

# The Influence of Family Communication Patterns and Sociodemographic Factors on Caregiver Decision-Making in Managing Type 2 Diabetes Mellitus

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## ABSTRACT

**Background:** Family caregivers play a crucial role in managing Type 2 Diabetes Mellitus (T2DM) by facilitating communication and decision-making. This role is vital in overcoming barriers such as limited health literacy and conflicting decisions, thereby enhancing care strategies and patient outcomes. This study aimed to examine the influence of family communication patterns and sociodemographic factors on caregiver decision-making in managing Type 2 Diabetes Mellitus.

**Methods:** A descriptive analytical design with a cross-sectional approach was employed, involving 324 family caregivers of patients with T2DM from 14 Public Health Centers in Malang City, Indonesia, selected through a cluster random sampling technique. Communication patterns were assessed using the Family Communication Patterns (FCP) questionnaire, while decision-making was measured using the Family Decision-Making Self-Efficacy Scale. Statistical analyses were performed using Spearman's rank correlation and multiple logistic regression.

**Results:** A total of 51.5% of respondents demonstrated favorable communication patterns, and 60.5% exhibited effective decision-making. The analysis revealed a statistically significant correlation between communication patterns and caregiver decision-making ( $p=0.000$ ,  $r=0.341$ ). The most influential sociodemographic factor affecting both variables was family educational background.

**Conclusion:** The study indicates that open and participatory family communication patterns are associated with more effective caregiver decision-making, while restricted communication is linked to less accurate decisions. These findings highlight the need for intervention strategies that strengthen family communication and address sociodemographic factors. However, experimental studies are required to further examine the causal effects of such interventions on diabetes care outcomes.

**Keywords:** Caregivers; Diabetes; Communication; Decision-making; Sociodemographic

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## INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a growing global health challenge, with a prevalence estimated to have exceeded 537 million adults (ages 20–79) worldwide (1). In 2023, the prevalence of diabetes in Indonesia was reported at 11.7% for adults aged 15 years and older, marking an increase from 10.9% in 2018 (2). This disease is a leading cause of death and long-term complications, including heart disease, kidney dysfunction, and blindness (3). Furthermore, the social and economic burdens of T2DM are substantial, driven by the increasing costs of treatment and care, as well as the disease's impact on patients' quality of life (4).

Decision making plays a central role in T2DM management because both patients and caregivers must continuously make informed choices regarding diet, medication adherence, glucose monitoring, physical activity, and follow-up care (5). Ineffective decision-making can worsen glycemic control, increase the risk of complications, and negatively impact both patient and caregiver quality of life (6). In Indonesia, where family support is deeply embedded in cultural practices, family caregivers often serve as key decision makers in managing T2DM, underscoring the magnitude of this issue (7).

The consequences of poor decision-making are evident in the rising prevalence of complications and the substantial caregiving burden (8). Caregivers not only face psychological stress but also economic hardship when treatment adherence and self-care behaviors are compromised (9). Thus, strengthening caregivers' decision making abilities is critical to improving long-term patient outcomes (10).

Previous studies have examined several factors related to decision making in T2DM management, including health literacy, cultural norms, stress levels, and caregiver education (11). In particular, family communication patterns have been recognized as a significant determinant, shaping how health information is shared, negotiated, and applied within families (12). However, despite growing evidence, there is still limited understanding of how communication patterns interact with caregivers' decision-making confidence, especially when

moderated by sociodemographic factors (13). This gap is particularly relevant in resource limited settings such as Indonesia, where caregivers' roles are central but often underexplored.

The conceptual framework of this study is based on the Family Communication Patterns Theory (14), which distinguishes two primary orientations: conversation orientation (open communication, collaborative dialogue, and shared decision-making) and conformity orientation (closed communication, hierarchical authority, and restricted participation) (15). In this study, these categories were used to classify caregivers' communication styles into "open or consensual" versus "closed or authoritarian," allowing an analysis of how each style correlates with caregivers' self-efficacy in decision making (16). Caregiver decision making was measured through confidence in making choices regarding treatment, lifestyle modifications, emotional support, and long-term care planning (17). Sociodemographic traits specifically age, gender, educational level, employment status, income, relationship to the patient, duration of caregiving, family type, and family development stage were analyzed as moderating variables to assess their influence on both communication and decision-making (18).

By clarifying how communication patterns, decision making processes, and sociodemographic characteristics converge, this study addresses a critical gap in the body of knowledge. The findings are expected to provide evidence for designing culturally sensitive interventions that empower caregivers and improve the management of T2DM.

## METHODS

This study employed an observational design with an analytical correlational approach. It is a quantitative study using a cross-sectional method, which enables the assessment of relationships between variables at a single point in time. This design is appropriate for identifying associations between communication patterns and family caregivers' decision-making in the context of T2DM care.

The study was conducted across 16 Public Health Centers (PHCs) in Malang City, East Java Province, Indonesia. Of these, 14 PHCs participated fully, while 2 sites declined due to administrative constraints. The PHCs served as sampling clusters. Within each cluster, family caregivers of patients with T2DM were randomly selected proportionally to the caseload reported by the PHC. The sample size ( $n=324$ ) was calculated using the Isaac and Michael (19), formula with a 5% margin of error, population size  $N=24,984$  (20), confidence level 95%, and design effect of 1.5 applied to account for clustering.

Eligibility criteria included caregivers living in the same household as a T2DM patient, related by blood, marriage, or adoption,  $\geq 17$  years old, and able to communicate verbally. Caregivers  $>60$  years were excluded to reduce potential confounding due to age related cognitive or physical decline; however, we acknowledge this exclusion may introduce selection bias and limit generalizability. Caregivers with "health issues" were defined more precisely as those with self-reported diagnoses of severe communicable diseases (e.g., TB) or noncommunicable diseases impairing caregiving ability (e.g., stroke, advanced diabetes complications). This operational definition aimed to reduce subjective screening.

This study used three instruments: a sociodemographic questionnaire, the Family Communication Patterns (FCP) questionnaire (21), and the Family Decision-Making Self-Efficacy Scale (FDMSE) (22). The adaptation process followed recommended cultural validation procedures: forward translation into Bahasa Indonesia, review by a three members expert panel to assess content validity index (CVI), and pilot field testing with 30 caregivers for clarity. Exploratory factor analysis was conducted to confirm dimensionality. Cronbach's alpha was then calculated on the full study sample, yielding  $\alpha=0.93$  for FCP and  $\alpha=0.91$  for FDMSE, indicating excellent internal consistency. While an earlier pilot of  $n=10$  was underpowered, results from the full sample provided more robust reliability estimates. Limitations regarding the absence of confirmatory factor analysis (CFA) are acknowledged.

Cut off points for categorizing outcomes were determined empirically. For FCP (24 items, 5

point scale, range 24–120), "good" communication was defined as  $\geq 92$ , corresponding to the 50th percentile (median split) of the study sample. For FDMSE (13 items, 5-point scale, range 13–65), "effective" decision-making was defined as  $\geq 52$ , also reflecting the median split.

Sociodemographic characteristics (age, gender, education, occupation, income, relationship to the patient, duration of caregiving, family type, and family development stage) were treated as independent variables, while communication patterns and caregiver decision-making were dependent outcomes. This order was standardized across the manuscript to avoid causal misinterpretation.

Univariate analysis was performed to describe sociodemographic characteristics. Bivariate analysis tested associations between communication patterns and decision-making using Spearman's rank correlation. Multivariate logistic regression models were constructed to assess the influence of sociodemographic factors on both outcomes. Model diagnostics included checks for multicollinearity (variance inflation factors  $<2$ ), linearity of the logit for continuous predictors, Hosmer Lemeshow goodness of fit, and examination of residuals for influential points. Missing data ( $<3\%$  per variable) were handled using listwise deletion after confirming missingness was random (MCAR).

### Ethical Matters

This study adhered to research procedures based on ethical principles and was reviewed by the Ethics Committee of the Faculty of Health Sciences, Universitas Brawijaya, with Ethical Approval Letter No. 4375/UN10.F17.10.4/TU/2023.

### RESULTS

Based on the data in **Table 1**, the majority of family caregivers for patients with Type 2 Diabetes (T2D) are between the ages of 20 and 44, totaling 198 individuals (61.1%). Female caregivers represent 228 individuals (70.4%). Islam is the predominant religion among caregivers, with 314 individuals (96.9%) identifying as Muslim. The highest educational level achieved by most caregivers is high school or its equivalent, with 156 individuals (48.1%) falling into this category. Javanese

caregivers account for 310 individuals (95.7%) of the total. Regarding employment status, 126 caregivers (38.9%) are unemployed, while 286 individuals (88.3%) report earning below the standard income level. In terms of familial

relationships, 140 caregivers (43.2%) are the patients' children. The majority of caregivers have been providing care for less than five years, totaling 236 individuals (72.8%).

**Table 1:** Sociodemographic Characteristics of Family Caregivers of Patients with T2DM (N=324)

Sociodemographic	Frequency (n)	Percentage (%)
Age (years)		
10-19	1	0.3
20-44	198	61.1
45-59	125	38.6
Gender		
Male	96	29.6
Female	228	70.4
Religion		
Islam	314	96.9
Non-Islam	10	3.1
Education		
No School	9	2.8
Elementary School	39	12
Junior High School	45	13.9
Senior High School	156	48.1
College	75	23.1
Tribe		
Java	310	95.7
Non-Java	14	4.3
Employment		
Unemployed	126	38.9
Government employees	28	8.6
Laborer	94	29
Entrepreneur	76	23.5
Wages (Rp. 3.100.000,00)		
Above Standard	38	11.7
Below Standard	286	88.3
Relationship		
Parent	43	13.3
Spouse	124	38.3
Child	140	43.2
Sibling	17	5.2
Duration of Caregiving		
>5 years	88	27.2
<5 years	236	72.8
Family Type		
Nuclear	237	84.3
Extended	51	15.7
Family Development		
Families with Adolescents	80	24.7
Middle-age Families	176	54.3
Aging Families	68	21

Additionally, most caregivers belong to nuclear families, comprising 273 individuals (84.3%), with 176 individuals (54.3%) identified as members of middle-aged families.

The data in **Table 2** show that among caregivers with strong communication skills, 78 individuals (65.4%) also exhibit effective decision-making as family caregivers. This suggests a potential correlation between good

communication patterns and effective decision-making in caregiving. Furthermore, the results of the bivariate analysis reveal a significant relationship between

communication patterns and decision-making among caregivers of family members with Type 2 Diabetes Mellitus (N=324;  $\alpha=0.05$ ;  $p=0.001$ ;  $r=0.341$ ).

**Table 2:** Results of the Analysis Between Communication Patterns and Decision-Making Family among Caregivers of Patients with T2DM (N=324)

Communication patterns	Decision-making		p-value	r
	Effective, n (%)	Ineffective, n (%)		
Good	78 (65.4)	92 (33.8)	0.001	0.341
Poor	28 (53.8)	24 (46.2)		

The data in **Table 3** highlight that demographic factors such as age, gender, education, employment, wages, relationship, and family development significantly impact communication patterns among caregivers ( $p<0.05$ ). Similarly, age, education, employment, wages, and caregiving relationship are found to significantly affect family caregiver decision-making ( $p<0.05$ ). The correlation between communication patterns and decision-making was positive and statistically significant ( $r=0.341$ ;  $p<0.001$ ), representing a small to moderate effect size. This suggests that improvements in family communication are meaningfully associated with more effective caregiver decision-making, though not determinative.

A more detailed demographic analysis revealed that caregiver education level was particularly influential. Caregivers with higher education levels were about 2.4 times more likely to demonstrate favorable communication patterns (OR=2.41) and about 2.1 times more likely to report effective decision-making (OR=2.13) compared with those with lower education. In practical terms, this translates to an absolute risk difference of approximately 18–22% in achieving favorable outcomes between higher and lower educated caregivers, underscoring education as a central determinant in caregiver performance.

## DISCUSSION

This study examined the association between family communication patterns and caregiver decision-making in managing T2DM, while also exploring the role of sociodemographic characteristics. The results showed that open communication was positively associated with more effective decision-making ( $r=0.341$ ;  $p<0.001$ ), representing a small-to-moderate

effect size. Caregiver education emerged as the strongest predictor: those with higher education were more than twice as likely to demonstrate favorable communication and effective decision-making (OR=2.41 and OR=2.13, respectively). In practical terms, this corresponds to an 18–22% higher probability of positive outcomes among better educated caregivers.

In the context of the conceptual framework, these findings suggest that conversation-oriented families characterized by open dialogue and information sharing are more likely to support collaborative and confident decision making (23). Conversely, conformity-oriented families, where authority and hierarchy dominate, may limit caregivers' ability to exercise autonomy in care decisions (15). Our analysis further indicates that the "conversation orientation" dimension appears more critical than conformity orientation, underscoring the importance of dialogue opportunities over hierarchical norms (24).

However, the observed associations should not be interpreted as unidirectional. It is plausible that caregivers with greater decision-making self-efficacy are also more likely to initiate open communication with patients (reverse causality) (25). Moreover, unmeasured factors such as caregiver health literacy, patient disease severity, and intra-family dynamics could confound both communication and decision making (26). Local PHC practices including the extent to which staff encourage shared decision-making versus directive counselling may also shape both outcomes simultaneously (27). Sensitivity analyses adjusting for education, relationship to the patient, and income did not substantially alter effect estimates, but residual confounding cannot be excluded (28).

**Table 3:** Demographic Factors Influencing Communication Patterns and Decision-Making Family Caregivers (N=324)

Variables	B	SE	OR	95% CI	p-value
Communication patterns					
Age	0.02	0.11	1.02	1.00 – 1.04	0.045*
Gender	-0.53	0.32	0.59	0.35 – 0.99	0.046*
Religion	0.30	0.25	1.35	0.81 – 2.23	0.245
Education	0.88	0.30	2.41	1.35 – 4.29	0.003*
Tribe	-0.12	0.28	0.89	0.52 – 1.52	0.694
Employment	0.65	0.27	1.92	1.13 – 3.26	0.016*
Wages	0.45	0.22	1.57	1.02 – 2.41	0.040*
Relationship	0.73	0.33	2.08	1.09 – 3.98	0.027*
Duration of Caregiving	-0.32	0.26	0.73	0.43 – 1.24	0.239
Family Type	0.21	0.29	1.23	0.69 – 2.17	0.471
Family Development	0.55	0.31	1.73	1.03 – 2.90	0.036*
Decision-making					
Age	0.03	0.01	1.03	1.01 – 1.05	0.002*
Gender	-0.45	0.28	0.64	0.38 – 1.08	0.091
Religion	0.18	0.22	1.20	0.77 – 1.88	0.423
Education	0.76	0.30	2.13	1.16 – 3.92	0.014*
Tribe	-0.10	0.25	0.90	0.54 – 1.51	0.702
Employment	0.53	0.26	1.70	1.02 – 2.84	0.040*
Wages	0.38	0.21	1.46	1.01 – 2.11	0.042*
Relationship	0.62	0.29	1.86	1.06 – 3.30	0.028*
Duration of Caregiving	-0.25	0.23	0.78	0.47 – 1.29	0.318
Family Type	0.13	0.27	1.14	0.64 – 2.01	0.654
Family Development	0.48	0.30	1.62	0.92 – 2.88	0.097

The prominence of education as a predictor warrants special attention. In this Indonesian PHC setting, higher educational attainment likely equips caregivers with greater health literacy, confidence in interacting with healthcare providers, and skills to process medical information (29). Caregivers with lower levels of education, on the other hand, often reported difficulties in understanding clinical instructions, which may explain weaker communication and decision-making scores (30). This aligns with prior studies linking low education to delayed diagnosis, poorer treatment adherence, and reduced participation in health decision-making (31).

These findings have practical implications for diabetes care in primary health care. Structured caregiver education sessions, culturally adapted teach back protocols, and routine caregiver involvement in clinical consultations could enhance both communication and decision-making (32). Given the moderate strength of association observed, even modest improvements in communication may yield meaningful gains in decision confidence and adherence (33).

This study has several strengths, including the use of validated instruments and a relatively large, multi-site PHC based sample. Nonetheless, limitations must be acknowledged. The cross-sectional design restricts causal inference, and dichotomizing continuous scores may have reduced statistical power. While efforts were made to culturally adapt and validate instruments, full confirmatory testing (e.g., CFA) was not conducted. In addition, excluding caregivers over 60 years may have introduced selection bias.

Future research should adopt longitudinal or experimental designs to establish causal pathways and intervention effects. Further work is also needed to examine the role of caregiver health literacy, patient disease severity, and PHC workflows in shaping family communication and decision-making. Complementary qualitative studies could provide richer insights into family dynamics influencing caregiving.

In summary, open communication was associated with more effective caregiver

decision-making, with education emerging as the most influential sociodemographic factor. While consistent with the conceptual framework, alternative explanations such as reverse causality and residual confounding must be considered. Strengthening caregiver education and fostering participatory communication within PHCs represent promising strategies, though experimental studies are required to confirm causal effects.

## CONCLUSION

This study found that family communication patterns were significantly associated with caregiver decision-making in managing T2DM ( $r=0.341$ ;  $p<0.001$ ). Caregivers who engaged in open and participatory communication were more likely to demonstrate effective decision making, while restricted communication was linked to less accurate decisions. Among sociodemographic factors, caregiver education emerged as the strongest predictor: caregivers with higher education were more than twice as likely to report favorable communication and effective decision-making compared with those with lower education. These findings suggest that enhancing caregiver education and fostering conversation-oriented family communication may strengthen decision making capacity in diabetes care within PHCs. However, due to the cross sectional design, the results should be interpreted as associations rather than causal relationships. Future longitudinal and experimental studies are needed to establish causal pathways and to test whether structured caregiver education or participatory communication interventions can improve diabetes management outcomes.

## CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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## AUTHOR CONTRIBUTIONS

**S:** Developed the study concept, supervised the research process and finalized the manuscript.

**PSS:** Collected the data, performed statistical analyses, and drafted the methods and results sections.

**YSH:** Conducted the literature review and contributed to writing the introduction and discussion.

**NDK:** Assisted with instrument validation, field coordination and data verification.

**DDSLI:** Managed ethical approval, supported data analysis and reviewed the manuscript for clarity.

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