensif Diabetes Melitus: Klasifikasi, Gejala, Diagnosis, Pencegahan, Dan Pengobatan. *Jurnal Bioteknologi & Biosains Indonesia (JBBI)*, 7(2), 304–317. <https://doi.org/10.29122/jbbi.v7i2.4209>
- Khoirudin, Siswanti, H., & Faridah, U. (2024). Hubungan Tingkat Stres dan Kualitas Tidur dengan Kadar Gula Darah Sewaktu Pasien Diabetes Mellitus di UPTD Puskesmas Kedung 2 Jepara. *Medical Research and Public Health Information Journal*, 2(1), 9–18.
- Ludiana, L., Hasanah, U., Sari, S. A., Fitri, N. L., & Nurhayati, S. (2022). Hubungan Faktor Psikologis (Stres dan Depresi) Dengan Kadar Gula Darah Penderita Diabetes Mellitus Tipe 2. *Jurnal Wacana Kesehatan*, 7(2), 61–67. <https://doi.org/10.52822/jwk.v7i2.413>
- Milita, F., Handayani, S., & Setiaji, B. (2021). Kejadian Diabetes Mellitus Tipe II pada Lanjut Usia di Indonesia (Analisis Riskesdas 2018). *Jurnal Kedokteran Dan Kesehatan*, 17(1), 9–20. <https://doi.org/10.24853/jkk.17.1.9-20>
- Okaniawan, P. E. P., & Agustini, N. N. M. (2021). Penurunan fungsi kognitif akibat diabetes melitus. *Ganesha Medicina Journal*, 1(1), pp 28-37.
- Perkeni. (2021). Pedomam Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Dewasa di Indonesia. In PB Perkeni. PB Perkeni.
- Putra, D. H., Oktarina, Y., & Sulistiawan, A. (2023). Hubungan Tingkat Stress Dengan Kadar Gula Darah Pada Pasien Diabetes Mellitus di Puskesmas Simpang IV Sipin. *Jurnal Ilmiah Dikdaya*, 13(2), 362. <https://doi.org/10.33087/dikdaya.v13i2.502>
- Seaward, B. L. (2018). *Managing stress : principles and strategies for health and well being*.



- In C. McAlister (Ed.), Fire Rescue Magazine* (Ninth edit, Vol. 34, Issue 5). Burlington, MA : Jones & Bartlett Learning, [2018].
- Suri, S. I., Izzati, W., & Endang. (2024). Hubungan Tingkat Stres Dengan Kadar Gula Darah Pada Pasien Diabetes Melitus di Rumah Sakit Islam Ibnu Sina Padang Panjang. *Jurnal Kesehatan Lentera Aisyiyah*, 7(1), 11–19.
- Swathi, M., Manjusha, S., Vadakkiniath, I. J., & Gururaj, A. (2023). *Prevalence and correlates of stress, anxiety, and depression in patients with chronic diseases: a cross-sectional study. Middle East Current Psychiatry*, 30(1), 1–14. <https://doi.org/10.1186/s43045-023-00340-2>
- Wahyuni, L., Krisnana, I., & Ramadina, R. D. (2024). *Relationship Between Stress Levels And Changes In Random Sugar Levels In Patients With Diabetes Mellitus At Mentikan Public Health Center , Mojokerto City. International Journal of Nursing and Midwifery Science*, 8(3), 354–362.
- Webber, S. (2021). *International Diabetes Federation. In Diabetes Research and Clinical Practice* (Vol. 102, Issue 2). <https://doi.org/10.1016/j.diabres.2013.10.013>
- Widiasari, K., Wijaya, I. M., & Suputra, P. A. (2021). Diabetes Melitus Tipe 2 : Faktor Risiko , Diagnosis , dan Tatalaksana. *Ganesha Medicina Journal*, 1(2), 114–120.