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ORIGINAL RESEARCH

Path Analysis of Family Communication, Decision-Making, and Caregiver Burden on Family Caregivers' Quality of Life: The Mediating Role of Self-Efficacy

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Abstract

Background: Type 2 Diabetes Mellitus (T2DM) presents a chronic health challenge that extends beyond the patients, significantly affecting family members who assume caregiving responsibilities. Family caregivers often experience emotional, physical, and psychological burdens, particularly in low-resource settings. However, the interplay between family communication, decision-making, caregiver burden, and self-efficacy, and how these factors jointly influence caregiver quality of life, remains insufficiently explored, particularly in culturally specific and resource-limited settings.
Purpose: This study aimed to examine the structural relationships among family communication, shared decision-making, caregiver burden, self-efficacy, and their influence on the quality of life of family caregivers of individuals with T2DM.
Methods: A cross-sectional study was conducted involving 327 family caregivers recruited from 16 primary health centers using cluster random sampling. Data were collected using validated instruments to measure family communication, decision-making, caregiver burden, self-efficacy, and quality of life. Structural Equation Modeling (SEM) was used to analyze both direct and indirect relationships among the variables.
Results: The findings revealed that family communication (β = 0.35) and decision-making (β = 0.42) had significant positive effects on self-efficacy, whereas caregiver burden (β = -0.33) had a significant negative effect. Self-efficacy, in turn, significantly improved caregivers' quality of life (β = 0.51). Furthermore, self-efficacy mediated the indirect effects of family communication, decision-making, and caregiver burden on quality of life. The model explained 49% of the variance in self-efficacy and 64% of the variance in caregiver quality of life.
Conclusion: Self-efficacy plays a central role in enhancing caregiver well-being and quality of life. Interventions that promote open family communication, shared decision-making, and burden reduction are essential. Nursing implications include the need for culturally sensitive, family-centered nursing interventions to enhance caregiver self-efficacy through communication training, psychosocial support, and empowerment in decision-making. Nurses should be equipped to assess caregiver burden and facilitate supportive family dynamics to promote sustainable diabetes care.

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1. Introduction

Type 2 Diabetes Mellitus (T2DM) is one of the fastest-growing chronic conditions globally, posing a significant burden to public health systems and communities. The International Diabetes Federation (Magliano & Boyko, 2025) estimates that 11.1% of adults aged 20-79 worldwide are living with diabetes, with more than 90% of cases being T2DM. This progressive metabolic disorder requires ongoing self-management and lifestyle adjustments, including strict adherence to medication, dietary regulation, and physical activity (Al-Salmi et al., 2022; Lu et al., 2024). Consequently, its impact extends beyond patients to their family members, especially informal caregivers who support day-to-day care (Gregg et al., 2024).

In many low and middle-income countries, the responsibility for diabetes care often falls on family caregivers. These individuals, commonly spouses, children, or relatives, are typically untrained and lack support from formal health systems (Neller et al., 2024; Stenberg & Hjelm, 2024; Woodward et al., 2024). Their caregiving duties include monitoring blood glucose, encouraging treatment adherence, managing complications, and providing emotional support (Seng et al., 2023). These tasks are demanding and long-term, often resulting in caregiver burden, which includes emotional exhaustion, role strain, and physical fatigue (Lindt et al., 2020). Such a burden affects not only the caregiver's well-being but also the quality of care provided to patients. Research from high-income countries indicates that a significant proportion of caregivers experience distress, with some developing anxiety or depression (Ataya et al., 2024; Starr et al., 2022). In resource-limited settings, where access to psychosocial support is minimal, the strain on caregivers may be even more pronounced (Culberson et al., 2023; Niño-de-Guzman Quispe et al., 2023).

Several interpersonal and family-centered strategies have been identified as effective approaches to dealing with caregiver burden. Effective family communication characterized by openness, empathy, and clarity can help mitigate this burden (Hou & Chen, 2024; Kartika et al., 2024). It enables better coordination, emotional support, and shared responsibility in caregiving (Northwood et al., 2023; Setyoadi et al., 2024). Likewise, shared decision making strengthens caregiver engagement and reinforces their sense of purpose and agency, which contributes to greater resilience (Peimani et al., 2025). Central to these dynamics is self-efficacy, defined as one's belief in one's capacity to organize and perform caregiving tasks successfully (Bandura A, 1993). Self-efficacy was selected as a mediating variable not only because of its critical role in influencing behavior and coping but also because it links external family dynamics with internal psychological outcomes. Higher self-efficacy has been associated with better stress management, proactive problem-solving, and improved emotional regulation in caregivers (Ting et al., 2025). Conversely, low self-efficacy undermines caregivers' confidence and may reduce the effectiveness of caregiving (White et al., 2022).

Despite existing literature on caregiver burden and self-efficacy, limited research has examined how family communication and shared decision-making influence caregiver quality of life through self-efficacy as a mediator. This integrative model is crucial to understand, especially in collectivist cultures like Indonesia, where caregiving is often viewed as a moral duty. If this gap remains unaddressed, caregivers may continue to operate in emotionally unsupportive environments, leading to burnout and compromised patient care. Therefore, this study aims to analyze the structural relationships among family communication, shared decision making, caregiver burden, self-efficacy, and caregiver quality of life. Specifically, it investigates whether self-efficacy mediates the effects of family dynamics and burden on caregivers' well-being. By addressing this gap, the study provides evidence to support the development of culturally sensitive, family-centered interventions that promote caregiver resilience and sustainable diabetes care.

2. Methods

2.1 Research design

This study employed a quantitative, cross-sectional design and structural equation modeling (SEM) to examine the relationships among family communication, decision-making, caregiver burden, self-efficacy, and quality of life among family caregivers of individuals with type 2 diabetes mellitus (T2DM). The model tested both direct and indirect pathways, with self-efficacy positioned as a mediating variable.

Figure 1 presents the conceptual framework illustrating the interrelationships among family communication, decision-making, caregiver burden, self-efficacy, and quality of life. Family communication is operationalized through openness, empathy, and frequency, while decision-making is operationalized through participation, involvement, and consensus. Caregiver burden is reflected in physical, psychological, social, and financial dimensions. These three constructs are hypothesized to influence self-efficacy, defined as the individual's capacity to obtain, respond to, and control caregiving situations. Subsequently, self-efficacy is proposed to directly affect quality of life across physical, psychological, social, and environmental domains. Overall, the framework emphasizes the central role of family-related factors in enhancing self-efficacy and improving quality-of-life outcomes.

Prior to SEM analysis, assumptions were tested, including multivariate normality (using Mardia's coefficient), outliers (via Mahalanobis distance), and multicollinearity (through Variance Inflation Factor analysis). All assumptions were met and deemed acceptable for SEM.

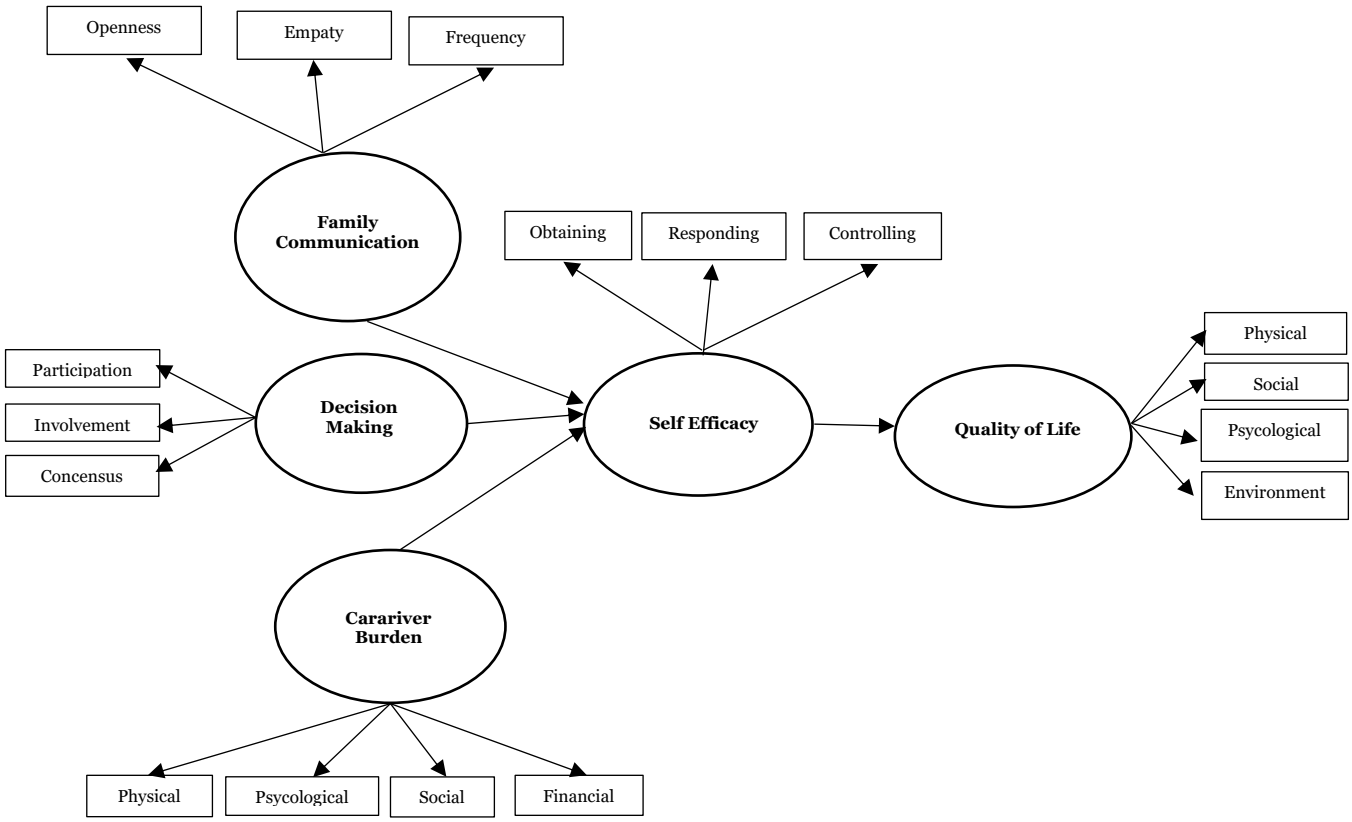

Figure 1. Research framework of the study

2.2 Setting and samples

The study was conducted from March to June 2023 across 16 public health centers (PHCs) located in five districts (Klojen, Blimbing, Lowokwaru, Sukun, and Kedungkandang) in Malang City, East Java Province, Indonesia. Participants were family caregivers of individuals with T2DM. Inclusion criteria included: being the primary caregiver, residing in the same household as the patient, having a familial relationship (blood, marriage, or adoption), being aged ≥18 years, and being able to communicate verbally. Exclusion criteria included caregivers who had active infectious (e.g., tuberculosis) or non-infectious diseases (e.g., stroke, uncontrolled hypertension), and those over the age of 60. These criteria were applied to reduce confounding effects from caregivers' own health limitations, which could independently impact perceived burden or quality of life. Elderly caregivers, in particular, may have age-related cognitive or physical decline, which would alter their experience of caregiving stress and skew the model outcomes. This exclusion, however, limits generalizability and is addressed further in the limitations section. Sample size was determined using the Isaac and Michael formula (Althubaiti, 2023), with a population of 1,787 diabetic patients. At a 5% margin of error, 327 respondents were required (Malang City Health Office, 2024). A cluster random sampling technique was used to ensure proportional representation across PHC regions. Accordingly, the number of samples from each public health center was determined proportionally to the size of the eligible population, resulting in sample sizes ranging from 15 to 32 participants per PHC. Specifically, Gribig (23), Arjowinangun (22), Janti (25), Ciptomulyo (25), Mulyorejo (25), Arjuno (20), Bareng (23), Rampal Celaket (16), Cisadea (20), Polowijen (20), Pandanwangi (21), Dinoyo (32), Mojolagu (27), and Kendalsari (28) contributed participants to the study.

2.2 Measurement and data collection

Data collection was conducted over three months across 16 public health centers (PHCs), using a combination of scheduled home visits and in-person sessions at primary healthcare facilities. The research team coordinated with health workers and community health volunteers to identify eligible family caregivers of individuals with T2DM. Before data collection, participants were informed about the study's objectives and procedures, and written informed consent was obtained. Respondents completed a self-administered structured questionnaire comprising five instruments, each of which was tested for validity and reliability with 20 family caregivers who were not part of the main study sample.

The Family Communication Scale (FCS), Family Decision-Making Self-Efficacy Scale (FDMSE), and Revised Caregiving Self-Efficacy Scale (RCSES) were translated using a forward–backward translation process. Two bilingual experts independently translated the instruments into Indonesian, followed by back-translation into English. Discrepancies were reviewed by the research team to ensure semantic and conceptual equivalence. The Zarit Burden Interview (ZBI) and WHOQOL-BREF questionnaires were used in their validated Indonesian versions. These instruments have been previously translated, culturally adapted, and psychometrically tested in Indonesian populations, demonstrating satisfactory reliability and validity in prior studies.

Family communication was measured using a modified version of the Family Communication Scale (FCS) (Guo et al., 2021; Rudiana & Damaiyanti, 2019), which included three dimensions: openness, empathy, and frequency of communication. The instrument consisted of 12 items, each rated on a 4-point Likert scale ranging from "strongly disagree" to "strongly agree." Validity testing using Pearson correlations yielded item-total correlations ranging from 0.488 to 0.815, and the instrument demonstrated high internal consistency, with a Cronbach's alpha of 0.876.

Decision making was assessed using the Family Decision-Making Self-Efficacy Scale (FDMSE) (Pignatiello et al., 2020), which measures caregivers' confidence in their ability to participate in health-related decisions within the family. The instrument consists of 10 items that cover key dimensions, including initiating discussions, expressing opinions, evaluating care options, and achieving consensus in caregiving contexts. Each item was rated on a 5-point Likert scale, ranging from "not confident at all" to "very confident." Results of the validity testing revealed item-total correlation coefficients ranging from 0.497 to 0.812, indicating good construct validity. Reliability analysis using Cronbach's alpha yielded a coefficient of 0.872, demonstrating strong internal consistency of the scale for use among family caregivers involved in diabetes care.

Caregiver burden was measured using the standardized Zarit Burden Interview (ZBI) (Maria et al., 2025; Zarit et al., 1980), which includes 22 items covering aspects such as isolation, disappointment, emotional involvement, and environment. Participants rated each item on a 5-point Likert scale ranging from "never" to "nearly always." The validity test showed item-total correlation coefficients ranging from 0.529 to 0.902, and the instrument demonstrated excellent reliability with a Cronbach's alpha of 0.895, indicating strong internal consistency for use among family caregivers of individuals with T2DM.

Self-efficacy was measured using the Revised Caregiving Self-Efficacy Scale (RCSES) (Ritter et al., 2022), which consists of 15 items designed to assess caregivers' confidence in managing various aspects of caregiving. The instrument covers sub-variables such as Obtaining Respite, Responding to Disruptive Patient Behaviors, and Controlling Upsetting Thoughts. Each item was rated on a 5-point Likert scale ranging from "not confident at all" to "very confident." Validity testing yielded item-total correlation coefficients ranging from 0.475 to 0.821, and reliability analysis indicated a Cronbach's alpha of 0.863, indicating strong internal consistency and confirming the scale's appropriateness for assessing self-efficacy in family caregivers of individuals with type 2 diabetes mellitus.

Finally, the caregiver's quality of life was evaluated using the WHOQOL-BREF questionnaire (Prahastuti et al., 2025; World Health Organization, 1997), which includes 26 items covering four domains: physical health, psychological health, social relationships, and environment. Responses were rated on a 5-point Likert scale. Validity testing yielded item-total correlation values ranging from 0.498 to 0.893, and the scale achieved high reliability, with a Cronbach's alpha of 0.911.

2.3 Data analysis

Descriptive statistics were used to summarize participants' demographic characteristics and mean scores of each variable. Pearson correlation was used to examine bivariate relationships.

SEM was performed using AMOS version 30 to test the hypothesized path model. Model fit was evaluated using indices including Chi-square/df, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Direct, indirect, and total effects were reported with standardized regression coefficients and significance levels.

2.4 Ethical considerations

This study was approved by the Institutional Review Board (IRB) of the Health Research Ethics Committee, Faculty of Health Sciences, Universitas Brawijaya (FIKES-UB), under approval number 5036/UN10.F17.01/PT.01.04.3/2023 and ethical clearance certificate number 4375/UN.10. F17.10.4/TU/2023. All participants provided written informed consent and were assured of confidentiality, voluntary participation, and the right to withdraw from the study at any time. All data were anonymized during analysis to protect participant privacy.

3. Results

3.1 Characteristics of participants

Table 1 presents the demographic profile of family caregivers, revealing that the largest proportion were under the age of 45, comprising 158 individuals (48.3%). The vast majority identified as Muslim (96.9%), with males accounting for 51.4% of the sample. Most caregivers (48.6%) had completed senior high school, and over half (57.5%) were engaged in entrepreneurial activities. Among T2DM patients, the majority were aged 45-65 years, totaling 207 individuals (63.3%). Similar to the caregiver group, most patients were Muslim (96.9%), and a substantial majority were female (80.4%). More than half (51.7%) had attained an elementary level of education, and a majority (68.8%) were unemployed. In terms of relationship to the patient, the majority were the patient's children (47.1%).

Table 1. Distribution of family caregiver respondents (n = 327)

Demographic Characteristics	Frequency (f)	Percentage (%)
Age (years)		
<45	158	48.3
45-65	123	37.6
> 65	46	14.1
Religion		
Islam	317	96.9
Christian	7	2.1
Catholic	3	0.9
Gender		
Male	168	51.4
Female	159	48.6
Education		
No school	1	0.3
Elementary school	71	21.7
Middle School	54	16.5
High school	159	48.6
College	42	12.8
Employment		
Unemployed	120	36.7
Labor	9	2.8
Farmers	1	0.3
Government employees	9	2.7
Entrepreneur	188	57.5
Relationship with Patients		
Husband	102	31.2
Wife	51	15.6
Child	154	47.1
Others	22	6.1

3.2 Descriptive statistics test normality of variables

Table 2 presents descriptive statistics for five key variables involved in the study. The Family Communication Pattern variable shows a relatively high average score (M = 3.82), indicating generally positive communication within families, with moderate variability (SD = 0.56) and slight negative skewness (Skewness = -0.45), suggesting more respondents scored above the mean. The Decision-Making variable has a mean of 3.74 (SD = 0.61) and is also negatively skewed (Skewness = -0.30), indicating a tendency toward more active decision involvement among caregivers. Caregiver Burden has the lowest mean among all variables (M = 2.95), with a relatively wider spread (SD = 0.71) and a slight positive skew (Skewness = 0.31), implying that while most caregivers experience a moderate burden, some report higher levels. Self-Efficacy scores are among the highest (M = 3.88, SD = 0.52), with a negatively skewed distribution (Skewness = -0.60), indicating a generally high sense of confidence among caregivers in managing caregiving tasks. Finally, the Caregiver Quality of Life variable has a mean of 3.69 and a moderate standard deviation (SD = 0.58). The distribution is slightly left-skewed (Skewness = -0.25), suggesting that most caregivers perceive their quality of life as relatively good.

Table 2. Descriptive statistics and test for normality of observed variables (n = 327)

Variables	Mean (M)	Standard Deviation (SD)	Minimum	Maximum	Skewness	Kurtosis
Family Communication	3.82	0.56	2.10	5.00	-0.45	0.78
Decision-Making	3.74	0.61	2.00	5.00	-0.30	0.62
Caregiver Burden	2.95	0.71	1.30	4.80	0.31	-0.35
Self-Efficacy	3.88	0.52	2.40	5.00	-0.60	0.93
Quality of Life	3.69	0.58	2.20	4.90	-0.25	0.41

3.3 Pearson correlation matrix among variables

Table 3 presents family communication and decision-making, which show strong positive correlations with both self-efficacy and quality of life. This finding highlights the crucial role of open communication and shared decision-making in fostering caregivers' psychological well-being. Caregiver burden is negatively correlated with all other variables, particularly with self-efficacy (r = -0.489) and quality of life (r = -0.466), indicating that higher caregiving stress is associated with lower self-efficacy and diminished quality of life. Notably, self-efficacy shows the strongest positive correlation with quality of life (r = 0.663), suggesting a potential mediating role. In this context, self-efficacy may serve as a key pathway through which positive family dynamics and reduced caregiver burden enhance overall caregiver well-being. Interventions aimed at strengthening caregivers' self-efficacy, such as skill development, emotional support, and empowerment strategies, could significantly improve their quality of life.

Table 3. Pearson correlation matrix among study variables (n = 327)

Variables	1	2	3	4	5
1. Family Communication	-				
2. Decision-Making	0.624** p = 0.000	-			
3. Caregiver Burden	-0.428** p = 0.000	-0.395** p = 0.000	-		
4. Self-Efficacy	0.587** p = 0.000	0.552** p = 0.000	-0.489** p = 0.000	-	
5. Caregiver Quality of Life	0.601** p = 0.000	0.545** p = 0.000	-0.466** p = 0.000	0.663** p = 0.000	-

Note: $p < 0.01$ indicates a statistically significant correlation at the 0.01 level (2-tailed).**

3.4 Testing the structural model of the QoL

3.4.1 Test of the goodness of fit of the hypothetical model

The model fit indices indicate that the structural model has a good overall fit to the data. The Chi-square/df (CMIN/DF) value is 2.073, which falls below the recommended threshold of 3,

indicating a good model fit. The Comparative Fit Index (CFI) is 0.957, exceeding the minimum criterion of 0.95, and reflecting an excellent fit. Similarly, the Tucker-Lewis Index (TLI) is 0.945, meeting the acceptable criterion of ≥ 0.90, indicating a good level of model fit. Furthermore, the Root Mean Square Error of Approximation (RMSEA) is 0.056, which is below the recommended maximum of 0.08, indicating an acceptable fit of the model to the data. The Standardized Root Mean Square Residual (SRMR) is 0.041, also well below the cutoff of 0.08, indicating a low level of discrepancy between observed and predicted values.

3.4.2 Analysis of the hypothetical model

Based on the path analysis results illustrated in the diagram, the relationships among the variables are both statistically and practically meaningful (Figure 2). Family communication (X1), which includes indicators such as openness, empathy, and frequency of interaction, shows a strong and positive direct effect on self-efficacy (X4) (β = 0.41). This indicates that when families communicate effectively, caregivers are more likely to feel confident in their ability to manage caregiving tasks. Likewise, decision-making (X2), which encompasses participation, involvement, and consensus within the family, has a positive direct effect on self-efficacy (β = 0.29). This suggests that caregivers who engage in shared decision-making with other family members tend to develop a greater sense of control and personal agency.

In contrast, caregiver burden (X3), measured through physical, psychological, social, and financial strain, negatively affects self-efficacy (β = -0.33). This result highlights that a higher level of burden diminishes caregivers' belief in their capacity to care effectively. Importantly, self-efficacy (X4) significantly and positively influences quality of life (Y1) (β = 0.30), which includes physical, psychological, social, and environmental dimensions. This confirms that caregivers with stronger self-efficacy are more likely to report better overall well-being. The factor loadings of the indicators for each latent variable are all above 0.6, indicating good reliability of the measurement model. Overall, the results reinforce the importance of fostering supportive family environments and reducing caregiver burden as effective strategies to enhance caregivers' self-efficacy, which, in turn, contributes to better quality-of-life outcomes.

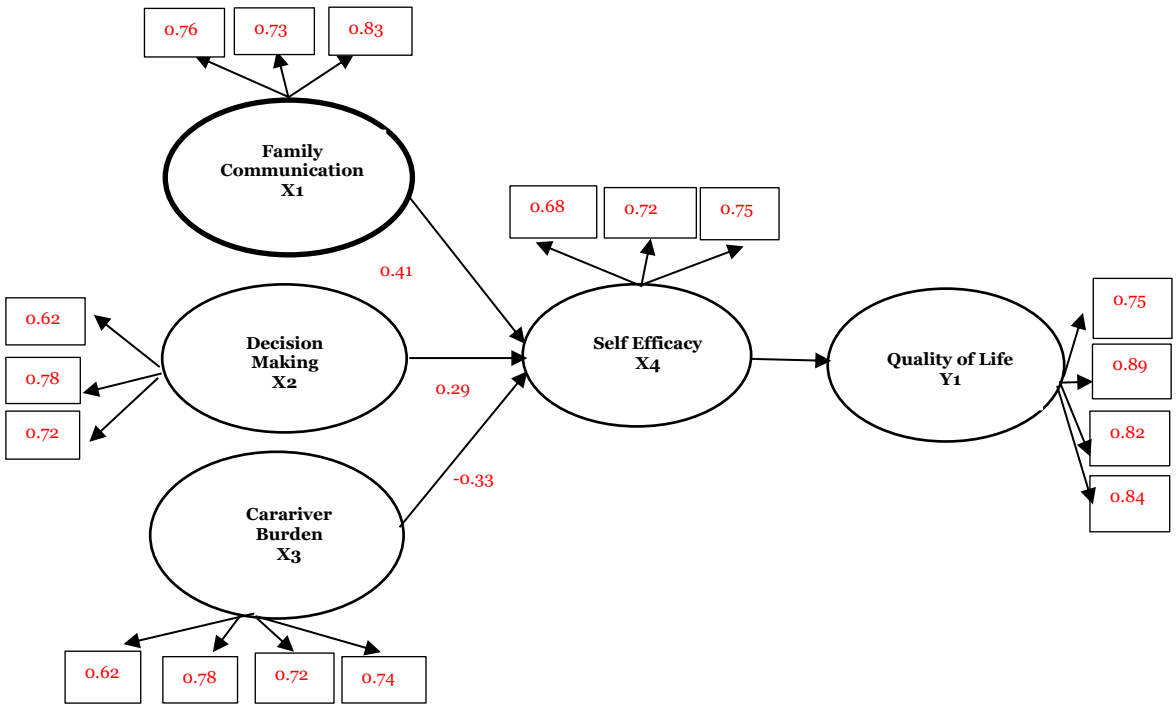

Figure 2. Path diagram for the hypothetical model (*p< 0.01)

Figure 2 also illustrates structural model results, confirming the hypothesized relationships among variables. Family communication demonstrates a significant positive effect on self-efficacy (β = 0.41), as does decision-making (β = 0.29). In contrast, caregiver burden exhibits a significant

negative effect on self-efficacy (β = −0.33). Self-efficacy, in turn, exerts a direct and positive influence on quality of life, supporting its mediating role within the model. Indicator loadings across constructs indicate satisfactory convergent validity. All paths are statistically significant at $p < 0.01$, suggesting strong model fit and robustness. These findings underscore the importance of strengthening family dynamics and reducing caregiver burden to enhance quality of life through improved self-efficacy.

Furthermore, based on the SEM results presented in Table 4, several significant pathways were identified among the study variables. Family communication was found to have a positive and significant direct effect on self-efficacy (β = 0.35, $p < 0.01$), indicating that open, empathetic, and frequent communication within the family contributes to increased self-efficacy among caregivers in managing their responsibilities. Similarly, decision-making within the family context, particularly regarding participation, involvement, and consensus, also showed a significant positive effect on self-efficacy (β = 0.42, $p < 0.01$). In contrast, caregiver burden, encompassing physical, psychological, social, and financial stressors, was found to have a significant negative effect on self-efficacy (β = -0.33, $p < 0.01$), indicating that higher burden reduces caregivers' perceived competence. Furthermore, self-efficacy demonstrated a strong positive direct effect on quality of life (β = 0.51, p < 0.01), indicating that caregivers with higher self-efficacy experience better physical, psychological, social, and environmental well-being. Importantly, the indirect effects of family communication (β = 0.18, $p < 0.01$), decision making (β = 0.21, $p < 0.01$), and caregiver burden (β = -0.17, $p < 0.01$) on quality of life through self-efficacy were also statistically significant. These findings confirm that self-efficacy serves as a mediating variable in the relationship between the exogenous variables and quality of life. The model explains 49% of the variance in self-efficacy and 64% of the variance in quality of life, as indicated by the squared multiple correlations (SMC). These results underscore the pivotal role of self-efficacy in enhancing caregivers' well-being and suggest that improving family dynamics and reducing burden can indirectly boost caregivers' quality of life by strengthening their belief in their own caregiving abilities.

Table 4. Standard direct, indirect, and total effects

Endogenous Variable	Exogenous Variable	Standardized Direct Effect	Standardized Indirect Effect	Standardized Total Effect	SMC
Self-Efficacy	Family Communication	0.35**	-	0.35**	0.49
	Decision Making	0.42**	-	0.42**	
	Caregiver Burden	-0.33**	-	-0.33**	
Quality of Life	Self-Efficacy	0.51**	-	0.51**	0.64
	Family Communication	-	0.18**	0.18**	
	Decision Making	-	0.21**	0.21**	
	Caregiver Burden	-	-0.17**	-0.17**	

Notes. SMC = Squared multiple correlations; **$p < .01$

4. Discussion

This study investigated the complex relationships among family communication, decision making, caregiver burden, self-efficacy, and quality of life in the context of caregiving for patients with T2DM. The findings underscore the central role of psychological and familial mechanisms in shaping the caregiving experience, especially in managing chronic, non-communicable diseases such as T2DM, which require long-term behavioral monitoring, lifestyle adjustments, and often intensive family support.

The present study demonstrates that effective family communication significantly enhances caregivers' self-efficacy in managing T2DM. This finding aligns with prior studies indicating that open and empathetic communication strengthens caregivers' confidence by promoting emotional connectedness and mutual understanding within families (Wittenberg et al., 2017). Supportive communication has also been shown to reduce emotional isolation and foster collaborative caregiving relationships (Amin et al., 2025). However, evidence suggests that communication alone may be insufficient when structural stressors such as financial strain or high caregiving demands remain unaddressed, potentially limiting its impact on caregiver outcomes (Makanjuola & Ngcobo, 2025). From the perspective of Social Cognitive Theory, effective family

communication functions as a form of social persuasion and emotional regulation that directly shapes self-efficacy beliefs (Bandura, 1993). In the context of T2DM, where caregiving requires continuous coordination related to daily routines, symptom monitoring, dietary regulation, and self-management behaviors, communication facilitates shared responsibility and coordinated action (Venechuk et al., 2023). These relational processes help caregivers perceive caregiving challenges as more manageable, thereby strengthening perceived control, internal coping resources, and resilience (Y. Zhang et al., 2025).

The present study demonstrates that shared decision-making significantly enhances caregivers' self-efficacy in managing T2DM. This finding is consistent with previous research showing that meaningful caregiver involvement in health-related decisions fosters a stronger sense of agency, mutual respect, and confidence in managing caregiving responsibilities (Dumba & Lekganyane, 2025). Consistent with prior studies, caregivers in T2DM are frequently involved in meal planning, medication reminders, participation in medical appointments, and negotiation of lifestyle changes, making their inclusion in decision-making processes particularly critical (Teli et al., 2024). In contrast, evidence indicates that caregivers excluded from decision-making may experience feelings of powerlessness, a lack of recognition, and emotional overload, which can erode their self-efficacy and caregiving effectiveness (W. Zhang et al., 2025). From a psychosocial and family empowerment perspective, shared decision-making redistributes caregiving responsibilities, reduces the emotional burden of unilateral care, and promotes collaborative problem-solving, thereby reinforcing caregivers' self-efficacy and resilience (Setyoadi et al., 2023).

Caregiver burden, on the other hand, emerges as a major threat to self-efficacy in the caregiving process (Neller et al., 2024). The burden of caring for a patient with T2DM involves not only daily tasks but also the emotional weight of uncertainty, fear of complications (e.g., hypoglycemia, neuropathy, or amputation) (Liu, 2023), and financial pressures due to medical expenses and dietary needs (Lin et al., 2024). Over time, this burden may lead to burnout, anxiety, or physical exhaustion, all of which deplete psychological resources (Setyoadi et al., 2024). As previous studies have shown, high caregiver burden is associated with poor mental health outcomes, diminished motivation, and lower quality of care (Semere et al., 2021). In the current study, burden was found to negatively affect caregivers' belief in their competence, confirming that unmitigated stress undermines a caregiver's resilience and efficacy (Choi et al., 2024).

The findings of this study indicate that self-efficacy is a strong and significant predictor of caregiver quality of life in T2DM. Caregivers with higher levels of self-efficacy demonstrated more adaptive coping behaviors, better emotional regulation, and greater confidence in supporting patients' treatment adherence. In addition, high self-efficacy was associated with caregivers' ability to maintain their own health routines, which is critical for sustaining long-term caregiving roles. Consequently, caregivers with stronger self-efficacy reported higher psychological well-being, more positive social relationships, and greater overall life satisfaction. The pathway from family communication and shared decision-making to improved caregiver quality of life via self-efficacy, as observed in this study, mirrors findings from Western contexts. For instance, studies in Europe and the U.S. show that caregivers with stronger self-efficacy supported by family involvement report reduced emotional distress and improved care delivery (Münchenberg et al., 2024; Wang et al., 2025). This suggests that while cultural expressions of family dynamics may differ, the underlying psychological mechanisms, particularly the mediating role of self-efficacy, appear to be cross-culturally robust. This model is consistent with Bandura's Social Cognitive Theory, which posits that self-efficacy is a central mechanism through which external social support and internal coping shape behavioral outcomes (Bandura, 1993). What distinguishes this study is the identification of self-efficacy as a psychological bridge linking both positive (communication, participation) and negative (burden) family-related factors to quality of life (AlSaleh et al., 2025; Shengyao et al., 2024). This reinforces the theoretical view that beliefs about personal capability are key determinants in whether individuals thrive or struggle under stress.

5. Implications and limitations

This study highlights important implications for nursing practice in T2DM care by identifying self-efficacy as a key mechanism linking family communication, shared decision-making, caregiver burden, and caregiver quality of life. These findings underscore the role of family-focused nursing, in which nurses assess caregiver self-efficacy, communication patterns, and

caregiving burden as part of routine diabetes management. Nurses can enhance caregiver competence and emotional resilience through nurse-led education, counseling, and family meetings that promote open communication and collaborative decision-making. In addition, nurses are well-positioned to deliver psychosocial support, provide targeted caregiver education on stress management and problem-solving, and facilitate access to respite and community resources. Integrating these approaches into nursing care plans may reduce caregiver burden and improve outcomes for both caregivers and patients in T2DM care.

Despite its valuable contributions, this study has certain limitations that warrant consideration. The cross-sectional nature of the research design limits the ability to infer causality, as it captures data at a single point in time. Additionally, the study was conducted within a single cultural context in Indonesia, which may limit the broader applicability of the findings to populations with different sociocultural backgrounds. The use of self-reported measures also introduces the possibility of social desirability bias and subjective interpretation, which may affect data accuracy.

6. Conclusion

This study highlights the pivotal role of family dynamics and psychological resilience in shaping the well-being of family caregivers who support individuals with T2DM. The findings indicate that positive family communication and collaborative decision-making significantly enhance caregivers' self-efficacy, while elevated caregiver burden negatively affects it. In turn, self-efficacy mediates the relationship between these psychosocial factors and caregivers' perceived quality of life. These limitations highlight the need for future research to adopt longitudinal designs and include more diverse cultural settings to validate and expand upon the current findings.

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Author contribution

All authors (SS, DDSLI, YSH, FE, JH) contributed substantially to the study design, data collection, analysis, and interpretation of results. All authors drafted and revised the article, approved the published version, and agreed to be accountable for all aspects of the work.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Declaration of Use of AI in Scientific Writing

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) to enhance the clarity, structure, and readability of the text. All outputs generated by this tool were carefully reviewed, revised, and validated by the authors to ensure they accurately reflect their original ideas and interpretations. The authors take full responsibility for the integrity and originality of the final manuscript.

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