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ORIGINAL RESEARCH

Self-Disclosure and Fear of Progression in Younger and Middle-Aged Adults with Diabetes: Chain-Mediating Roles of Social Support and Illness Perception

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Background: Among younger and middle-aged adults with diabetes, fear of progression (Fop) is a prominent psychological burden that is associated with impaired self-management and poorer long-term treatment adherence. Although self-disclosure has shown benefits in alleviating Fop in other chronic conditions, its role in younger and middle-aged adults with diabetes, and the pathways through which it might relate to Fop remain unclear.

Purpose: To examine the effect of self-disclosure on FoP among younger and middle-aged adults with diabetes and to test the chain-mediating roles of social support and illness perception using a cross-sectional design.

Patients and Methods: A survey was conducted in a tertiary hospital in Nanjing, China, from March 2023 to August 2024. Standardized scales were used to assess self-disclosure, social support, illness perception, and FoP. A multiple mediation model was tested using the PROCESS macro for SPSS (v22.0).

Results: A total of 193 participants were included. Self-disclosure exhibited a substantial direct impact on FoP. It also exerted indirect effects through two pathways: (1) the independent mediation of illness perception and (2) the serial mediation of social support followed by illness perception.

Conclusion: Self-disclosure is a meaningful and modifiable psychosocial factor associated with reduced FoP among younger and middle-aged adults with diabetes. Interventions aimed at facilitating disclosure, enhancing supportive communication, and reshaping maladaptive illness perceptions may help reduce FoP and support long-term self-management and adherence.

Keywords: fear of progression, self-disclosure, social support, illness perception, diabetes

Introduction

Diabetes—of which type 2 diabetes accounts for nearly 90%—is a progressive metabolic disorder marked by impaired insulin secretion or insulin resistance, resulting in chronic hyperglycemia.[1] According to Global Burden of Disease data, diabetes accounts for over two million deaths each year and remains a major global cause of cardiovascular and renal morbidity.[2] In recent years, diabetes has become more prevalent in young and middle-aged groups worldwide.[3] Individuals in this age group often progress more rapidly toward insulin dependence, largely due to accelerated β-cell dysfunction.[3] Previous studies demonstrated an inverse association between age at diabetes onset and the risks of all-cause mortality as well as macrovascular and microvascular complications.[4,5] Moreover, the onset of this chronic disease during the most productive stages of life—such as education, employment, and family formation—imposes considerable personal challenges and results in significant economic losses at both the individual and societal levels.[3] In addition to its physical and financial consequences, diabetes imposes considerable psychological burdens, which are particularly

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pronounced among young and middle-aged adults and have been shown to compromise self-management and psychological well-being.[6] These intertwined physical and psychosocial stressors heighten uncertainty about future health and elicit a prominent emotional distress—fear of progression (FoP)—within this population.[7]

FoP refers to a conscious and non-pathological emotional response that arises from concerns about potential disease deterioration and its accompanying physical, emotional, and social consequences.[8] It is recognized as a significant emotional challenge for individuals living with chronic diseases.[9] A recent study indicates that approximately one in four patients (mean age: 57.65 years) with type 2 diabetes (23.1%) experience dysfunctional FoP.[7] The most frequently reported fears involve disease exacerbation, adverse drug effects, and dependence on others for daily activities. Although a moderate degree of FoP can be adaptive and motivational, excessive or prolonged FoP tends to undermine treatment compliance and health-promoting behaviors.[9] Furthermore, a study conducted specifically in a diabetes cohort found that heightened FoP was associated with poorer QoL.[10] In addition, evidence from research on other chronic conditions, such as Parkinson's disease and ischemic stroke, supports the detrimental impact of FoP on reduced self-efficacy and increased anxiety and depression.[11,12] Identifying modifiable determinants of FoP and addressing them early in younger and middle-aged patients with diabetes is therefore essential to foster psychological adaptation and support sustained self-management.

Self-disclosure, defined as the genuine sharing of one's personal thoughts, emotions, and experiences, is an important coping strategy that enables patients to express negative feelings and reinterpret illness-related experiences.[13] According to social cognitive processing theory, disclosure behaviors facilitate cognitive engagement with disease-related stimuli, encouraging individuals to confront, reflect upon, and reappraise their illness experiences.[14] Through this process, patients can integrate disease-related information into their existing cognitive frameworks, thereby fostering psychological adjustment. Studies among patients with cancer, a population in which FoP has been extensively studied, suggest that self-disclosure is associated with reduced fear of disease recurrence and emotional distress, as well as enhanced benefit finding and relational functioning.[15,16] Although these findings provide indirect support for a relationship between self-disclosure and FoP in chronic illnesses, whether this beneficial association extends to young and middle-aged adults with diabetes, and through which mechanisms, remains unknown.

The Disclosure Processes Model proposes a core mechanisms through which self-disclosure promotes psychological adjustment: activating social support.[17] By sharing personal concerns and illness-related experiences, individuals create more opportunities to receive supportive responses from significant others. Such supportive reactions help reduce feelings of isolation, provide emotional and instrumental resources for coping with illness-related stressors, and buffer fears of health deterioration by reducing uncertainty about future complications and reinforcing adaptive coping. Supporting this view, a study involving young male cancer patients in China found that self-disclosure reduced reproductive concerns indirectly via greater perceived social support.[18] Drawing on this finding and the theoretical assumptions of the Disclosure Processes Model, it is reasonable to hypothesize that social support may also mediate the effect of self-disclosure on FoP among younger and middle-aged adults with diabetes.

In addition, the Disclosure Processes Model identifies alleviation of inhibition as a central internal mechanism.[17] When individuals articulate previously suppressed negative thoughts and emotions—such as worries about disease progression—they relieve internal inhibition and initiate more profound cognitive processing. This process enables them to reappraise and reorganize illness-related information, potentially reshaping their illness perceptions by attenuating catastrophic interpretations and enhancing beliefs about illness controllability. Through this cognitive–emotional restructuring pathway, self-disclosure may therefore help mitigate FoP. While direct evidence linking illness perception as a mediator between self-disclosure and FoP is presently lacking, indirect empirical support exists. Illness perception has been consistently linked to FoP across various chronic disease populations (eg, cancer, heart failure).[19,20] Meanwhile, studies among children and youth with epilepsy have documented associations between self-disclosure and illness perceptions.[21] Taken together, these findings provide a conceptual foundation for examining whether self-disclosure influences FoP through illness perception. Furthermore, a study examining adolescent and young adult survivors of hematopoietic stem cell transplantation found that illness perception significantly mediated the association between social constraints and fear of disease recurrence.[22] Although social constraints differ from social support, this evidence indicates that social-interpersonal factors may influence fear responses through illness perception, supporting their potential

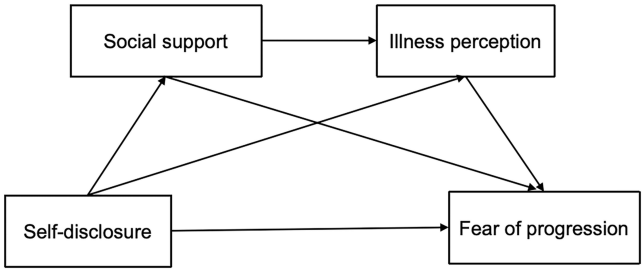

Figure 1 Hypothesized conceptual model of chain mediation.

mediating role in related psychosocial pathways. Thus, we hypothesize that social support and illness perception act as serial mediators in the link between self-disclosure and FoP in younger and middle-aged adults with diabetes.

Guided by the Disclosure Processes Model and existing empirical evidence, the hypothesized chain-mediation framework is presented in Figure 1. The study tests the following hypotheses: Hypothesis 1: Self-disclosure exhibits a significant negative association with FoP among younger and middle-aged adults with diabetes. Hypothesis 2: Social support mediates the association between self-disclosure and FoP in this population. Hypothesis 3: Illness perception mediates the relationship between self-disclosure and FoP. Hypothesis 4: Social support and illness perception jointly function as sequential mediators linking self-disclosure to FoP. A clearer understanding of these pathways will advance the development of patient-centered interventions that enhance psychological well-being, strengthen social resources, and improve long-term treatment adherence in younger and middle-aged adults with diabetes.

Materials and Methods

Design

A cross-sectional design was employed for this study, adhering to the methodology and reporting standards set forth by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Study Population and Data Collection

Using convenience sampling, this study enrolled younger and middle-aged adults with diabetes from a public tertiary hospital in Nanjing from March 2023 to August 2024. Eligible participants were required to: (i) have Type 1 or Type 2 diabetes for ≥6 months; (ii) be aged 18–59 years; and (iii) be proficient in Chinese to complete the survey. Individuals were excluded if they had a history of mental illness, cognitive dysfunction, or concurrent severe chronic conditions (eg, cardiovascular diseases, chronic kidney disease, and cancer). The current study was conducted in accordance with the Declaration of Helsinki. Before participant recruitment, a sample size calculation was performed using G*Power 3.1. Based on a multiple linear regression model with 12 predictors (encompassing illness perception, self-disclosure, social support, FoP, and demographics), the analysis employed an effect size f^2 of 0.10, a two-tailed α of 0.05, and 80% power. A total of 185 participants were deemed necessary to adequately power the study. From an initial enrollment of 207 eligible patients, 193 were included in the final analysis after excluding 14 with incomplete questionnaires.

This study received ethical approval from the Ethics Committee of the First Affiliated Hospital with Nanjing Medical University (2023-SRFA-155). Written informed consent was obtained from all individuals prior to enrollment. Before launching the formal survey, a pilot assessment was conducted to verify that patients understood all questionnaire items and could complete them independently. Data were collected using structured, paper-based questionnaires composed of six sections: (1) sociodemographic characteristics (including age, sex, educational attainment, marital status, place of residence, and type of medical insurance), (2) diabetes-related clinical information (such as disease duration, diabetes classification, and treatment regimen), (3) Fear of Progression Questionnaire-Short Form (FoP-Q-SF), (4) Distress Disclosure Index (DDI), (5) Multidimensional Scale of Perceived Social Support (MSPSS) and (6) Brief Illness Perception Questionnaire (BIPQ). Participants completed the surveys in a quiet, designated area within each clinical site. Trained research staff were available throughout the process to address any questions participants raised. After

completion—typically within 20 minutes—the questionnaires were collected and immediately reviewed for accuracy and completeness.

Study Tools

Fear of Progression Questionnaire-Short Form

FoP-Q-SF, developed by Mehnert et al in 2006 as a condensed version of the original FoP-Q, is commonly used to evaluate FoP among individuals with cancer.[23] The Chinese adaptation of the scale was completed and psychometrically validated by Wu et al in 2015, comprising two dimensions: physical health and social/family well-being.[24] The instrument consists of 12 items and adopts a five-point Likert response format (1 = "never" to 5 = "always"). Total scores range from 12 to 60, with higher scores representing greater FoP. A cutoff score of ≥34 is considered indicative of potential psychological impairment. In the present study, the Cronbach's alpha coefficient of the Chinese FoP-Q-SF was 0.882.

Distress Disclosure Index

DDI, initially created by Kahn et al and subsequently translated and culturally adapted into Chinese by Li et al, assesses the extent to which individuals share their concerns, emotional distress, and private information with others.[25,26] This scale consists of 12 items scored on a 5-point rating, ranging from one for "strongly disagree" to five for "strongly agree." Six items (2, 4, 5, 8, 9, and 10) are reverse-scored. Total scores vary between 12 and 60, with higher values reflecting a greater propensity for self-disclosure. In the current study, the DDI demonstrated satisfactory internal reliability (Cronbach's alpha = 0.885).

Brief Illness Perception Questionnaire

BIPQ, developed by Broadbent et al based on Leventhal's Common-Sense Model, was employed to assess participants' cognitive and emotional appraisals of their illness.[27] Mei et al validated the Chinese version among breast cancer patients, demonstrating satisfactory reliability and validity.[28] The scale comprises nine items across three dimensions: cognitive perceptions (5 items), emotional responses (2 items), and illness comprehensibility (1 item). The final item is an open-ended question and is therefore not scored. The other items use an 11-point response format (0~10). Items 3, 4, and 7 are reverse-scored. Total scores range from 0 to 80, with higher values indicating more negative illness perceptions. In the present study, the BIPQ showed acceptable internal reliability, with a Cronbach's alpha coefficient of 0.681.

Multidimensional Scale of Perceived Social Support

MSPSS, developed by Zimet et al, was utilized in this study to evaluate individuals' perceptions of the adequacy of social support received from family, friends, and significant others.[29] The MSPSS consists of 12 items, each rated on a 7-point Likert scale ranging from 1 ("very strongly disagree") to 7 ("very strongly agree"). The total score is calculated by summing all item scores, with higher scores indicating greater perceived social support. The Chinese version of the MSPSS has demonstrated excellent reliability and validity, with a Cronbach's α of 0.91.[30] In the present study, the MSPSS also exhibited excellent internal consistency (Cronbach's α = 0.936).

Ethical Considerations

Ethical approval for this study was obtained from the Ethics Committee of the First Affiliated Hospital of Nanjing Medical University (Approval No. 2023-SRFA-155). The study complied with the ethical principles of the Declaration of Helsinki. Before enrollment, all participants received a detailed explanation of the study purpose, procedures, potential risks and benefits, and their right to decline or withdraw at any time without affecting their medical care. Written informed consent was obtained from all participants. To ensure confidentiality, all identifying information was removed during initial data processing, and each participant was assigned a unique code. The anonymized dataset was stored in a password-protected database accessible only to authorized researchers. These procedures ensured strict adherence to international ethical standards, safeguarded participant autonomy, and maintained robust data security.

Data Analysis

Data were analyzed using SPSS version 22.0. Participants with missing data on the study scales were excluded from the analysis. No imputation methods were used. Prior to the primary analyses, rigorous data-screening procedures were implemented. First, the distributions of self-disclosure, social support, illness perception, and FoP were assessed using skewness and kurtosis to confirm approximate normality. Second, Harman's single-factor test was conducted to determine the potential for common-method bias. Third, multicollinearity among independent variables was examined using the variance inflation factor (VIF) values. Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables (eg, FoP scores) were reported as means and standard deviations (SD), whereas categorical variables (eg, sex, marital status, education level, age group) were summarized using frequencies and percentages. Independent t-tests and one-way analyses of variance (ANOVA) were conducted to examine differences in FoP across sociodemographic and disease-related characteristics. Based on prior literature, relevant sociodemographic and disease-related variables were identified a priori as potential covariates. These variables were then examined using univariate analyses to explore their associations with FoP. Subsequently, variables demonstrating significant effects were retained as covariates in the mediation analyses. Pearson correlation analyses were performed to examine associations among the core variables. To test the proposed chain mediation model, the PROCESS macro (Model 6) was used, with social support and illness perception specified as serial mediators between self-disclosure and FoP. Mediation effects were evaluated using bias-corrected bootstrapping with 5,000 resamples and were considered statistically significant when the 95% confidence interval (CI) did not include zero.

Results

Tests for Normality, Common Method Variance, and Multicollinearity

To evaluate whether the study variables followed approximately normal distributions, skewness and kurtosis were first examined. The results demonstrated that absolute skewness and kurtosis ranged from 0.119 to 0.780 and from 0.324 to 2.470, respectively. According to Drezner's criteria, real-world datasets rarely achieve perfect normality; however, skewness values below three and kurtosis values below 10 are generally considered acceptable indicators of approximate normality.[31] Based on these thresholds, the variables in this study satisfied the normality assumption. Second, potential common-method bias was assessed using Harman's single-factor test. Exploratory factor analysis yielded ten factors with eigenvalues greater than one, and the first factor accounted for 23.41% of the variance, well below the commonly accepted benchmark of 40%.[32] These results indicated that common-method variance was unlikely to threaten the validity of the findings. Finally, multicollinearity among predictor variables was evaluated using VIFs. All VIF values were substantially below the recommended cutoff of 5, indicating that collinearity was not a concern and that the predictors were sufficiently independent for further analysis.

Sociodemographic and Clinical Characteristics of Participants and Group Differences in Fear of Progression

Table 1 presents the demographic and clinical profile of the 193 participants (108 men, 85 women). Notably, our sample was relatively young and educated, with 43.5% over 35 years of age and more than half (52.9%) holding a bachelor's degree or higher. This aligns with our focus on young and middle-aged adults, a group often navigating career and family responsibilities alongside diabetes management. Clinically, a majority (56.5%) had a diabetes duration of five years or less, suggesting many were in the early-to-mid phase of disease progression where fears about the future may be particularly salient. Notably, FoP differed significantly by marital status, with unmarried participants reporting higher levels of FoP than their married counterparts, suggesting that the absence of spousal or family support may exacerbate concerns about future disease progression. In addition, medical insurance type was significantly associated with FoP, with participants lacking stable or comprehensive insurance coverage exhibiting greater fear. This finding highlights the potential role of financial security and access to healthcare resources in shaping psychological responses to diabetes. In contrast, FoP did not differ significantly by sex, age group, education level, residence, disease duration, diabetes type, or

Table 1 Sociodemographic and Clinical Characteristic Differences in Response to Fear of Progression Among Younger and Middle-Aged Adults with Diabetes (N = 193)

Characteristic	N (%)	Fear of Progression (M ± SD)	*t*/*F* value	*p*-value
Sex			−1.039[a]	0.300
Male	108 (55.96)	29.95 ± 8.12		
Female	85 (44.04)	31.18 ± 8.10		
Age			0.542[a]	0.588
≤35	109 (56.48)	30.77 ± 7.90		
>35	84 (43.52)	30.13 ± 8.41		
Marriage			3.289[b]	0.039
Unmarried	46 (23.83)	31.48 ± 7.65		
Married	140 (72.54)	30.54 ± 8.13		
Divorced	7 (3.63)	23.14 ± 8.11		
Education			1.092[b]	0.354
Middle School	23 (11.92)	32.26 ± 8.41		
High School	22 (11.40)	28.64 ± 8.07		
Associate degree	46 (23.83)	31.50 ± 6.93		
≥Bachelor's degree	102 (52.85)	30.04 ± 8.53		
Residence			0.224[a]	0.140
Urban area	112 (58.03)	29.76 ± 7.77		
Rural area	81 (41.97)	31.51 ± 8.63		
Medical insurance type			5.386[b]	0.001
Self-pay	24 (12.43)	30.58 ± 6.46		
New Rural Cooperative Medical Scheme	22 (11.40)	36.00 ± 7.90		
Urban Resident Basic Medical Insurance	136 (70.47)	29.30 ± 8.06		
Government-funded medical care	11 (5.70)	34.00 ± 7.81		
Disease duration			1.626[a]	0.106
≤5 years	106 (54.92)	31.35 ± 8.45		
>5 years	87 (45.08)	29.45 ± 7.60		
Disease type			−0.547[a]	0.585
Type 1 diabetes	109 (56.48)	30.21 ± 8.06		
Type 2 diabetes	84 (43.52)	30.86 ± 8.22		
Antidiabetic treatment regimen			1.381[b]	0.254
Oral hypoglycemic agents	40 (20.73)	32.38 ± 8.85		
Insulin injections	116 (60.10)	29.93 ± 8.13		
Oral hypoglycemic agents + insulin injection	37 (19.17)	30.22 ± 7.08		

Notes: [a] independent samples *t*-test; [b] One-Way ANOVA.

treatment regimen, indicating that psychosocial factors may be more salient determinants of FoP than clinical characteristics alone in this population.

Scale Scores and Correlation Coefficients for the Study Variables

Table 2 displays the intercorrelations among the primary study variables. As expected, FoP was positively correlated with negative illness perception ($r = 0.534$, $p < 0.001$). This finding suggests that patients who view their diabetes as more threatening, chronic, or uncontrollable are far more likely to experience heightened fear about its progression. Conversely, FoP was negatively correlated with both self-disclosure ($r = -0.290$, $p < 0.001$) and social support ($r = -0.213$, $p < 0.001$). This indicates that individuals who are more open about their condition and those who perceive greater social support tend to report lower levels of FoP. Furthermore, self-disclosure was positively linked to social support ($r = 0.392$, $p < 0.001$) and negatively linked to negative illness perception ($r = -0.278$, $p < 0.001$). Collectively, these patterns provide a coherent empirical foundation for testing our serial mediation model.

Table 2 Correlation Analysis Among Illness Perception, Self-Disclosure, Social Support and Fear of Progression (N = 193)

Variable	Score (M ± SD)	1	2	3
1. Illness perception	44.02 ± 8.33	1		
2. Self-disclosure	36.79 ± 7.57	−0.278***	1	
3. Social support	62.12 ± 11.67	−0.306***	0.392***	1
4. Fear of progression	30.49 ± 8.11	0.534***	−0.290***	−0.213***

Notes: *** $p < 0.001$.

Chain Mediating Effects of Social Support and Illness Perception

Figure 2 illustrates the chain mediation model examining the relationships among social support, illness perception, self-disclosure, and FoP among younger and middle-aged adults with diabetes. Marital status and type of medical insurance, which were significantly associated with FoP in univariate analyses, were included as covariates in the mediation model. The total effect of self-disclosure on FoP was statistically significant ($\beta = -0.281$, 95% CI [−0.425, −0.137]). The direct, negative association between self-disclosure and FoP remained significant ($\beta = -0.149$, 95% CI [−0.287, −0.011]). The total indirect effect through social support and illness perception was also significant ($\beta = -0.132$, 95% CI [−0.233, −0.032]). Three specific mediating pathways were examined: (1) the indirect effect through illness perception alone ($\beta = -0.09$, 95% CI [−0.178, −0.008]); (2) the indirect effect through social support alone ($\beta = 0.005$, 95% CI [−0.048, 0.066]); and (3) the serial mediating effect through social support followed by illness perception ($\beta = -0.047$, 95% CI [−0.088, −0.014]). Among these, only the first and third pathways reached statistical significance, as the confidence interval for the social support pathway included zero. Together, the two significant mediating routes accounted for 32.03% and 16.7% of the total effect, respectively. Comprehensive mediation results are summarized in Table 3.

Discussion

The results of this study illuminate the psychosocial mechanisms linking self-disclosure to FoP in younger and middle-aged adults with diabetes. While the direct negative relationship of self-disclosure with FoP (Hypothesis 1) and the independent mediating role of illness perception (Hypothesis 3) were supported, the hypothesized independent mediation by social support (Hypothesis 2) was not statistically significant. Importantly, a chain-mediating pathway through social support and then illness perception (Hypothesis 4) was confirmed, revealing a more nuanced interpersonal-cognitive route to reducing FoP.

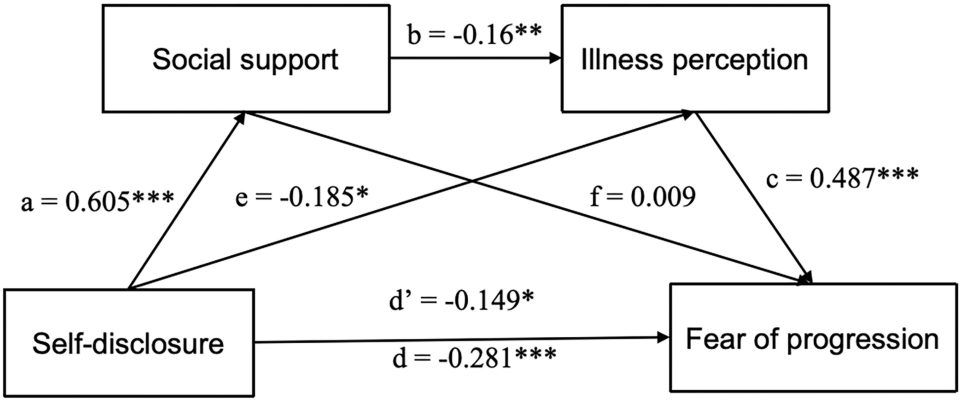

Figure 2 Chain mediation model of social support and illness perception linking self-disclosure and FoP in younger and middle-aged adults with diabetes. a: The effect of self-disclosure on social support; b: The effect of social support on illness perception; c: The effect of illness perception on fear of progression; d: The total effect of self-disclosure on fear of progression; d': The direct effect of self-disclosure on fear of progression; e: The effect of self-disclosure on illness perception; f: The effect of social support on fear of progression. *p < 0.05; **p < 0.01; ***p < 0.001. Unstandardized beta coefficients were reported.

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Table 3 Chain Mediation Effects of Social Support and Illness Perception Between Self-Disclosure and Fear of Progression (N = 193)

Self-Disclosure → Fear of Progression	Effect	SE	95% CI
Total effect	−0.281	0.073	(−0.425, −0.137)
Direct effect	−0.149	0.070	(−0.287, −0.011)
Total indirect effect:	−0.132	0.051	(−0.233, −0.032)
Indirect effect 1: Self-disclosure → social support → illness perception→ fear of progression	−0.047	0.019	(−0.088, −0.014)
Indirect effect 2: Self-disclosure → illness perception → fear of progression	−0.090	0.043	(−0.178, −0.008)
Indirect effect 3: Self-disclosure → social support → fear of progression	0.005	0.029	(−0.048, 0.066)

The direct protective effect of self-disclosure against FoP aligns with evidence from oncology research, where expressive disclosure has been linked to reduced fear of cancer disease recurrence.[15] Soriano et al further confirmed that inhibited disclosure significantly predicted higher concurrent fear of cancer recurrence among couples coping with breast cancer.[33] Putting stressful experiences into words helps individuals transform vague, intrusive fears into more coherent, manageable experiences.[34] Theoretically, Self-disclosure may decrease FoP because articulating one's internal worries promotes emotional processing and reduces the intensity of unregulated negative emotions.[35] Consequently, it is imperative to prioritize FoP in younger and middle-aged adults with diabetes, particularly those exhibiting lower levels of self-disclosure.

The lack of a significant independent mediating effect for social support diverges from Hypothesis 2. This finding may be understood through the nature of the measured construct and the cultural context. First, while self-disclosure can increase social interactions, it does not guarantee these interactions are subjectively appraised as supportive, especially in the context of a condition like diabetes, where disclosure may occasionally elicit stigmatizing or blaming responses.[36,37] Our measure captured global perceived support, which may not have been sensitive enough to detect the specific, disclosure-related changes in support perception hypothesized by the Disclosure Processes Model. Second, in Chinese culture, where familial obligation and implicit concern are highly valued, expressions of support can often be intertwined with pressure, criticism, or heightened expectations for self-management (so-called "tough love" or "anxious concern"). For a young or middle-aged adult with diabetes, disclosing struggles may trigger familial responses aimed at ensuring adherence, which, despite being rooted in concern, may be perceived as demanding or critical rather than purely supportive. Therefore, the act of disclosure might increase social involvement without necessarily enhancing the positive quality of perceived support, thereby weakening its mediating role in alleviating FoP.

In contrast, illness perception emerged as a mediator (supporting Hypothesis 3), indicating that part of the benefit of self-disclosure operates through cognitive reappraisal. Although direct empirical evidence examining illness perception as a mediator between self-disclosure and FoP remains limited, findings from related populations provide meaningful support for this pathway. Previous studies in cancer survivors have shown that more negative illness perceptions—including stronger beliefs about severe consequences or chronicity—are strongly associated with heightened FoP or fear of cancer recurrence.[38,39] Moreover, evidence also suggests that self-disclosure may help shape patients' cognitive appraisal of illness. For instance, a study in thyroid cancer survivors demonstrated that self-disclosure was linked to illness perception through cognitive–emotional processes.[21] From the perspective of cognitive reappraisal within emotion regulation theory, verbal expression facilitates reinterpretation of illness-related threats, thereby reducing catastrophic thinking.[40] Through these cognitive–emotional mechanisms, self-disclosure may enhance individuals' sense of cognitive clarity and control, ultimately lowering FoP.

Interestingly, the significant chain mediation pathway (self-disclosure → social support → illness perception →FoP) provides empirical support for Hypothesis 4 and reveals a complementary interpersonal-cognitive mechanism. Although this pathway is examined for the first time in our study, prior theoretical frameworks and empirical findings lend strong plausibility to this result. According to the Disclosure Processes Model, activation of social support constitutes a central mechanism through which self-disclosure facilitates psychological adjustment.[17] By fostering supportive interpersonal interactions, self-disclosure enables individuals to obtain emotional reassurance, practical advice, and validation of their

illness experiences, which can buffer the adverse psychological effects of chronic disease and reduce FoP. Complementarily, the Common-Sense Model of Self-Regulation emphasizes that social information and interpersonal feedback serve as external cues that guide individuals to reinterpret their illness as less threatening and more manageable.[41] Such supportive inputs help shape more adaptive cognitive representations of illness, thereby mitigating psychological maladaptation and reducing FoP. Prior research further substantiates this chain mediating pathway. For example, Shen et al observed that illness perception mediated 42.1% of the effect of social constraints on fear of cancer recurrence among adolescent and young adult hematopoietic stem cell transplant survivors, highlighting how social-interpersonal factors influence FoP through cognitive representations of illness.[22] Similarly, Yang et al reported that early-stage lung cancer patients who perceived higher social support and held less threatening illness beliefs experienced lower FoP.[39] Collectively, these findings suggest that self-disclosure may enhance perceived social support, which helps inform illness perceptions, ultimately leading to decreased FoP among younger and middle-aged adults with diabetes.

Limitations

Careful interpretation of these findings is warranted in light of several limitations. First, the cross-sectional nature of our data constitutes the primary limitation for causal inference. While we proposed a theoretical model with self-disclosure as an antecedent, the observed associations among self-disclosure, social support, illness perception, and FoP are bidirectional. Therefore, the proposed directional and mediation pathways, although theoretically grounded and statistically supported, require verification through longitudinal or experimental designs to establish temporal precedence and causal direction. Second, the use of a convenience sample from a single tertiary hospital limits the representativeness of our findings. This sampling approach may introduce selection bias by over-representing patients with more severe symptoms, greater healthcare engagement, or higher socioeconomic status, compared to the broader community-based population of young and middle-aged adults with diabetes. Furthermore, our cohort included a relatively high proportion of patients with type 1 diabetes. This deviation is primarily attributable to the study setting: the hospital serves as a regional referral center for type 1 diabetes, and a departmental winter camp for this patient group was conducted during the recruitment period, thereby increasing their enrollment. These sampling characteristics may affect both the internal validity of the observed associations and the generalizability of our conclusions, particularly when applied to individuals in primary care settings, those with type 2 diabetes, or from different cultural backgrounds. Future multi-center studies with more representative sampling frames are warranted to verify and extend our results. Third, the present study examined only self-disclosure, social support, and illness perception, leaving out other personal or environmental factors that may contribute to FoP. Future research should consider incorporating additional constructs—such as coping styles, or self-perceived burden—to build a more comprehensive explanatory model for FoP in younger and middle-aged adults with diabetes.

Implications

Firstly, the negative association between self-disclosure and FoP suggests that healthcare providers should encourage patients to express their illness-related concerns more freely. Interventions such as expressive writing and marital disclosure exercises facilitate emotional expression and processing, thereby alleviating FoP by reducing unspoken distress and promoting cognitive reappraisal.[15,16,34] Secondly, the significant mediating role of illness perception suggests that cognitive components should be a central target in interventions aimed at reducing FoP among younger and middle-aged adults with diabetes. Clinicians might integrate cognitive–behavioral techniques to help patients re-evaluate maladaptive beliefs (eg, catastrophic consequences or uncontrollability) about their disease and build more adaptive, coherent cognitive representations. Educational programs that supply accurate, tailored information about diabetes trajectories and self-management can further reinforce these adaptive illness perceptions. Thirdly, although social support alone did not fully mediate the relationship between self-disclosure and FoP in our sample, its role in the serial mediation model underscores the nuanced influence of interpersonal contexts, particularly within Chinese cultural norms. Interventions should therefore aim not only to increase the quantity of social support but also to enhance its quality. Psychoeducation for families and peers may help reduce critical or stigmatizing reactions and promote more constructive forms of support that facilitate positive illness perceptions. Finally, the chain-mediated pathway (self-disclosure → social

support → illness perception → FoP) emphasizes that multidimensional interventions that foster self-disclosure, encourage supportive social interactions, and facilitate cognitive restructuring of illness beliefs may be most effective in mitigating FoP.

Conclusion

This study elucidates the psychosocial mechanisms linking self-disclosure to FoP in younger and middle-aged adults with diabetes. Self-disclosure was associated with lower FoP both directly and indirectly via illness perception, as well as through a chain-mediating pathway involving social support and illness perception. Social support operated primarily within this sequential process, underscoring the interdependence of psychosocial resources. However, these findings should be interpreted in light of cultural context and sample characteristics. Future research should employ longitudinal designs to establish temporal precedence and causal direction among these variables. In addition, multi-center and cross-cultural studies with more representative samples are needed to examine the stability of the mediation model across healthcare systems, particularly regarding the nuanced role of social support. Overall, facilitating emotional expression, enhancing supportive interactions, and reshaping maladaptive illness beliefs represent complementary intervention targets for reducing FoP, improving psychological well-being, and promoting sustained self-management in this population.

Data Sharing Statement

The data presented in this study are available on request from the corresponding author.

Consent for Publication

Written informed consent was obtained from the patients for publication of this study.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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