ORIGINAL ARTICLE

Diabetes Distress, Self-Care Behaviors, Quality of Life, and Clinical Encounters as Correlates of Glycemic Control among South Indian Adults with Type 2 Diabetes Mellitus

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Abstract

Objectives: The objective of the study was to investigate how emotional distress, self-management strategies and clinician interactions in glycemic control and quality of life in South Indian adults with Type 2 diabetes using a mixed methods approach. **Methods:** We carried out a sequential exploratory mixed-methods study among 250 adults with Type 2 diabetes attending two tertiary care centers in Chennai, India. The development of a quantitative survey was guided by qualitative interviews with 20 participants. We measured diabetes distress (Diabetes – related distress [DDS]-17), self-care summary of diabetes self-care activities (SDSCA), quality of life EuroQOL-5 dimension- 5 level (EQ-5D-5L) and glycated hemoglobin (HbA1c). Linear and logistic regression were used to identify predictors of HbA1c and quality of life, while qualitative themes helped explain the quantitative associations. **Results:** Mean HbA1c was 8.2 ± 1.5%; HbA1c <7.0% was achieved in 35.2%. The mean DDS-17 was 2.7 ± 0.9, indicating moderate distress. Qualitative data revealed diagnosis as a biographical disruption that shattered social identity around food. Glucose readings were interpreted as moral judgments and produced guilt. Higher DDS-17 was independently linked to elevated HbA1c ($\beta = 0.21$, $P = 0.002$) and lower EQ-5D-5L utility (0.65 vs. 0.81; $P < 0.001$). SDSCA was the strongest predictor, with each additional day/week associated with 0.38% lower HbA1c ($\beta = -0.35$, $P < 0.001$). Participants distinguished transactional metric-driven care from person-centered communication that increased agency. **Conclusion:** Poor glycemic control was driven by diabetes distress, moralized self-management and transactional clinical encounters. Routine distress screening, communication training to demoralize self-monitoring, and peer-support models are needed. Effective diabetes care must take into account the psychological and social architecture of self-management, not simply glucose.

Key words: Clinical encounters, diabetes distress, glycemic control, self-care behaviors, Type 2 diabetes

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a serious public health issue affecting more than 77 million people in India. Despite advances in pharmacotherapy, fewer than 40% of patients achieve the target glycated hemoglobin (HbA1c) <7.0%, underscoring the challenge of optimal glycemic management.[1] Poor control is influenced by biological factors such as duration of disease, obesity, and comorbidities, but psychosocial factors are increasingly recognized as important determinants of diabetes outcomes.

Diabetes distress, a condition separate from clinical depression, is experienced by 18–45% of individuals with Type 2 diabetes globally. In India, social stigma, financial

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constraints, and lack of availability of structured diabetes education may increase the distress levels further. Prior research has shown that greater distress is correlated with poor self-care behaviors, higher HbA1c, and lower health-related quality of life (HRQL).[2] However, there is little evidence from a range of Indian data that is from tertiary hospitals in urban areas. Furthermore, the association of certain microvascular complications, such as neuropathy and nephropathy, with various domains of HRQL, as assessed by the EuroQOL-5 dimension- 5 level (EQ-5D-5L), a tool validated for use in India has been assessed in a few studies.[3]

This study aimed to determine the prevalence and severity of diabetes distress among adults with Type 2 diabetes attending a routine outpatient clinic and to identify independent predictors of glycemic control, including distress, self-care behaviors, and clinical factors. It also investigated the association among diabetes distress, HbA1c, and HRQoL. This study examined links between specific comorbidities and problems with self-care, mobility, and usual activities. Understanding these interrelationships can help formulate integrated care models to satisfy the biological and psychological requirements of individuals living with Type 2 diabetes in India.

METHODS

Study design and settings

We conducted a sequential exploratory mixed-methods study in the outpatient departments (OPDs) of two tertiary care hospitals in Chennai, Tamil Nadu, from January to August 2025. The study involved a descriptive phenomenological qualitative phase followed by a quantitative cross-sectional survey. Findings from the qualitative phase were used to inform the development and contextual interpretation of the quantitative phase. The study was approved ethically by the TVM College of Pharmacy Institutional Ethics Committee (Approval No. TVMCP/IEC/VI PD/2023-24/1077). The study was conducted in accordance with the Declaration of Helsinki. Qualitative components are reported following the consolidated criteria for reporting qualitative research checklist, and quantitative components following the strengthening the reporting of observational studies in epidemiology guidelines for cross-sectional studies.

Qualitative phase

Qualitative phase design and approach

The lived experiences of adults living with T2DM were explored through descriptive phenomenology using Colaizzi's seven-step method.[4]

Participants

Purposive sampling was used to recruit 20 adults aged ≥18 years with T2DM for ≥1 year who were able to communicate in Tamil or English and were willing to discuss diabetes care. The exclusion criteria included severe cognitive impairment, recent hospitalization, or inability to give consent. Recruitment proceeded until data saturation was achieved, defined as no new themes arising in three consecutive interviews.

Data collection

In-depth, semi-structured interviews were carried out in consultation rooms in the hospital or at the participant's home, depending on their preference, from January to August 2025. Written consent was obtained before each interview. All interviews were conducted by the first author, who is trained in qualitative research methods and has no clinical relationship with the participants. The duration of the audio-recorded interviews ranged from 60 to 90 min guided by a pilot-tested interview schedule that covered the experience of diagnosis, daily management, emotional challenges, healthcare interactions, and coping strategies. The interview was developed in English and translated into Tamil using forward-backward translation. During the interview, the field notes were taken to document non-verbal clues.

Data analysis

Interviews were verbatim recorded, and when necessary, they were translated into English. Colaizzi's method was used, which included: familiarization, important claims, the creation of interpretations, the clustering of topics, the development of a thorough description, the explanation of the basic structure, and the validation of the results. Five participants were involved in member checking. NVivo 14 (QSR International, Burlington, MA, USA) was used to manage the data.

Quantitative phase

Design

A cross-sectional survey was conducted from January to August 2025.

Participants and sampling

Consecutive sampling was used to select adult patients with T2DM visiting OPDs during the data collection period. Both the inclusion and exclusion standards were similar to those applied in the qualitative study.

Sample size

To estimate the prevalence of suboptimal glycemic control (HbA1c ≥7.0%) using the formula $n = Z^2P(1-P)/d^2$, assuming a conservative prevalence (P) of 65% based on local data,[5] with a desired precision (d) of 6% at a 95% confidence level (Z = 1.96), the sample size computation as follows; $n = (1.962 \times 0.65 \times 0.35)/0.062 = 243$. Therefore, a sample size of approximately 245 would be required.

To account for an expected respondent rate between 10% and 15%. The target sample size was set at 250 participants. This sample size also gives >80% power to identify a medium effect size ($f^2 = 0.15$) in multiple linear regression analysis involving six independent variables at $\alpha = 0.05$ (G* power 3.1.9.7).

Data collection

Quantitative data Information was gathered using an established questionnaire, which was conducted through in-person interviews conducted by qualified research assistants who were fluent in English and Tamil. The questionnaire had a few focus areas:

Sociodemographic and clinical information

Data regarding age, sex, educational level, duration of type 2 diabetes mellitus (T2DM), and the presence of comorbidities, including hypertension, dyslipidemia, neuropathy, and nephropathy, were collected from the participants.

Glycemic control

HbA1c was taken from the medical records of the patient if measured in the last 3 months. Where unavailable, HbA1c was determined using a point-of-care method (SD Biosensor).[6]

Diabetes self-care

Summary of diabetes self-care activities (SDSCA) scale was used to assess self-management practices throughout the previous 7 days. SDSCA consists of 11 items that relate to general diet, specific diet, exercise, blood glucose testing, foot care, and medication management. These were rated according to frequency in days/week on a scale of 0–7.[7]

Diabetes-related distress (DDS)

The 17-item diabetes distress scale (DDS-17) assessed emotional burden, physician-specific distress, diabetes-related regimen discomfort and interpersonal distress.[8] A six-point Likert scale, ranging from 1 (not a problem) to 6 (a very serious problem), was used by respondents to identify the severity of issues. Points of ≥2.0 and ≥3.0 were indicative of moderate and high distress, respectively.

HRQoL

EQ-5D-5L assessed mobility, self-care, performing usual activities, pain/discomfort, and anxiety/depression, each with five levels of severity. The utilities were estimated based on Indian value sets ranging between <0 (worse than death) and 1 (perfect health).[9] The study instruments, SDSCA, DDS-17, and EQ-5D-5L, were translated into the Tamil language based on a forward and backward method and piloted in a group of 10 participants with T2DM. Regarding internal consistency, all three scales demonstrated satisfactory results, with Cronbach's alpha equal to 0.91 for DDS-17, 0.83 for SDSCA, and 0.87 for EQ-5D-5L.

Data analysis

The quantitative data were statistically analyzed using the IBM Statistical Package for the Social Sciences Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY). For descriptive statistical analysis, the mean and standard deviation were used in calculating the participants' demographic profile for continuous variables, while the frequency and percentages were utilized for categorical variables. For bivariate analysis, an independent samples *t*-test was conducted to assess the mean differences between the two groups. In addition, if there were mean differences to be computed among three or more groups, then a one-way analysis of variance was carried out. In such cases, a *post hoc* Tukey honestly significant difference (HSD) test was also done. On the other hand, the Pearson product-moment correlation coefficient (r) was utilized for measuring the relationships among continuous variables. However, if there were categorical variables involved, then the Chi-square test of independence (χ^2) was used. Afterward, the predictors of HbA1c were identified using multiple linear regression, considering the independent variables with significant correlations from the bivariate analysis or which were considered clinically significant (i.e., age, sex, years with T2DM, body mass index (BMI), SDSCA, and DDS). Multicollinearity was evaluated using variance inflation factors; a value of <5 was acceptable. In addition, a $P < 0.05$ was regarded as statistically significant.

RESULTS

Qualitative analysis

Five themes were identified that elucidate the actual experience of the T2DM patients through analysis of 20 interviews. Pseudonyms are used to give exemplar quotes.

Theme 1: The weight of the diagnosis: A shattered normalcy

This theme describes the diagnosis as a "bombshell" causing loss of dietary and social freedom.

- P4: "When the doctor told me, "You have diabetes," it was just like a bombshell" (Male, 58 years)
- P12: Now every meal demands some careful considerations. It is not about food, but the pleasure associated with it has gone (Female, 64 years).

Theme 2: The relentless choreography of self-management

Guilt and hypervigilance were brought by self-monitoring and dietary compliance.

- P9: Whenever I measure my blood glucose with a glucometer, if it is high, I feel guilty and inadequate (Female, 39 years)

- P2: "Is there any sugar in this? This totally detracts from the enjoyment of eating" (Male, 55 years).

Theme 3: Navigating the emotional landscape

Isolation results from social miscommunication and fear of complications.

- P6: I witness older people losing their vision and having their legs amputated. I feel goosebumps whenever my toes hurt (Male,70 years)
- P3: Everyone is telling me to control my blood sugar, but they are unaware of the intricacy (Female, 42 years).

Theme 4: The paradox of professional support

Participants were empowered by compassionate, team-based care; disengagement was increased by metrics-only care.

- P8: She discusses what would be most effective for me. She appears to be an ally (Female, 59 years)
- P1: Doctors tell me to try harder after looking at the statistics, but they wouldn't enquire about my lifestyle (Male, 63 years).

Theme 5: Adapting and searching for a new normal

Routines were established by the participants, and seeking peer support.

- P19: There is less oil and more vegetables now in my diet. Compared to earlier dishes, I prefer these (Female, 60 years)
- P20: I have accepted the terms now. Presently, I want to live a contented life and spend time with my grandchildren (Male,72 years).

Quantitative analysis

Sociodemographic and clinical characteristics

The average age was 58.3 ± 9.7 years, and 138 participants were female (55.2%) [Table 1]. The mean duration of T2DM was 8.1 ± 4.2 years with a calculated mean age of 50.2 ± 9.8 years. Mean HbA1c was 8.2 ± 1.5%, and mean BMI was 29.8 ± 4.1 kg/m^2. Hypertension was the most common comorbidity (58.0%), followed by dyslipidemia (44.0%).

Table 1: Baseline sociodemographic and clinical characteristics of participants (*n*=250)

Characteristics value	
Sociodemographic	**Mean±SD**
Age (years)	58.3±9.7
Sex	*n* (%)
Male	112 (44.8)
Female	138 (55.2)
Education level (years), Mean±SD	10.5±3.1
Clinical	
Duration of T2DM (years)	8.1±4.2
Average age at T2DM diagnosis (years)	50.2±9.8
HbA1c (%)	8.2±1.5
Fasting plasma glucose (mg/dL)	165.2±45.8
BMI (kg/m^2)	29.8±4.1
Comorbidities	*n* (%)
Hypertension	145 (58.0)
Dyslipidemia	110 (44.0)
Neuropathy	75 (30.0)
Nephropathy	30 (12.0)

SD: Standard deviation, T2DM: Type 2 diabetes mellitus, HbA1c: Glycated hemoglobin, BMI: Body mass index

Table 2: Glycemic control and related factors among Type 2 diabetes mellitus patients (*n*=250)

Factors	Result
Mean HbA1c (%)	8.2±1.5
Participants achieving target HbA1c (<7.0%)	88 (35.2)
Duration of T2DM (years)	r=0.32, *P*<0.001
HbA1c by sex	
Male, mean±SD	8.1±1.4
Female, mean±SD	8.3±1.6
Independent *t*- test	*P*=0.21

SD: Standard deviation, T2DM: Type 2 diabetes mellitus, HbA1c: Glycated hemoglobin

Glycemic control (HbA1c levels)

The average HbA1c level of the study participants was 8.2 ± 1.5% [Table 2]. Only 35.2% (n = 88) of the participants had HbA1c <7.0%. Longer duration of T2DM was weakly correlated with higher HbA1c (r = 0.32, P < 0.001). There were no sex-based differences observed in HbA1c (P = 0.21).

Diabetes self-care activities

The mean SDSCA total score was 5.8 ± 1.2 days/week [Table 3]. Using a cut-off of ≥6 days/week, 118 (47.2%) participants were classified as having high self-care adherence and 132 (52.8 %) as having low adherence.

Association between self- care and glycemic control

Participants with high SDSCA scores (≥6 days/week) had significantly lower mean HbA1c compared with those with lower scores (7.5 ± 1.2% vs. 8.8 ± 1.4%; t = −7.18; P < 0.001; [Table 4]).

Diabetes-related distress (DDS)

The mean DDS score was 2.7 ± 0.9, indicating moderate diabetes distress overall [Table 5]. Based on established cut-offs, scores were categorized as low (<2.0), moderate (2.0–2.9), and high (>3.0). Moderate distress was most common, reported by 120 participants (48.0%).

Association between diabetes distress and glycemic control

Table 6 shows that the mean HbA1c differed significantly across diabetes distress categories ($P < 0.001$). *Post hoc* analysis showed that high distress had higher HbA1c (9.1 ± 1.3%) compared to those with moderate (8.3 ± 1.4%) and low distress (7.4 ± 1.1%).

Health- related quality of life

In Table 7, among the five EQ-5D-5L dimensions, Pain/discomfort is the most commonly reported problem (62.0%), followed by anxiety/depression (52.0%).

Table 3: Summary of diabetes self-care activities score (*n*=250)

Characteristics	Mean±SD
SDSCA total score, days/week	5.8±1.2
SDSCA subscales, days/week	
General diet	4.1±1.4
Specific diet	3.9±1.5
Exercise	2.9±1.6
Blood glucose testing	3.2±1.8
Foot care	4.5±1.5
Medication adherence	5.2±1.1
Self-care adherence category	*n* (%)
High (≥6 days/week)	118 (47.2)
Low (<6 days/week)	132 (52.8)

SD: Standard deviation, SDSCA: Summary of diabetes self-care activities

Table 4: Glycemic control by diabetes self - care adherence level (*n*=250)

SDSCA category	*n*	HbA1c (%) Mean±SD
High (≥6 days/week)	118	7.5±1.2
Low (<6 days/week)	132	8.8±1.4
P-value (t-test)		<0.001 (t=−7.18)

SD: Standard deviation, SDSCA: Summary of diabetes self-care activities, HbA1c: Glycated hemoglobin

Table 5: Levels of diabetes distress among adults with Type 2 diabetes (*n*=250)

DDS level	*n* (%)
Low (<2.0)	80 (32.0)
Moderate (2.0–2.9)	120 (48.0)
High (≥3.0)	50 (20.0)
DDS level score	**Mean±standard deviation**
Overall DDS-17 score	2.7±0.9

Association between diabetes distress and HRQL

Mean EQ-5D-5L index values differed significantly across diabetes distress categories ($P < 0.001$; [Table 8]). *Post hoc* Tukey HSD test showed that participants with high distress had significantly lower EQ-5D-5L index values (0.65 ± 0.12) compared to those with moderate (0.73 ± 0.10) and low distress (0.81 ± 0.09).

Predictors of glycemic control

Multiple linear regression analysis was used to identify independent predictors of HbA1c [Table 9]. Overall, the model was significant, $F = 25.1$, $P < 0.001$, and explained 38.5% of the variance in HbA1c ($R^2 = 0.385$; adjusted $R^2 = 0.370$). Higher self-care scores (SDSCA) were associated with lower HbA1c

Table 6: Glycemic control by diabetes distress level (*n*=250)

DDS level	*n*	HbA1c (%) Mean±SD	*P*-value
Low (<2.0)	80	7.4±1.1	<0.001
Moderate (2.0–2.9)	120	8.3±1.4	
High (≥3.0)	50	9.1±1.3*	

*One-way Analysis of variance: F=32.4, *P*<0.001. *Post hoc* Tukey honestly significant difference: High>Moderate>Low, all *P*<0.05. SD: Standard deviation, HbA1c: Glycated hemoglobin

Table 7: EQ-5D-5L health dimensions and summary score (*n*=250)

Dimension	*n* (%) reporting problems
Mobility	98 (39.2)
Self-care	42 (16.8)
Usual activities	85 (34.0)
Pain/discomfort	155 (62.0)
Anxiety/depression	130 (52.0)
Overall EQ-5D-5L index value (Mean±SD)	0.74±0.11
EQ-VAS, 0–100 (Mean±SD)	68.3±15.2

SD: Standard deviation, EQ-5D-5L: EuroQOL-5 Dimension- 5 level, EQ-VAS: EuroQol Visual Analog Scale

Table 8: EQ-5D-5L index values by diabetes distress level (*n*=250)

DDS level	*n*	EQ-5D-5L index value Mean±SD
Low (<2.0)	80	0.81±0.09
Moderate (2.0–2.9)	120	0.73±0.10
High (≥3.0)	50	0.65±0.12
P-value (ANOVA)		<0.001

ANOVA: Analysis of variance, SD: Standard deviation, EQ-5D-5L: EuroQOL-5 dimension- 5 level

(β = −0.38, P <0.001). Higher diabetes scores (DDS-17) were associated with higher HbA1c (β = 0.25, P = 0.002). After adjustment, long duration of T2DM was associated with lower HbA1c (β = −0.15, P = 0.012). Age, sex, and BMI were not significant independent predictors (P > 0.001).

Relationship between comorbidities and quality of life

The presence of microvascular complications was associated with problems in specific EQ-5D- 5L dimensions [Table 10]. For analysis, each EQ-5D-5L dimension was dichotomized into "no problems" versus "any problems" (Slight, moderate, severe, or extreme). Participants with neuropathy (n = 75) were more likely to report problems with mobility (66.7% vs. 32.6%; χ^2 = 15.8, P < 0.001) and unusual activities (60.0% vs. 34.3%; χ^2 = 10.2, P = 0.001) compared with those without neuropathy (n = 175). Participants with nephropathy (n = 32) were more likely to report problems with self-care (40.6% vs. 18.3%; χ^2 = 8.5, P = 0.004).

DISCUSSION

This sequential exploratory mixed-methods study demonstrates that a cycle of emotional distress, moralized self-management, and transactional clinical encounters is linked to inadequate glycemic control in South Indian individuals with Type 2 diabetes.[10] The average HbA1c was 8.2% ± 1.5%, and only 35.2% of the 250 participants had an HbA1c of <7.0%. This disparity can be explained by our qualitative findings. The diagnosis was perceived as a significant biographical disruption that upended social identity and affiliation, especially with regard to eating habits. Participants described the diagnosis as a "bombshell" that terminated "everything I knew about eating with my family was finished" and reported that "the pleasure associated with food has gone." After controlling for age, sex, BMI, and duration of illness, this disruption was measured by moderate diabetic distress with a mean DDS-17 score of 2.7 ± 0.9, which independently predicted greater HbA1c (β = 0.21, P = 0.002). These results demonstrate that distress is an active driver of glycemic outcomes rather than just a comorbidity and expand the idea of biographical disruption to South Indian contexts.[11]

Moralized self-surveillance is the pathway from distress to glycemia.[12] Participants reported "guilt and inadequacy" when values were high and constant monitoring that "detracts from the enjoyment of eating," viewing glucometer results as moral judgments rather than objective statistics. This explains the strong univariate link between distress and HbA1c (r = 0.52, P < 0.001) and is consistent with the regimen-related distress domain of DDS-17.[13] Even adherent individuals felt defeated by metrics, according to qualitative data, even if self-care was the strongest independent predictor of HbA1c (i.e., a 1-day/week increase in SDSCA score was associated with a 0.38% lower HbA1c; β = −0.35, P < 0.001). Exercise and blood glucose testing mean scores were only 2.9 and 3.2 days/week, respectively. This implies that the very activities that enhance control may be compromised by distress.[14] Self-management education is unlikely to close the treatment gap in the absence of psychological support.[15]

Clinical interactions played a crucial role in either intensifying or reducing this distress. Participants distinguished between relational care, in which providers "appear to be an ally,"

Table 9: Multiple linear regression analysis predicting HbA1c (n=250)

Variable	B	Standard error B	β	t	*P*-value
Constant	10.25	0.81	-	12.65	<0.001*
Age, years	0.05	0.03	0.08	1.52	0.13
Sex, female versus male	0.02	0.05	0.02	0.40	0.69
Duration of T2DM	−0.15	0.06	−0.14	−2.51	0.012*
BMI, Kg/m²	−0.07	0.04	−0.09	−1.75	0.081
SDSCA Score	−0.38	0.07	−0.35	−5.43	<0.001*
DDS-17 Score	0.25	0.08	0.21	3.13	0.002*

*Significant at P<0.05. T2DM: Type 2 diabetes mellitus, SDSCA: Summary of diabetes self-care activities, BMI: Body mass index, HbA1c: Glycated hemoglobin

Table 10: Relationship between comorbidities and quality of life

Comorbidities	EQ-5D-5L dimensions	Problems in group with comorbidities *n* (%)	Problems in group without comorbidities *n* (%)	Chi-square	*P*-value
Neuropathy	Mobility	50/75 (66.7)	57/175 (32.6)	15.8	<0.001*
Neuropathy	Usual activities	45/75 (60.0)	60/175 (34.3)	10.2	0.001*
Nephropathy	Self-Care	13/32 (40.6)	40/218 (18.3)	8.5	0.004*

*Significant at P<0.05. EQ-5D-5L: EuroQOL-5 dimension- 5 level

and transactional care, which focused on "statistics."[16] Disengagement was associated with consultations that focused solely on metrics: "Doctors look at statistics and say try harder, but they don't ask me about my lifestyle or if I can afford the tablets." Person-centered dialogue, on the other hand, boosted agency and motivation. This difference was measured: Participants with high distress reported significantly lower EQ-5D-5L utility values (0.65 ± 0.12) than those with low distress (0.81 ± 0.09; $P < 0.001$), and physician-related distress was a contributing factor to total DDS-17 scores. Pain or discomfort and anxiety were the most prevalent issues with quality of life (62.0% and 52.0%, respectively). According to the results, participation in this environment is influenced by the communication of targets rather than the targets themselves, which is consistent with American Diabetes Association and European Association for the Study of Diabetes recommendations on psychosocial care.[17,18]

This study found a paradoxical link between glycemic control and the duration of diabetes. Longer duration was linked to greater HbA1c in bivariate analysis ($r = 0.32$, $P < 0.001$), but after adjustment, duration became an independent predictor of lower HbA1c ($\beta = -0.14$, $P = 0.012$). Insulin use, a suppressor effect of treatment intensification, and survivorship bias in cross-sectional outpatient samples are probably the causes of this reversal.[19] Participants reported "reconstructing normalcy" over time with the creation of new eating habits and peer networks, reframing the adaptation as "my sugar control," according to a behavioral correlation found in the qualitative data.[20] However, longitudinal investigations are necessary since cross-sectional data cannot differentiate between the escalation of care and the course of the disease.[21,22]

The emotional and functional burden was increased by complications. Mobility issues (66.7% vs. 32.6%; $P < 0.001$), difficulties with usual tasks (60.0% vs. 34.3%; $P = 0.001$), and deficiencies in self-care (40.6% vs. 18.3%; $P = 0.004$) were linked to neuropathy. Participants' anticipatory grief provided meaning for these statistics: "I get goosebumps every time my toes hurt." I believe that's how it begins. The results highlight the importance of complication-specific counseling by demonstrating that anxiety originates from community suffering rather than abstract risk.[23-25]

Three clinical implications for outpatient settings in India are suggested by these integrated results. First, given its independent correlation with both HbA1c and quality of life, the DDS-17 should be routinely used in diabetes clinics to screen for diabetes distress.[26,27] Second, since guilt and shame make it difficult to adhere to the practices that promote glycemic control, communication training is necessary for non-moral self-monitoring and diet.[28] Third, there should be more peer support models. Better habits and higher acceptance were reported by participants who reframed dietary modification as desirable rather than restrictive.[29]

Limitations of the study

This study has several limitations. First, the cross-sectional design does not allow for inferring causality. HbA1c was predicted by diabetes distress alone, but the connection between distress and glycemic control is probably bidirectional and requires long-term research to ascertain temporality. Second, patients were drawn from Chennai's metropolitan tertiary care facilities, which limited their generalis ability to rural populations or primary care settings where sociocultural norms, health literacy, and access to care can differ. Third, recall and social desirability bias can affect self-reported data on self-care habits and comorbidities; however, this bias was probably lessened when the questionnaires were administered by an interviewer. Fourth, we did not gather information on household income, insulin regimen intensity, or objective medication adherence, which could have complicated relationships between distress and glycemic outcomes. Fifth, only Tamil-speaking individuals were included in the qualitative survey, and thematic saturation was attained; opinions from other linguistic and ethnic groups were not sought.

CONCLUSION

Among South Indian adults with Type 2 diabetes, poor glycemic control was largely caused by diabetic distress, moralized self-management, and transactional therapeutic interactions. Both HbA1c and quality of life were independently predicted by distress and self-care, but their effects were mitigated by patients' interpretation of glucose parameters and clinician communication. Glucometer readings and the diagnosis of shattered social identity surrounding food were perceived as moral judgments that compromised adherence. Regular distress assessment and communication training to promote self-monitoring and peer support models are necessary to break the loop. Integrated psychological and relational therapies should be investigated in future studies. In addition to glucose, effective diabetes care must address the social and psychological foundation of self-management.

AUTHOR'S CONTRIBUTION

Helen Williams: Conceptualization, Methodology, Software, Validation, Formal Analysis, Investigation, Resources, Data Curation, Writing – Original Draft Preparation, Reviewing and Editing, Visualization, Project Administration. Srinivasan Ranganathan: Supervised and finalized the manuscript.

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