FAMILY SUPPORT IN RELATION TO SELF MANAGEMENT AMONG PATIENTS WITH UNCONTROLLED TYPE 2 DIABETES MELLITUS

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ABSTRACT

Patients with uncontrolled Type 2 Diabetes Mellitus (T2DM) are at increased risk of developing diabetes related complications due to poor glycemic control, which may reflect inadequate self-management practices. This study aimed to examine the relationship between family support and self management among patients with uncontrolled T2DM. A quantitative correlational study with a cross-sectional design was conducted among 83 patients with uncontrolled T2DM from five community health centers in Malang City, Indonesia, using purposive sampling. Family support was measured using the Hensarling Diabetes Family Support Scale (HDFSS), while self-management was assessed using the Diabetes Self-Management Questionnaire-Revised (DSMQ-R). Data were analyzed using descriptive statistics and Pearson's correlation test. Most participants reported poor family support (55.4%, n=46), while 53.0% (n=44) demonstrated poor self-management. A weak but statistically significant positive correlation was found between family support and self-management (r=0.218, p=0.047). These findings indicate that better family support is associated with better self management among patients with uncontrolled T2DM. Therefore, family-centered education and interventions involving family members may be considered to strengthen family support and promote diabetes self management.

Keywords: Type 2 Diabetes Mellitus; Family Support; Self-Management; Uncontrolled Diabetes.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) requires lifelong self-management, comprising medication adherence, dietary regulation, physical activity, blood glucose monitoring, and regular healthcare visits, which support glycemic control and reduce the risk of complications (Davies *et al.*, 2022). T2DM is associated with serious microvascular and macrovascular complications, including retinopathy, nephropathy, neuropathy, cardiovascular disease, and stroke (Moseneke *et al.*, 2026), which makes achieving glycemic targets an important clinical concern. The problem is substantial in Indonesia, which ranks fifth worldwide with an estimated 19.5 million people with diabetes, and where more than 60% of T2DM patients in a primary care reversed referral program had poor glycemic control (Ningrum *et al.*, 2026). Poor glycemic control was found in 83% of patients in another cross-sectional study of Indonesian patients (Adi Pamungkas et al., 2017), and 22,227 people with diabetes were recorded in Malang City in 2022 (Dinas Kesehatan Kota

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Malang, 2023). Uncontrolled glycemia, however, is not synonymous with poor adherence, because drug therapy, age, and gender also influence glycemic control (Ningrum et al., 2026).

Most self-management takes place at home, where family members can remind patients to take medication, prepare healthy meals, exercise with them, assist with blood glucose testing, and accompany them to appointments (Hung et al., 2020; Diriba, Leung and Suen, 2023). Family support has also been linked to motivation, independence, psychological well-being, and dietary behavior (Kristianingrum, Wiarsih and Nursasi, 2018; Safaruddin and Permatasari, 2022). These roles are particularly relevant for patients with uncontrolled T2DM, in whom unhealthy eating, physical inactivity, medication nonadherenc e, and infrequent glucose monitoring have been reported, and insufficient family support has been associated with poor self-management (Pamungkas, Chamroonsawasdi and Vatanasomboon, 2017)

Previous studies have reported associations between family support and diabetes self-care. In Malang City, family support was associated with self-care behavior among primary care patients, 46.84% of whom showed less adequate self-care (Ulfah *et al.*, 2022), and it correlated positively with self-care management (r = 0.413) and with health status (r = 0.400) (Setyoadi *et al.*, 2023; Santi, Sipollo and Syukkur, 2025). Similar associations have been found in adults with T2DM (Ojewale *et al.*, 2019) and in a meta-analysis (Dini Islami, Tamtomo and Prasetya, 2021), and lack of family support was associated with poor glycemic control in Indonesia (Adi Pamungkas, Hadijah and Mayasari, 2017). Family-involved interventions have improved self-management and glycemic outcomes, including among patients with uncontrolled T2DM (Pamungkas, Chamroonsawasdi and Vatanasomboon, 2017; Viet Hung *et al.*, 2020) and among Indonesian patients (Azmiardi, Febrinasari and Murti, 2026).

However, the relationship between family support and self-management among patients with uncontrolled T2DM in Indonesian primary care remains unclear. Evidence in this group comes largely from intervention studies (Pamungkas, Chamroonsawasdi and Vatanasomboon, 2017; Viet Hung *et al.*, 2020), whereas Indonesian observational studies, including those in Malang, have examined family support in relation to self-care, health status, or glycemic outcomes in broader samples (Adi Pamungkas, Hadijah and Mayasari, 2017; Ulfah *et al.*, 2022; Setyoadi *et al.*, 2023; Santi, Sipollo and Syukkur, 2025). Findings are also inconsistent: among Prolanis participants in Manggarai, overall family support was not significantly correlated with HbA1c, although emotional support was (Reynald Susilo, Sari Tetra Dewi and Huriyati, 2022), and how family support influences adherence is not fully understood (Miller and DiMatteo, 2013). Clarifying this relationship matters because primary care, through programs such as Prolanis and the reversed referral program (Reynald Susilo, Sari Tetra Dewi and Huriyati, 2022; Ningrum *et al.*, 2026), is where these patients are followed and where families could be involved in routine care. This study aimed to analyze the relationship between family support and self-management among patients with uncontrolled T2DM attending primary healthcare centers in Malang City, Indonesia.

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METHODS

Study Design

This study employed a quantitative correlational design with a cross-sectional approach to examine the relationship between family support and diabetes self-management among patients with uncontrolled type 2 diabetes mellitus (T2DM). Data on family support and diabetes self-management were collected at a single point in time.

Study Setting and Participants

The This study was conducted at five public health centers (Puskesmas) in Malang City, Indonesia, namely Arjuno, Ciptomulyo, Polowijen, Kedungkandang, and Gribig. Data collection was carried out in May 2026. A total of 83 patients with uncontrolled type 2 diabetes mellitus (T2DM) participated in this study. Participants were recruited using a purposive sampling technique based on predetermined eligibility criteria. The inclusion criteria were patients aged 18 years or older who had been diagnosed with T2DM, had an HbA1c level greater than 7%, and were willing to participate in the study by providing informed consent. Patients with communication or cognitive impairments that could interfere with their ability to understand and complete the research questionnaires were excluded. This study focused specifically on patients with uncontrolled T2DM because achieving glycemic control requires consistent and sustained self-management. Investigating family support in this population may provide insights into its relationship with daily diabetes self-management behaviors, particularly medication adherence, dietary regulation, physical activity, and blood glucose monitoring in primary healthcare settings.

Research Instrument, Scoring, and Categorization

Data were collected using a demographic questionnaire and two standardized instruments: the Diabetes Self-Management Questionnaire-Revised (DSMQ-R) and the Hensarling's Diabetes Family Support Scale (HDFSS).

The The DSMQ-R was developed by (Schmitt *et al.*, 2021) as a revised version of the original Diabetes Self-Management Questionnaire (DSMQ) developed by Schmitt et al. (2013). This instrument was designed to assess diabetes self-management behaviors associated with glycemic control. The DSMQ-R consists of 27 items, comprising 20 core items and 7 optional items intended for patients receiving intensive insulin therapy. In this study, only the 20 core items were used to assess diabetes self-management behaviors across five dimensions: dietary behavior, medication taking, blood glucose monitoring, physical activity, and cooperation with the diabetes healthcare team. Respondents were asked to evaluate their self-management behaviors over the preceding eight weeks.

Each item was rated using a four-point Likert scale, ranging from 1 to 4, with response options of strongly applies (4), applies (3), somewhat does not apply (2), and does not apply (1). Negatively worded items were reverse-scored before calculating the total score to ensure that higher scores consistently indicated better diabetes self-management. The theoretical total score ranged from 20 to 80, with higher scores reflecting better self-management.

Diabetes self-management was categorized based on the mean total score of the study participants (57.59; SD = 6.70). Respondents with scores equal to or greater than 57.59 (≥57.59) were categorized as having good self-management, whereas those with scores below 57.59 (<57.59) were categorized as having poor

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self-management. Based on this categorization, 39 respondents (47.0%) had good self-management, while 44 respondents (53.0%) had poor self-management. The mean score was used as an operational cutoff for this study rather than an established clinical or universally validated threshold for the DSMQ-R.

Family support was measured using the Hensarling's Diabetes Family Support Scale (HDFSS), originally developed by Hensarling (2009) to assess perceived family support among patients with diabetes mellitus. The instrument was subsequently translated and adapted for the Indonesian context by Yusra (2011). The version used in this study consisted of 29 items covering four dimensions: emotional support (13 items), appreciation support (9 items), instrumental support (5 items), and participation support (2 items). Each item was rated using a four-point Likert scale: never (1), rarely (2), often (3), and always (4). The total score ranged from 29 to 116, with higher scores indicating greater perceived family support. Family support was categorized as good when the total score was equal to or greater than 75 (≥75), and poor when the total score was below 75 (<75).

Data Collection Procedure

Data were collected directly from eligible respondents at the five selected public health centers. Respondents were provided with an explanation of the study objectives and procedures before completing the questionnaires. After providing informed consent, respondents completed the demographic questionnaire, DSMQ-R, and HDFSS. All completed questionnaires were checked for completeness, and all 83 respondents had provided responses to every questionnaire item before data analysis.

Data Analysis

The collected data were analyzed using IBM SPSS Statistics version 21. Univariate analysis was conducted to describe respondents' demographic characteristics and the distribution of family support and diabetes self-management. Categorical variables were presented as frequencies and percentages, while numerical variables were summarized using appropriate measures of central tendency and dispersion.

For descriptive purposes and cross-tabulation, diabetes self-management scores were categorized into good and poor categories based on the sample mean score of 57.59. Respondents with scores equal to or above the mean were classified as having good self-management, while those with scores below the mean were classified as having poor self-management. These categories were used for descriptive presentation and cross-tabulation purposes only.

Bivariate analysis was performed using the Pearson Product-Moment Correlation test to examine the relationship between family support and diabetes self-management. The Pearson correlation test was selected because the data were normally distributed. The correlation analysis used the numerical scores of both variables rather than their categorized forms. Statistical significance was determined at a p-value of less than 0.05.

Ethical Considerations

This study received ethical approval from the Health Research Ethics Committee of the Faculty of Health Sciences, University of Muhammadiyah Malang, under approval number E.4.d/120/KEPK/FIKES-UMM/V/2026. Participation was

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voluntary, and respondents provided informed consent before participating in the study. Respondents' confidentiality and the privacy of the collected data were maintained throughout the research process.

RESULTS

In this study, 83 individuals who met the inclusion criteria had uncontrolled type 2 diabetes. The distribution of respondents by gender showed that women constituted the largest proportion, with 74 individuals (89.2%), while 9 were male (10.8%). The data distribution showed a predominance of female respondents in the uncontrolled type 2 diabetes group studied.

The composition of respondents by education level shows that high school graduates (SMA) constitute the largest group, at 25 (30.1%). Meanwhile, respondents with elementary school (SD) education numbered 22 (26.5%), followed by junior high school (SMP) with 18 (21.7%) and college with 16 (19.3%). Furthermore, 2 respondents (2.4%) had never received formal education.

The majority of respondents 48 people (57.8%) were unemployed, 13 people (15.7%) were self-employed, 8 people (9.6%) were civil servants, 7 people (8.4%) were in other occupations, 5 people (6.0%) were farmers, and 2 people (2.4%) were retired. As a result of these contributions, the majority of respondents were unemployed. The average age of respondents was 54.24 ± 5.39 years, with ages ranging from 40 to 59. This composition indicates that the study was dominated by individuals in late adulthood to early old age. This age group is known to have a higher tendency to develop type 2 diabetes mellitus and various complications related to the disease

Table 1. Frequency Distribution of Demographic Characteristic (n = 83)

Demographic Characteristics	Frequency (n)	Percentage %
Gender		
Male	9	10.8
Female	74	89.2
Education		
No School	2	2.4
Elementary School	22	26.5
Junior High School	18	21.7
Senior High School	25	30.1
University	16	19.3
Occupation		

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Unemployed	48	57.8
Entrepreneur	13	15.7
Government Employee	8	9.6
Farmer	5	6.0
Retired	2	2.4
Others	7	8.4
Age		
Average	54.24	
Standard Deviation	± 5.39	
Maximum	59 Years Old	
Minimum	40 Years Old	

Analysis of the two main variables revealed that 55.4% of respondents had poor family support. Furthermore, more than half of respondents (53.0%) reported poor self-management. These findings indicate that the majority of uncontrolled T2DM patients still have suboptimal family support and self-management skills.

Table 2. Distribution of Family Support and Self Management (n = 83)

Variable	**Good**		**Poor**	
	Frequency (n)	**Prcentage (%)**	**Frequency (n)**	**Prcentage (%)**
Family Support	37	44.6	46	55.4
Self Management	39	47.0	44	53.0

According to the cross-tabulation results, respondents with poor family support were more likely to have poor self-management (24 respondents) than good self-management (22 respondents). The group of respondents with good family support consisted of 20 people with poor self-management and 17 people with good self-management.

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Table 3. Family Support and Self-Management Cross-Tabulation (n = 83)

		DSMQ		TOTAL
		Poor	Good	
HDFSS	**Poor**	24	22	46
	Good	20	17	37
TOTAL		44	39	83

The correlation analysis identified family support as the only factor associated with self-management (p = 0.047; r = 0.218), but no significant relationship was found between age, gender, occupation, and education level (p > 0.05). The positive correlation indicates that greater family support is associated with increased patient self-management. However, the magnitude of the relationship between the variables remains relatively weak.

Table 4. Correlation between Family Support and Self-Management (n = 83)

Variable	Self Management	
	p	r
Family Support*	0.047*	0.218

Description: The Pearson test was used for the variables family support.

The correlation analysis revealed a statistically significant positive relationship between family support and self-management among patients with uncontrolled type 2 diabetes mellitus (p = 0.047; r = 0.218). The correlation coefficient indicates a weak positive relationship, suggesting that higher levels of family support tend to be associated with better self-management. However, the strength of this association is relatively weak, indicating that family support may be one of several factors related to self-management in patients with uncontrolled type 2 diabetes mellitus.

DISCUSSION

The findings of this study showed that more than half of the respondents (53.0%; n = 44) had poor diabetes self management, while 47.0% (n = 39) demonstrated good self management based on the sample mean score of 57.59. It should be noted that this categorization was based on the mean score of the study participants rather than an established clinical or validated cut-off point for the DSMQ-R instrument. Therefore, these categories represent the distribution of self-management scores within this study sample and should not be interpreted as standardized classifications. This finding indicates that maintaining optimal diabetes self-management remains a challenge among patients with uncontrolled T2DM. Diabetes self-management involves several daily activities, including dietary regulation, medication adherence, physical activity, blood glucose monitoring, and regular healthcare consultations. Difficulties in maintaining these behaviors may be influenced by several factors, such as limited diabetes-related knowledge, low motivation, inadequate self-efficacy, psychological conditions, and the complexity of treatment regimens. A systematic literature review by Karlsson, Petersson and Wickman (2026) identified several interacting factors influencing self-care

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adherence among patients with T2DM, including sociodemographic, disease- and treatment-related, healthcare-related, and psychological factors. The review particularly emphasized the importance of psychological factors, including motivation, in supporting adherence to self-care practices. In the present study, the mean age of respondents was 54.24 ± 5.39 years, and the majority were female (89.2%). However, age was not significantly associated with self-management ($p = 0.571$), suggesting that age alone may not explain the observed self-management patterns. Furthermore, although women represented the majority of respondents, gender was also not significantly associated with self-management ($p = 0.919$). Therefore, the relatively high proportion of poor self-management may be better understood through behavioral, psychological, and social factors rather than demographic characteristics alone (Ulfah *et al.*, 2022; Karlsson, Petersson and Wickman, 2026).

Regarding family support, this study found that 55.4% (n = 46) of respondents experienced poor family support, whereas 44.6% (n = 37) reported good family support. This finding suggests that family involvement in diabetes management may not always be optimal, despite the important role of family members in supporting long-term disease management. Family support may involve emotional encouragement, providing health-related information, assisting with medication routines, preparing appropriate meals, encouraging physical activity, and helping patients access healthcare services. Busebaia et al. (2023), in an umbrella review of 19 systematic reviews, emphasized that family interactions can either facilitate or hinder diabetes self-management, depending on the nature and quality of support provided. The predominance of female respondents in this study (89.2%) may also be considered when interpreting the findings, particularly because gender-related psychosocial characteristics may influence diabetes self-management experiences. Tseng, Nkimbeng and Han (2022) examined gender differences in psychosocial characteristics and diabetes self-management among African American patients with T2DM. Their findings suggested that the relationships between psychosocial factors, such as diabetes knowledge, self-efficacy, health literacy, depression, and social support, and self-management behaviors may differ between men and women. However, the study did not establish statistically significant gender differences, and its relatively small sample size requires cautious interpretation. In the present study, gender was not significantly associated with self-management ($p = 0.919$), and the specific family members providing support were not identified. Therefore, it cannot be concluded that respondents primarily received support from their husbands or other particular family members. Evidence from Malang City also supports the importance of family involvement, as Ulfah et al. (2022) found that family support was significantly associated with self-care behavior among patients with diabetes. These findings highlight the importance of strengthening family awareness and involvement in supporting patients' daily diabetes management.

The main finding of this study was a statistically significant positive relationship between family support and diabetes self-management among patients with uncontrolled T2DM ($r = 0.218$; $p = 0.047$). Although the correlation was relatively weak, the positive direction indicates that higher levels of perceived family support tended to be associated with better diabetes self-management. This finding is consistent with the umbrella review by Busebaia et al. (2023), which highlighted the contribution of family interactions and informal social support to adherence to diabetes self-care practices. Family members may facilitate self-

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management by providing reminders about medication, assisting with meal planning, accompanying patients to healthcare appointments, encouraging physical activity, and offering emotional support. Similarly, Ulfah et al. (2022), in a study involving 158 patients with diabetes in Malang City, found that family support was significantly associated with self-care behavior. The relatively weak correlation observed in the present study suggests that family support is an important factor but may not be the only factor influencing diabetes self-management. Other factors, including self-efficacy, diabetes-related knowledge, psychological well-being, health literacy, treatment complexity, and access to healthcare services, may also contribute to patients' ability to maintain self-care behaviors (Tseng et al., 2022; Karlsson et al., 2026). Therefore, diabetes management programs should not focus exclusively on patients but should also involve family members through family-centered education, counseling, and support strategies to strengthen patients' ability to manage their condition..

CONCLUSION

This study found a statistically significant positive correlation between family support and self-management among patients with uncontrolled type 2 diabetes mellitus ($r = 0.218$; $p = 0.047$), although the strength of the relationship was weak. These findings suggest that family support is an important aspect to consider in promoting better diabetes self management. Therefore, future healthcare providers, particularly nurses in primary healthcare settings, should pay greater attention to family involvement by integrating family centered education, counseling, and support into routine diabetes care to encourage medication adherence, healthy dietary practices, regular physical activity, and blood glucose monitoring, thereby supporting glycemic control and reducing the risk of diabetes related complications. Furthermore, this study provides preliminary evidence to support future research on family based interventions for patients with uncontrolled T2DM. Future studies should develop and evaluate structured interventions involving family members as active partners in diabetes management to determine their effectiveness in improving patients' self management behaviors and glycemic outcomes. Longitudinal and experimental research designs are also recommended to further establish the long-term contribution of family support to diabetes management.

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REFERENCES

Adi Pamungkas, R., Hadijah, S. and Mayasari, A. (2017) "FACTORS ASSOCIATED WITH POOR GLYCEMIC CONTROL AMONG TYPE 2 DIABETES MELLITUS IN INDONESIA," *Rian Adi Pamungkas, S.Kep.Ns., MNS Jl. Antang Raya*, 3(3), pp. 272–280. Available at: http://belitungraya.org/BRP/index.php/bnj/.

Azmiardi, A., Febrinasari, R.P. and Murti, B. (2026) "Effectiveness of family and peer support intervention on glycemic control, self-management, and quality of life in type 2 diabetes in rural Indonesia: A randomized controlled trial," *Journal of Family and Community Medicine*, 33(2), pp. 84–91. Available at: https://doi.org/10.4103/jfcm.jfcm_357_25.

Busebaia, T.J.A. *et al.* (2023) "The role of family in supporting adherence to diabetes self-care management practices: An umbrella review," *Journal of Advanced Nursing*. John Wiley and Sons Inc, pp. 3652–3677. Available at: https://doi.org/10.1111/jan.15689.

Davies, M.J. *et al.* (2022) "Management of Hyperglycemia in Type 2 Diabetes, 2022. A Consensus Report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD)," *Diabetes Care*, 45(11), pp. 2753–2786. Available at: https://doi.org/10.2337/dci22-0034.

Dinas Kesehatan Kota Malang (2023) *PROFIL KESEHATAN KOTA MALANG TAHUN 2022 DINAS KESEHATAN KOTA MALANG 2023*.

Dini Islami, D., Tamtomo, G. and Prasetya[3], H. (2021) "Correlation between Family Support and Self Care in Type 2 Diabetes Mellitus: Meta-Analysis," *Indonesian Journal of Medicine*, (01), pp. 62–70. Available at: https://doi.org/10.26911/theijmed.2021.

Diriba, D.C., Leung, D.Y.P. and 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). Available at: https://doi.org/10.1038/s41598-023-48049-w.

Karlsson, A.V., Petersson, T. and Wickman, U.L. (2026) "Factors Influencing Adherence to Self-Care in Patients with Type 2 Diabetes: A Systematic Literature Review," *Healthcare (Switzerland)*. Multidisciplinary Digital Publishing Institute (MDPI). Available at: https://doi.org/10.3390/healthcare14070941.

Kristianingrum, N.D., Wiarsih, W. and Nursasi, A.Y. (2018) "Perceived family support among older persons in diabetes mellitus self-management," *BMC Geriatrics*, 18. Available at: https://doi.org/10.1186/s12877-018-0981-2.

Miller, T.A. and DiMatteo, M.R. (2013) "Importance of family/social support and impact on adherence to diabetic therapy," *Diabetes, Metabolic Syndrome and Obesity*. Dove Medical Press Ltd, pp. 421–426. Available at: https://doi.org/10.2147/DMSO.S36368.

Moseneke, M.V.T. *et al.* (2026) "Behavioral and Lifestyle Determinants of Poor Glycemic Control Among Adults with Type 2 Diabetes in Lesotho: Implications for Public Health in Low-Resource Settings," *International Journal of Environmental Research and Public Health*, 23(1). Available at: https://doi.org/10.3390/ijerph23010044.

Ningrum, V.D.A. *et al.* (2026) "The glycemic control of type-2 diabetic patients in the reversed referral program of Indonesia's healthcare and social security agency: a cross-sectional study," *Family Medicine and Primary Care*

Article History:
Received: October 2, 2026; Revised October 30, 2026; Accepted: October 31, 2026

Review, 28(1), pp. 62–69. Available at: https://doi.org/10.5114/fmpcr.2026.159151.

Ojewale, L.Y. *et al.* (2019) "A survey on patients' characteristics, perception of family support and diabetes self-management among type 2 diabetes patients in South-West Nigeria," *Nursing Open*, 6(2), pp. 208–215. Available at: https://doi.org/10.1002/nop2.236.

Pamungkas, R.A., Chamroonsawasdi, K. and Vatanasomboon, P. (2017) "A systematic review: Family support integrated with diabetes self-management among uncontrolled type II diabetes mellitus patients," *Behavioral Sciences*. MDPI Multidisciplinary Digital Publishing Institute. Available at: https://doi.org/10.3390/bs7030062.

Reynald Susilo, L., Sari Tetra Dewi, F. and Huriyati, E. (2022) "Family support, diabetes self-management behavior, and HbA1c levels in Manggarai Regency, East Nusa Tenggara," 38, pp. 305–312. Available at: https://doi.org/10.22146/bkm.v38i8.5073.

Safaruddin, S. and Permatasari, H. (2022) "Dukungan Keluarga Dengan Manajemen Diri Diabetes Pada Pasien Diabetes Melitus Tipe 2 : Tinjauan Sistematik Family Support with Diabetes Self-Management in Type 2 Diabetes Mellitus Patients : A Systematic Review," *Jurnal Kesehatan Komunitas*, 8(2), pp. 195–204.

Santi, P.A.E., Sipollo, B.V. and Syukkur, A. (2025) "Hubungan Dukungan Keluarga dengan Self Care Management Pada Pasien Diabetes Melitus di Puskesmas Bareng Kota Malang," *Malahayati Nursing Journal*, 7(8), pp. 3705–3718. Available at: https://doi.org/10.33024/mnj.v7i8.21619.

Schmitt, A. *et al.* (2013) "The Diabetes Self-Management Questionnaire (DSMQ): Development and evaluation of an instrument to assess diabetes self-care activities associated with glycaemic control," *Health and Quality of Life Outcomes*, 11(1). Available at: https://doi.org/10.1186/1477-7525-11-138.

Schmitt, A. *et al.* (2021) "A Self-Report Measure of Diabetes Self-Management for Type 1 and Type 2 Diabetes: The Diabetes Self-Management Questionnaire-Revised (DSMQ-R) – Clinimetric Evidence From Five Studies," *Frontiers in Clinical Diabetes and Healthcare*, 2. Available at: https://doi.org/10.3389/fcdhc.2021.823046.

Setyoadi *et al.* (2023) "The correlation between family support and health status in patients with diabetes mellitus," *Healthcare in Low-Resource Settings*, 11(S1), pp. 1–6. Available at: https://doi.org/10.4081/hls.2023.11212.

Tseng, H.H.K., Nkimbeng, M. and Han, H.R. (2022) "Gender differences in psychosocial characteristics and diabetes self-management among inner-city African Americans," *Nursing Open*, 9(5), pp. 2425–2433. Available at: https://doi.org/10.1002/nop2.1259.

Ulfah, N.H. *et al.* (2022) "Personal characteristics, families, and community support associated with self-care behavior among Indonesian diabetic patients," *Journal of Public Health in Africa*, 13(s2). Available at: https://doi.org/10.4081/jphia.2022.2419.

Viet Hung, N. *et al.* (2020) *Effectiveness of a family support coaching program on diabetes mellitus self-management to improve health outcomes among Thai patients with uncontrolled type 2 diabetes: a quasi-experimental study*, *Journal of Public Health and Development*.

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