

Caregiver Perceived Stress, Anxiety, and Coping Strategies Among Family Members of Patients With Diabetes

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Abstract

Family members often participate in the everyday management of diabetes, yet their psychological experience can remain less visible than the patient's clinical needs. This cross-sectional quantitative study examined perceived stress, anxiety, and coping strategies among 64 adult family caregivers of patients with diabetes. Perceived stress was assessed with the 10-item Perceived Stress Scale (PSS-10), anxiety with the 10-item anxiety measure actually administered in the study, and coping with 28 administered coping items scored according to the study questionnaire's specified problem-focused, emotion-focused, avoidant, additional, and overall composites. Descriptive statistics, Cronbach's alpha, Pearson correlations, Spearman sensitivity analyses, Holm-adjusted domain comparisons, and multiple regression with diagnostic and HC3 robust checks were used. Mean perceived stress was 20.66 (SD = 7.17); 59.4% of caregivers were classified in the moderate and 20.3% in the high perceived-stress category. Stress and anxiety were strongly positively related, $r = .734$, 95% CI [.596, .830], $p < .001$. Neither stress nor anxiety was significantly related to overall coping. At the domain level, however, stress and anxiety were positively associated with avoidant coping, and both associations remained significant after Holm correction. The exploratory regression predicting avoidant coping explained 30.1% of its variance; perceived stress retained a significant unique association under HC3 robust inference. The findings indicate that caregiver distress was related more clearly to coping strategy than to an undifferentiated amount of coping. Because the sample was recruited by convenience and measured at one time point, the results do not establish prevalence or causal direction. Caregiver assessment in diabetes services may benefit from attention to stress, anxiety,

Submitted : September 29, 2026

Published : October 31, 2026

DOI: doi.org/10.65320/ice.vol.1.issue5.51

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and persistent avoidance while remaining sensitive to the practical and social conditions in which coping occurs.

Keywords: Family Caregivers, Diabetes, Perceived Stress Anxiety | Coping | Avoidant Coping

I. INTRODUCTION

Diabetes is managed largely outside clinical settings. Medication schedules, food choices, physical activity, monitoring, appointments, transport, financial decisions, and responses to changes in health are embedded in daily life. Although the person with diabetes remains the central agent in self-management, family members frequently participate in these routines. Their involvement can be supportive, but it can also create sustained responsibility, uncertainty, and concern. Rintala et al. (2013), in a systematic review of adult diabetes and family interaction, described a reciprocal relationship in which family life influences diabetes self-management while diabetes also affects family members. This reciprocity makes caregiver well-being relevant to the broader context of long-term disease management.

Family caregiving is not a uniform exposure. Two caregivers may perform similar tasks yet experience them differently because their resources, relationships, competing obligations, health literacy, financial circumstances, and perceived control differ. Caregiver burden can involve emotional, social, financial, and physical consequences (Adelman et al., 2014), and meta-analytic evidence has documented differences between caregivers and non-caregivers across psychological and health outcomes (Pinquart & Sörensen, 2003; Vitaliano et al., 2003). These findings support a risk perspective rather than the assumption that caregiving inevitably produces distress. The psychological meaning of caregiving depends on how demands are appraised and on the resources available to meet them.

The transactional model of stress and coping provides a useful framework for this distinction. Lazarus and Folkman (1984) proposed that stress develops through an appraisal process in which individuals evaluate the significance of demands and their available coping resources. Primary appraisal concerns whether circumstances are threatening, harmful, or challenging, whereas secondary appraisal concerns perceived options and capacity to respond. Within diabetes caregiving, a treatment change, possible complication, or responsibility for daily routines may be experienced differently depending on knowledge, family cooperation, access to healthcare, and perceived control. Perceived stress is therefore not reducible to a count of caregiving tasks.

Anxiety is closely related to perceived stress but is conceptually distinct. Perceived stress concerns the appraisal of circumstances as unpredictable, uncontrollable, or overwhelming; anxiety reflects apprehension, tension, nervousness, and worry. Repeated appraisal of caregiving demands as difficult may coexist with anxious responding, but anxiety can also influence attention to threat and subsequent appraisal. A cross-sectional study cannot establish which process precedes the other. It can, however, determine whether the two dimensions of distress co-occur and estimate the strength of their association.

Coping adds another layer of complexity. Lazarus and Folkman (1984) defined coping as changing cognitive and behavioral efforts to manage demands appraised as taxing or exceeding resources. Carver's (1997) Brief COPE operationalized multiple coping responses rather than a single adaptive-versus-maladaptive continuum. In caregiving, problem solving,

emotional support, acceptance, reframing, distraction, denial, and disengagement may serve different functions. The same caregiver can use several strategies, and the usefulness of a strategy can depend on the controllability and timing of the stressor. Consequently, a broad total coping score may conceal meaningful differences between domains.

This distinction is particularly relevant to avoidance. Brief distraction can provide temporary relief, but persistent disengagement can interfere with information seeking, communication, problem solving, or support seeking. Longitudinal caregiver evidence has shown that coping strategies can have different associations with later distress. Del-Pino-Casado, Serrano-Ortega, López-Martínez, and Orgeta (2019) found that positive reframing and self-distraction were associated with lower subsequent psychological distress, whereas denial and substance-use coping were associated with greater distress. More recent meta-analytic evidence has also linked anxiety symptoms with dysfunctional coping among family carers (Muñoz-Cruz et al., 2024). These findings caution against treating coping as an undifferentiated quantity.

Social and family context can alter both demands and coping resources. Social support may redistribute practical responsibilities, reduce isolation, and increase access to information. Del-Pino-Casado et al. (2018) reported an inverse meta-analytic association between social support and subjective caregiver burden. Cultural expectations are also relevant. In settings where family care is strongly normative, caregivers may value the role while simultaneously experiencing strain, and they may be reluctant to describe family responsibility as burdensome. The coexistence of commitment and distress should therefore be recognized rather than framed as contradictory.

Diabetes creates a particularly important context for this issue because care can be prolonged yet relatively invisible. Unlike conditions that require continuous personal assistance, diabetes may

involve intermittent but persistent participation in routines and decision making. Family members may not identify themselves as caregivers even when they regularly coordinate meals, medications, transport, finances, appointments, or emotional support. The fluctuating course of diabetes can also sustain anticipatory concern about complications and future dependence. Chatterjee et al. (2017) emphasized the long-term, multifaceted management required in type 2 diabetes, underscoring why disease management extends beyond isolated clinical encounters.

Caregiver research nevertheless has important methodological limitations. Many studies are cross-sectional, use convenience samples, or focus on conditions such as dementia, cancer, frailty, and severe mental illness. Evidence specific to family caregiving in diabetes is less extensive. Measurement also matters: caregiver burden, perceived stress, anxiety, and coping are related but not interchangeable constructs. Burden concerns consequences of the caregiving role; perceived stress concerns appraisal; anxiety concerns apprehensive emotional responding; and coping concerns efforts to manage demands and emotions. An integrated study that measures these constructs separately can therefore reveal patterns that would be lost if they were combined conceptually.

The present study was designed to examine perceived stress, anxiety, and coping among family caregivers of patients with diabetes. Its primary questions concerned the level of perceived stress and anxiety, the pattern of coping, the relationship between stress and anxiety, the relationships of stress and anxiety with overall coping, and the joint statistical contribution of stress and anxiety to overall coping. Four null hypotheses were specified: no significant relationship between perceived stress and anxiety (H01), no significant relationship between perceived stress and overall coping (H02), no significant relationship between anxiety and overall coping (H03), and no significant contribution of stress and anxiety to overall coping in multiple regression (H04).

The study also examined coping domains as secondary analyses. This distinction between primary and secondary outcomes is important because examining several domains increases the opportunity for chance findings. The domain analyses were therefore interpreted with Holm adjustment for multiple comparisons. The purpose was not to redefine the primary outcome after seeing the data, but to determine whether a broad coping total might conceal strategy-specific relationships. Based on theory and caregiver evidence, avoidant or dysfunctional coping was of particular interpretive interest, while all domains were evaluated systematically.

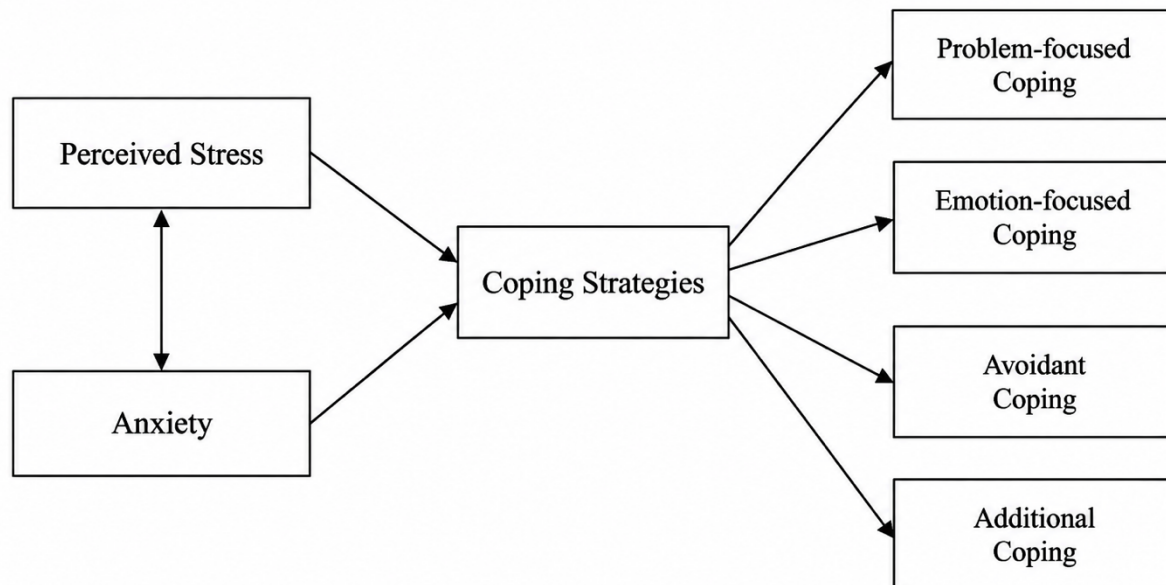
The study contributes in three ways. First, it provides a focused description of psychological distress and coping in a sample of family caregivers involved in diabetes care. Second, it compares overall and domain-specific coping relationships within the same dataset. Third, it emphasizes transparent statistical reporting, including reliability, confidence intervals, sensitivity correlations, multiplicity correction, regression diagnostics, and robust inference when assumptions were imperfect. These practices are especially important in a modest sample because they discourage overreliance on isolated p values.

The conceptual expectation was that perceived stress and anxiety would be positively related because both reflect aspects of psychological

distress, while relationships with coping could vary by strategy. No causal pathway was assumed. Stress could influence coping, coping could influence subsequent stress, or both could reflect unmeasured conditions such as patient severity, financial strain, social support, family conflict, or caregiver health. The cross-sectional design therefore supports conclusions about association only. This boundary guides the interpretation of all findings reported below.

The conceptual framework for the present study is presented in Figure 1. Guided by the transactional model of stress and coping (Lazarus & Folkman, 1984), the framework treats perceived stress and anxiety as related but distinct dimensions of caregiver psychological distress and coping as a multidimensional response to caregiving demands. Perceived stress and anxiety were expected to be positively associated, while their relationships with coping were examined both at the overall level and across the study-defined problem-focused, emotion-focused, avoidant, and additional coping domains. The framework is intended to represent the study variables and hypothesized statistical relationships rather than a causal sequence, because all variables were assessed concurrently.

Figure 1. *Conceptual Framework of Perceived Stress, Anxiety, and Coping Strategies Among Family Caregivers of Patients With Diabetes*



Note. The framework represents the study's conceptual organization of perceived stress, anxiety, and coping strategies. Perceived stress and anxiety are treated as related dimensions of psychological distress, while coping is represented through the study-defined problem-focused, emotion-focused, avoidant, and additional coping domains. The framework is informed by the transactional model of stress and coping (Lazarus & Folkman, 1984). Arrows indicate hypothesized statistical relationships and should not be interpreted as evidence of causal or temporal direction.

Caregiver burden and perceived stress overlap but should not be used as synonyms. Clinical reviews describe burden as a multidimensional consequence of caregiving that can include time demands, role disruption, financial effects, social restriction, and emotional strain (Adelman et al., 2014). Perceived stress is narrower in one respect and broader in another: it asks how uncontrollable, unpredictable, or overloaded life feels, without requiring every stressor to arise from caregiving. For a family caregiver, this distinction is useful because diabetes care may interact with employment, parenting, household work, personal illness, and financial responsibilities. The PSS-10 therefore captures the caregiver's appraisal of the broader demand-resource balance rather than a task inventory.

Meta-analytic caregiver research provides a reason to take this appraisal seriously. Pinquart and Sörensen (2003) reported systematic differences between caregivers and noncaregivers across psychological and physical health indicators, while Vitaliano et al. (2003) examined caregiving as a potential physical-health risk. These syntheses also show heterogeneity, which argues against treating caregiver status itself as a sufficient explanation for distress. Relationship quality, intensity of care, social resources, and individual vulnerability can modify outcomes. The present study follows this logic by examining variation among caregivers rather than assuming a uniform caregiving effect.

Subjective burden has also been linked specifically with emotional symptoms. Del-Pino-Casado et al. (2019) synthesized evidence relating subjective caregiver burden to depressive symptoms, and del-Pino-Casado et al. (2021) reported a large positive meta-analytic relationship between subjective caregiver burden and anxiety symptoms. Although the present study measured perceived stress rather than burden, this literature provides a relevant comparison because both constructs reflect the caregiver's experienced strain. It also supports the decision to examine anxiety directly rather than assuming that all psychological distress can be represented by one general score.

The distinction between objective and subjective caregiving demands has practical consequences. Hours of care, duration of caregiving, and relationship to the patient describe exposure, but they cannot indicate whether a caregiver feels capable, trapped, supported, or uncertain. A long-term caregiver may develop routines and confidence, whereas a caregiver with fewer hours may experience intense worry about complications or treatment decisions. This is why the present manuscript uses demographic caregiving characteristics to contextualize the sample without treating them as substitutes for psychological measurement.

Coping similarly needs to be understood in relation to context. Problem-focused strategies are often useful when a demand can be changed, such as organizing medication or arranging appointments. Emotion-focused responses may be useful when the situation cannot be immediately altered, such as accepting uncertainty or seeking reassurance. Avoidance may provide short-term emotional distance yet become problematic when it repeatedly delays necessary engagement. The transactional framework therefore favors coping flexibility over the assumption that one strategy is universally optimal (Lazarus & Folkman, 1984).

This contextual interpretation also guards against moralizing questionnaire responses. A caregiver who disengages may be exhausted, lack information, face family conflict, or have limited access to healthcare. A questionnaire cannot determine the function of a response in every episode. The appropriate empirical claim is that higher endorsement of the study-defined avoidant domain was associated with greater stress and anxiety in this sample. Explanation of why that association arose requires designs that measure resources, barriers, and coping over time.

II. METHODOLOGY

A quantitative cross-sectional survey design was used. The unit of analysis was the individual family

caregiver. This design was appropriate to the descriptive and relational objectives because perceived stress, anxiety, coping, and demographic characteristics could be assessed at a common time point. It also limited participant burden compared with repeated assessment. Its principal limitation is temporal: variables measured simultaneously cannot establish whether one preceded or caused another.

The achieved analytical sample comprised 64 adult family caregivers of patients diagnosed with diabetes. The original synopsis anticipated approximately 40 to 60 participants; the final sample slightly exceeded that range. Participants were recruited through convenience sampling on the basis of accessibility and willingness to participate. Consequently, the findings characterize the observed sample and should not be interpreted as population-prevalence estimates for all family caregivers of people with diabetes.

Planned eligibility criteria required participants to be at least 18 years old, to be a family member serving as the primary caregiver, to have provided care for at least six months, and to care for a patient diagnosed with diabetes. Planned exclusions included paid or professional caregivers, individuals with severe psychiatric disorders, and caregivers of patients with multiple critical illnesses. One limitation in the recorded data is that the shortest caregiving-duration category was “less than 1 year.” Six participants selected this category, which does not distinguish less than six months from six to eleven months. The dataset therefore cannot independently verify the six-month threshold for these respondents, and no retrospective exclusion was imposed without supporting information.

Demographic information included age, gender, relationship to the patient, duration of caregiving, occupation, and average daily caregiving time. These variables were used primarily to describe the sample rather than as a large set of covariates. This decision preserved analytical parsimony given

the sample size and kept the primary regression aligned with the stated hypotheses.

Perceived stress was assessed using the 10-item Perceived Stress Scale (PSS-10; Cohen et al., 1983). The scale is intended to assess the degree to which circumstances are appraised as stressful. Items were scored from 0 to 4. In accordance with the administered scoring plan, items 4, 5, 7, and 8 were reverse scored before summing the items. Possible total scores ranged from 0 to 40, with higher scores indicating greater perceived stress. For descriptive presentation, scores were also classified as low (0–13), moderate (14–26), and high (27–40). These categories were used descriptively and were not interpreted as psychiatric diagnoses.

Anxiety was assessed with the 10-item anxiety section actually administered in the survey. Items were scored from 1 to 4, with items 1, 4, 7, and 9 reverse scored before calculation of the total. Possible scores ranged from 10 to 40, with higher values indicating greater anxiety. The research synopsis had referred to a 40-item State-Trait Anxiety Inventory, whereas the administered questionnaire and dataset contained only 10 anxiety items. For methodological accuracy, the present manuscript therefore refers to the “administered 10-item anxiety measure” and does not claim that the full standard STAI was administered. Internal consistency in this sample was high, but reliability does not establish equivalence with a validated STAI form.

Coping was assessed using 28 administered items based on the study questionnaire's Brief COPE scoring framework. The Brief COPE was developed to measure multiple coping responses (Carver, 1997). In the present dataset, items were scored from 1 to 4 and combined according to the questionnaire-defined groupings: problem-focused coping (items 1–4), emotion-focused coping (items 5–10), avoidant coping (items 11–15), and an additional coping composite (items 16–28). An overall coping total was calculated from all 28 items. Because these broad groupings reflect the scoring structure supplied with the

study rather than an independently validated factor structure in this sample, they are described as study-defined composites. Raw totals across domains were not directly compared as frequency indicators because the domains contained different numbers of items.

Data preparation preserved the original item responses and created derived variables separately. Participant identifiers were checked for duplication, item values were checked against allowable ranges, missingness was reviewed, designated items were reverse scored, and composite variables were calculated from the verified responses. No missing scale responses, duplicate identifiers, or out-of-range values were identified. Response-pattern screening did not identify a case meeting the predefined exclusion logic. All 64 records were therefore retained. Cases were not removed merely because they had high or unusual psychological scores.

Internal consistency was evaluated with Cronbach's alpha. The resulting coefficients were .896 for perceived stress, .919 for anxiety, .817 for problem-focused coping, .933 for emotion-focused coping, .840 for avoidant coping, .867 for additional coping, and .845 for overall coping. These coefficients support consistency of the calculated scores in this sample, but they do not by themselves demonstrate construct validity or unidimensionality. This qualification is particularly relevant to the study-defined coping composites and the 10-item anxiety measure.

Categorical variables were summarized with frequencies and percentages. Continuous variables were summarized using means, standard deviations, medians, ranges, and distributional information. Pearson's product-moment correlation was the primary statistic for linear associations among the principal scores. Spearman's rank correlation was examined as a sensitivity analysis to determine whether the central conclusions depended strongly on parametric assumptions or individual score spacing. Fisher-transformed confidence intervals were used for Pearson correlations.

The prespecified hypothesis tests focused on perceived stress, anxiety, and the overall coping total. Secondary analyses examined the four coping domains. Because stress and anxiety were each correlated with five coping outcomes, Holm correction was applied across the resulting 10 tests to control the family-wise error rate. This approach was selected instead of interpreting each unadjusted p value independently. Domain associations that did not remain significant after correction were treated as exploratory signals rather than confirmed findings.

Multiple linear regression was used to examine the joint association of perceived stress and anxiety with coping. The primary model predicted overall coping. Secondary models were examined for coping domains to clarify the pattern observed in the correlations. Model evaluation included R^2 , adjusted R^2 , the model F test, unstandardized and standardized coefficients, and coefficient p values. Because perceived stress and anxiety were strongly correlated, variance inflation factors were inspected; values of approximately 2.17 did not indicate severe multicollinearity.

Regression diagnostics included residual normality, heteroscedasticity, Durbin-Watson statistics, leverage, and Cook's distance. The overall-coping model did not show a major diagnostic concern. The avoidant-coping model showed evidence of non-normal residuals and heteroscedasticity. HC3 heteroscedasticity-consistent standard errors were therefore used as a robustness check for that model. Robust inference was used to test whether the conclusion changed when conventional standard-error assumptions were relaxed, not to select whichever result was more favorable.

Statistical significance was evaluated at $\alpha = .05$, but interpretation emphasized effect magnitude, confidence intervals, multiplicity, and consistency across analyses. A nonsignificant finding was not treated as proof of no relationship, and a significant p value was not treated as evidence of clinical importance or causality. This

approach was particularly important for a sample of 64, where precision is more limited than in large probability samples.

The study was conducted with attention to voluntary participation, informed consent, confidentiality, privacy, and respect for participants. Respondents were informed about the purpose and nature of the study and participated voluntarily. Data were analyzed and reported in aggregate form. Because questions about caregiving, stress, and anxiety can be personally sensitive, scores were interpreted as research measures rather than clinical diagnoses. The manuscript does not infer an institutional ethics approval number or other formal approval detail that is not documented in the supplied dissertation materials.

III. RESULTS

All 64 records were retained in the analytical sample. Participants had a mean age of 41.61 years ($SD = 10.64$), with a range from 19 to 63 years. Women represented 59.4% of the sample and men 40.6%. Spouses were the largest caregiver group (43.8%), followed by children (34.4%), siblings (15.6%), and parents (6.3%). Caregiving was generally sustained rather than brief: 29.7% had provided care for more than five years, 26.6% for three to five years, and 34.4% for one to three years. Daily caregiving time was most commonly two to five hours (42.2%), followed by five to ten hours (32.8%). These distributions indicate substantial variation in relationship, duration, and time commitment within the sample.

Perceived stress had a mean of 20.66 ($SD = 7.17$), median of 22, and observed range of 6 to 37. Thirteen caregivers (20.3%) were classified in the low perceived-stress category, 38 (59.4%) in the moderate category, and 13 (20.3%) in the high category. Thus, 79.7% of participants fell within the moderate-or-high descriptive categories. The administered 10-item anxiety measure had a mean of 24.69 ($SD = 6.66$), median of 26, and range of 10 to 40.

The study-defined problem-focused coping score averaged 10.45 (SD = 2.64), emotion-focused coping 16.11 (SD = 4.85), avoidant coping 9.69 (SD = 3.73), and additional coping 37.84 (SD = 7.21). The overall coping total averaged 74.09 (SD = 11.12), with a median of 74.5 and range of 41 to 95. Because domain lengths differed, these raw means do not indicate that one coping domain was necessarily used more frequently than another.

Internal consistency was good to excellent across the calculated measures. Cronbach's alpha was .896 for perceived stress and .919 for anxiety. Coping-domain coefficients ranged from .817 to .933, and the overall coping total had an alpha of .845. These estimates support the reproducibility of the scores within the observed sample. They do not resolve the separate questions of the exact provenance of the anxiety short form or the construct validity of the study-defined coping groupings.

The first primary hypothesis concerned the relationship between perceived stress and anxiety. Pearson correlation showed a strong positive association, $r = .734$, $p < .001$, 95% CI [.596, .830]. The corresponding Spearman correlation was also strong and positive, $\rho = .699$, $p < .001$. The convergence of the two estimates indicates that the result did not depend on a single correlation metric. H01 was therefore rejected: caregivers who reported greater perceived stress also tended to report greater anxiety.

The second and third primary hypotheses concerned overall coping. Perceived stress was essentially unrelated to the overall coping total, $r = -.066$, $p = .606$, 95% CI [-.307, .183]. Anxiety showed a nearly identical relationship with overall coping, $r = -.065$, $p = .608$, 95% CI [-.306, .183]. The corresponding rank-based analyses also did not indicate meaningful overall relationships. H02 and H03 were therefore not rejected. In hypothesis-testing terms, the data did not provide sufficient evidence against the null hypotheses for overall

coping; this does not establish that the true population associations are exactly zero.

The domain-level analyses revealed a different pattern. Perceived stress was negatively correlated with problem-focused coping, $r = -.317$, $p = .011$, and positively correlated with avoidant coping, $r = .544$, $p < .001$. Its relationships with emotion-focused coping, $r = -.033$, $p = .798$, and additional coping, $r = -.245$, $p = .051$, were not statistically significant at the conventional threshold. Anxiety was negatively correlated with problem-focused coping, $r = -.287$, $p = .022$, and positively correlated with avoidant coping, $r = .447$, $p < .001$. Anxiety was not significantly related to emotion-focused coping, $r = -.061$, $p = .630$, or additional coping, $r = -.186$, $p = .141$.

Multiplicity correction materially changed the interpretation of the problem-focused findings. After Holm adjustment across the 10 stress/anxiety-by-coping tests, only the stress-avoidant and anxiety-avoidant relationships remained statistically significant. The adjusted p value for stress with problem-focused coping was approximately .086, and the adjusted p value for anxiety with problem-focused coping was approximately .152. The stress-avoidant association remained significant at adjusted $p < .001$, and the anxiety-avoidant association remained significant at approximately adjusted $p = .002$. The problem-focused correlations are therefore reported as nominal or exploratory findings rather than confirmed associations.

Spearman sensitivity analyses supported the principal domain result. Perceived stress was positively associated with avoidant coping, $\rho = .547$, $p < .001$, and anxiety was positively associated with avoidant coping, $\rho = .438$, $p < .001$. This consistency is important because avoidant coping had a positively skewed distribution and the subsequent regression model showed assumption concerns. The rank-based results indicate that the association was not solely an artifact of ordinary Pearson assumptions.

The primary multiple regression model predicted overall coping from perceived stress and anxiety. The model explained approximately 0.5% of the variance, $R^2 = .005$, adjusted $R^2 = -.028$, $F(2, 61) = 0.15$, $p = .859$. Neither perceived stress (B approximately $-.060$, standardized beta = $-.038$, $p = .839$) nor anxiety (B approximately $-.062$, standardized beta = $-.037$, $p = .844$) contributed significant unique variance. H04 was therefore not rejected. The negative adjusted R^2 reinforces the conclusion that the two-predictor model offered no meaningful improvement over an intercept-only description of overall coping in this sample.

Secondary regressions were examined to understand the domain-level pattern. The avoidant-coping model was the only model with a substantial explanatory result. Perceived stress and anxiety jointly explained 30.1% of the variance in avoidant coping, $R^2 = .301$, adjusted $R^2 = .278$, $F(2, 61)$ approximately 13.11, $p < .001$. In the conventional ordinary least-squares model, perceived stress had a positive unique coefficient (B approximately $.243$, standardized beta = $.467$, $p = .004$), whereas anxiety did not contribute significant unique variance (B approximately $.058$, standardized beta = $.104$, $p = .510$).

Diagnostics for the avoidant model indicated non-normal residuals and heteroscedasticity, so HC3 robust inference was examined. The perceived-stress coefficient remained statistically significant under HC3, p approximately $.002$, with a robust 95% confidence interval of approximately $[.091, .395]$. Anxiety remained nonsignificant under robust inference. Variance inflation factors of approximately 2.17 for stress and anxiety indicated shared predictor variance but not severe multicollinearity. Cook's distances did not suggest that the model was determined by a single extreme influential observation.

The other coping-domain regression models did not provide a comparably robust explanatory pattern. Although the problem-focused model reflected the negative bivariate tendencies, neither stress nor anxiety showed a significant unique coefficient once both were entered

together, and the nominal correlations did not survive Holm correction. Emotion-focused and additional coping models were nonsignificant. These results reinforce the distinction between the broad coping total and the avoidant domain.

Taken together, the hypothesis tests show a clear hierarchy of evidence. The strongest primary result was the positive stress-anxiety relationship. The primary relationships of stress and anxiety with overall coping were unsupported, as was the primary regression predicting overall coping. The strongest secondary result involved avoidant coping: both stress and anxiety were positively associated with avoidance after multiplicity correction, and perceived stress retained a unique association in a robust exploratory regression. This hierarchy was used to guide the discussion rather than giving equal weight to every nominal p value.

Table 1. *Participant Characteristics (N = 64)*

Characteristic	Category	n	%
Gender	Male	26	40.6
	Female	38	59.4
Relationship	Spouse	28	43.8
	Child	22	34.4
	Sibling	10	15.6
	Parent	4	6.3
Caregiving duration	< 1 year	6	9.4
	1–3 years	22	34.4
	3–5 years	17	26.6
	> 5 years	19	29.7
Daily caregiving	< 2 hours	10	15.6
	2–5 hours	27	42.2
	5–10 hours	21	32.8
	> 10 hours	6	9.4

Note. Mean age = 41.61 years ($SD = 10.64$; range = 19–63). Percentages may differ slightly from 100 because of rounding.

Table 2. *Descriptive Statistics and Internal Consistency*

Measure	M	SD	Median	Range	α
PSS-10	20.66	7.17	22	6–37	.896

10-item anxiety measure	24.69	6.66	26	10–40	.919
Problem-focused coping	10.45	2.64	10	4–16	.817
Emotion-focused coping	16.11	4.85	16.5	6–24	.933
Avoidant coping	9.69	3.73	8.5	5–19	.840
Additional coping	37.84	7.21	39	18–49	.867
Overall coping	74.09	11.12	74.5	41–95	.845

Note. Anxiety refers to the 10-item measure actually administered. Coping domains are study-defined composites.

Table 3. Correlations of Stress and Anxiety With Coping Outcomes

Outcome	Stress <i>r</i>	<i>p</i>	Anxiety <i>r</i>	<i>p</i>
Problem-focused	-.317	.011	-.287	.022
Emotion-focused	-.033	.798	-.061	.630
Avoidant	.544	< .001	.447	< .001
Additional	-.245	.051	-.186	.141
Overall	-.066	.606	-.065	.608

Note. Holm correction was applied across the 10 stress/anxiety-by-coping tests. Only the two avoidant-coping associations remained significant after correction.

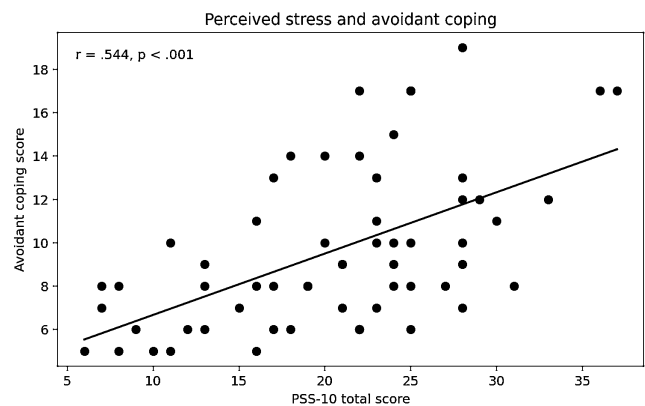
Table 4. Multiple Regression Results for Overall and Avoidant Coping

Outcome predictor	<i>B</i>	β	<i>p</i>	Model <i>R</i> ²
Overall coping				.005
Perceived stress	-.060	-.038	.839	
Anxiety	-.062	-.037	.844	
Avoidant coping				.301

Perceived stress	.243	.467	.004	
Anxiety	.058	.104	.510	

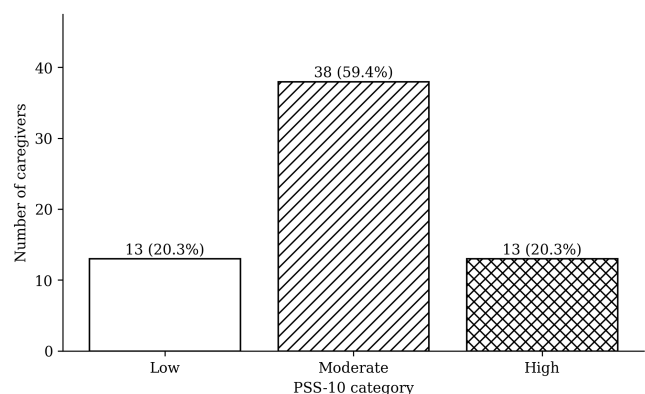
Note. Overall coping: $F(2, 61) = 0.15$, $p = .859$. Avoidant coping: $F(2, 61) \approx 13.11$, $p < .001$. For the avoidant model, HC3 robust inference retained the perceived-stress coefficient ($p \approx .002$); anxiety remained nonsignificant.

Figure 2. Relationship Between Perceived Stress and Avoidant Coping



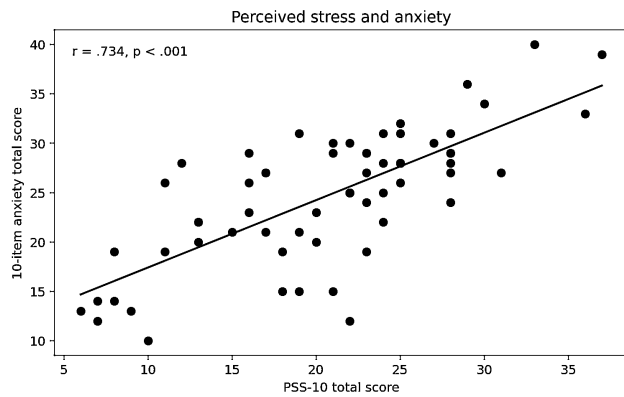
Note. Higher perceived stress was associated with greater avoidant coping, $r = .544$, $p < .001$. The association remained significant after Holm correction.

Figure 3. Distribution of Perceived Stress Levels Among Family Caregivers



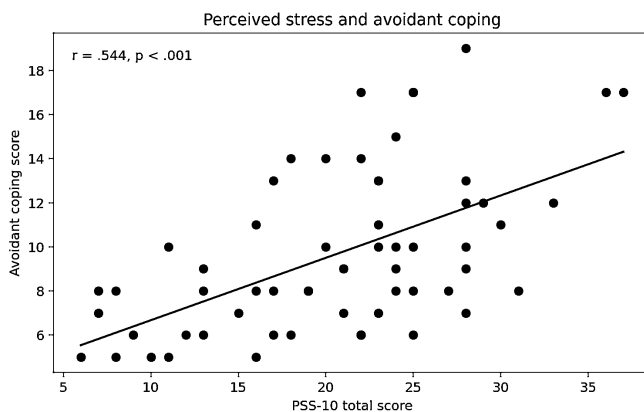
Note. Stress categories used in the dissertation were low = 0–13, moderate = 14–26, and high = 27–40. Categories are descriptive and are not psychiatric diagnoses.

Figure 4. Relationship Between Perceived Stress and Anxiety



Note. The positive pattern corresponds to Pearson $r = .734$, $p < .001$. The association is cross-sectional and should not be interpreted as evidence that perceived stress causes anxiety or vice versa.

Figure 5. Relationship Between Perceived Stress and Avoidant Coping



Note. Perceived stress was positively associated with avoidant coping, $r = .544$, $p < .001$; the association remained significant after Holm correction.

Table 5. Summary of Hypothesis Decisions

Hypothesis	Key statistical result	Decision
H01: No significant relationship between stress and anxiety	$r = .734$, $p < .001$	Rejected
H02: No significant relationship between stress and overall coping	$r = -.066$, $p = .606$	Not rejected
H03: No significant relationship between anxiety and overall coping	$r = -.065$, $p = .608$	Not rejected

H04: Stress and anxiety do not significantly predict overall coping	$R^2 = .005$; $F(2, 61) = 0.15$; $p = .859$	Not rejected
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Note. Hypothesis decisions refer to the prespecified overall outcomes. “Not rejected” indicates insufficient evidence against the null hypothesis and does not establish that the null hypothesis is true.

IV. DISCUSSION

The study examined perceived stress, anxiety, and coping among 64 family caregivers of patients with diabetes. Three findings organize the interpretation. First, perceived stress and anxiety were strongly related. Second, neither distress measure was meaningfully associated with the overall coping total. Third, avoidant coping showed the clearest strategy-specific relationship with distress, surviving correction for multiple testing and sensitivity analysis. These results suggest that the psychological relevance of coping in this sample depended more on the type of coping response than on the total number or amount of coping responses endorsed.

The strong association between perceived stress and anxiety is consistent with an appraisal-based account of caregiver distress. Caregivers who perceived circumstances as more overwhelming, unpredictable, or difficult to control also tended to report greater anxiety. This does not mean that the constructs are interchangeable. The correlation of .734 indicates substantial shared variance while leaving meaningful variance unique to each measure. Conceptually, perceived stress describes appraisal of demands, whereas anxiety captures apprehensive emotional responding. The observed relationship therefore fits the transactional model without collapsing the constructs into a single dimension (Lazarus & Folkman, 1984).

The finding also aligns with broader caregiver evidence linking subjective burden and anxiety. Del-Pino-Casado, Priego-Cubero, López-Martínez, and Orgeta (2021) reported a large positive meta-

analytic association between subjective caregiver burden and anxiety symptoms across informal caregiver populations. Burden and perceived stress are not identical constructs, so direct equivalence would be inappropriate, but both involve the subjective experience of caregiving demands. The present result adds a diabetes-caregiving example to the broader observation that appraisal-related strain and anxious symptoms often co-occur.

The descriptive stress distribution provides additional context. Nearly four in five participants fell within the moderate-or-high PSS categories used in the study. This does not establish a population prevalence and should not be interpreted diagnostically. The sample was recruited by convenience, and PSS categories describe perceived stress rather than psychiatric disorder. Nevertheless, the distribution indicates that elevated subjective strain was common among the participating caregivers and supports attention to caregiver well-being in diabetes care.

The null results for overall coping are equally important. Perceived stress and anxiety each correlated approximately $-.07$ with the overall coping total, and the two-predictor regression explained only about 0.5% of total-coping variance. These are not merely nonsignificant results hovering around a conventional threshold; the observed relationships were close to zero. The findings therefore provide little evidence that more distressed caregivers simply “cope less” or “cope more” when coping is represented as one broad sum.

A conceptual explanation is that total coping combines responses with different psychological functions. A caregiver can simultaneously seek information, accept an uncontrollable circumstance, obtain emotional support, distract from distress, and disengage from a difficult problem. Summing these behaviors can produce similar total scores for caregivers whose coping profiles are psychologically very different. Carver's (1997) multidimensional approach to coping is compatible with this interpretation. The present

data illustrate why strategy-level information can be lost when heterogeneous coping responses are combined.

The avoidant-coping results make this point particularly clear. Perceived stress showed a moderate positive association with avoidance, and anxiety showed a somewhat smaller but still substantial positive association. Both survived Holm correction, and both were supported by Spearman correlations. Thus, the pattern was not dependent on uncorrected multiple testing or on a single parametric correlation. In the exploratory regression, perceived stress retained a unique positive association with avoidance after anxiety was included, and this conclusion persisted with HC3 robust standard errors.

The robust regression finding requires careful interpretation. Stress and anxiety were strongly correlated, so their regression coefficients represent unique statistical associations after accounting for shared variance. Anxiety's nonsignificant unique coefficient does not mean anxiety is unrelated to avoidance; its bivariate correlation with avoidance was significant and survived multiplicity correction. Rather, once perceived stress and anxiety were entered together, perceived stress accounted for the clearer unique component. Because the predictors overlap substantially and the sample is modest, the coefficient difference should not be converted into a strong claim that stress is intrinsically more important than anxiety.

The avoidant-coping model also remains exploratory. The primary regression concerned overall coping, and that model was nonsignificant. The domain analyses were secondary and were subjected to multiplicity correction. Although the avoidant model explained 30.1% of variance and the stress coefficient survived robust inference, the model had residual non-normality and heteroscedasticity. HC3 inference strengthens confidence that the association is not merely a conventional-standard-error artifact, but it does not transform a secondary cross-sectional model into confirmatory causal evidence.

The direction of the stress-avoidance relationship cannot be determined. One possibility is that caregivers who perceive greater demands disengage, deny, or avoid as a response to overload. Another is that persistent avoidance leaves practical problems unresolved and thereby contributes to continuing stress. A third is that both are influenced by unmeasured circumstances such as financial difficulty, patient complications, family conflict, poor access to services, limited knowledge, or caregiver health. The transactional model explicitly allows reciprocal influence between appraisal and coping over time (Lazarus & Folkman, 1984).

Longitudinal caregiver evidence reinforces the need for this caution. Del-Pino-Casado et al. (2019) found that specific coping responses had different prospective relationships with distress: positive reframing and self-distraction were associated with lower later distress, while denial and substance use were associated with higher distress. These findings show that even responses sometimes placed under broad labels such as “avoidance” can have different functions. The present study's avoidant composite therefore identifies an associated pattern, not a universal rule that every form of temporary disengagement is harmful.

Similarly, the unadjusted negative correlations involving problem-focused coping should not be overstated. Both stress and anxiety were nominally associated with lower problem-focused coping, but neither relationship survived Holm correction. This means the data are compatible with a potentially meaningful negative tendency, yet the evidence was not strong enough to distinguish it confidently from chance across the family of tests. Treating these findings as exploratory preserves the distinction between suggestive and robust evidence.

The absence of significant relationships with emotion-focused coping should also not be interpreted as evidence that emotional coping is irrelevant. Emotion-focused responses can include

acceptance, emotional support, reframing, spiritual coping, or expression of feelings, and their usefulness may depend on whether the stressor can be changed. Chronic illness contains both controllable and uncontrollable elements. A caregiver may need active planning for medication organization while relying on acceptance or emotional support for uncertainty that cannot be eliminated. A broad cross-sectional composite may therefore show little simple correlation with distress even when individual strategies are useful in specific situations.

The broader caregiver literature supports contextual interpretation rather than a rigid hierarchy of “good” and “bad” coping. Muñoz-Cruz et al. (2024) found that anxiety was associated with dysfunctional coping in family carers, while relationships involving other coping dimensions varied. Del-Pino-Casado et al. (2018) showed that social support is inversely related to subjective caregiver burden. Together, these findings suggest that coping takes place within a resource environment. A response that appears avoidant on a questionnaire may sometimes reflect exhaustion, lack of information, family conflict, financial constraints, or limited access to care rather than a stable personal tendency.

This contextual point is important for diabetes. Much of diabetes care requires repeated action but not necessarily continuous physical assistance. Caregivers may participate in food preparation, medication reminders, appointments, monitoring, and responses to symptoms while also managing employment, household responsibilities, and other family roles. Rintala et al. (2013) emphasized the reciprocal influence between family life and adult diabetes self-management. Psychological support for caregivers should therefore be integrated with practical clarity about roles and disease management rather than treating distress as an isolated individual deficit.

The results have implications for assessment. Diabetes services that involve family members could include brief, proportionate enquiry about caregiver strain, persistent worry, sleep

disruption, overload, and coping responses. Such enquiry need not turn every family interaction into a mental-health assessment. Its purpose would be to recognize when a caregiver's role is becoming difficult to sustain and to identify whether information, role clarification, respite, family support, or professional psychological assessment may be appropriate.

The findings do not support using the study scores as diagnostic thresholds. The PSS categories provide descriptive context, while the supplied materials do not establish a validated diagnostic cutoff for the administered 10-item anxiety measure. A caregiver with a lower research score may still experience clinically important difficulty, and a higher score does not by itself establish a disorder. Clinical decisions require assessment of symptoms, duration, impairment, safety, medical context, and personal circumstances beyond the survey totals.

Support should also be strategy-sensitive. Asking only whether a caregiver is “coping” may conceal important differences. When persistent avoidance is present, the relevant question is what function it serves. If it reflects uncertainty about diabetes management, targeted education may help. If it reflects exhaustion, redistribution of tasks or respite may be more relevant. If it reflects severe anxiety or functional impairment, psychological assessment may be indicated. Interventions should address the conditions surrounding the coping response rather than treating avoidance as a character flaw.

Family-inclusive diabetes education may be useful when the patient agrees to caregiver involvement. Clear explanations of medication routines, warning signs, follow-up requirements, and realistic expectations can reduce ambiguity. Consistent information from healthcare professionals may also reduce situations in which relatives feel responsible for outcomes without having adequate knowledge or authority. This systemic implication is consistent with the transactional view that stress reflects the balance

between demands and resources, not simply the presence of demands.

At the same time, family participation should not become coercive. The person with diabetes retains autonomy, and caregiver involvement should be collaborative. Excessive responsibility can itself become a source of strain, particularly when family members feel accountable for adherence or outcomes that remain partly outside their control. Caregiver support and patient-centered care are therefore complementary when roles are negotiated clearly.

The study's Indian context should be interpreted cautiously. Family responsibility can carry strong cultural expectations, but India is highly diverse in family structure, socioeconomic resources, gender roles, healthcare access, and regional practices. The convenience sample cannot represent this diversity. Women comprised 59.4% of participants, but the study was not powered to determine whether women experience greater stress or different coping after accounting for employment, relationship, care intensity, and household support. Larger stratified studies are needed before drawing subgroup conclusions.

Caregiving duration also deserves further study. Long exposure may accumulate strain, but experience can simultaneously increase confidence and routine. Likewise, daily hours do not capture night-time vigilance, decision-making responsibility, financial management, emotional monitoring, or the unpredictability of complications. Future studies should measure caregiving intensity multidimensionally rather than relying only on time categories.

Several measurement limitations affect the interpretation. The most important is the discrepancy between the synopsis, which referred to the 40-item STAI, and the 10-item anxiety section actually administered. The present manuscript addresses this by reporting the measure descriptively rather than presenting it as the standard full STAI. High internal consistency in this sample is encouraging but cannot establish

the short form's provenance, factorial validity, or equivalence to the standard instrument. Before journal publication, documentation of the exact source and validation of the administered anxiety items would materially strengthen the measurement argument.

The coping structure also requires caution. The administered survey included 28 coping items, but the broad problem-focused, emotion-focused, avoidant, and additional groupings were defined by the study questionnaire. They should not automatically be equated with canonical Brief COPE subscales. Cronbach's alpha indicates internal consistency within the calculated composites, not proof that the grouping represents the optimal factor structure. With 64 participants, a new 28-item factor analysis would be too unstable to resolve the issue convincingly. Future work should use a prespecified validated scoring model and a sample large enough for psychometric evaluation where necessary.

Sampling is another limitation. Convenience recruitment means inclusion probabilities are unknown and may favor caregivers who were accessible, willing, or sufficiently available to complete a survey. The findings therefore cannot be interpreted as prevalence estimates. The achieved N of 64 is reasonable for descriptive analyses, correlations, and a parsimonious two-predictor regression, but it limits precision and discourages extensive subgroup testing or complex multivariable modeling.

The cross-sectional design is the central limitation for causal interpretation. Stress, anxiety, and coping were measured at one time point. Regression terminology such as "predictor" refers only to statistical prediction within the observed dataset. It does not demonstrate that stress preceded avoidant coping. Longitudinal designs could examine whether stress predicts later avoidance, avoidance predicts later stress, or reciprocal pathways are present. Repeated assessment around treatment changes or complications could also distinguish stable

caregiver characteristics from temporary responses to disease events.

Self-report measurement introduces additional uncertainty. Responses can be influenced by current mood, memory, social desirability, cultural expectations, and interpretation of item wording. Caregivers who view family care as an obligation may understate strain, while those experiencing an acute difficult period may report higher distress than their longer-term average. Combining self-report with contextual measures, clinical interviews where appropriate, or repeated assessments would provide a richer account.

An eligibility-recording limitation should also be retained transparently. The planned criterion required at least six months of caregiving, but the recorded category "less than 1 year" does not permit verification of that threshold for six respondents. Excluding those cases would require inventing information not present in the dataset, so they were retained. Future surveys should record caregiving duration in months or use categories aligned exactly with eligibility criteria.

Despite these limitations, the study has several methodological strengths. The complete dataset was audited before analysis; no missing scale responses, duplicate identifiers, or out-of-range values were identified; and all valid cases were retained. Reverse scoring and composite construction were documented rather than applied opaquely. Primary hypotheses were distinguished from secondary domain analyses, and Holm correction was used to reduce false-positive emphasis across multiple coping tests.

The analysis also used sensitivity and diagnostic procedures proportionate to the data. Spearman correlations supported the principal bivariate findings, and regression diagnostics identified assumption concerns in the avoidant model. HC3 robust inference was then used to determine whether the key coefficient remained supported without relying on homoscedastic conventional standard errors. Importantly, the robust procedure did not create the association; it tested

the stability of an already identified exploratory model.

A further strength is the retention of null findings. The overall coping hypotheses were not supported, and the manuscript does not replace them with the more interesting avoidant-coping result. Instead, the domain finding is presented as a refinement: a broad coping total can be uninformative even when one coping pattern is meaningfully related to distress. This distinction reduces selective reporting and provides a more credible account of the evidence.

Future research should build on this strategy-specific approach. Larger multi-site samples could estimate associations more precisely and examine whether patterns vary by gender, relationship to the patient, socioeconomic circumstances, disease severity, or caregiving intensity. Longitudinal designs should measure stress, anxiety, coping, social support, caregiver burden, family functioning, and patient-related demands at repeated time points. Such designs could test reciprocal pathways and identify periods when caregivers are most vulnerable.

Intervention research is also warranted, but it should be informed by mechanism. Recent systematic evidence indicates that psychological interventions for families affected by type 1 diabetes can influence caregiver outcomes, although heterogeneity and risk-of-bias concerns remain (Wakelin et al., 2025). For adult diabetes caregiving, interventions might combine disease-management education, role clarification, problem solving, support mobilization, and psychological skills rather than targeting coping labels in isolation. The present study cannot determine which intervention would be effective; it identifies a pattern that can help formulate testable intervention questions.

In summary, the findings support a nuanced account of caregiver psychological adaptation. Perceived stress and anxiety were strongly interconnected, but neither was associated with the overall amount of coping. Avoidant coping was

the domain most consistently related to distress. This pattern is theoretically coherent with transactional stress theory and broadly compatible with caregiver research on dysfunctional coping, yet it remains bounded by the cross-sectional design and measurement limitations. The practical implication is not that caregivers should simply “avoid avoidance,” but that services and researchers should pay closer attention to the strategies caregivers use and the circumstances that make those strategies necessary or persistent.

A stepped approach to caregiver support is consistent with the range of need implied by the data. Some caregivers may require only clear information and acknowledgment of their role. Others may benefit from brief problem-solving support, help mobilizing family resources, or guidance on managing worry. Caregivers with persistent severe distress, functional impairment, or other clinical concerns may require formal mental-health assessment. The present study did not test a stepped-care intervention, so this is a service implication rather than an effectiveness claim.

Future studies should also separate coping frequency from coping effectiveness. A caregiver may report frequent use of a strategy because the caregiving situation is unusually demanding. Cross-sectional correlations can therefore reflect greater need to cope rather than failure of the strategy itself. Repeated measurement could assess whether a strategy is followed by improvement, stability, or worsening in later distress. Such work would provide a stronger basis for intervention than classifying strategies solely from their concurrent correlations.

Dyadic research could extend the present caregiver-only design. Family participation in diabetes management is reciprocal: patient functioning can alter caregiver demands, while caregiver distress and communication may shape the support environment (Rintala et al., 2013). Studies that measure both members of the patient-caregiver dyad could examine whether

caregiver stress relates to patient self-management, family conflict, or perceived support while respecting the autonomy of both participants. This would situate caregiver psychological outcomes within the family system rather than treating them as isolated individual characteristics.

V. CONCLUSION

Family caregiving is an important part of the environment in which diabetes is managed. In this sample of 64 caregivers, perceived stress and anxiety were strongly related, and moderate-to-high perceived stress was common. The study did not support the proposition that psychological distress was associated with a broad total amount of coping. Instead, the most informative coping pattern emerged at the domain level: caregivers reporting greater stress and anxiety also reported greater avoidant coping.

This distinction matters conceptually and practically. Coping is not a single continuum on which more is necessarily better. Different strategies can serve different functions, and a total score can conceal those differences. The present findings therefore support strategy-specific assessment while discouraging simplistic judgments about whether a caregiver is coping adequately. Persistent avoidance may signal overload, uncertainty, constrained resources, or psychological distress and should be understood in context.

The conclusions remain deliberately limited. Convenience sampling prevents broad population generalization, the cross-sectional design prevents causal inference, and the administered anxiety measure and study-defined coping composites require further psychometric clarification. Nevertheless, the transparent handling of these limitations, the preservation of null primary findings, multiplicity correction, and robust sensitivity analyses provide a defensible empirical account of the observed sample.

The central contribution is therefore specific: perceived stress and anxiety were closely

interconnected among the family caregivers studied, while avoidant coping was the coping domain most consistently associated with higher distress. Larger longitudinal research is needed to establish temporal pathways and determine whether caregiver-focused interventions can modify these relationships. Within diabetes care, recognizing the psychological experience of family caregivers can complement patient-centered management by acknowledging the resources required to sustain long-term family involvement.

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