

What are the Psychological Issues of Diabetic Ulcer Patients

Ade Jundy Fahri Prahastyo¹, Anna Kurnia^{2,*}, Khoiriyah³, Dwi Nur Rahmantika PS⁴
^{1,2,3,4}Faculty of Nursing and Health Sciences, University of Muhammadiyah Semarang, Indonesia

Abstract

Diabetic ulcers, a complication of Diabetes Mellitus, affect both physical and psychological well-being, including self-motivation, anxiety, self-esteem, and body image. This study examines the psychological profile of diabetic ulcer patients using a quantitative descriptive approach. This research conducted at a wound clinic in Semarang City in July–August 2024, the study involved 55 patients. Psychological assessments utilized the TSRQ (Treatment Self-Regulation Questionnaire), ZSAS (Zung Self Anxiety Scale), RSES (Rosenberg Self-Esteem Scale), and a body image questionnaire. Findings indicate poor self-motivation in 78.2% of patients, moderate anxiety in 54.5%, low self-esteem in 52.7%, and positive body image in 78.2%. These results highlight significant psychological challenges among diabetic ulcer patients. Future research should explore the relationship between respondent characteristics and psychological factors influencing the healing process.

Keywords: Diabetic Ulcer; Self-Motivation; Anxiety; Self-Esteem; Body Image; Psychological Profile

Article info: Article info: Sending on November 21, 2024; Revision on December 27, 2024; Accepted on February 04, 2025

*) Corresponding author: Anna Kurnia
E-mail: annakurnia@unimus.ac.id

1. Introduction

Diabetes Mellitus (DM) is a chronic metabolic disease characterized by elevated blood sugar levels, resulting from an imbalance between insulin supply and demand, leading to insulin deficiency and potential complications ([Yanti & Leniwita, 2019](#)). According to data from the International Diabetes Federation (IDF) in 2021, the global number of diabetes patients reached 536.6 million. Indonesia ranked fifth worldwide, with 19.4 million people affected by diabetes ([IDF, 2021](#)). The city of Semarang recorded 4,700 deaths due to diabetes complications, with the mortality rate from diabetes complications in Indonesia at 73.3% ([Riskseddas, 2018](#)).

The impact of elevated blood glucose levels in Diabetes Mellitus patients can lead to both acute and chronic complications, including macrovascular and microvascular complications ([Hananto et al., 2022](#)). Microvascular complications arise from persistently high blood glucose levels, leading to the formation of glycated proteins that weaken and block small blood vessels. This can result in conditions such as diabetic nephropathy, diabetic retinopathy, and diabetic neuropathy. Diabetic neuropathy, in particular, can progress to diabetic ulcers ([Rachman & Dwipayana, 2019](#)). Diabetic ulcers can progress to

infections caused by both aerobic and anaerobic bacteria. Diabetic ulcer development begins with a loss of pain sensation, foot deformities, muscle atrophy in the feet, callus formation, and reduced oxygen and nutrient supply to the tissue ([Kusumastuti et al., 2022](#)).

The impact of diabetic ulcers includes both physical and psychological effects. Psychological effects encompass self-motivation, anxiety, self-esteem, and body image ([Setiawan et al., 2020](#)). Self-motivation can influence an individual's confidence in their ability to engage in self-care and recover effectively through a proper healing process ([Notoatmodjo, 2014](#)). Furthermore, psychological impacts such as anxiety can result from prolonged wound healing and financial factors ([Setiawan et al., 2020](#)). Body image is a set of conscious and unconscious attitudes an individual holds toward their body, including perceptions and feelings from the past and present about the body's structure, shape, and function. Experiences of changes in appearance or bodily function tend to influence a negative body image ([Andilala, 2023](#)). Low self-esteem in patients can put them at risk of withdrawing from social interactions. Such patients may become passive and dependent, lacking the motivation to participate actively in their own care and treatment ([Setiorini et al., 2019](#)).

A preliminary study examining anxiety disorders, body image disturbances, self-esteem levels, and self-motivation among diabetic ulcer patients was conducted at several wound care clinics in Semarang City, involving 10 respondents. The findings revealed that 60% of respondents experienced severe anxiety, while moderate and mild anxiety were each reported by 20%. Regarding self-esteem, 60% of respondents exhibited low self-esteem, 10% had moderate self-esteem, and 30% displayed high self-esteem. Self-motivation was predominantly poor in 90% of respondents, with only 10% demonstrating good self-motivation. Additionally, body image perceptions were evenly distributed, with 50% of respondents reporting a negative body image and the remaining 50% indicating a positive body image.

Based on the above discussion, the author plans to conduct a detailed study on the “Psychological Profile of Diabetes Patients.” The aim is to understand their psychological state and self-motivation to facilitate the planning and implementation of appropriate interventions to address the psychological issues arising from diabetic ulcers.

2. Method

This study employs a descriptive quantitative method, which utilizes quantitative techniques and descriptive analysis. It was conducted at a wound clinic in Semarang City from July to August 2024. The study population consists of 55 diabetic ulcer patients receiving care at the wound clinic in Semarang as of April 2024. Consecutive sampling was used to select a sample of 55 respondents. The instruments utilized in this study include the TSRQ (Treatment Self-Regulation Questionnaire) to assess self-motivation, the ZSAS (Zung Self-Anxiety Scale) to measure anxiety levels, the RSES (Rosenberg Self-Esteem Scale) to evaluate self-esteem, and a body image questionnaire adapted from Hapid (2020) to assess the body image of diabetic ulcer patients. Self-

motivation is categorized into two levels: good ($\geq 80\%$ of the total score or ≥ 35.2) and poor ($< 80\%$ of the total score or < 35.2). Anxiety is classified into four categories: mild anxiety (scores 20–44), moderate anxiety (scores 45–59), severe anxiety (scores 60–74), and panic anxiety (scores 75–80). Self-esteem is categorized as low self-esteem (scores 10–25), moderate self-esteem (scores 26–29), and high self-esteem (scores 30–40). Body image disturbances are divided into two categories: negative body image (< 45) and positive body image (≥ 45). Data were collected using paper copies filled out by respondents, who were provided with explanations by the researcher beforehand. This study received ethical approval with clearance number 507/KE/07/2024 from Health Research Ethics Commission, Faculty of Nursing and Health Sciences, University of Muhammadiyah Semarang.

3. Results and Discussion

This study was conducted in July 2024 at a wound care clinic in Semarang City. A total of 55 respondents, all diabetic ulcer patients undergoing ulcer treatment at the wound care clinic, participated in the study.

Table 1 shows that the diabetic ulcer patients in this study had an average age of 55.18 years. The majority of respondents were female, with 29 respondents (52.7%). The most common education level was high school, with 23 respondents (41.8%), followed by employment and marital status, with 25 respondents (45.5%) being unemployed or retired and 47 respondents (85.5%) being married. The average duration of diabetes among respondents was 5.35 years, while the average duration of diabetic ulcers was 54.18 days. Hypertension was the most prevalent comorbid condition, affecting 26 respondents (47.3%). Metformin was the most frequently used medication, taken by 15 respondents (27.3%). Blood glucose levels above 200 mg/dL were observed in 25 respondents (45.5%), and grade 2 ulcers were the most common, affecting 36 respondents (65.5%).

Table 1. Frequency Distribution Based on Characteristics of Diabetic Ulcer Patients at the Wound Care Clinic in Semarang City (n=55)

Variable	f	%	Mean	Median	Std	Min	Max
Age			55.18	56	7.85	36	73
Sex							
Female	29	52.7					
Male	26	47.3					
Education							
Elementary school	8	14.5					
Junior High School	5	9.1					
Senior High School	23	41.8					
University	19	34.5					
Job							
None	25	45.5					
Employee	26	49					

Variable	f	%	Mean	Median	Std	Min	Max
Other	3	5.5					
Marital Status							
Married	47	85.5					
Divorced	8	14.5					
Duration of DM (Year)			5.35	4	4.05	1	15
Duration of Diabetic Ulcer (Day)			54.18	46	31.2	7	153
Comorbid Condition							
Hypertension	26	47.3					
Cardiovascular Disease	4	7.3					
None	25	45.5					
Medication Usage							
Antidiabetic Medication							
Amaryl M1	5	9.1					
Amaryl M2	7	12.7					
Diaformin	1	1.8					
Fonylin	1	1.8					
Galyusmet	1	1.8					
Gliclazide	2	3.6					
Glimiperid	6	10.9					
Metformin	15	27.3					
Insulin	2	3.6					
Novorapid	12	21.8					
None							
Blood Glucose Level							
<140							
140-200	19	34.5					
>200	11	20					
	25	45.5					
Wound Stage							
Stage 1	5	9.1					
Stage 2	36	65.5					
Stage 3	9	16.4					
Stage 4	4	7.3					
Stage 5	1	1.8					

Respondent Characteristic

The average age of diabetic ulcer patients in this study was 55.18 years. Age is an independent risk factor for diabetic ulcers, as older diabetic patients tend to have a higher risk of developing foot ulcers. Aging leads to changes in skin structure, blood circulation, and nerve function, all of which increase susceptibility to diabetic ulcers (Marsya et al., 2023). The most of respondents were female, totaling 29 individuals (52.7%). Hormonal changes in women, particularly during menstruation and menopause, can affect blood sugar levels and insulin sensitivity. Additionally, women generally have thinner skin and thicker fat tissue in their feet, which may increase their risk of wounds and ulcers (Vanherwegen et al., 2023). The majority of respondents were unemployed or retired, totaling 25 individuals (45.5%). Individuals who are not working or retired tend to be less physically active, which can negatively impact blood sugar control and circulation, thereby increasing the risk of ulcers. Additionally, the loss of work identity or feeling less productive can lead to stress. Chronic stress may further affect blood sugar control and weaken the immune system (R.

A. Budiman et al., 2024). The next demographic data point reveals that the majority of respondents are married or have a partner, totaling 47 individuals (85.5%). Family responsibilities can add stress, which may affect diabetes management and increase vulnerability to complications, as well as impact the management of existing complications (Zalianty, 2024).

The average duration of diabetes among diabetic ulcer patients was 5.35 years. This aligns with previous research showing an average diabetes duration of 5 years, with a minimum of 1 year and a maximum of 12 years. Diabetic ulcers can develop earlier in patients with high-risk factors, such as poor blood sugar control, pre-existing peripheral neuropathy, peripheral artery disease, foot trauma, and inadequate foot care (Mildawati et al., 2019). The average duration of diabetic ulcers among patients was 54.18 days, or approximately 3 months. This is consistent with previous research, which found an average ulcer duration of 52 days (Wulandari et al., 2021). The chronic nature of the condition leads diabetic ulcer patients to experience heightened psychological stress, including depression and anxiety (Maulidita & Prihati, 2020).

The longer a person suffers from an ulcer, particularly a diabetic ulcer, the higher the risk of amputation. Prolonged ulcer duration necessitates more complex and intensive care strategies ([Mansoor & Modaweb, 2022](#)).

Table 2. Frequency Distribution Based on Psychological Issues Categories of Diabetic Ulcer Patients at the Wound Care Clinic in Semarang City (n=55)

Variable	f(n)	(%)
Self Motivatiomm		
Good Motivation	12	21.8
Bad Motivation	43	78.2
Anxiety		
Mild	20	36.4
Moderate	30	54.5
Severe	5	9.1
Panic	0	0
Self-esteem		
Mild	29	52.7
Moderate	24	43.6
High	2	3.6
Body Image		
Negative	12	21.8
Positive	43	78.2

Hypertension is the most prevalent comorbid condition among diabetic ulcer patients, affecting 26 respondents (47.3%). Hypertension can exacerbate diabetes-related microvascular complications, including neuropathy, which contributes to ulcer formation. Both conditions lead to vascular damage, impairing circulation to the lower extremities. Hypertension reduces blood flow to wounds, thereby slowing the healing process of diabetic ulcers. Vascular damage caused by hypertension complicates the healing process further. The combination of hypertension and diabetes significantly heightens the risk of cardiovascular complications, which can adversely impact overall health and delay ulcer recovery ([Zakir et al., 2023](#)).

The medication most used by respondents is metformin, with 15 respondents (27.3%) currently taking it. Metformin effectively lowers blood glucose levels by enhancing insulin sensitivity and reducing glucose production in the liver. Compared to other antidiabetic medications, metformin carries a lower risk of hypoglycemia (excessively low blood sugar). Studies have also shown that metformin may provide additional cardiovascular benefits. It is a relatively affordable medication, making it accessible to many patients. Having been in use for decades, metformin has a well-established safety profile (Vieira et al., 2022).

Research findings indicate that 25 respondents (45.5%) with diabetic ulcers have blood glucose levels exceeding 200 mg/dL. This

aligns with previous studies, which showed a significant proportion of diabetes patients with uncontrolled blood glucose levels, totaling 20 individuals (66.7%). Another study by Ismail (2017) reported that among 53 diabetic foot patients, 29 samples (54.7%) had elevated blood glucose levels. Further research indicated that hyperglycemia was detected in 29 out of 38 respondents (76.3%) with diabetic ulcers ([Wahyudi et al., 2023](#)). High blood glucose levels can lead to various complications, including diabetic ulcers. Chronic hyperglycemia can damage both small and large blood vessels, impairing blood flow to the extremities, particularly the feet. Elevated blood glucose levels can also damage nerves, reducing sensitivity to pain and pressure on the feet. Hyperglycemia weakens the immune system, increasing the risk of infection in wounds. High blood glucose levels disrupt the wound healing process, making diabetic ulcers challenging to heal ([Huang et al., 2019](#)).

The majority of respondents had grade 2 ulcers, with 65.5% of participants falling into this category. This finding aligns with previous research, which reported that most diabetic foot ulcer patients had grade 2 ulcers, totaling 26 individuals (66.7%), while 5 individuals (12.8%) had grade 3 ulcers, and 8 individuals (20.5%) had grade 4 ulcers (Kano et al., 2019). Grade 2 ulcers are more easily detected compared to grade 1. Patients may only become aware of a problem once the ulcer has reached grade 2. Due to sensory impairments in diabetes patients, an ulcer can progress from grade 1 to grade 2 without the patient noticing. Patients may delay seeking medical care until the wound becomes more severe ([Rosyid, 2017](#)).

Self-Motivation

The research findings reveal that 43 respondents (78.2%) with diabetic ulcers exhibit low self-motivation. This is consistent with previous research involving 53 respondents, where 28 individuals (52.8%) demonstrated low levels of self-motivation ([Andilala, 2023](#)). The level of self-motivation among diabetic ulcer patients is generally low, as respondents believe that managing their diet is essential for recovery, yet some feel pressured by others when attempting to control their eating habits. These findings are consistent with a previous study which found that 84 patients (76.4%) with diabetes at H. Adam Malik General Hospital in Medan demonstrated low self-motivation toward self-care, while 26 patients (23.6%) showed higher motivation. In this study, diabetic patients exhibited poor adherence to dietary practices essential for preventing foot ulcers and diabetic complications. One of the primary risk factors for Diabetes Mellitus is an unhealthy diet, characterized by frequent consumption of

carbohydrates and high-glucose foods, which raises blood glucose levels. Therefore, dietary regulation is crucial for diabetic patients (Ariani, 2011). Some interventions that can be implemented to enhance motivation is motivational interviewing and group therapy.

Anxiety

The research findings indicate that the majority of diabetic ulcer patients experience moderate levels of anxiety, with 30 respondents (54.5%) reporting moderate anxiety. This is consistent with previous research involving 142 diabetic ulcer patients, where 24 respondents (16.9%) reported mild anxiety, 86 respondents (60.6%) experienced moderate anxiety, and 32 respondents (22.5%) experienced severe anxiety (Ariyanti & Afyanti, 2022). The study results show that respondents often feel anxious and uneasy about their wounds, largely due to concerns over economic factors. In addition to daily living expenses, the high cost of wound care contributes to feelings of fear without a clear cause, making respondents more prone to anger and irritability. This aligns with the theoretical framework presented (Honan et al., 2018). Diabetic ulcer patients typically experience anxiety due to infection or surgical procedures related to their ulcers. The extended healing process and increasing cost of care contribute to emotional and psychological stress (including anxiety) as well as financial strain for these patients (Setiawan et al., 2020).

Self Esteem

The research findings indicate that 29 respondents (52.7%) with diabetic ulcers have low self-esteem. This is consistent with previous research conducted on 30 respondents with diabetic ulcers, which showed that 17 respondents (56.7%) had low self-esteem, while 13 respondents (43.3%) exhibited high self-esteem (Bidiastuti et al., 2022). The study results reveal that diabetic ulcer patients with low self-esteem often perceive themselves as inadequate after developing the ulcer, feel they lack quality, and believe they are unable to perform tasks as well as others. This aligns with previous research indicating that 22 respondents (55%) with diabetic ulcers experienced low self-esteem. This low self-esteem is attributed to feelings of dissatisfaction with themselves, an inability to accomplish tasks, a lack of confidence, and a sense of worthlessness and insignificance (Setiorini et al., 2019). Low self-esteem in diabetic ulcer patients is often due to complications from the ulcer, which bring challenges such as dietary management, odor from the wound, prolonged treatment, and physical changes to their bodies. Both short- and long-term hospitalizations, as well as loss of bodily functions or partial amputation, can lead to feelings of worthlessness, impacting patients' relationships

with others. In such situations, nursing interventions should be promptly provided, as a lack of intervention may lead to sustained low self-esteem (Packer et al., 2024).

Body Image

Based on the research findings, 43 respondents (78.2%) with diabetic ulcers exhibited a positive body image. This aligns with previous research, where 27 out of 40 respondents (67.5%) displayed a positive body image (M. E. A. Budiman et al., 2020).

The study shows that respondents with a positive body image tend to communicate openly with healthcare providers about their experiences, facilitating care and education that align with their actual conditions. Some respondents reported feeling unashamed of their wounds, enabling them to continue social interactions. Previous analyses indicate that diabetic ulcers can impact body image due to the changes in foot appearance and odor. However, positive family support and high-quality care have been found to enhance the body image of diabetic ulcer patients, resulting in a positive self-perception among those with diabetic ulcers (M. E. A. Budiman et al., 2020).

4. Conclusions and Suggestions

The study reveals that diabetic ulcer patients are predominantly middle-aged (average age of 55.18 years), mostly female, with a high school level of education, and are primarily married. The majority are unemployed or retired, have been living with diabetes for less than five years, and have experienced diabetic ulcers for over 45 days. Hypertension emerges as the most prevalent comorbid condition, and metformin is the most commonly used medication. Blood glucose levels in these patients are typically above 200 mg/dL, with grade 2 ulcers being the most common presentation. Psychologically, most respondents demonstrate low self-motivation, moderate anxiety, low self-esteem, and a positive body image.

These findings provide valuable insights into the psychological and clinical profiles of diabetic ulcer patients, advancing the understanding of how psychological factors intersect with physical conditions. Such insights underscore the need for comprehensive management strategies that address both physical and psychological aspects to improve patient outcomes in diabetic ulcer care.

Future research should delve deeper into the specific relationships between patient characteristics and psychological components, such as the impact of self-motivation and anxiety on wound healing. Additionally, employing robust methodologies, such as longitudinal studies or interventions targeting

psychological factors, could provide more actionable data. Linking psychological factors directly to intervention strategies, such as tailored counseling, stress management programs, or motivational therapies. These interventions could strengthen clinical relevance and inform more holistic treatment approaches. This integrated perspective may better support the healing process and improve the quality of life for patients with diabetic ulcers.

5. Acknowledgments

We would like to express sincere gratitude to the University of Muhammadiyah Semarang. Additionally, we extend appreciation to all participants and healthcare professionals who generously contributed their time and experiences for doing this research.

6. References

- Andilala. (2023). Hubungan Motivasi Dengan Pelaksanaan Perawatan Kaki Pada Penderita Diabetes Mellitus di Desa Cinta Rakyat Percut Sei Tuan. *Jurnal Ners*, 7, 1225–1229.
- Ariani, Y. (2011). *Hubungan Antara Motivasi Dengan Efikasi Diri Pasien DM Tipe 2 Dalam Konteks Asuhan Keperawatan Di RSUP. H. Adam Malik Medan*.
- Ariyanti, N. M. N., & Afyanti, Y. (2022). Perbedaan Tingkat Kecemasan dan Faktor yang Mempengaruhi pada Pasien Laki-laki dan Perempuan dengan Ulkus Diabetikum di Rumah Cipondoh. *Nusantara Hasana Journal*, 2(7), Page.
- Bidiastuti, F., Abrar, E. A., & Zaenal, S. (2022). Gambaran Depresi Dan Harga Diri Rendah Pada Pasien Ulkus Diabetik. *Jurnal Ilmiah Mahasiswa & Penelitian Keperawatan*, 1(No. 6), 822–829.
- Budiman, M. E. A., Yusuf, A., & Suhardiningsih, A. S. (2020). Hubungan Ulkus Diabetik Dengan Citra Tubuh Klien Diabetes Mellitus Tipe 2. *Jurnal Penelitian Kesehatan "SUARA FORIKES" (Journal of Health Research "Forikes Voice")*, 11(3), 283. <https://doi.org/10.33846/sf11312>
- Budiman, R. A., Nasir, P., Putra, F. M., & Rajab, R. (2024). Faktor Risiko Terjadinya Ulkus Diabetik di Rumah Sakit Umum Daerah Kota Makassar Tahun 2020-2022. *Jurnal Pendidikan Tambusai*, 8(1), 10970–10975.
- Hananto, S. Y., Putri, S. T., & Puspita, A. P. W. (2022). Studi Kasus: Penatalaksanaan Diabetes Self Management Education (DSME) Terhadap Kadar Glukosa Darah pada Pasien Diabetes Melitus Tipe 2. *Jurnal Keperawatan*, 20(4), 128–137. <https://doi.org/10.35874/jkp.v20i4.1111>
- Honan, L., Bautista, C., & Esposito, C. (2018). *Focus on Adult Health Medical-Surgical Nursing 2nd Ed*. Nursing and Health Studies Faculty Book Gallery.
- Huang, Z. H., Li, S. Q., Kou, Y., Huang, L., Yu, T., & Hu, A. (2019). Risk factors for the recurrence of diabetic foot ulcers among diabetic patients: a meta-analysis. *International Wound Journal*, 16(6), 1373–1382. <https://doi.org/10.1111/iwj.13200>
- IDF. (2021). IDF Diabetes Atlas 10th Edition. In *Diabetes Research and Clinical Practice* (10th ed.). International Diabetes Federation. <https://doi.org/10.1016/j.diabres.2013.10.013>
- Kusumastuti, H., Nugraha, A. C., & Utami, H. S. (2022). Gambaran Efikasi Diri Pasien Diabetes Melitus Terhadap Penyembuhan Luka Dengan Ulkus Diabetikum Yang Menjalani Perawatan Luka. *Jikes: Jurnal Ilmu Kesehatan*, 1, 63–69.
- Mansoor, Z., & Modaweb, A. (2022). Predicting Amputation in Patients With Diabetic Foot Ulcers: A Systematic Review. *Cureus*, 14(7). <https://doi.org/10.7759/cureus.27245>
- Marsya, V., Mahmuda, I. N. N., Lestari, N., & Jatmiko, S. W. (2023). Correlations between Age and Hypertension on Diabetic Foot Ulcer. *Indonesian Journal of Medicine*, 8(2), 179–185. <https://doi.org/10.26911/theijmed.2023.08.02.07>
- Maulidita, K., & Prihati, D. R. (2020). Lama Menderita Ulkus Dengan Distress Dan Depresi Pada Penderita Diabetes Mellitus. *Jurnal Riset Media Keperawatan*, 1(2), 24–32. <https://doi.org/10.51851/jrmk.v1i2.15>
- Mildawati, Diani, N., & Wahid, A. (2019). Hubungan Usia, Jenis Kelamin dan Lama Menderita Diabetes dengan Kejadian Neuropati Perifer Diabeteik. *Caring Nursing Journal*, 3(2), 31–37.
- Notoatmodjo, S. (2014). *Promosi Kesehatan dan Perilaku Kesehatan*. Rineka Cipta.
- Ochoa-Gonzalez, F., Cervantes-Villagrana, A. R., Fernandez-Ruiz, J. C., Nava-Ramirez, H. S., Hernandez-Correa, A. C., Enciso-Moreno, J. A., & Castañeda-Delgado, J. E. (2016). Metformin induces cell cycle arrest, reduced proliferation, wound healing impairment in vivo and is associated to clinical outcomes in diabetic foot ulcer patients. *PLoS ONE*, 11(3), 1–16. <https://doi.org/10.1371/journal.pone.0150900>
- Packer, C. F., Ali, A. A., & Manna, B. (2024). *Diabetic Ulcer*. StatPearls Publishing.
- Rachman, A., & Dwipayana, I. M. P. (2019). Prevalensi Dan Hubungan Antara Kontrol Glikemik Dengan Diabetik Neuropati Perifer Pada Pasien Diabetes Melitus Tipe Ii Di RSUP Sanglah. *Jurnal Medika Udayana*,

- 9(1), 33–37.
- Riskesdas. (2018). Laporan Riskesdas 2018 Kementerian Kesehatan Jawa Tengah Republik Indonesia. In *Laporan Nasional Riskesdas 2018*.
- Rosyid, F. N. (2017). Etiology, pathophysiology, diagnosis and management of diabetics' foot ulcer. *International Journal of Research in Medical Sciences*, 5(10), 4206. <https://doi.org/10.18203/2320-6012.ijrms20174548>
- Setiawan, H., Mukhlis, H., Wahyudi, D. A., & Damayanti, R. (2020). Kualitas Hidup Ditinjau dari Tingkat Kecemasan Pasien Penderita Ulkus Diabetikum. *Majalah Kesehatan Indonesia*, 1(2), 33–38. <https://doi.org/10.47679/makein.20207>
- Setiorini, H., Pahria, T., & Sutini, T. (2019). Gambaran Harga Diri Pasien Diabetes Melitus di Rumah Perawatan Luka Bandung. *Jurnal Keperawatan Komprehensif*, 5, 118–126.
- Vanherwegen, A. S., Lauwers, P., Lavens, A., Doggen, K., Dirinck, E., Lusendi, F. M., Aerden, D., Denecker, N., De Bruyne, S., Coucke, C., De Wilde, J. P., Jacobs, C., Deschamps, K., Houthoofd, S., Matricali, G., Deweer, S., Moors, B., Dumont, I., Ers, V., ... Vandenbroucke, M. (2023). Sex Differences in Diabetic Foot Ulcer Severity and Outcome in Belgium. *PLoS ONE*, 18(2 February), 1–13. <https://doi.org/10.1371/journal.pone.0281886>
- Vieira, I. H., Barros, L. M., Baptista, C. F., Rodrigues, D. M., & Paiva, I. M. (2022). Recommendations for Practical Use of Metformin, a Central Pharmacological Therapy in Type 2 Diabetes. *Clinical Diabetes*, 40(1), 97–107. <https://doi.org/10.2337/cd21-0043>
- Wahyudi, D. A., Susanto, G., Stiexs, A., Wahyudi, M. T., & Sadhana, W. (2023). Hubungan Kadar Glukosa dan Tekanan Darah dengan Kejadian Ulkus Diabetikum pada Pasien DM Tipe 2 di Puskesmas Tiuh Tohou Menggala. *Health Research Journal of Indonesia*, 1(6), 229–236.
- Wulandari, P., Diani, N., & Lestari, D. R. (2021). Hubungan Lama Menderita Luka dengan Harga Diri Pasien Diabetic Foot Ulcer. *Dunia Keperawatan: Jurnal Keperawatan Dan Kesehatan*, 9(1), 85. <https://doi.org/10.20527/dk.v9i1.8365>
- Yanti, A., & Leniwita, H. (2019). Modul Keperawatan Medikal Bedah II. *Keperawatan*, 1–323.
- Zakir, M., Ahuja, N., Surksha, M. A., Sachdev, R., Kalariya, Y., Nasir, M., Kashif, M., Shahzeen, F., Tayyab, A., Khan, M. S. moazzam, Junejo, M., Manoj Kumar, F., Varrassi, G., Kumar, S., Khatri, M., & Mohamad, T. (2023). Cardiovascular Complications of Diabetes: From Microvascular to Macrovascular Pathways. *Cureus*, 15(9). <https://doi.org/10.7759/cureus.45835>
- Zalianty, I. (2024). Karakteristik Ulkus Deibetikum Di RSUD Cut Meutia Kabupaten Aceh Utara. *Jurnal Berita Ilmu Keperawatan*, 5(4), 14–25.