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Original Article

The Relationship Between Family Support with Self-Care for People with Diabetes Mellitus

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Abstract

Diabetes mellitus (DM) is a chronic disease that requires long-term management, and family support plays an important role in helping patients perform self-care. This study aimed to determine the relationship between family support and self-care in people with diabetes mellitus. Using a quantitative approach with a cross-sectional design, the study involved a population of 147 diabetes mellitus patients, with 60 respondents selected through the Slovin Formula. Data were collected using questionnaires and analyzed with the Chi-Square test. The findings showed a significant relationship between family support and self-care in people with diabetes mellitus (P-value = 0.001). Patients who received high levels of family support were more disciplined in controlling their diet, engaging in physical activity, maintaining personal hygiene, and adhering to medication. These results indicate that family support significantly influences self-care abilities in people with diabetes mellitus, and thus, health workers should involve families in diabetes management programs to improve the effectiveness of patient care. Family members can help monitor the patient's health, provide emotional support, and reinforce positive health behaviors, ultimately contributing to better health outcomes for the patient. Given these findings, healthcare providers should consider incorporating family-centered care into diabetes management programs to improve patient compliance, reduce the burden of disease, and enhance the overall quality of care.

Keywords: Chronic Disease Management, Diabetes Mellitus, Family Support, Healthcare, Self-Care.

1. Introduction

Diabetes mellitus is a long-term condition marked by metabolic issues stemming from the body's inability to generate enough insulin or the failure of cells to properly react to insulin, resulting in high blood sugar levels (Ageru, 2024). American Diabetes Association (2023) reports that the prevalence of DM in the world continues to increase, in line with changes in lifestyle, increasing obesity, and population aging factors. Indonesia is one of the countries with a number of DM sufferers that continues to increase significantly, with a prevalence reaching 11.7% in 2023, this figure places Indonesia as one of the countries with the highest DM burden in Southeast Asia (Ageru et al., 2024). Data from the International Diabetes Federation (IDF) estimates that in 2024 there will be around 589 million adults (20–79 years) who have diabetes (around 1 in 9 adults). It is estimated that this number will increase to 853 million people in 2050 (1 in 8 adults), and around 81% of sufferers live in low-income countries and middle (Al-Dwaikat et al., 2023). According to the latest report by WHO (2024) and the NCD Risk Factor Collaboration, the global prevalence of diabetes has increased dramatically from round 7% in 1990 to around 14% in 2022. Currently, it is estimated that more than 800 million adults are living with diabetes, and most of them are in low- and

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middle-income countries. A similar situation also occurs at the local level (ElSayed et al., 2023).

In Indonesia, the prevalence of diabetes is quite high, reaching 11.3% in 2024 with an estimated 20.4 million cases out of an adult population of 185 million people. At the local level, data from the Lawawoi Community Health Center (UPT Puskesmas) in Sidenreng Rappang Regency shows a similar trend: DM patients increased from 277 cases in 2022 to 488 cases in 2023, and as of July 2024, 147 new cases had been discovered. This trend indicates an urgent need for disease management strategies, including interventions at the family level (ElSayed et al., 2023). Diabetes mellitus is a long-lasting condition caused by the body's inability to produce enough insulin or when cells do not properly react to insulin, leading to high blood sugar levels (Beltran et al., 2024). This increasing trend indicates that managing DM at the community level remains a major challenge. DM management requires not only medical intervention but also ongoing social support, especially from family, to help patients optimize self-care (Chen & Lin, 2025).

Self-care for people with diabetes encompasses a range of activities undertaken by patients to independently manage their disease, such as maintaining a healthy diet, managing physical activity, monitoring blood sugar levels, and adherence to medication (Chowdhury et al., 2024). Previous research has shown that the success of self-care is significantly influenced by family support, as the family is the closest social environment and plays a central role in helping patients adopt a healthy lifestyle and comply with medical recommendations. Family support can be expressed in various forms, such as emotional support (providing attention, empathy, and comfort), esteem support (providing motivation and recognition), instrumental support (assistance with daily activities), and participatory support (active involvement in disease management) (Diriba et al., 2023).

This support has been shown to help people with diabetes maintain metabolic control, reduce the risk of complications, and improve quality of life (Hondro et al., 2025). However, implementing self-care for people with diabetes is not easy. Patients often face obstacles such as limited knowledge, psychological stress, low motivation, and lack of support from their environment (Powers et al., 2020). In this regard, the role of the family is a crucial determinant of successful self-management. Without adequate family support, patients tend to have difficulty controlling their diet, maintaining an exercise routine, or regularly monitoring their blood sugar levels (Feng et al., 2023).

The rising number of diabetes cases in Indonesia and the significant impact of family support on self-care among patients are key factors driving this research initiative. This study seeks to investigate how family support influences self-care habits in those with diabetes, with the goal of offering evidence-backed suggestions to enhance diabetes management for individuals and families (Fitzpatrick et al., 2023). Therefore, efforts to improve self-care among individuals with diabetes should focus not only on patients themselves but also on strengthening family support as an integral part of management strategies. Families can act as primary companions by assisting patients in adhering to medication schedules, preparing healthy meals, providing motivation to engage in physical activity, and regularly monitoring blood glucose levels. Family-based interventions have been shown to enhance patient adherence to self-care practices, reduce the risk of complications, and improve overall quality of life (Gebeyaw & Lema, 2025). Thus, a deeper understanding of the relationship between family support and self-care practices serves as a critical foundation for designing more effective educational programs and interventions for diabetes management in Indonesia (Hanlon et al., 2021).

This study holds significant value in advancing knowledge about diabetes management, particularly in the Indonesian context where the prevalence of diabetes continues to increase. By examining the relationship between family support and self-care practices, the findings provide critical insights into how family involvement can enhance patient adherence and overall disease management. The results are expected to contribute to the development of evidence-based strategies that integrate families as active partners in diabetes care (Gebeyaw & Lema, 2025). From a practical perspective, this study highlights the need for health professionals, especially nurses, to design family-centered educational and intervention programs that empower both patients and their families to engage in effective diabetes management. The findings may also serve as a reference for policymakers to strengthen public health initiatives by incorporating family-oriented approaches into community-based diabetes programs. Furthermore, this research adds to the growing body of international literature on the role of social and familial determinants in chronic disease management, thereby offering a broader implication for global health promotion efforts (Kanny et al., 2025).

2. Literature Review

2.1. Theory Health Belief Model

Health Belief Model (HBM) can be applied to explain self-care behaviors in DM patients. According to HBM, an individual's perception of disease severity, susceptibility, benefits, and barriers influences their health-related behaviors (Kanny et al., 2025). In the context of DM, patients who perceive the seriousness of hyperglycemia and recognize the benefits of proper self-care are more likely to adhere to dietary management, physical activity, blood glucose monitoring, and medication adherence (Kautzky-Willer et al., 2023). Family support acts as a modifying factor in this model by enhancing patients' perceptions of benefits and reducing perceived barriers, thereby promoting effective self-care (Kerr et al., 2024).

2.2. Theory Social Support

Social Support Theory emphasizes the importance of family and social networks in influencing health outcomes. Social support can be categorized as emotional, esteem, instrumental, and participatory support, all of which contribute to better management of chronic diseases (Lee et al., 2022). In DM management, family support helps patients maintain metabolic control, prevent complications, and improve quality of life (Magaji et al., 2024). Lack of support can lead to poor adherence to diet, exercise, and medication routines, highlighting the family's role as a crucial determinant of successful self-care.

2.3. Previous Research

Several studies have examined the relationship between family support and self-care in DM patients. Opoku (2023) reported that patients with higher levels of family support showed significantly better adherence to self-care activities. Similarly Lee (2022) found that active family involvement improves patients' blood glucose monitoring and lifestyle management. Local data from the Lawawoi Community Health Center indicate increasing DM prevalence, emphasizing the urgent need for family-centered interventions to optimize self-care practices (Kanny et al., 2025) These findings form the basis for the current study, which explores the relationship between family support and self-care behavior in DM patients.

3. Methods

This research utilized a cross-sectional quantitative method, examining all 147 diabetes mellitus patients located within the catchment area served by the Lawawoi Community Health Center UPT in Sidenreng Rappang Regency. Using the Slovin Formula, 60 respondents were chosen for the study sample. Data collection utilized a questionnaire that had undergone validity and reliability testing. Statistical analysis was performed using the Chi-Square test to assess the correlation between family support as the predictor variable and diabetes self-care abilities as the outcome variable.

3.1. Research Methodology

A study was conducted using a cross-sectional quantitative design to investigate how family support is related to the ability of diabetes patients to take care of themselves. The study focused on all 147 diabetic patients living in the area served by the Lawawoi Community Health Center (UPT) in Sidenreng Rappang Regency. This cross-sectional methodology facilitates one-time data gathering, creating a momentary assessment of the relationship between independent and dependent variables.

3.2. Sample and Research Instruments

A total of 60 respondents were selected as the sample using the Slovin formula to ensure representativeness. Data were collected using a structured questionnaire that had been tested for validity and reliability to ensure accurate measurement of both family support (independent variable) and self-care ability (dependent variable). The data obtained were subsequently analyzed using the Chi-Square test to determine the presence and strength of the relationship between the two variables.

4. Results and Discussion

4.1. Research Results

4.1.1. Respondent Characteristics

Table 1. Frequency of Respondent Characteristics Based on Age

Age	Frequency	Percentage (%)
30–45 years	17	28.3
46–60 years	43	71.7
Total	60	100.0

Source: Primary data

The results show that the largest portion of participants falls within the 46-60 age range, consisting of 43 individuals (71.7%), with 17 people (28.3%) being between the ages of 30-45.

Table 2. Frequency of Respondent Characteristics Based on Gender

Gender	Frequency	Percentage (%)
Woman	37	61.7
Man	23	38.3
Total	60	100.0

Source: Primary data

According to the data in the chart, most of the people who participated in the survey were women, totaling 37 individuals (61.7%), with 23 male participants (38.3%).

4.1.2. Univariate Analysis

Table 3. Frequency Distribution Family Support of People with Diabetes Mellitus

Family Support	Frequency	Percentage (%)
Support	49	81.7
Less Supportive	11	18.3
Total	60	100.0

Source: Primary data

The results of the study showed that most families provided good support to people with diabetes mellitus, namely 49 people (81.7%), while 11 people (18.3%) had insufficient family support.

Table 4. Frequency Distribution Self-Care of People with Diabetes Mellitus

Self-Care	Frequency	Percentage (%)
Good	50	83.3
Not enough	10	16.7
Total	60	100.0

Source: Primary data

The results of the study also showed that of the 60 respondents, there were 50 diabetes mellitus sufferers (83.3%) who had good self-care skills, while 10 people (16.7%) had poor self-care skills.

4.1.3. Bivariate Analysis

Table 5. Relationship between Family Support and Self-Care in People with Diabetes Mellitus

Family Support	Good Self-Care	Lack of Self-Care	Total
Support	48	1	49
Less supportive	2	9	11
Amount	50	10	60
P-value = 0.001			

Source: Primary data, 2024

The Chi-Square statistical test results from 60 study participants revealed a P-value of 0.001 ($p < 0.005$), which resulted in rejecting Ho and accepting H_a. Consequently, the study establishes that a meaningful correlation exists between family support and self-care competence in diabetic patients.

4.2. Discussion

The research results indicate that, 17 respondents (28.3%) were aged 30–40 years, while 43 (71.7%) were aged 41–60 years. Age is closely related to increased blood glucose levels, where as age increases, the prevalence of diabetes mellitus also tends to increase. As age increases, the body's ability to regulate blood sugar levels becomes less optimal, so the risk of developing type 2 diabetes increases. This is in line with the findings of Wardhani et al. (2025) which showed that the 45–55 age group is a group with a higher risk because they have experienced changes and decreased function of various body systems. Individuals aged 40–55 years are more susceptible to diabetes mellitus than those under 40 years. The chance of

developing diabetes in the age group under 40 years is still relatively low when compared to those over 40 years (Song et al., 2023).

Research data also shows that the majority of diabetes mellitus sufferers in the Lawawoi Community Health Center (UPT) work area are women, namely 37 people (61.7%), while men are 23 people (38.3%). This finding is in line with the results of a study by Susanti et al. (2024) which stated that women have a higher risk of developing diabetes mellitus. Factors that play a role include hormonal changes (especially during pregnancy/gestational diabetes and menopause), genetic factors, and lifestyle. Female gender is also associated with blood sugar levels that are more easily increased, especially under conditions of severe stress and lack of sleep, which can trigger the risk of diabetes mellitus (Werner et al., 2024).

The results of the study regarding family support showed that the majority of respondents received good support from their families 49 people (81.7%), while 11 people (18.3%) received insufficient support. Adequate family support can influence adherence to the diet of diabetics. This is because family motivation and attention make sufferers feel valued, cared for, and loved, and foster confidence in recovery. This finding is consistent with research by Lee (2022), which concluded that family support is a key factor in diabetes patients' adherence to diet programs. Therefore, the role of family members, especially spouses, is crucial in assisting with healthcare and preventing complications in patients. Family support also plays a role in adopting a healthy lifestyle, as sufferers feel more motivated, less alone, and their condition can be better monitored (Werner et al., 2024).

Research on self-care behaviors showed that 50 (83.3%) people with diabetes mellitus demonstrated good self-care behaviors. Self-care in diabetes mellitus includes recognizing when to monitor blood sugar, managing diet, and administering medication (Filani, 2022). The influence of attitudes toward self-care management on respondents was proven significant with a p-value of 0.0007. This indicates that good self-care behavior is influenced by the patient's level of awareness, perception, and knowledge of their disease. Research by Kerr (2024), also confirmed that increasing education about non-communicable diseases and how to control them, including type 2 diabetes mellitus by involving the family, is one strategy for lowering blood sugar levels.

The examination of how family support relates to self-care behavior in patients with diabetes mellitus resulted in a p-value of 0.001, which is significant. This indicates that the null hypothesis is rejected and the alternative hypothesis is accepted, leading to the conclusion that there is a correlation between family support and self-care behavior in diabetes mellitus patients. Research by Nadya et al. (2024) also confirmed that family support is a supporting factor in nursing interventions provided by healthcare professionals. This support plays an active role in helping patients perform optimal self-care and supporting medication adherence in diabetes patients.

Another study also showed a significant relationship between self-care and quality of life, with a p value of 0.002 in the Pampang Community Health Center, Makassar City (Mesylis et al., 2025). The discovery aligns with past studies indicating that family assistance, whether through knowledge, emotional backing, or resources, can enhance a patient's ability to care for themselves. Greater family support leads to improved self-care habits in patients, which in turn enhances their overall health and well-being.

However, despite a positive relationship between family support and self-care behavior, some aspects of self-care remain suboptimal, particularly those related to diet and physical activity/exercise. This is due to the persistence of respondents' poor adherence to dietary and dietary management practices. Research by Sihotang et al. (2023) also found a significant

relationship between family support and self-care behavior in diabetes mellitus patients in the Tubaan Community Health Center (UPT) work area (p-value = 0.006).

5. Conclusion

According to the findings, it is evident that there exists a strong correlation between familial assistance and the ability to practice self-care among individuals suffering from diabetes. Families who provide optimal support tend to be better able to help patients carry out self-care effectively. The study findings indicate that high levels of family support are closely related to patient adherence to treatment, the implementation of a healthy diet, and regular physical activity. However, some families still do not understand the importance of their role in providing support, especially regarding diet management and blood sugar monitoring. Furthermore, this study also revealed that the level of self-care in people with diabetes varies; some patients have implemented good self-care practices, such as maintaining a low-sugar diet and regular exercise, while others still require further guidance and assistance to ensure consistent and optimal self-care behaviors.

The findings of this study highlight the critical role of family support in enhancing self-care skills among individuals with diabetes mellitus. Strengthening family involvement in diabetes management can improve patient adherence to treatment, dietary regulation, and physical activity routines. Health professionals, especially nurses, should therefore design educational interventions that not only target patients but also involve family members as active partners in care. Additionally, the results imply that healthcare providers should emphasize family-based education on the importance of monitoring blood sugar, assisting in dietary planning, and providing emotional encouragement. Public health programs could incorporate family-centered approaches as part of diabetes management strategies to ensure sustainability of self-care behaviors. For patients who still demonstrate poor self-care practices, tailored interventions and continuous family support are necessary to reduce the risk of complications. Future research should explore the most effective family-based educational methods to maximize patient outcomes.

6. References

Ageru, T. A., Le, C. N., Wattanapisit, A., Woticha, E. W., Truong, N. T., Stanikzai, M. H., Abiso, T. L., & Suwanbamrung, C. (2024). Diabetes self-care intervention strategies and their effectiveness in Sub-Saharan Africa: A systematic review. *PLOS ONE*, *19*(10), e0305860. https://doi.org/10.1371/journal.pone.0305860

Al-Dwaikat, T. N., Ali, A. M., & Khatatbeh, H. (2023). Self-Management Social Support in Type 2 Diabetes Mellitus: A Concept Analysis. *Nursing Forum*, *2023*, 1–9. https://doi.org/10.1155/2023/1753982

Beltran, J., Valli, C., Medina-Aedo, M., Canelo-Aybar, C., Niño de Guzmán, E., Song, Y., Orrego, C., Ballester, M., Suñol, R., Noordman, J., Heijmans, M., Seitidis, G., Tsokani, S., Kontouli, K.-M., Christogiannis, C., Mavridis, D., Graaf, G. de, Groene, O., Grammatikopoulou, M. G., … Alonso-Coello, P. (2024). COMPAR-EU Recommendations on Self-Management Interventions in Type 2 Diabetes Mellitus. *Healthcare*, *12*(4), 483. https://doi.org/10.3390/healthcare12040483

Chen, W.-J., & Lin, L.-Y. (2025). The Impact of Diabetes Self-Care, Healthy Lifestyle, Social Support, and Demographic Variables on Outcomes HbA1c in Patients With Type 2 Diabetes. *Clinical Medicine Insights: Endocrinology and Diabetes*, *18*. https://doi.org/10.1177/11795514251331907

Chowdhury, H. A., Harrison, C. L., Siddiquea, B. N., Tissera, S., Afroz, A., Ali, L., Joham, A.

E., & Billah, B. (2024). The effectiveness of diabetes self-management education intervention on glycaemic control and cardiometabolic risk in adults with type 2 diabetes in low- and middle-income countries: A systematic review and meta-analysis. *PLOS ONE*, *19*(2), e0297328. https://doi.org/10.1371/journal.pone.0297328

Diriba, D. C., Leung, D. Y. P., & Suen, L. K. P. (2023). Effects of family-based diabetes self-management education and support programme on support behaviour amongst adults with type 2 diabetes in Western Ethiopia. *Scientific Reports*, *13*(1), 20867. https://doi.org/10.1038/s41598-023-48049-w

ElSayed, N. A., Aleppo, G., Aroda, V. R., Bannuru, R. R., Brown, F. M., Bruemmer, D., Collins, B. S., Hilliard, M. E., Isaacs, D., Johnson, E. L., Kahan, S., Khunti, K., Leon, J., Lyons, S. K., Perry, M. Lou, Prahalad, P., Pratley, R. E., Seley, J. J., Stanton, R. C., & Gabbay, R. A. (2023). 1. Improving Care and Promoting Health in Populations: Standards of Care in Diabetes—2023. *Diabetes Care*, *46*(Supplement_1), S10–S18. https://doi.org/10.2337/dc23-S001

Feng, Y., Zhao, Y., Mao, L., Gu, M., Yuan, H., Lu, J., Zhang, Q., Zhao, Q., & Li, X. (2023). The Effectiveness of an eHealth Family-Based Intervention Program in Patients With Uncontrolled Type 2 Diabetes Mellitus (T2DM) in the Community Via WeChat: Randomized Controlled Trial. *JMIR MHealth and UHealth*, *11*, e40420. https://doi.org/10.2196/40420

Filani, A. (2022). *Hubungan Pengetahuan dan Sikap dengan Perilaku Self Care pada Penderita Diabetes Melitus tipe 2 Selama Pandemi di Desa Kalianget Barat*. Universitas Wiraraja.

Fitzpatrick, R., Pant, S., Li, J., Ritterman, R., Adenikinju, D., Iloegbu, C., Pateña, J., Vieira, D., Gyamfi, J., & Peprah, E. (2023). Implementation of non-insulin-dependent diabetes self-management education (DSME) in LMICs: a systematic review of cost, adoption, acceptability, and fidelity in resource-constrained settings. *Frontiers in Health Services*, *3*. https://doi.org/10.3389/frhs.2023.1155911

Gebeyaw, E. D., & Lema, G. D. (2025). Gender based difference in glycemic control and diabetes related chronic complications among type 2 diabetic patients in Debre Berhan city public hospitals. *Metabolism Open*, *25*, 100349. https://doi.org/10.1016/j.metop.2025.100349

Hanlon, P., Bryson, I., Morrison, H., Rafiq, Q., Boehmer, K., Gionfriddo, M. R., Gallacher, K., May, C., Montori, V., Lewsey, J., McAllister, D. A., & Mair, F. S. (2021). Self-management interventions for Type 2 Diabetes: systematic review protocol focusing on patient workload and capacity support. *Wellcome Open Research*, *6*, 257. https://doi.org/10.12688/wellcomeopenres.17238.1

Hondro, H. S., Karota, E., Tanjung, R., Lubis, Z., & Nasution, S. Z. (2025). The Effect of Self-Care Behavior on Blood Glucose Control Levels Among Patients with Type II Diabetes Mellitus. *Indonesian Journal of Global Health Research*, *7*(5). https://doi.org/10.37287/ijghr.v7i5.6937

Kanny, S., Hall, L., Blackhurst, D., & Sherrill, W. W. (2025). Community-based diabetes self-management and support program: addressing quality of life and social vulnerability. *BMC Public Health*, *25*(1), 1538. https://doi.org/10.1186/s12889-025-22627-1

Kautzky-Willer, A., Leutner, M., & Harreiter, J. (2023). Sex differences in type 2 diabetes. *Diabetologia*, *66*(6), 986–1002. https://doi.org/10.1007/s00125-023-05891-x

Kerr, D., Ahn, D., Waki, K., Wang, J., Breznen, B., & Klonoff, D. C. (2024). Digital Interventions for Self-Management of Type 2 Diabetes Mellitus: Systematic Literature Review and Meta-Analysis. *Journal of Medical Internet Research*, *26*, e55757. https://doi.org/10.2196/55757

Lee, E. Y., Cha, S.-A., Yun, J.-S., Lim, S.-Y., Lee, J.-H., Ahn, Y.-B., Yoon, K.-H., Hyun, M. K., & Ko, S.-H. (2022). Efficacy of Personalized Diabetes Self-care Using an Electronic Medical Record–Integrated Mobile App in Patients With Type 2 Diabetes: 6-Month

Randomized Controlled Trial. *Journal of Medical Internet Research*, *24*(7), e37430. https://doi.org/10.2196/37430

Magaji, H. Y., Olawumi, A. L., Ogunyele, T. T., Umar, A. I., Michael, G. C., & Grema, B. A. (2024). Influence of Family Function on Self-care Practice among Type 2 Diabetes Patients in a Primary Care Clinic in Northern Nigeria. *Nigerian Journal of Basic and Clinical Sciences*, *21*(2), 137–144. https://doi.org/10.4103/njbcs.njbcs_3_24

Mesylis, V., Zainal, S., & Sabil, F. A. (2025). Hubungan Self Care Dengan Kualitas Hidup Pasien Diabetes Melitus Tipe II Di Wilayah Kerja Puskesmas Pampang Kota Makassar. *JIMPK : Jurnal Ilmiah Mahasiswa & Penelitian Keperawatan*, *5*(3). https://doi.org/10.35892/jimpk.v5i3.2007

Opoku, R., Ackon, S. K., Kumah, E., Botchwey, C. O.-A., Appiah, N. E., Korsah, S., & Peprah, M. (2023). Self-care behaviors and associated factors among individuals with type 2 diabetes in Ghana: a systematic review. *BMC Endocrine Disorders*, *23*(1), 256. https://doi.org/10.1186/s12902-023-01508-x

Powers, M. A., Bardsley, J. K., Cypress, M., Funnell, M. M., Harms, D., Hess-Fischl, A., Hooks, B., Isaacs, D., Mandel, E. D., Maryniuk, M. D., Norton, A., Rinker, J., Siminerio, L. M., & Uelmen, S. (2020). Diabetes Self-management Education and Support in Adults With Type 2 Diabetes: A Consensus Report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Acad. *The Diabetes Educator*, *46*(4), 350–369. https://doi.org/10.1177/0145721720930959

Puig-García, M., Caicedo-Montaño, C., Márquez-Figueroa, M., Chilet-Rosell, E., Montalvo-Villacis, G., Benazizi-Dahbi, I., Peralta, A., Torres-Castillo, A. L., & Parker, L. A. (2023). Prevalence and gender disparities of type 2 diabetes mellitus and obesity in Esmeraldas, Ecuador: a population-based survey in a hard-to-reach setting. *International Journal for Equity in Health*, *22*(1), 124. https://doi.org/10.1186/s12939-023-01939-x

Sihotang, E. M., Tini, & Purwanto, E. (2023). The Relationship between Family Support and Self-Care Behavior on Diabetes Mellitus Patients. *Formosa Journal of Science and Technology*, *2*(5), 1243–1262. https://doi.org/10.55927/fjst.v2i5.4027

Song, Y., Beltran Puerta, J., Medina-Aedo, M., Canelo-Aybar, C., Valli, C., Ballester, M., Rocha, C., Garcia, M. L., Salas-Gama, K., Kaloteraki, C., Santero, M., Niño de Guzmán, E., Spoiala, C., Gurung, P., Willemen, F., Cools, I., Bleeker, J., Poortvliet, R., Laure, T., … Heijmans, M. (2023). Self-Management Interventions for Adults Living with Type II Diabetes to Improve Patient-Important Outcomes: An Evidence Map. *Healthcare*, *11*(24), 3156. https://doi.org/10.3390/healthcare11243156

Wardhani, E. S., Junita, D. E., Wati, D. A., & Khairani, M. D. (2025). The Relationship Between Age and Blood Sugar Levels in Patients with Type 2 Diabetes Mellitus Outpatient at Wonogiri Health Center, North Lampung in 2024. *INDOGENIUS*, *4*(1), 102–109. https://doi.org/10.56359/igj.v4i1.459

Werner, J. J., Ufholz, K., & Yamajala, P. (2024). Recent Findings on the Effectiveness of Peer Support for Patients with Type 2 Diabetes. *Current Cardiovascular Risk Reports*, *18*(5), 65–79. https://doi.org/10.1007/s12170-024-00737-6

WHO. (2024). *Global Report on Diabetes*. WHO Press.