



Original Article

Instrumental Family Support and Blood Glucose Self-Management Among Older Adults with Diabetes Mellitus: A Cross-Sectional Study

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ABSTRACT

Background: Family support, particularly instrumental support, plays an important role in helping older adults with diabetes mellitus (DM) manage their blood glucose levels independently. Inadequate support may contribute to poor adherence to diabetes management and an increased risk of complications. This study aimed to determine the relationship between instrumental family support and blood glucose self-management among older adults with DM.

Methods: This quantitative correlational study employed a cross-sectional design and was conducted in July 2025 in Sawangan Village, Batang Regency, Indonesia. The sample consisted of 39 older adults with DM selected using total sampling. The independent variable was instrumental family support, measured using a questionnaire that had been tested for validity and reliability. The dependent variable was blood glucose self-management, assessed using a questionnaire. Data were analyzed using Fisher's exact test (two-sided), as 25% of the cells had expected counts below 5. The odds ratio (OR) and its 95% confidence interval (CI) were calculated to estimate the strength of the association. A p-value of less than 0.05 was considered statistically significant.

Results: Supportive family support was reported by 27 participants (69.2%), and good self-management by 28 participants (71.8%). Instrumental family support was significantly associated with blood glucose self-management (OR = 16.00, 95% CI: 2.93-87.25, $p = 0.001$, Fisher's exact test).

Conclusion: Instrumental family support was associated with self-reported blood glucose self-management among older adults with diabetes mellitus. Family-based interventions to strengthen instrumental support may be considered, although their effectiveness was not assessed in this study.



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INTRODUCTION

The global burden of diabetes continues to increase, affecting individuals, families, and communities worldwide. According to the International Diabetes Federation (IDF), approximately one in nine adults aged 20–79 years is living with diabetes, and more than 40% of those affected are unaware of their condition. By 2050, the number of adults living with diabetes is projected to reach approximately 853 million, representing a 46% increase. More than 90% of people with diabetes have type 2 diabetes, which is influenced by socioeconomic, demographic, environmental, and genetic factors. Key contributors to the increasing prevalence of type 2 diabetes include urbanization, population ageing, reduced physical activity, and rising rates of overweight and obesity. Nevertheless, the burden of diabetes can be reduced through effective prevention strategies, early diagnosis, and access to quality care, which may help prevent or delay the development of diabetes-related complications ([International Diabetes Federation, 2023](#)). Indonesia ranked fifth worldwide in terms of the number of people with DM, with 19.47 million cases in 2021, a figure projected to increase to 21.3 million by 2030 ([Aryanto, Sulastyawati, Pujiastuti, & Hidayah, 2024](#); [Milita, Handayani, & Setiaji, 2021](#)).

At the national level, Central Java is among the provinces with a high burden of noncommunicable diseases, with diabetes mellitus (DM) ranking second after hypertension. Data indicate that the prevalence of DM in the province increased by 6.33% between 2019 and 2020. According to data from the Batang Regency Health Office, 9,304 cases of diabetes mellitus (DM) were recorded in September 2023. In Sawangan Village, 43 older adults were reported to have DM. Of these, 18 regularly attended integrated health service posts (*posyandu*), whereas 25 were reported to be inactive in attending these services. These local data highlight the importance of examining factors associated with diabetes self-management among older adults in the community. These figures indicate a gap in participation in routine community-based health services among older adults with DM. However, the available data do not establish the reasons for non-attendance ([Ramadhani & Hati, 2024](#)).

Risk factors for DM among older adults include advanced age, high body mass index (BMI), family history, unhealthy dietary habits, physical inactivity, and excessive sugar consumption ([Astutisari, Darmini, & Wulandari, 2022](#); [Fortuna, Karuniawati, Purnamasari, & Purlinda, 2023](#); [Lariwu, Sarayar, Pondaag, Merentek, & Lontaan, 2024](#)). Effective DM management involves five pillars: education, dietary management, physical activity, pharmacological therapy, and self-monitoring of blood glucose (SMBG) ([Agustini, Adiana, & Dharmapatni, 2019](#); [Suciana, Daryani, Marwanti, & Arifianto, 2019](#)). Family involvement, particularly in the form of instrumental support, has been shown to help improve patients' adherence to these five pillars.

Previous studies have shown that strong family support is associated with better dietary adherence, blood glucose control, and quality of life among people with DM ([Arini, Anggorowati, & Pujiastuti, 2021](#); [Latifahny, Zulfitri, & Aziz, 2024](#)). Instrumental support may include practical assistance with dietary management, transportation to healthcare facilities, and access to blood glucose monitoring devices ([Aryanto et al., 2024](#); [Mardiyanti, Tanjung, Rumijati, & Washudi, 2020](#)). However, further investigation is warranted to clarify the specific association between instrumental family support and self-reported blood glucose self-management among older adults with DM in community settings. This study addresses this issue by examining the relationship between these variables among older adults with DM in Sawangan Village, Batang Regency, Indonesia.

The reported level of participation in routine community-based health services among older adults with DM in Sawangan Village highlights the importance of understanding factors associated with diabetes self-management in this population. Given the practical role that family members may play in supporting daily diabetes management, this study aimed to examine the association between instrumental family support and self-reported blood glucose self-management among older adults with DM. The findings may provide preliminary evidence to inform the development

of context-appropriate family support strategies, although intervention effectiveness was not evaluated in this study.

METHODS

Study Design

This quantitative study employed a correlational cross-sectional design and was conducted in Sawangan Village, Batang Regency, in July 2025. It aimed to analyze the relationship between instrumental family support and blood glucose self-management among older adults with diabetes mellitus (DM).

Population and Sample

The study population consisted of 43 older adults with type 2 diabetes mellitus (DM) in Sawangan Village, Batang Regency, Indonesia. Total sampling was used to recruit participants from the study population. The inclusion criteria were adults aged 60–75 years with type 2 DM, as verified through medical records available at the local primary healthcare center (Puskesmas), who were willing to participate in the study. Hearing impairment was specified as an exclusion criterion. Of the 43 eligible individuals, 39 agreed to participate, while four declined. Therefore, the final sample consisted of 39 participants. The age range of 60–75 years was selected to focus on older adults with DM within the age limits established for this study. Age-related physiological changes may increase susceptibility to chronic diseases, including DM ([Arisudhana, Antarika, Wijaya, Rosita, & Pemayun, 2024](#)).

Instrument

Two researcher-developed questionnaires were used to collect data: the Instrumental Family Support Questionnaire and the Blood Glucose Self-Management Questionnaire. Both questionnaires were developed by the researcher with reference to previous studies, including ([Jais, Tahlil, & Susanti, 2021](#)) for instrumental family support and ([Pratiwi, Wahyudi, Sadhana, & Sutrisno, 2025](#)) for blood glucose self-management. The items and scoring procedures were adapted to the objectives and context of the present study.

The Instrumental Family Support Questionnaire consisted of 11 items assessing tangible support provided by family members to older adults with diabetes mellitus (DM). The items covered four domains: financial support (1 item), facilities (2 items), food (3 items), and resources and assistance (5 items). Responses were measured using a four-point Likert scale: never (1), rarely (2), often (3), and always (4). The total score ranged from 11 to 44. Scores of 22–44 were classified as supportive, whereas scores of 11–21 were classified as less supportive. These category thresholds were established by the researcher as operational cutoffs during questionnaire development rather than being derived from previously validated thresholds.

The Blood Glucose Self-Management Questionnaire consisted of four researcher-developed items addressing blood glucose monitoring practices among older adults with diabetes mellitus. The items concerned general blood glucose testing, complete blood examinations, blood glucose testing in the morning before eating, and blood glucose testing two hours after meals. Responses were measured using a four-point frequency scale: never (1), rarely (2), often (3), and always (4). The total score ranged from 4 to 16, with scores of 8–16 categorized as good self-management and scores of 4–7 as poor self-management. These thresholds were established by the researcher for the present study and were not derived from previously validated clinical cutoffs. Accordingly, the categories represent classifications of questionnaire scores rather than clinically validated levels of diabetes self-management. The outcome was the questionnaire-based self-management score; domain-specific adherence was not separately established. The questionnaire did not directly assess dietary adherence, physical activity, or medication-taking behavior.

Both questionnaires were researcher-developed. Before use, the content of both questionnaires was reviewed by experts/lecturers. Item validity was assessed using Pearson's product-moment correlation in a pilot study involving 20 respondents in Plemen Village who had characteristics similar to those of the study population. The calculated item-correlation coefficients were compared with the critical r value of 0.444. The reported coefficients ranged from 0.571 to 0.775 for the Instrumental Family Support Questionnaire and from 0.677 to 0.857 for the Blood Glucose Self-Management Questionnaire. All items met the study's item-validity criterion. Pearson correlations were used rather than corrected item-total correlations.

Internal consistency was assessed using Cronbach's alpha in the same pilot sample. The coefficients were 0.893 for the Instrumental Family Support Questionnaire and 0.820 for the Blood Glucose Self-Management Questionnaire, indicating internal consistency within the pilot sample. However, these analyses did not establish all aspects of measurement validity, including construct and criterion validity.

Data Collection

Data were collected over an eight-day period in July 2025 through door-to-door visits to eligible participants in Sawangan Village, Batang Regency, Indonesia. Before data collection, the researcher coordinated with village officials to obtain permission to conduct the study. With assistance from local integrated health post (posyandu) cadres, the researcher informed potential participants about the study.

The researcher explained the study's purpose, benefits, and procedures to potential participants. Those who agreed to participate provided written informed consent by signing a consent form. The researcher then administered the Instrumental Family Support Questionnaire and the Blood Glucose Self-Management Questionnaire. Depending on participants' abilities, the questionnaires were either self-completed or interviewer-administered, with the researcher reading the questions aloud and recording participants' responses. The number of participants completing each administration mode was not recorded. Questionnaire completion took approximately 15–30 minutes per participant. After each questionnaire was completed, the researcher checked the responses for completeness and consistency. The collected data were then prepared for analysis.

Random blood glucose levels were measured directly by the researcher using a glucometer during data collection and recorded in milligrams per deciliter (mg/dL). Healthcare visit frequency was recorded as the number of routine healthcare check-ups per year. After data collection, the researcher checked the responses for completeness and consistency. The collected data were then prepared for analysis.

Data Analysis

Instrumental family support was the independent variable, while blood glucose self-management was the dependent variable. Data were analyzed using univariate and bivariate analyses. Univariate analysis was used to describe the distribution of each study variable and demographic characteristics, while bivariate analysis was performed to examine the association between instrumental family support and blood glucose self-management was analyzed using Fisher's exact test. The unadjusted odds ratio (OR) and its 95% confidence interval (CI) were calculated using the log-Wald method. Statistical significance was set at $p < 0.05$.

Ethical Considerations

This study was conducted after obtaining ethical approval from the the Research Ethics Committee of the Faculty of Health, Universitas Bhamada Slawi, under approval number 083/Univ.Bhamada/KEP.EC/VI/2025, dated June 2, 2025. Written informed consent was obtained from all participants before data collection. The study information was explained to participants,

and their understanding of the information and ability to make an independent decision regarding participation were confirmed before consent was obtained. No participants were known to have conditions that impaired their ability to provide informed consent. To maintain confidentiality, each participant was assigned a respondent code, and access to the research data was restricted to the research team. Participation was voluntary, and the study data were handled confidentially.

RESULTS

This correlational study was conducted in Sawangan Village, Batang Regency, Indonesia, over an eight-day period in July 2025. A total of 39 participants aged 60–75 years with type 2 diabetes mellitus (DM) participated in the study. Their demographic and clinical characteristics are presented below.

Participant Characteristics

The characteristics of the 39 older adults with diabetes mellitus included sex, healthcare services used for routine check-ups, age, duration of diabetes mellitus, random blood glucose (RBG) levels, and frequency of healthcare visits. The distribution of these characteristics is presented in Table 1.

Table 1. Demographic and Clinical Characteristics of Participants (n=39)

Characteristics	Frequency (n)	Percentage (%)				
Sex						
Male	14	35.9%				
Female	25	64.1%				
Healthcare service used for routine check-ups						
Primary healthcare center (Puskesmas)	3	7.7%				
Integrated health post (Posyandu)	15	38.5%				
Other healthcare services (clinics and pharmacies)	21	53.8%				
	SD	IQR	Mean	Median	Minimum	Maximum
Age (years)	2.757	5	62.92	62.00	60	69
Duration of diabetes mellitus (years)	1.587	0	2.54	2.00	2	8
Random blood glucose (RBG) level (mg/dL)	98.868	150	284.15	271.00	161	518
Frequency of healthcare visits (years)	10.248	10	9.67	12.00	1	48

A total of 39 older adults with diabetes mellitus participated in this study. As shown in Table 1, the majority of participants were female (25; 64.1%), while 14 (35.9%) were male. Regarding healthcare services used for routine check-ups, 21 participants (53.8%) reported using other healthcare services, including clinics and pharmacies, followed by integrated health posts (posyandu) (15; 38.5%) and primary healthcare centers (puskesmas) (3; 7.7%).

The participants' mean age was 62.92 years (SD = 2.76), with a median of 62 years, an interquartile range (IQR) of 5 years, and a range of 60–69 years. The mean duration of diabetes mellitus was 2.54 years (SD = 1.59), with a median of 2 years, an IQR of 0 years, and a range of 2–8

years. The mean random blood glucose (RBG) level was 284.15 mg/dL (SD = 98.87), with a median of 271 mg/dL, an IQR of 150 mg/dL, and a range of 161–518 mg/dL. Regarding healthcare utilization, participants reported a mean of 9.67 routine healthcare visits per year (SD = 10.25), with a median of 12 visits, an IQR of 10 visits, and a range of 1–48 visits per year.

Instrumental Family Support Among Older Adults with Diabetes Mellitus

The results showed that instrumental family support among older adults with diabetes mellitus was categorized as either supportive or less supportive.

Table 2. Frequency Distribution of Instrumental Family Support Among Older Adults with Diabetes Mellitus (n=39)

Instrumental Family Support	Frequency (n)	Percentage (%)
Less supportive	12	30.8%
Supportive	27	69.2%
Total	39	100.0%

The results showed that 27 older adults with diabetes mellitus (69.2%) reported receiving instrumental support from their families, while 12 older adults (30.8%) reported receiving insufficient instrumental support. These findings are presented in Table 2.

Blood Glucose Self-Management Among Older Adults with Diabetes Mellitus

Blood glucose self-management among older adults with diabetes mellitus was categorized as either good or poor.

Table 3. Frequency Distribution of Self-Management of Blood Glucose Among Older Adults with Diabetes Mellitus (n=39)

Blood Glucose Self-Management	Frequency (n)	Percentage (%)
Poor	11	28.2%
Good	28	71.8%
Total	39	100.0%

The results showed that 28 older adults with diabetes mellitus (71.8%) reported good blood glucose self-management, while 11 older adults (28.2%) reported poor blood glucose self-management. These findings are presented in Table 3.

Relationship Between Instrumental Family Support and Blood Glucose Self-Management Among Older Adults with Diabetes Mellitus

Instrumental family support was significantly associated with blood glucose self-management (Fisher's exact test, $p = 0.001$). The unadjusted OR was 16.00 (95% CI 2.93–87.25), indicating higher odds of poor blood glucose self-management among participants with less supportive instrumental family support. However, the wide confidence interval indicates considerable uncertainty regarding the magnitude of the association. The analysis was not adjusted for potential confounders.

Table 4. Relationship Between Instrumental Family Support and Blood Glucose Self-Management Among Older Adults with Diabetes Mellitus (n=39)

Instrumental Family Support	Blood Glucose Self-Management				Total, n (%)	P-value Exact Sig. (2-sided)
	Poor		Good			
	n	%	n	%		
Less-supportive	8	66.7	4	33.3	12 (100)	0,001
Supportive	3	11.1	24	88.9	27 (100)	
Total	11	28.2	28	71.8	39 (100)	

As shown in Table 4, poor blood glucose self-management was more prevalent among participants with less supportive instrumental family support (8/12, 66.7%) than among those with supportive family support (3/27, 11.1%). Conversely, good self-management was observed in 33.3% of participants in the less supportive group and 88.9% in the supportive group. Fisher's exact test showed a statistically significant association between instrumental family support and blood glucose self-management (two-sided $p = 0.001$). The unadjusted OR for poor versus good self-management was 16.00 (95% CI 2.93–87.25), comparing the less supportive group with the supportive group.

DISCUSSION

Regarding the demographic and clinical characteristics, the majority of respondents were female (64.1%), while 35.9% were male. The mean age was 62.92 years, with a range of 60–69 years, and the mean duration of diabetes mellitus (DM) was 2.54 years, ranging from 2 to 8 years. The mean random blood glucose (RBG) level was 284.15 mg/dL, with a median of 271 mg/dL, while the mean frequency of healthcare visits was 9.67 times. Regarding healthcare services used for routine check-ups, 53.8% of respondents used other healthcare services, including clinics and pharmacies, 38.5% used integrated health posts (Posyandu), and 7.7% used primary healthcare centers (Puskesmas). These characteristics provide context for interpreting the study findings; however, their relationships with instrumental family support and blood glucose self-management were not specifically examined.

The results showed that the majority of respondents received good instrumental family support. This finding indicates that most families in Sawangan Village provided practical assistance to support DM management among older adults, as perceived by the respondents. Such support included providing meals that complied with a DM diet, helping organize medication schedules, arranging transportation to integrated health service posts (Posyandu) or healthcare facilities, and assisting with self-monitoring of blood glucose levels.

Instrumental family support is an important form of social support that may help patients with DM carry out self-care activities. Previous studies have described instrumental support as tangible assistance provided by family members to help patients manage their treatment and daily activities (Mokodongan, Takahepis, & Sarwan, 2022; Mufid, Aspihan, & Luthfa, 2025). This finding is consistent with (Mardiyanti et al., 2020), who reported that instrumental support may facilitate adherence to the five pillars of DM management, including dietary management, exercise, medication adherence, blood glucose monitoring, and education.

Aryanto et al (2024) also reported that instrumental support from family members was associated with quality of life among patients with DM. Older adults who receive such support may have assistance accessing healthcare services and following medical recommendations. Conversely, (Kshanti et al., 2021) reported that insufficient instrumental support may create barriers to routine check-ups and timely healthcare. These findings provide context for the potential relevance of instrumental family support in diabetes management; however, the present study did not assess quality of life or directly evaluate whether family support improved healthcare access.

Arini et al (2021) reviewed evidence on family support and diabetes mellitus management.

Their review provides context for understanding the potential relevance of family involvement in diabetes self-management. In the context of Sawangan Village, the high proportion of older adults reporting good family support highlights the relevance of considering family involvement in diabetes self-management. Nevertheless, the present study was observational and did not evaluate the effectiveness of family-based interventions.

This study also showed that the majority of respondents reported good blood glucose self-management. This indicates that older adults perceived themselves as engaging in self-care behaviors, such as monitoring blood glucose levels, following recommended dietary guidelines, engaging in physical activity, and adhering to prescribed medications.

Blood glucose self-management is an important component of DM management. Previous studies have discussed the role of dietary management, physical activity, and medication use in diabetes care ([Pratiwi et al., 2025](#); [Suciana et al., 2019](#)). However, the present study assessed self-reported self-management and did not establish whether these behaviors resulted in blood glucose levels within the target range. Random glucose was recorded descriptively; HbA1c, longitudinal glycemic outcomes, and intervention effects were not assessed.

These findings are consistent with those of [Patoding et al. \(2024\)](#), who reported that family support, such as reminders about follow-up appointments, access to blood glucose monitoring devices, and assistance with physical activities, was relevant to diabetes management ([Patoding, Fadli, & Hartono, 2024](#)). Similarly, [Latifahny et al. \(2024\)](#) reported an association between family involvement in dietary management and physical activity and adherence to DM management. These studies provide context for understanding the potential relationship between family involvement and self-management, although differences in study designs and outcome measurements should be considered when comparing findings ([Latifahny et al., 2024](#)).

Bivariate analysis indicated a statistically significant relationship between instrumental family support and blood glucose self-management among older adults with DM in Sawangan Village ($p = 0.001$, as reported in Table 4; this value should be verified against the original statistical output). Among respondents with less supportive instrumental family support, 8 of 12 (66.7%) reported poor self-management and 4 of 12 (33.3%) reported good self-management. In contrast, among respondents with supportive instrumental family support, 3 of 27 (11.1%) reported poor self-management and 24 of 27 (88.9%) reported good self-management. The unadjusted OR for poor versus good self-management was 16.00 (95% CI 2.93–87.25), comparing respondents with less supportive family support with those with supportive family support. The wide confidence interval indicates considerable uncertainty regarding the magnitude of this association. As the analysis was not adjusted for potential confounders, the findings should be interpreted as an unadjusted association rather than evidence of a causal relationship.

These findings are consistent with the concept of instrumental support discussed in House's theory, as cited by [Aryanto et al., 2024](#)., which describes practical assistance as a form of social support that may help individuals address barriers to health-related activities. Assistance with daily activities and healthcare arrangements may be relevant to older adults managing DM. However, the mechanisms through which instrumental family support was associated with self-management were not directly examined in the present study.

The findings of the present study are broadly consistent with the evidence reviewed by [Arini et al., 2021](#)) concerning family support and diabetes mellitus management. Similarly, [Latifahny et al. \(2024\)](#) discussed the relationship between instrumental support and adherence to dietary recommendations and blood glucose self-monitoring. These findings support the relevance of examining family support in the context of diabetes self-management but do not establish that instrumental support directly causes better self-management in the present sample ([Arini et al., 2021](#); [Latifahny et al., 2024](#)).

Furthermore, [Mardiyanti et al. \(2020\)](#) discussed the role of instrumental family support in facilitating self-care activities. This may be particularly relevant for older adults who experience

physical or mobility limitations and require assistance with daily activities related to DM management (Bar, Afriani, & Masyitah, 2025; Mardiyanti et al., 2020; Melinda, Yusuf, & Hamzah, 2017). However, physical limitations and mobility were not specifically examined as explanatory factors in this study.

These findings are also relevant to previous discussions concerning access to blood glucose monitoring equipment and healthcare services (Bar et al., 2025; Mardiyanti et al., 2020; Riskawaty, Jannah, & Salfarina, 2024). Nevertheless, the present study did not establish whether access to monitoring equipment, healthcare services, or medication adherence accounted for the observed association between instrumental family support and self-management.

Several factors may have influenced the observed association, including diabetes duration, treatment regimen, medication adherence, family knowledge of DM, socioeconomic circumstances, and access to healthcare services. These factors may be associated with both family support and self-management. Reverse causation is also possible because older adults who experience greater difficulties managing DM may receive more instrumental assistance from their families, whereas those who are more independent may require less assistance. Because the variables were assessed at a single point in time, the direction of the relationship cannot be established.

Study Limitations

This study has several limitations. First, its cross-sectional design and small sample from a single village limit causal interpretation and generalizability. Second, the use of self-reported data, the absence of a defined recall period, and the use of two questionnaire administration modes (self-completion and interviewer-administered) may have introduced response bias and affected response comparability. In addition, the number of participants completing each administration mode was not recorded, limiting the ability to assess potential differences between the modes. Third, random glucose was recorded descriptively, whereas HbA1c and longitudinal glycemic outcomes were not assessed. The study also did not evaluate intervention effects. Fourth, the researcher-developed questionnaires used category thresholds that had not been validated in previous studies, and the self-management questionnaire did not comprehensively assess dietary adherence, physical activity, or medication-taking behavior. Finally, other relevant factors, including emotional support, socioeconomic status, and access to healthcare, were not fully examined. Further studies should evaluate the measurement properties and category thresholds of these questionnaires in larger and more diverse populations.

Recommendations for Future Research

Future research should involve larger samples and participants from multiple settings to improve the generalizability of the findings. Longitudinal studies are recommended to clarify the temporal relationship between instrumental family support and blood glucose self-management, while appropriately designed intervention studies may evaluate the effectiveness of family-based support programs. Future studies should also consider other factors that may influence blood glucose self-management, including emotional support, family knowledge of DM, medication adherence, socioeconomic status, and access to healthcare services. The inclusion of objective glycemic measures, such as HbA1c and repeated blood glucose measurements, would also help clarify whether self-reported self-management is associated with clinical outcomes.

CONCLUSION

This study found a statistically significant association between instrumental family support and blood glucose self-management among older adults with diabetes mellitus in Sawangan Village. Participants with supportive instrumental family support more frequently reported good self-management than those with less supportive family support. However, this finding reflects an association with self-reported self-management and does not establish causality. Random glucose was recorded descriptively; HbA1c, longitudinal glycemic outcomes, and intervention effects were

not assessed. Therefore, the effectiveness of family-based interventions and their impact on glycemic outcomes remain unestablished. Future research should use longitudinal or appropriately designed intervention studies to further investigate the relationship between instrumental family support and self-management, while considering other relevant factors, such as emotional support and family knowledge of diabetes mellitus.

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