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The Relationship Between Providing Diabetes Mellitus Education and Stress Levels in Diabetes Mellitus Patients

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ABSTRACT

Diabetes is a metabolically complex disorder characterized by chronic hyperglycemia caused by abnormalities in insulin production and function. Diabetes is classified into type 1 and type 2. Type 1 diabetes is triggered by an autoimmune process that damages pancreatic beta cells, whereas type 2 diabetes is characterized by insulin resistance. The purpose of this study was to identify the relationship between diabetes mellitus education and stress levels among patients with diabetes mellitus at UPT Puskesmas Sei Agul. This research employed a correlational design with a descriptive approach, using a cross-sectional method to examine the relationship between two variables: the independent variable and the dependent variable. The sampling technique used was total sampling, involving 50 respondents. The results showed a significant relationship between the provision of education and stress levels among respondents. Specifically, 10.0% of respondents with poor education experienced severe stress, while in the good education category, 78.0% experienced mild stress and 12.0% experienced moderate stress, with no cases of severe stress. Statistical analysis revealed a p-value of 0.001, indicating that the level of education significantly influences respondents' stress levels. In conclusion, there is a significant relationship between education and stress levels, suggesting that effective counseling and education play an important role in reducing stress among patients.

Keywords: diabetes mellitus, education, stress level

INTRODUCTION

Diabetes mellitus has become a rapidly growing medical problem in the 21st century, with approximately 537 million individuals diagnosed in 2021, and this number is expected to rise to 643 million by 2030 and continue to grow to 783 million individuals (International Diabetes Federation, 2021). The World Health Organization estimates a surge in the number of people with type 2 diabetes mellitus in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030. IDF predictions also show that in 2019 - 2030 there will be an increase in the number of DM patients from 10.7 million to 13.7 million in 2030 (Soelistijo et al., 2021).

According to the Indonesian Health Survey (SKI), the proportion of cases of chronic metabolic disorders based on doctor's diagnosis across all age ranges occurred most frequently in the DKI Jakarta area, namely 33,552 (3.1%) of the total population, while in North Sumatra, namely 48,469 (1.4%) of the total population (Ministry of Health of the Republic of Indonesia, 2023).

The number of children and adolescents diagnosed with diabetes is expected to increase, highlighting the need for comprehensive health care (IDF, 2021).

Diabetes is a complex metabolic dysfunction characterized by chronic hyperglycemia, caused by abnormalities in insulin secretion and function. Diabetes is classified into two types: type 1 and type 2. Type 1 diabetes is triggered by an autoimmune process that destroys pancreatic beta cells, while type 2 diabetes is characterized by insulin resistance (Minister of Health of the Republic of Indonesia, 2024).

Previous research has suggested that there is a relationship between diabetes mellitus and patient anxiety levels (Irawandi, 2020). Type II DM sufferers showed that almost all had moderate levels of anxiety with a good quality of life (Sriwiyati et al., 2024). The study findings show that respondents with good self-management have low anxiety compared to respondents with moderate anxiety (Siska & Dikha, 2024).This provides a more realistic and clarified understanding of the procedures involved in stress and anxiety reduction through music therapy. The implications of this study are the importance of music therapy as another effective treatment for anxiety and the need for further research to improve understanding of the effectiveness and mechanisms of music therapy (Lussy, 2023).

The diabetes mellitus categories were created based on analysis conducted by researchers. There is a correlation between stress intensity and blood sugar levels in diabetes patients. Stress in diabetes patients impacts the proper use of medication (Makalew et al., 2021). Stress is an adaptive response of an individual through mental traits and processes to external actions, situations and events (Sugiarti et al., 2021).

Data indicates a link between stress and blood sugar levels in a person, increasing psychological stress has the potential to affect the regulation of glucose metabolism (Ludiana et al., 2022). Respondents who experience stress in diabetes mellitus patients have an 11.769 times greater chance of experiencing heart disease compared to respondents who do not experience stress (Rahmawati & Purwanti, 2023). At normal stress levels, for mild stress levels, blood glucose levels are 82 mg/dL, moderate stress is 83 mg/dL, and severe stress levels are 81 mg/dL (Caesaria et al., 2021).

According to Nooseisai et al. (2021) found that a planned Diabetes Self-Management Education (DSME) intervention was scientifically proven to be effective in reducing plasma glucose levels, HbA1c levels, stress levels, and quality of life in patients with diabetes mellitus in the short term. One step taken was to provide education to people with diabetes, especially

those undergoing treatment at Community Health Centers (Puskesmas) under the Prolanis program, through counseling and interactive discussions. They were educated through a lecture approach. Individuals with diabetes are at high risk of developing severe complications and require further treatment in health services, including inpatient hospitalization (I Gede et al., 2023).

Based on the results of previous studies, stress levels have a significant correlation with blood sugar levels in individuals with diabetes mellitus. As a result, stress has a negative impact on both the physical and psychological health of people with diabetes mellitus. Educational efforts are therefore essential and should include providing information about diabetes mellitus, such as its etiology, risk factors, clinical manifestations, and classification. This information is necessary to prevent disease progression, improve the quality of life of patients, and raise awareness about how the disease develops and how it can be prevented early. Previous studies have also discussed anxiety among diabetes patients, with individuals suffering from type 2 diabetes mellitus showing notable levels of anxiety.

Research onThe effectiveness of music therapy is proven more realistically and clarifies the procedures involved in reducing anxiety through music therapy. Research on providing education to diabetes patients experiencing psychological distress in the form of stress has never been conducted. The aim of this study was to identify the relationship between diabetes mellitus education and stress levels in diabetes mellitus patients at the Sei Agul Community Health Center (UPT).

METHOD

This study employed a correlational design with a descriptive approach, utilizing the cross-sectional method to examine the relationship between two variables: the independent variable and the dependent variable. The research was conducted at the Sei Agul Medan Community Health Center UPT from April to May 2025. The study population comprised all patients diagnosed with diabetes mellitus at the facility, totaling 50 individuals. A total sampling technique was applied, thereby including all eligible patients as study respondents.

Data collection was carried out using a structured questionnaire, with the Perceived Stress Scale (PSS) employed as the primary measurement instrument to assess stress levels. The questionnaire also incorporated items related to diabetes mellitus education to evaluate respondents' knowledge and exposure to educational interventions. Data analysis was

performed using univariate and bivariate statistical methods to identify patterns and determine the significance of relationships between variables.

Ethical considerations were addressed prior to data collection. The study obtained approval from the relevant ethics review board, and informed consent was secured from all respondents. Participants were assured of the confidentiality of their information and informed that their involvement was voluntary, with the option to withdraw from the study at any stage without consequence.

RESULTS AND DISCUSSION

RESULT

The results of the study on the relationship between providing diabetes mellitus education and stress levels in Diabetes Mellitus patients, the characteristics of the respondents are as follows:

Table 1. Frequency Distribution Based on Respondent Characteristics

Characteristics	Frequency (f)	Percentage (%)
Age		
36-45 years	7	14.0
46-55 years	4	8.0
> 56 years	39	78.0
Gender		
Man	22	44.0
Woman	28	56.0
Marital status		
Not married yet	3	6.0
Marry	47	94.0
Respondent education		
Elementary-Middle School	6	12.0
Senior High School	21	42.0
College	23	46.0
Work		
State Civil Servant	2	4.0
Housewife	27	54.0
Private sector employee	21	42.0
Long-term illness		
< 1 year	14	28.0
1-2 years	18	36.0
> 2 years	18	36.0

Based on research from 50 samples with age characteristics, most were in the age group over 56 years (78.0%), and most of them were female (56.0%). Most of the respondents were also married (94.0%). In terms of education level, most respondents had a college degree (46.0%), followed by high school (42.0%), and elementary-junior high school (12.0%). Most respondents worked as private employees or self-employed (42.0%), followed by housewives

(54.0%) and civil servants (4.0%). Duration of the disease, most respondents had experienced it for more than one year. The same percentage was also seen in the group aged between 1 and 2 years, with 36.0%, and 28.0% in the group aged less than one year.

Table 2. Frequency Distribution Based on Stress Height

Stress Level	Frequency (f)	Percentage (%)
Mild Stress	39	78.0
Moderate Stress	6	12.0
Severe Stress	5	10.0
Total	50	100.0

The researchers reported that 39 respondents (78%) experienced mild stress, 6 respondents (12%) experienced moderate stress, and 5 respondents (10%) experienced severe stress.

Table 3. Distribution of Education Frequency

Education	Frequency(f)	Percentage (%)
Not good	5	10.0
Good	45	90.0
Total	50	100.0

The study showed that most respondents had received a good education; 45 respondents (90.0%) of the total data had a good level of education and only 5 respondents (10.0%) had a poor level of education.

Table 4. Frequency distribution of the relationship between education and stress levels in diabetes mellitus patients.

Education	Stress Category						Total		P-value
	Low Stress		Moderate Stress		High Stress				
	F	*%*	*f*	*%*	*f*	*%*	*N*	*%*	
Not good	0	0.0	0	0.0	5	10.0	5	10.0	
Good	39	78.0	6	12.0	0	0.0	45	90.0	0.001
Total	39	78.0	6	12.0	5	10.0	50	100.0	

Table 4. Shows a significant relationship between education provision and stress levels among respondents, with 10.0% of respondents experiencing severe stress levels with poor education, while 78.0% of respondents with good education experienced mild stress levels and 12.0% experienced moderate stress levels, with no severe stress levels. The results of statistical tests prove that the p-value is 0.001, meaning that education level has an influence on respondents' stress levels.

DISCUSSION

Respondent Characteristics

This study found that the majority of patients with diabetes mellitus were over 56 years of age. This may be attributed to the increased risk of developing diabetes due to metabolic changes that occur with aging. According to Naba et al. (2021), older adults, particularly those in late adulthood, are the group most likely to develop diabetes.

The results also showed that the majority of respondents were women. This finding may be linked to hormonal changes during pregnancy and menopause, which increase the risk of gestational diabetes. In addition, women are generally more prone to being overweight and tend to undergo regular health check-ups, which may contribute to higher detection rates. Adyas et al. (2022) also reported that the female gender has a higher prevalence of diabetes mellitus compared to males.

Furthermore, the combination of age-related metabolic decline and gender-specific physiological changes may compound the risk of diabetes in older women. This highlights the importance of targeted preventive strategies, such as lifestyle modifications, regular screenings, and early interventions, particularly for women over the age of 50. Addressing these risk factors can play a key role in reducing the incidence and complications of diabetes mellitus in this vulnerable population.

Research indicates that diabetes mellitus is more prevalent among married individuals than those who are single. This trend may be associated with lifestyle changes and unbalanced dietary patterns that often occur after marriage. Sari et al. (2021) also reported that the majority of diabetes mellitus patients are married.

Education was one of the characteristics examined in this study, with the majority of respondents holding a college degree. This could be related to workplace habits where eating out and consuming snacks are common. Supporting this finding, Ali et al. (2020) observed that most diabetes mellitus patients in their study had a relatively high level of education.

Housewives represented the largest occupational group affected by diabetes mellitus. This may be due to the nature of domestic activities, which generally involve light physical exertion, such as cooking, childcare, and household cleaning. Naba et al. (2021) also found that a significant proportion of diabetes patients had only a basic level of education and were primarily engaged in household work.

From an analytical perspective, these findings suggest that sociodemographic factors such as marital status, education level, and occupation may indirectly contribute to the risk of developing diabetes mellitus. Married life may introduce dietary and lifestyle patterns that elevate the risk, while higher educational attainment does not necessarily guarantee healthier habits, especially if occupational demands encourage sedentary behavior and unhealthy food consumption. Similarly, housewives, despite being engaged in daily activities, may lack sufficient physical activity intensity to counteract the metabolic risks associated with diabetes. These insights highlight the need for targeted health education and lifestyle modification programs tailored to different demographic groups.

Based on the data obtained, the duration of diabetes mellitus ranged from 1-2 years to more than 2 years. The data showed that the majority of patients diagnosed with diabetes were in the early stages, with a higher risk of complications if not properly managed. According to univariate analysis conducted over several years, respondents who had suffered from DM for more than 1 year (Ilmi et al., 2020).

Stress Level

The research results showed that the majority experienced mild stress. This is because most respondents were educated and therefore able to manage stress well. This condition is thought to be closely related to respondents' high level of education. With adequate understanding, respondents tend to be better able to identify sources of stress, understand the risks, and seek appropriate solutions or assistance to address their problems. Furthermore, highly educated people typically possess better adaptive skills, such as positive thinking, emotional control, and rational decision-making. This makes them better prepared to experience various psychological stresses, especially those related to their health problems. Good knowledge also encourages respondents to be more compliant with medication and follow doctors' advice to reduce stress. Therefore, a high level of education is one factor that helps respondents reduce stress levels.

According to Fatmawati et al. (2020), the test group with a good level of knowledge did not show significant symptoms of stress. Health education can improve attitudes and actions in maintaining health in DM sufferers (Rosdiana et al., 2024). This finding suggests that knowledge plays a critical role in psychological well-being for patients with diabetes mellitus. Patients who are well-informed about the disease, its management, and preventive strategies are more likely to adopt healthy behaviors, adhere to treatment plans, and cope effectively with the challenges of living with a chronic illness. Improved knowledge may also reduce

uncertainty and fear, thereby lowering stress levels. Consequently, structured health education programs should be prioritized as part of comprehensive diabetes care, not only to enhance clinical outcomes but also to improve patients' mental health and quality of life.

Education

Research shows that most respondents have received adequate education. Researchers provided education about diabetes mellitus, specifically factors that can potentially lead to increased blood glucose levels. The material provided included information on foods diabetics should avoid and strategies for controlling their blood sugar levels. Solutions to reducing blood glucose levels include regular exercise and effective stress management.

According to research Cahyoajibroto et al. (2023), the material provided and interval testing were conducted to analyze the knowledge of the participants about diabetes mellitus and its potential risk factors. This indicates that after the material was presented, their knowledge improved. This counseling helps people understand the disease.

Study Haskas et al. (2020), he stated that diabetes management can be achieved through several approaches, including education, nutritional therapy, exercise, and medication. Providing education is one method that has been widely implemented and has had a positive impact on diabetes sufferers.

This highlights the multifaceted nature of diabetes management, where education serves as a foundational component that supports the effectiveness of other interventions. Knowledge gained through education empowers patients to make informed decisions about their diet, physical activity, and medication adherence. Furthermore, education fosters self-efficacy, enabling patients to actively participate in managing their condition rather than relying solely on medical interventions. When combined with nutritional guidance, regular exercise, and appropriate pharmacological treatment, education not only improves clinical outcomes but also enhances the overall quality of life for diabetes patients.

The Relationship Between Providing Diabetes Mellitus Education and Stress Levels in Diabetes Mellitus Patients

The correlation analysis revealed a negative correlation between education and stress levels; in other words, the more education a person receives, the less stress they tend to experience. Psychologically, individuals with a higher level of education generally have more effective coping skills when facing pressure, enabling them to manage stress more effectively.

Conversely, individuals with lower levels of education tend to have limitations in understanding and handling stressful situations.

Study Ningsih and Thahura, (2022) convey more specific policies to improve the health of diabetes mellitus patients by increasing education and information on how to reduce stress. According to Handayani et al. (2020), blood glucose levels differed before and after education. Researchers found that education can help diabetes patients manage their own disease and achieve controlled blood glucose levels.

According to research Prabowo et al. (2021), before and after the community service, education was provided using a questionnaire sheet, there was an increase in respondents' knowledge after being given education and a decrease in stress levels.To help patients control stress, provide education about good coping strategies, and programs teach relaxation techniques to help respondents control their emotions (Faith, 2024).

These findings highlight that education goes beyond simply increasing a patient's knowledge, it can also serve as a form of therapy that supports mental and emotional well-being for those living with diabetes mellitus. When stress management techniques such as breathing exercises, mindfulness, and progressive muscle relaxation are incorporated into educational sessions, patients benefit on both a physical and psychological level. Regular reinforcement of these skills through follow-up activities can help ensure that patients continue to apply them effectively over time. By taking this holistic approach, healthcare providers can better prepare individuals to cope with the emotional demands of a chronic condition, ultimately fostering better self-care, stronger adherence to treatment plans, and an improved quality of life.

CONCLUSION

The results showed that the majority of respondents were women over the age of 56, married, with a high school or college education, working as housewives, and having lived with diabetes for an average of 1–2 years or more. When viewed in terms of stress levels, an encouraging pattern emerged: most patients experienced stress at a mild level. Furthermore, those who had received quality diabetes education appeared better equipped to manage the condition both emotionally and psychologically.

Correlation analysis revealed a significant relationship between the quality of education and stress levels ($r = –0.719$, $p < 0.001$). This strong negative correlation indicates that the better the education patients received, the lower their stress levels. These findings support the initial

hypothesis that education plays a protective role in reducing the psychological stress burden experienced by individuals with diabetes mellitus.

LIMITATIONS

The study revealed several limitations that may have influenced the results and the validity of the conclusions. One of the primary constraints was the limited timeframe for data collection, which could have affected the depth and accuracy of the information obtained from respondents. A longer study period might have allowed for more comprehensive data gathering and follow-up, leading to richer and more reliable findings. In addition, the relatively small sample size limited to 50 respondents may not fully represent the broader population of individuals with diabetes mellitus in the region. This limitation reduces the generalizability of the results, as the findings may not be entirely applicable to different demographic or geographic contexts.

Another factor to consider is the potential influence of the research methods and data collection procedures. Variations in how instructions were given to respondents, or the respondents' understanding of the questionnaire items, could have introduced bias or variability in responses. Furthermore, unmeasured variables such as socioeconomic status, comorbidities, or access to healthcare services may have acted as confounding factors, affecting both education levels and stress outcomes. These issues highlight the need for future research with larger, more diverse samples, extended study durations, and standardized data collection protocols. Employing mixed-method approaches, such as combining quantitative surveys with qualitative interviews, could also provide a deeper and more nuanced understanding of the relationship between education and stress in patients with diabetes mellitus.

REFERENCES

Adyas, A., Putri, D. U. P., Setiaji, B., & Sutriyani, S. (2022). Faktor – faktor yang mempengaruhi penderita diabetes mellitus peserta posyandu lansia. *Jurnal Ilmu Kesehatan Indonesia (JIKSI)*, *2*(2), 54-66. https://doi.org/10.57084/jiksi.v2i2.654

Ali, A., Muzakkir, H., & Sudirman. (2020). Hubungan pengetahuan dengan tingkat stres pada klien diabetes melitus di Rumah Sakit Bhayangkara Makassar. *Jurnal Ilmiah Kesehatan Diagnosis, 15*(2), 158-162. https://jurnal.stikesnh.ac.id/index.php/jikd/article/view/201

Caesaria, A., Mutholib, A.-, Karneli, K., Edyansyah, E., & Nurhayati, N. (2021). Analisis kadar glukosa darah dengan tingkat stres mahasiswa teknologi laboratorium medis Poltekkes Kemenkes Palembang. *Journal of Medical Laboratory and Science*, *1*(2), 38–45. https://doi.org/10.36086/medlabscience.v1i2.1090

Cahyoajibroto, M. A., Dewi, L. M., Nandasari, D., Sabilla, F. F., Ratnaasri, U. D., Anisah, Y. H., Puspitasari, K. V., & Permatasari, A. A. D. (2023). Mengenal penyakit diabetes

melitus dan faktor risikonya pada lansia. *Jurnal Pengabdian Masyarakat Medika*, 29–34. https://doi.org/10.23917/jpmmedika.v3i1.1337

Eddy, R. (2021). *Populasi, sampel, variabel dalam penelitian kedokteran*. PT. Nasya Expanding Management.

Fatmawati, B. R., Suprayitna, M., & Prihatin, K. (2020). Pengaruh pendidikan kesehatan terhadap sikap dan tindakan pencegahan ulkus diabetik pada pasien diabetes mellitus tipe 2. *Jurnal Kesehatan Qamarul Huda*, *8*(1), 34–41. https://doi.org/10.37824/jkqh.v8i1.2020.189

Handayani, V. W., Aryanto, A. F., & Kurniawan, D. (2020). Systematic review; akbat bencana alam terhadap penderita diabetes mellitus. *J-HESTECH (Journal Of Health Educational Science And Technology)*, *3*(2). https://doi.org/10.25139/htc.v3i2.2927

Haskas, Y., Suarnianti, S., & Restika, I. (2020). Efek intervensi perilaku terhadap manajemen diri penderita diabetes melitus tipe 2: sistematik review. *Jurnal Kesehatan Andalas*, *9*(2). https://doi.org/10.25077/jka.v9i2.1289

I Gede, S. D., Udrayana, O., Ketut Suparna, Ida Ayu Setyawati Sri Krisna Dewi, & Kadek Surya Candra Wijaya. (2023). Penyuluhan perawatan kaki diabetik kepada peserta program prolanis di Puskesmas Buleleng Ii tahun 2022. *Jurnal Widya Laksana*, *12*(1), 39–45. https://doi.org/10.23887/jwl.v12i1.51538

Ilmi, M. Z., Abdurrahman, & Abiyoga, A. (2020). Hubungan antara lama menderita diabetes mellitus tipe 2 dengan kejadian neuropati sensorik di Puskesmas Loa Janan. *Jurnal Keperawatan Wiyata, 1*(1), 61–70. https://doi.org/10.35728/jkw.v1i1

International Diabetes Federation. (2021). *IDF Diabetes Atlas 10th edition*. IDF.

Irawandi, D. (2020). *The Correlation of Time Span of Suffering and Anxiety Level in Patient with Diabetes Melitus*. *Indonesian Contemporary Nursing Journal (ICON Journal)*, *5*(1), 21–26. https://doi.org/10.20956/icon.v5i1.9970

Kementerian Kesehatan RI. (2023). *Survei kesehatan Indonesia*. Badan Kebijakan Pembangunaan Kesehatan.

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). https://doi.org/10.52822/jwk.v7i2.413

Lussy, P. K. (2023). Efektivitas terapi musik untuk menurunkan tingkat stres dan kecemasan. *Detector: Jurnal Inovasi Riset Ilmu Kesehatan*, *1*(3). 95–102. https://doi.org/10.55606/detector.v1i3.2101

Makalew, C. D., Rompas, S. S. J., & Katuuk, M. E. (2021). Gambaran tingkat stres pada penderita diabetes melitus tipe 2: Literatur review. *Jurnal Keperawatan*, *9*(1), 22–30. https://doi.org/10.35790/jkp.v9i1.36766

Menteri Kesehatan Republik Indonesia. (2024). *Keputusan menteri kesehatan Republik Indonesia nomor HK.01.07/MENKES/2009/2024*. Kementerian Kesehatan RI.

Naba, O. S., Adu, A. A., & Tedju Hinga, I. A. (2021). Gambaran karakteristik pasien diabetes melitus di wilayah kerja Puskesmas Sikumana Kota Kupang. *Media Kesehatan Masyarakat*, *3*(2), 186–194. https://doi.org/10.35508/mkm.v3i2.3468

Ningsih, N., & Thahura, F. (2022). Kesehatan mental pasien diabetes melitus di Puskesmas Langsa Baro. *Jurnal Kebidanan, Keperawatan dan Kesehatan (BIKES)*, *2*(1), 1–9. https://doi.org/10.51849/j-bikes.v2i1.20

Nooseisai, M., Viwattanakulvanid, P., Kumar, R., Viriyautsahakul, N., Muhammad Baloch, G., & Somrongthong, R. (2021). Effects of diabetes self-management education program on lowering blood glucose level, stress, and quality of life among females with type 2 diabetes mellitus in Thailand. *Primary Health Care Research & Development*, *22*, e64. https://doi.org/10.1017/S1463423621000505

Prabowo, N. A., Ardyanto, T. D., Hanafi, M., Kuncorowati, N. D. A., Dyanneza, F.,

Apriningsih, H., & Indriani, A. T. (2021). Peningkatan pengetahuan diet diabetes, self management diabetes dan penurunan tingkat stres menjalani diet pada pasien diabetes mellitus ipe 2 di Rumah Sakit Universitas Sebelas Maret. *Warta LPM*, *24*(2), 285–296. https://doi.org/10.23917/warta.v24i2.12515

R Ahmawati, N. A., & Purwanti, O. S. (2023). Hubungan tingkat stres dengan kejadian penyakit jantung pada pasien diabetes melitus. *Malahayati Nursing Journal*, *5*(10), 2512–2518. https://doi.org/10.33024/mnj.v5i10.9326

Rosdiana, E., Harianti, F., Finaul, A., & Lisnawati. (2024). Pengaruh pemberian edukasi terhadap tingkat pengetahuan dan sikap pasien diabetes mellitus tipe 2 pada pasien Prolanis di Puskesmas Muara Satu Kota Lhokseumawe. *Journal of Healthcare Technology and Medicine,* *10*(1), 44–51. https://www.jurnal.uui.ac.id/index.php/JHTM/article/view/3775

Sari, D. K., Wardani, I. M. K., Shofiyatul, M., Samah, D. A., Alma, L. R., Septa, K., & Ulfah, N. H. (2021). Korelasi status perkawinan, pendapatan keluarga, kebiasaan makan "muluk" dan konsumsi gorengan terhadap risiko diabetes pada wanita lansia awal (46–55 tahun). *Preventia: The Indonesian Journal of Public Health*, *6*(2), 111–122. https://doi.org/10.17977/um044v6i22021p111-122

Siska, R., & Dikha, A. K. (2024). Hubungan kecemasan dengan manajemen diri pada pasien diabetes melitus tipe 2 di masa pandemi COVID-19. *Jurnal Nurse*, *7*(1), 18–24. https://doi.org/10.57213/nurse.v7i1.220

Soelistijo, S. A., Suastika, K., Lindarto, D., Decroli, E., Permana, H., W Sucipto, K., Kusnadi, Y., Budiman, Ikhsan, M. R., Sasiarini, L., Sanusi, H., Nugroho HS, K. H., & Susanto, H. (2021). *Pedoman pengelolaan dan pencegahan diabetes melitus tipe 2 dewasa di Indonesia*. PB. PERKENI.

Sriwiyati, K., Wibisono, B., Permata, Y. N., & Nur, R. M. (2024). Hubungan tingkat kecemasan dengan kualitas hidup penderita diabetes melitus tipe II di Puskesmas Kalijaga Permai Kota Cirebon. *Jurnal Ilmu Kesehatan Bhakti Husada: Health Sciences Journal*, *15*(01), 45–50. https://doi.org/10.34305/jikbh.v15i01.1005

Sugiarti, F., Kurniawati, L. M., & Susanti, Y. (2021). Kajian teori hubungan stres kerja dengan hipertensi. *Kedokteran*, *Volume 7*.