

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

Ernawati^{1*}, Podo Yuwono², Marsito¹, Putra Agina Widyaswara Suwaryo²

¹Community Nursing, Faculty of Health Science, Universitas Muhammadiyah Gombong, Indonesia

²Emergency Nursing, Faculty of Health Science, Universitas Muhammadiyah Gombong, Indonesia

ABSTRACT

Family support is an important social resource for diabetes self-management, yet different forms of support may not contribute equally to specific self-care behaviors. This study examined the associations between emotional, instrumental, informational, and appraisal support and diabetes self-care among adults with type 2 diabetes receiving primary care. An analytical cross-sectional study was conducted among 99 adults with type 2 diabetes recruited using consecutive sampling. Family support was assessed using the Family Support Questionnaire, while diabetes self-care behaviors were measured using the Summary of Diabetes Self-Care Activities. Associations were examined using correlation analyses and multivariable linear regression adjusted for age, sex, educational attainment, duration of diabetes, and frequency of healthcare follow-up. Perceived family support was generally high across all dimensions. Medication adherence was the most frequently performed self-care behavior (5.24 ± 2.08 days/week), whereas blood glucose monitoring was the least frequent (2.40 ± 1.93 days/week). Although several family-support dimensions were positively correlated with physical activity, medication adherence, and foot care in bivariate analyses, most associations were attenuated after multivariable adjustment. Informational support showed the clearest independent associations, with higher informational support associated with more frequent blood glucose monitoring ($\beta = 0.31$, 95% CI [0.02, 0.60], $p = .036$) and foot care ($\beta = 0.42$, 95% CI [0.07, 0.76], $p = .018$). No consistent independent associations were observed for emotional, instrumental, or appraisal support across the self-care domains. These findings suggest that the contribution of family support to diabetes self-management may depend on the type of support provided. Family-oriented diabetes care in primary care may benefit from emphasizing specific informational support that helps patients perform practical and preventive self-care behaviors.

KEYWORDS: type 2 diabetes mellitus; family support; diabetes self-care; self-management; primary care; informational support

ARTICLE DETAILS

Published On:
31 August 2026

Available on:
<https://ijpbms.com/>

I. INTRODUCTION

Type 2 diabetes mellitus is a major chronic health condition that requires continuous management throughout the course of the disease. Unlike acute conditions in which treatment is largely delivered within healthcare facilities, much of diabetes management occurs in patients' everyday lives. Patients are expected to make repeated decisions regarding food intake, physical activity, medication use, blood glucose monitoring, and preventive behaviors,

including foot care. Consequently, effective self-care is a fundamental component of diabetes management and plays an important role in maintaining glycemic control and preventing long-term complications (Almomani & AL-Tawalbeh, 2022; Shrivastava et al., 2013). Despite its importance, maintaining consistent self-care remains challenging for many adults with type 2 diabetes because these behaviors must be sustained over long periods and

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

integrated into daily routines (Alrasheeday et al., 2024; Masupe et al., 2022).

Diabetes self-care is increasingly understood as a multidimensional behavior shaped by more than individual knowledge or motivation. Clinical characteristics, educational background, access to healthcare, and social resources may all contribute to patients' ability to manage their condition (Alrasasimah & Alsabaani, 2024; Khairnar et al., 2019). Among these social resources, support from family members may be particularly relevant because diabetes management frequently takes place within the household. Family members may influence food choices, medication routines, attendance at healthcare appointments, access to resources, emotional adjustment to chronic illness, and patients' motivation to maintain recommended behaviors. Previous studies have demonstrated associations between family or social support and diabetes self-care activities, treatment adherence, glycemic control, and other health-related outcomes (El-Radad et al., 2023; Zeren & Canbolat, 2023). Evidence synthesized in an umbrella review further indicates that families can play a substantial role in supporting adherence to diabetes self-management practices (Busebaia et al., 2023).

However, family support is not a single, homogeneous construct. It can comprise several conceptually distinct forms of assistance. Emotional support includes empathy, encouragement, reassurance, and expressions of concern; informational support involves providing advice, information, or guidance related to disease management; instrumental support refers to practical, material, or physical assistance; and appraisal support involves feedback, recognition, and reinforcement of patients' efforts and health-related decisions. These dimensions may plausibly support diabetes self-care through different pathways. Emotional support may help patients sustain motivation and cope with the burden of long-term disease management, whereas informational support may facilitate more appropriate self-management decisions. Instrumental support may enable patients to access medication, healthy food, glucose-monitoring resources, or healthcare services, while appraisal support may reinforce desirable behaviors through feedback and encouragement.

Despite these conceptual differences, much of the existing evidence has treated family support as an overall construct or has examined selected aspects of family involvement rather than simultaneously evaluating multiple dimensions of support. Zeren and Canbolat (2023), for example, demonstrated an association between family support and self-care among individuals with type 2 diabetes, while other studies have linked social support with self-care activities and glycemic outcomes (El-Radad et al., 2023). Although these findings establish the importance of patients' social environments, they provide less clarity regarding whether all forms of family support contribute

similarly to diabetes self-management. Consequently, an important question remains: which dimensions of family support matter most for diabetes self-care?

This distinction is clinically relevant because diabetes self-care itself comprises several different behaviors. Support that facilitates medication adherence may not necessarily be the same type of support required to improve dietary practices, physical activity, blood glucose monitoring, or foot care. Treating family support and self-care as single global constructs may therefore obscure potentially important domain-specific relationships. Identifying these relationships could provide a more precise basis for family-oriented diabetes interventions by allowing healthcare professionals to move beyond the general recommendation that families should “provide more support” toward identifying the particular forms of support most relevant to specific self-management behaviors.

The issue is particularly pertinent in primary care, where patients with type 2 diabetes require long-term follow-up but perform most disease-management activities outside healthcare facilities. In Indonesia, previous studies have highlighted the role of families in diabetes care, including emotional support, motivation, dietary adherence, and quality of life (Ernawati et al., 2023; Oktavia, 2022; Yuwono et al., 2023). However, much of this evidence has focused on individual aspects of family support or specific outcomes. A more comprehensive examination of emotional, informational, instrumental, and appraisal support within the same analytical framework may therefore provide additional insight into how families contribute to everyday diabetes management in the primary care context.

Accordingly, this study aimed to examine the associations between four dimensions of family support—emotional, informational, instrumental, and appraisal support—and diabetes self-care behaviors among adults with type 2 diabetes receiving primary care. Specifically, the study sought to determine which dimensions of family support were independently associated with self-care after accounting for relevant sociodemographic and clinical characteristics and to explore whether these associations differed across specific self-care domains, including dietary management, physical activity, blood glucose monitoring, medication adherence, and foot care. By distinguishing the relative contribution of different forms of family support, this study may provide a more specific empirical foundation for developing targeted, family-oriented strategies to strengthen diabetes self-management in primary care.

II. METHOD

Study Design and Setting

This study used an analytical cross-sectional design to examine the associations between different dimensions of family support and diabetes self-care behaviors among adults with type 2 diabetes mellitus receiving primary care.

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

The study was conducted at primary healthcare centers, Kebumen, Indonesia, between March and June 2026. The study is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology guidelines for cross-sectional studies (von Elm et al., 2007).

Participants and Sampling

The study population comprised adults with type 2 diabetes mellitus attending primary healthcare services during the study period. Participants were recruited using consecutive sampling, whereby all eligible patients encountered during the data-collection period were invited to participate until the required sample size was reached.

Patients were eligible if they were aged 18 years or older, had been diagnosed with type 2 diabetes mellitus for at least six months, had at least one family member involved in their care, and voluntarily agreed to participate by providing written informed consent. Patients were excluded if they were experiencing an acute diabetic complication, including diabetic ketoacidosis or severe hypoglycemia; had cognitive or psychiatric conditions that could interfere with questionnaire completion; or were clinically unstable at the time of recruitment.

Sample Size

The sample size was determined according to the requirements of the planned multivariable analysis. Four dimensions of family support emotional, informational, instrumental, and appraisal support were specified as the primary independent variables. A minimum of 20 participants per primary predictor was considered necessary to obtain sufficiently stable regression estimates, resulting in a minimum requirement of 80 participants. An additional 20% was allowed for incomplete questionnaires, ineligible responses, or other data-quality issues, resulting in an estimated sample requirement of 96 participants. This number was rounded to a target sample of 100 participants.

Study Variables and Measures

Family Support

The primary exposures were four dimensions of perceived family support: emotional, informational, instrumental, and appraisal support. Family support was assessed using the Family Support Questionnaire (FSQ). The questionnaire evaluates patients' perceptions of the extent to which family members provide psychological encouragement and empathy, information or advice related to diabetes management, practical or material assistance, and recognition or reinforcement of appropriate health behaviors.

The FSQ used in this study consisted of 16 items rated on a 5-point Likert scale ranging from 1 to 5. Items were grouped a priori into four family-support dimensions emotional, instrumental, informational, and appraisal support according to the instrument's scoring structure. Domain scores were calculated by summing the relevant

items, with higher scores indicating greater perceived family support. The Indonesian-language version used in this study underwent instrument testing and a readability assessment before the main data collection to ensure linguistic clarity and comprehensibility among the target population. Internal consistency was evaluated separately for each family-support domain using Cronbach's alpha.

Diabetes Self-Care Behaviors

Diabetes self-care was assessed using the Summary of Diabetes Self-Care Activities (SDSCA), a widely used self-report measure of diabetes self-management behaviors (Toobert et al., 2000). Participants reported the number of days during the preceding seven days on which they had performed specific recommended self-care activities. Responses therefore ranged from 0 to 7 days, with higher values generally indicating more frequent performance of the recommended behavior.

Self-care was evaluated across the behavioral domains represented in the study questionnaire, including dietary management, physical activity, blood glucose monitoring, medication adherence, and foot care. Domain scores were calculated in accordance with the SDSCA scoring approach, using the mean number of days for the relevant items and reverse-scoring negatively phrased items where applicable (Toobert et al., 2000). For medication-taking items, the applicable medication item or mean of applicable items was used according to the participant's treatment regimen.

Because the SDSCA represents conceptually distinct self-management behaviors, the domain scores were analyzed separately rather than being combined into a single global self-care score. This approach allowed the study to determine whether particular forms of family support were associated differently with specific diabetes self-care behaviors.

Sociodemographic and Clinical Characteristics

Sociodemographic and clinical characteristics were obtained using a structured questionnaire. Variables collected included age, sex, educational attainment, employment status, marital status, duration of diabetes, living arrangement, family involvement in diabetes care, and frequency of routine healthcare follow-up. Variables considered potential confounders were selected a priori based on their clinical relevance to diabetes self-management rather than solely on statistical significance in univariable analyses.

Data Collection Procedure

Potential participants were screened for eligibility during their attendance at the participating primary healthcare facility. Eligible patients received information regarding the purpose, procedures, voluntary nature, potential benefits, and minimal risks of participation. Written informed consent was obtained before data collection.

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

Data were collected using standardized questionnaires administered by trained research personnel. Enumerators received prior training regarding participant screening, questionnaire administration, research ethics, confidentiality, and communication with patients. Completed questionnaires were reviewed for completeness at the time of collection to minimize missing or inconsistent responses. Each participant was assigned a unique study code, and personally identifiable information was kept separately from the analytical dataset.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 30 (IBM Corp., Armonk, NY, USA). Data quality was evaluated before analysis through range checks, assessment of missing values, and examination of implausible or inconsistent responses.

Categorical variables were summarized as frequencies and percentages. Continuous variables were described using means and standard deviations when approximately normally distributed and medians with interquartile ranges when distributions were skewed. Distributional characteristics were examined using histograms, Q–Q plots, and appropriate descriptive statistics.

Internal consistency of the four FSQ dimensions was assessed using Cronbach's alpha. Reliability estimates were also examined for multi-item SDSCA domains where appropriate; however, a single reliability coefficient was not used to characterize the entire SDSCA because the instrument measures distinct self-care behaviors.

Bivariate associations between family-support dimensions and individual self-care domains were initially examined using Pearson's correlation coefficients for approximately normally distributed continuous variables or Spearman's rank correlation coefficients when distributional assumptions were not satisfied.

Multivariable linear regression analyses were subsequently performed to identify the independent associations between the four dimensions of family support and each diabetes self-care domain. Emotional, informational, instrumental, and appraisal support were entered simultaneously into each model so that the association of each dimension could be estimated while accounting for the other forms of family support. Prespecified covariates included age, sex, educational attainment, duration of diabetes, and frequency of healthcare follow-up.

Unstandardized regression coefficients (B), standardized regression coefficients (β), 95% confidence intervals, and p-values were reported. Standardized coefficients were used to facilitate comparison of the relative strength of associations across the four family-support dimensions. Model performance was summarized using R^2 and adjusted R^2 .

Regression assumptions were assessed before interpretation of the final models. Linearity and homoscedasticity were evaluated using residual plots, residual distributions were examined for substantial departures from normality, and multicollinearity was assessed using variance inflation factors. Potentially influential observations were examined using standardized residuals and Cook's distance. Two-sided p-values $< .05$ were considered statistically significant, with emphasis placed on effect estimates and their 95% confidence intervals.

Ethical Considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and applicable national regulations for health research involving human participants. Ethical approval was obtained from the Research Ethics Committee of Universitas Muhamamdiyah Gombong with approval number: 149.6/II.3.AU/F/KEPK/III/2026. Permission to conduct the study was also obtained from the participating primary healthcare facility.

All participants provided written informed consent before enrollment. Participation was voluntary, and participants could decline or withdraw at any time without consequences for their healthcare. Confidentiality was maintained through coded data collection, restricted access to research files, and secure data storage.

III.RESULTS

Participant Characteristics and Study Measures

A total of 99 adults with type 2 diabetes were included in the analysis, with complete data available for all family-support and diabetes self-care items. The mean age was 61.8 ± 7.3 years (range, 40–75 years), and 77 participants (77.8%) were women. Most participants were married (96.0%) and lived with family members (94.9%). The median duration of diabetes was 4.0 years (interquartile range [IQR], 2.0–10.0 years), and the median frequency of routine healthcare follow-up was 1 visit per month (IQR, 1–1).

Perceived family support was generally high across all four dimensions. Emotional support had the highest mean score (4.45 ± 0.45), followed by instrumental support (4.40 ± 0.48), appraisal support (4.38 ± 0.53), and informational support (4.31 ± 0.58). Internal consistency was good to excellent across the four domains, with Cronbach's alpha coefficients ranging from 0.808 to 0.903.

Table 1. Participant Characteristics, Family Support, and Diabetes Self-Care Behaviors (n = 99)

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

Variable	Value	Cronbach's α
Participant characteristics		
Age, years, mean $\pm$ SD	61.8 $\pm$ 7.3	—
Female sex, n (%)	77 (77.8)	—
Male sex, n (%)	22 (22.2)	—
Educational attainment, n (%)		
No formal education	11 (11.1)	—
Primary school	37 (37.4)	—
Junior secondary school	25 (25.3)	—
Senior secondary school	23 (23.2)	—
Bachelor's degree	3 (3.0)	—
Married, n (%)	95 (96.0)	—
Living with family, n (%)	94 (94.9)	—
Duration of diabetes, years, median (IQR)	4.0 (2.0–10.0)	—
Healthcare follow-up, visits/month, median (IQR)	1.0 (1.0–1.0)	—
Family support dimensions, mean $\pm$ SD¹		
Emotional support	4.45 $\pm$ 0.45	0.808
Instrumental support	4.40 $\pm$ 0.48	0.843
Informational support	4.31 $\pm$ 0.58	0.903
Appraisal support	4.38 $\pm$ 0.53	0.894
Diabetes self-care behaviors, days/week, mean $\pm$ SD²		
Diet	3.62 $\pm$ 1.05	—
Physical activity	3.24 $\pm$ 1.75	—
Blood glucose monitoring	2.40 $\pm$ 1.93	—
Medication adherence	5.24 $\pm$ 2.08	—
Foot care	3.68 $\pm$ 1.92	—

Considerable variation was observed across diabetes self-care behaviors. Medication adherence was the most frequently performed self-care behavior, averaging 5.24 $\pm$ 2.08 days per week, whereas blood glucose monitoring was the least frequent, averaging 2.40 $\pm$ 1.93 days per week. Mean frequencies for diet, physical activity, and foot care were 3.62 $\pm$ 1.05, 3.24 $\pm$ 1.75, and 3.68 $\pm$ 1.92 days per week, respectively (Table 1).

Associations Between Family Support and Diabetes Self-Care

In bivariate analyses, the four dimensions of family support showed different patterns of association across self-care behaviors. Emotional, instrumental, informational, and appraisal support were all positively correlated with physical

activity (Spearman's ρ = 0.327–0.476), medication adherence (ρ = 0.331–0.509), and foot care (ρ = 0.311–0.505), with all corresponding p-values $\leq$.002. In contrast, none of the four family-support dimensions showed a statistically significant bivariate association with dietary self-care or blood glucose monitoring.

The four family-support dimensions were subsequently entered simultaneously into multivariable regression models together with age, sex, educational attainment, duration of diabetes, and frequency of healthcare follow-up. Multicollinearity was not considered problematic, with variance inflation factors not exceeding 3.75.

Table 2. Adjusted Associations Between Family-Support Dimensions and Diabetes Self-Care Behaviors

Family-support dimension	Diet, β (95% CI)	Physical activity, β (95% CI)	Blood glucose monitoring, β (95% CI)	Medication adherence, β (95% CI)
Emotional	0.19 (–0.34 to 0.71), p = .488	–0.05 (–0.48 to 0.37), p = .805	–0.09 (–0.46 to 0.28), p = .629	0.00 (–0.43 to 0.43), p = .985
Instrumental	0.32 (–0.03 to 0.68), p = .077	–0.03 (–0.32 to 0.27), p = .862	0.23 (–0.12 to 0.58), p = .192	–0.02 (–0.40 to 0.35), p = .902
Informational	–0.01 (–0.36 to 0.34), p = .938	0.32 (–0.03 to 0.68), p = .074	0.31 (0.02 to 0.60), p = .036	0.34 (–0.14 to 0.82), p = .166
Appraisal	–0.41 (–0.84 to 0.01), p = .057	0.26 (–0.17 to 0.70), p = .240	–0.38 (–0.78 to 0.03), p = .068	0.17 (–0.18 to 0.52), p = .353

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

Adjusted R ²	0.112	0.262	0.147	0.289
-------------------------	-------	-------	-------	-------

After adjustment, informational support emerged as the family-support dimension with the clearest independent associations with specific diabetes self-care behaviors. Higher informational support was independently associated with more frequent blood glucose monitoring (standardized $\beta = 0.31$, 95% CI 0.02 to 0.60, $p = .036$) and more frequent foot care ($\beta = 0.42$, 95% CI 0.07 to 0.76, $p = .018$). A positive association between informational support and physical activity was also observed, although the confidence interval included the null value ($\beta = 0.32$, 95% CI -0.03 to 0.68, $p = .074$).

No individual family-support dimension was independently associated with medication adherence after simultaneous adjustment, despite the positive correlations observed in the bivariate analysis. Similarly, none of the four support dimensions showed an independent association with dietary self-care. The adjusted models explained approximately 11.2% to 28.9% of the variance across the five self-care domains, with the greatest explained variance observed for medication adherence and physical activity (Table 2).

IV. DISSCUSSION

This study examined whether different dimensions of family support were associated with specific diabetes self-care behaviors among adults with type 2 diabetes receiving primary care. Three findings are particularly noteworthy. First, perceived family support was generally high across emotional, instrumental, informational, and appraisal dimensions, whereas the frequency of self-care behaviors varied considerably, with medication adherence reported most frequently and blood glucose monitoring least frequently. Second, although all four dimensions of family support were positively correlated with several self-care behaviors at the bivariate level, most associations were attenuated after simultaneous adjustment. Third, informational support emerged as the most consistently relevant independent dimension, showing significant positive associations with blood glucose monitoring and foot care. These findings suggest that the contribution of family support to diabetes self-management may depend not only on the amount of support available but also on the specific type of support provided and the self-care behavior being considered.

The prominence of informational support is clinically plausible. Diabetes management requires patients to repeatedly interpret recommendations, recognize symptoms, remember treatment instructions, and translate clinical advice into everyday behaviors. Family members who provide practical information, reminders, explanations, or guidance may therefore help patients operationalize diabetes recommendations in their daily routines. Previous research

has shown that family and social support are associated with better self-care practices among people with type 2 diabetes (El-Radad et al., 2023; Zeren & Canbolat, 2023), while broader evidence indicates that family involvement can facilitate adherence to diabetes self-management behaviors (Busebaia et al., 2023). The present findings extend this evidence by suggesting that informational support may be particularly relevant when family support is separated into distinct dimensions rather than treated as a single global construct.

The association between informational support and blood glucose monitoring deserves particular attention. Blood glucose monitoring was the least frequently performed self-care behavior in this study, averaging only 2.40 days per week. Unlike medication-taking, which may become incorporated into a relatively stable daily routine, glucose monitoring often requires additional knowledge, equipment, interpretation of results, and decisions regarding when monitoring is necessary. Patients may also need assistance understanding target glucose levels or determining how results should inform diet, physical activity, or healthcare consultation. Informational support from family members may therefore reduce uncertainty and reinforce appropriate monitoring practices. This interpretation is consistent with evidence that diabetes self-management is affected not only by motivation but also by patients' ability to understand and implement disease-management recommendations (Khairnar et al., 2019; Masupe et al., 2022).

Informational support was also independently associated with more frequent foot care. Preventive foot care is a behavior that requires awareness of risks even in the absence of symptoms. Patients must routinely inspect their feet, maintain hygiene, recognize skin or nail abnormalities, and seek care when necessary. Family members may reinforce these practices by reminding patients about foot inspection, communicating information previously provided by healthcare professionals, or helping patients recognize potentially concerning changes. This finding has practical importance because diabetic foot complications may develop gradually and can be overlooked when preventive behaviors are not routinely reinforced. Family-based education may therefore be particularly useful when it provides families with clear, behavior-specific instructions rather than only general encouragement.

In contrast, no individual dimension of family support remained independently associated with medication adherence after multivariable adjustment, despite positive bivariate correlations. One possible explanation is that the four dimensions of support share overlapping variance. Emotional encouragement, practical assistance, informational guidance, and appraisal frequently occur

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

together within families, and an apparent association observed in a simple correlation may therefore reflect the combined family environment rather than the unique contribution of one support dimension. This interpretation is consistent with the attenuation of several associations after all four dimensions were entered simultaneously into the regression models. Medication adherence was also the most frequently performed self-care behavior in the present sample, averaging 5.24 days per week. The relatively high frequency of this behavior may have limited variability and reduced the ability to distinguish the independent contribution of specific support dimensions. In addition, medication-taking may be influenced by factors beyond family support, including treatment complexity, medication availability, perceived adverse effects, healthcare access, and patients' beliefs regarding pharmacological treatment (Almomani & AL-Tawalbeh, 2022; Alrasasimah & Alsabaani, 2024).

Similarly, no clear independent association was observed between family-support dimensions and dietary self-care. Dietary management is particularly complex because food choices are shaped not only by information and encouragement but also by household food availability, cultural preferences, financial resources, meal preparation practices, and shared family eating habits. Consequently, a family may be perceived as highly supportive while the household environment itself does not facilitate sustained dietary modification. Previous studies have emphasized that barriers to diabetes self-management often operate at multiple levels, including individual, family, social, and environmental factors (Khairnar et al., 2019; Masupe et al., 2022). The absence of an independent association in the present study should therefore not be interpreted as evidence that families are unimportant for dietary management; rather, dietary behavior may require interventions that target the household food environment in addition to interpersonal support.

A positive association between informational support and physical activity was also observed, although the confidence interval included the null value after multivariable adjustment. Physical activity is influenced by factors that family support alone may not fully overcome, including age, physical limitations, safety concerns, availability of suitable spaces for exercise, and established lifestyle patterns. The participants in this study were predominantly older adults, which may further influence their capacity to undertake regular physical activity. Nevertheless, the direction of the association suggests that informational support may remain relevant, particularly when families help patients understand appropriate forms, intensity, and frequency of physical activity. Future studies with larger samples may be able to estimate this relationship with greater precision.

An important finding was the apparent contrast between the high levels of perceived family support and the comparatively modest frequency of several self-care behaviors. Mean scores for all four family-support dimensions exceeded 4.3 on a five-point scale, yet participants reported performing dietary self-care, physical activity, blood glucose monitoring, and foot care on substantially fewer than seven days per week. This suggests that high perceived support does not necessarily translate into consistent implementation of all recommended self-care behaviors. The quality, specificity, timing, and content of family support may be more important than its general presence. This distinction may explain why informational support, rather than emotional or appraisal support, showed the clearest independent relationships with selected behavioral outcomes.

These findings have implications for primary care nursing practice. Family involvement in diabetes care should not be limited to encouraging relatives to provide general support. Instead, healthcare professionals may need to identify which self-care behaviors are most problematic for each patient and equip family members with the specific knowledge required to support those behaviors. For example, families could be taught how to reinforce blood glucose monitoring schedules, recognize abnormal glucose readings, support routine foot inspection, and identify warning signs requiring professional assessment. Such an approach would move family participation from a broad social resource toward a more structured component of diabetes self-management support. This may be particularly relevant in Indonesian primary care, where family members frequently participate in the daily care of relatives with chronic illness (Ernawati et al., 2023; Yuwono et al., 2023).

Several limitations should be considered when interpreting the findings. First, the cross-sectional design does not permit determination of temporal or causal relationships. Greater informational support may facilitate better self-care, but patients who are more actively engaged in self-management may also seek or elicit more information from family members. Second, family support and self-care behaviors were assessed using self-report measures and may therefore be affected by recall or social desirability bias. Third, the study involved 99 participants from a primary care population, which may limit statistical power for detecting smaller independent associations and may restrict generalizability to other clinical or sociocultural settings. Fourth, perceived family support was generally high, suggesting a potential ceiling effect that may have reduced variability in the exposure measures. Fifth, although relevant sociodemographic and clinical characteristics were included as covariates, other potentially important factors—such as glycemic control, diabetes complications, health literacy, treatment regimen complexity, psychological distress, and household economic conditions—were not

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

incorporated into the present models. Finally, several family-support dimensions were correlated with one another, meaning that the unique regression coefficients should be interpreted as the contribution of each support dimension after accounting for substantial shared variance with the other dimensions.

Despite these limitations, this study provides a more differentiated understanding of family involvement in diabetes self-management. Rather than treating family support as a single construct, the analysis examined emotional, instrumental, informational, and appraisal support simultaneously across distinct self-care behaviors. The findings indicate that informational support may be particularly relevant to blood glucose monitoring and foot care, while the contribution of family support appears less uniform for diet, physical activity, and medication adherence. These results support the development of more behavior-specific and family-oriented approaches to diabetes self-management in primary care and provide a basis for longitudinal or interventional studies to determine whether strengthening particular forms of family support leads to measurable improvements in self-care behavior.

IV. CONCLUSION

This study demonstrates that the relationship between family support and diabetes self-care is not uniform across different forms of support or self-care behaviors. Among the four dimensions examined, informational support showed the clearest independent associations, particularly with blood glucose monitoring and foot care, after accounting for relevant sociodemographic and clinical characteristics. In contrast, emotional, instrumental, and appraisal support did not show consistent independent associations across the self-care domains.

These findings suggest that the presence of strong family support alone may not be sufficient to ensure optimal diabetes self-management. The type and specificity of support provided by family members may be particularly important, especially for behaviors that require ongoing knowledge, decision-making, and preventive action. Primary care professionals should therefore consider moving beyond general recommendations for family involvement toward more targeted family education that equips relatives with practical and behavior-specific information to support diabetes management.

Given the cross-sectional design, these findings should be interpreted as associations rather than causal relationships. Future longitudinal and intervention studies are needed to determine whether strengthening specific dimensions of family support, particularly informational support, can improve diabetes self-care behaviors and subsequent clinical outcomes.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to all participants who voluntarily contributed to this study and to the healthcare professionals and staff at the participating primary healthcare facility for their assistance during participant recruitment and data collection. The authors also acknowledge the support of Universitas Muhammadiyah Gombong in facilitating the implementation of this research.

REFERENCES

- I. Almomani, M. H., & AL-Tawalbeh, S. (2022). Glycemic control and its relationship with diabetes self-care behaviors among patients with type 2 diabetes in Northern Jordan: A cross-sectional study. *Patient Preference and Adherence*, 16, 449–465. <https://doi.org/10.2147/PPA.S343214>
- II. Alrasasimah, W. A., & Alsabaani, A. (2024). Predictors of diabetes self-management behaviour among type 2 diabetics in Saudi Arabia: A cross-sectional study. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, 17, 2371–2384. <https://doi.org/10.2147/DMSO.S455193>
- III. Alrasheeday, A. M., Alshammari, H. S., Alshammari, B., Alkubati, S. A., Llego, J. H., Alshammari, A. D., Alshammari, M. H., Almohammed, R. A., Alsheeb, S. M. S., & Alshammari, F. (2024). Perceived barriers to healthy lifestyle adherence and associated factors among patients with type 2 diabetes mellitus: Implications for improved self-care. *Patient Preference and Adherence*, 18, 2425–2439. <https://doi.org/10.2147/PPA.S432806>
- IV. Busebaia, T. J. A., Thompson, J., Fairbrother, H., & Ali, P. (2023). The role of family in supporting adherence to diabetes self-care management practices: An umbrella review. *Journal of Advanced Nursing*, 79, 3652–3677. <https://doi.org/10.1111/jan.15689>
- V. El-Radad, H. M., Sayed Ahmed, H. A., & Eldahshan, N. A. (2023). The relationship between self-care activities, social support, and glycemic control in primary healthcare patients with type 2 diabetes. *Diabetology International*, 14, 65–75. <https://doi.org/10.1007/s13340-022-00598-7>
- VI. Ernawati, Yuwono, P., & Sari, D. T. (2023). Sikap dan motivasi keluarga dalam perawatan penderita diabetes melitus di wilayah kerja Puskesmas Adimulyo: Family attitudes and motivation in caring for diabetes mellitus patients in the Adimulyo Community Health Center working area. *Journal of Holistic Health Science*, 5, 349–356. <https://doi.org/10.35473/jhhs.v5i2.356>
- VII. Khairnar, R., Kamal, K. M., Giannetti, V., Dwibedi, N., & McConaha, J. (2019). Barriers and facilitators

Which Dimensions of Family Support Matter for Diabetes Self-Care? Evidence from Adults with Type 2 Diabetes in Primary Care

- to diabetes self-management in a primary care setting—Patient perspectives. *Research in Social and Administrative Pharmacy*, 15, 279–286. <https://doi.org/10.1016/j.sapharm.2018.05.003>
- VIII. Masupe, T., Onagbiye, S., Puoane, T., Pilvikki, A., Alvesson, H. M., & Delobelle, P. (2022). Diabetes self-management: A qualitative study on challenges and solutions from the perspective of South African patients and health care providers. *Global Health Action*, 15, 2090098. <https://doi.org/10.1080/16549716.2022.2090098>
- IX. Oktavia, S. (2022). Hubungan dukungan keluarga dengan kepatuhan diet terhadap kualitas hidup pasien diabetes melitus di Puskesmas Cikalong Kulon tahun 2021: Relationship between family support and diet compliance with quality of life for diabetes mellitus patients at Cikalong Kulon Health Center in 2021. *Indonesian Scholar Journal of Nursing and Midwifery Science*, 2, 503–512. <https://doi.org/10.54402/isjnms.v2i01.223>
- X. Shrivastava, S. R., Shrivastava, P. S., & Ramasamy, J. (2013). Role of self-care in management of diabetes mellitus. *Journal of Diabetes & Metabolic Disorders*, 12, Article 14. <https://doi.org/10.1186/2251-6581-12-14>
- XI. Toobert, D. J., Hampson, S. E., & Glasgow, R. E. (2000). The summary of diabetes self-care activities measure: Results from 7 studies and a revised scale. *Diabetes Care*, 23(7), 943–950. <https://doi.org/10.2337/diacare.23.7.943>
- XII. von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *The Lancet*, 370(9596), 1453–1457. [https://doi.org/10.1016/S0140-6736\(07\)61602-X](https://doi.org/10.1016/S0140-6736(07)61602-X)
- XIII. Yuwono, P., Ernawati, E., Marsito, M., & Wardani, N. R. (2023). Dukungan emosional dalam perawatan diabetes mellitus di Puskesmas Karangsambung. *Jurnal Manajemen Asuhan Keperawatan*, 7, 17–21. <https://doi.org/10.33655/mak.v7i1.155>
- XIV. Zeren, F. G., & Canbolat, O. (2023). The relationship between family support and the level of self care in type 2 diabetes patients. *Primary Care Diabetes*, 17, 341–347. <https://doi.org/10.1016/j.pcd.2023.04.008>