Nigerian Medical Journal
NIGERIA MEDICAL ASSOCIATION
Print ISSN 0300-1652, E-ISSN 2229-774X

Original Article

Psychological distress, coping methods and self-care among people with diabetes mellitus in Ibadan.

***Lucia Yetunde Ojewale[1], Adesola Adebiyi[2], Chika Ekelaka[3]**

[1]Department of Medical-Surgical Nursing, Faculty of Nursing, University of Ibadan, [2]Lagos State University Teaching Hospital, Lagos, [3]King Fahad Hospital, Al Hofuf, Ministry of Health, Kingdom of Saudi Arabia.

Abstract

Background: Diabetes mellitus (DM) is a chronic metabolic disorder associated with serious complications if poorly controlled. Beyond routine clinical follow-up, people with diabetes (PWD) are required to engage in sustained self-care activities. Fear of complications and the demands of self-management may lead to psychological distress, which can negatively influence coping strategies and adherence to self-care practices. The study aims to determine the level of psychological distress among people with diabetes mellitus and to assess its relationship with coping styles and diabetes self-care activities.

Methodology: This descriptive cross-sectional study was conducted among PWD attending the Medical Outpatients' Clinic of the University College Hospital, Ibadan. Two hundred participants completed a structured questionnaire comprising the Diabetes Distress Scale (DDS), a modified Brief Coping Orientation to Problems Experienced (Brief-COPE), and the Summary of Diabetes Self-Care Activities (SDSCA). Ethical approval was obtained from the institutional review board (UI/EC/24/0064; 21 February 2024). Data were analysed using SPSS version 26, employing descriptive statistics, independent *t*-tests, and chi-square tests, with statistical significance set at $p < 0.05$.

Results: The mean age of respondents was 57.54 ± 10.87 years, with females constituting 51% of participants. Approximately 64% had attained tertiary education. High psychological distress was observed in 38% of respondents. The most commonly reported coping strategies were problem-focused approaches, including taking actions to improve situations and reframing diabetes positively, as well as seeking emotional support. High psychological distress was significantly associated with the use of avoidant coping strategies ($p < 0.001$). A significant association was also found between psychological distress and poor diabetes self-care practices ($p = 0.041$).

Conclusion: Psychological distress is common among people with diabetes and adversely affects coping mechanisms and self-care activities. Integrating routine psychological screening and promoting positive coping strategies within diabetes self-management education may improve overall patient outcomes.

Keywords: Diabetes mellitus, coping, psychological distress, diabetes self-care.

***Correspondence:** Lucia Y. Ojewale. luciayetunde@gmail.com, Department of Medical-Surgical Nursing, Faculty of Nursing, University of Ibadan

How to Cite: Ojewale LY, Adebiyi A, Ekelaka C. Psychological distress, coping methods and self-care among people with diabetes mellitus in Ibadan. Niger Med J 2026; 67 (2): 3212-3222. https://doi.org/10.71480/nmj.v67i2.1140

Quick Response Code:

Introduction

Globally, an estimated 588 million adults aged between 20 and 79 years are currently living with diabetes mellitus (DM), representing 11% of the world's population in this age group, and DM was responsible for up to 3.4 million deaths in 2024.[1] In Africa, an estimated 24.6 million people were living with diabetes in 2024, predicted to increase to 59.5 million by 2050.[1] Africa has the highest proportion of undiagnosed DM cases (72.6%), well above the global average of 42.8%.[1] Again, DM prevalence in adults in sub-Saharan Africa (SSA) is projected to increase from 23.6 million in 2021 to 54.9 million people in 2045. [2]In Nigeria, the crude prevalence of T2DM is 7.0%, which has nearly doubled the 2019 estimate by the International Diabetes Federation of 3.7%, and accounts for a 21.3% surge from the 2019 review.[3]

The complexity of managing DM puts a physical, social and emotional burden on PWD. Emotional/psychological distress could lead to anxiety and depression, affecting the self-care of people with TDM. [4]Moreover, most people who receive a Type 2 DM diagnosis frequently experience psychological issues such as anxiety and depression. [5]These mental health issues have been noted to interfere with both the regulation of blood sugar levels and a patient's capacity to handle their diabetes care, i.e. self-care. [6]

The term "diabetes distress" denotes the emotional strain associated with the ongoing management of diabetes. [7]It has been reported that people with diabetes are twice as likely to develop depression compared to the general population. [8,9]Diabetes distress (DD) varies in different countries and regions of the world. In South Asia, for instance, DD was as high as 85% in Pakistan, with the lowest regional prevalence being 25% in Sri Lanka.[10]Other reported prevalence rates include 13.4% in Egypt, 29.4% in Saudi Arabia and 36% globally.[1113]

Unfortunately, the psychological aspect of diabetes is often underreported and undertreated despite its high prevalence. [14] This is particularly common in resource-limited health settings, resulting in inadequate consideration of its detrimental effects on self-care. [15] Suboptimal self-care for Type 2 diabetes is common and is associated with an increased risk of poor glycaemic control, complications, and mortality.[16] One author noted that an escalation in psychological distress is linked to inferior glycaemic outcomes and suboptimal self-care practices.[17] Further, elevated diabetes-related distress levels have been linked to a lack of adherence to medication and healthy lifestyle recommendations, leading to suboptimal glycaemic control. [18]

Central to the occurrence of DD is the coping mechanism used by PWD, and this could be positive (adaptive) or negative (maladaptive). Positive coping mechanisms are associated with less distress, while the converse happens with a negative method of coping. Some adaptive and popular strategies used by persons with DM to cope include problem-focused strategies such as eating healthy and taking care of their diabetes, as reported by PWD in the Netherlands. [19] Fewer negative emotion-focused strategies, such as crying and being angry, were used, and there were differences in the use of the two types of strategies. [19]A high score for negative coping has been reported among some PWD in India, with a significant difference between positive and negative coping among those with DD. [20]Similar findings were made among PWD in Zambia, where adaptive strategies (e.g. religiosity and acceptance) were associated with a significantly lower DD compared to maladaptive/negative coping strategies. [4]

Additionally, DD and its associated socio-demographic factors have been reported among patients at a teaching hospital in Southeast Nigeria. [21] Also, coping and the influence of sociodemographic characteristics have been examined among PWD in Ibadan. [22]Earlier, the association between DD and self-care was reported among some Nigerian patients attending two secondary health care facilities. [23] However, there is a dearth of data on the level of diabetes distress, coping strategies, and self-care among PWD attending tertiary health care facilities in Nigeria. This study, therefore, sought to achieve the following objectives:

i. To determine the level of diabetes distress among people in UCH, Ibadan.

ii. To determine the association between psychological distress and the coping style of people living with Diabetes Mellitus in UCH, Ibadan.

iii. To determine the effects of diabetes distress on patients' self-care.

Materials and Methods.

The research design used in this study was a descriptive cross-sectional design aimed at assessing the level of psychological distress, the different coping methods adopted and the level of glycaemic control among people living with Diabetes Mellitus in the University College Hospital, Ibadan.

The study was conducted among patients with Diabetes Mellitus in the University College Hospital, Ibadan (UCH). The study setting was the medical outpatient clinic in the University College Hospital, Ibadan. UCH, Ibadan is a tertiary hospital located along Queen Elizabeth II Road, Agodi 200285, at Ibadan, Ibadan North, Oyo State, Nigeria. It serves as a teaching hospital affiliated with the College of Medicine, University of Ibadan. This setting facilitates a collaborative environment for medical education, training, and research. In addition, the hospital also provides facilities for postgraduate residency training programs in all specialties of Internal Medicine, Surgery, Obstetrics and Gynaecology, and Paediatrics.

The Medical Outpatients clinic, University College Hospital, Ibadan, operates in a multi-disciplinary setting, with various specialty departments and healthcare professionals available to address a wide range of medical conditions. The clinic's staff includes highly skilled and experienced physicians, nurses, technicians, and other medical personnel.

The population consisted of patients diagnosed with diabetes aged 18 years and above who consented to participate in the study and met the following additional inclusion criteria: non-healthcare personnel and diagnosed with diabetes at least 6 months before the survey. Patients with cognitive impairment and those with acute illnesses were excluded.

A sample size of 187 was determined for the study, which came up to 200 when the attrition rate was added. The sample size was determined using Taro Yamane's formula ($n = N / (1 + Ne^2)$) for determining the sample size for descriptive studies with N = 335, e = 0.05. All patients who met the eligibility criteria at the time of data collection were recruited for the study until the required sample size was achieved.

Instruments for Data Collection.

A structured, self-administered questionnaire was used to obtain information from the respondents. The questionnaire consisted of four sections —A, B, C, and D —adapted from the Diabetes Distress Scale (DSS), the Brief-Coping Orientation to Problems Experienced Inventory (brief-COPE), and the Summary of Diabetes Self-Care Activities measure (SDSCA).

The aforementioned were modified into a set of 44-question questions, viz: Section A: (7 items) socio-demographic data of the respondents; Section B: (17 items) diabetes distress among people living with Diabetes mellitus, adopted from the Diabetes Distress Scale.

The diabetes distress scale consists of 17 items, which are divided into four domains that describe possible diabetes-related problems such as emotional burden (EB), physician-related distress (PD), regimen-related distress (RD), and interpersonal distress (ID). Based on the items scoring from 1 to 6, the scale was depicted as no distress to severe distress. [12]

Section C: (8 items) elicited responses about coping methods adopted by people living with Diabetes mellitus adapted from the brief-coping Orientation to Problems Experienced Inventory (brief-COPE. The brief COPE is a condensed version of the COPE scale, assessing coping styles across problem-focused and emotion-focused dimensions. It comprises 14 domains with two items each, making a total of 28 questions, measured

on a four-point Likert scale (1= I have not been doing this at all, to 4= I have been doing this a lot). The brief cope has three subscales of (i) problem -solving coping with high score being predictive of positive outcomes/adaptive coping (indicating psychological strength, practical approach to problem solving etc.); (ii) emotion-focused coping in which high scores are uniformly related to psychological health or ill health; (iii) avoidant coping with low scores indicating a positive/adaptive coping and vice-versa. The questionnaire was modified by selecting eight items to represent the three sub-scales. The full scale demonstrates good internal consistency with a Cronbach's alpha of 0.84. [4]

Section D: (12 items) contained questions to measure the level of diabetes self-care, adapted from the Summary of Diabetes Self-Care Activities measure (SDSCA). The original Summary of Diabetes Self-Care Activities (SDSCA) instrument, developed in 1994, comprises 12 items assessing five aspects of diabetes care. Toobert et al. revised it, creating an 11-item scale which includes subscales for diet, exercise, blood glucose testing, foot care and smoking. [24]

Data Collection.

The research protocol was approved by the UI/UCH Institutional Ethical Review Board with approval number UI/EC/24/0064 on 21st February 2024. A letter of introduction was then obtained from the Department of Nursing, University of Ibadan, addressed to the Head of the Medicine Department and to the office of the Chairman of the Medical Advisory Committee (CMAC) of the UCH, to seek permission to obtain data. Support and collaboration from the Nursing and Medical staff in the clinic through the endocrinology unit head were sought for data collection. During a visit to the facility, the study's purpose, questionnaire content, and the right to refuse to participate were explained to the patients. On the data collection days, participants signed consent forms and completed the questionnaire at the outpatient clinic while awaiting their turn for consultation. One of the researchers administered the questionnaires to participants who were not literate. The last fasting blood glucose was documented as reported by the patients, as they routinely check and document it in a notebook. Participants were assured that all information provided would be treated confidentially; hence, the names of other possible identifiers were not requested. Data collection lasted for four (4) weeks, between 25th March and 22nd April 2024

Method of Data Analysis.

Completed questionnaires were screened for errors and completeness and entered into IBM-SPSS version 26.0 software. Data was summarised using percentages, frequencies and means and was presented using tables and figures. Psychological distress was categorised into high and low based on values above and below the mean scores, respectively. Chi-Square test was used in the analysis of hypotheses. The total score on the 11-item Summary of Diabetes Self-Care Activities (SDSCA) was summed up for each participant. An average score was determined for all participants.

Results

Socio-demographic Characteristics of Respondents

Table 1 shows the distribution of socio-demographic traits of 200 patients living with diabetes at the University College Hospital, Ibadan. The majority were aged between 48 and 69 years (67.0%) with a mean of 57.54±10.9 years. About half (51.0%) of the respondents were female, up to two-thirds (64.0%) had at least a tertiary education, and a great majority (85.5%) were married. Only a quarter (26.5%) had fasting blood glucose levels within the normal range (<100mg/dl).

Table 1: Participants' sociodemographic characteristics.

VARIABLE	Frequency (N=200)	Percentage (%)
Age group		
28-48 years	42	21
48-69 years	134	67
70-90 years	24	12
Mean	57.54±10.87	
Gender		
Female	102	51
Male	98	49
Level of Education		
No formal education	14	7
Primary	28	14
Secondary	30	15
Tertiary	71	35.5
Postgraduate	57	28.5
Religion		
Christianity	111	55.5
Islamic	89	44.5
Ethnicity		
Yoruba	148	74
Igbo	50	25
Hausa	2	1
Fasting blood glucose (self-reported)		
Normal fasting glucose	53	26.5
Impaired fasting glucose	60	30
Diabetes mellitus	87	43.5

Figure 1 below shows the categorisation of patients by psychological distress levels. The score ranged from 17 to 85, with a mean score of 31.75 ± 14.5. More than two-thirds (124, 62.0%) of the respondents exhibited low psychological distress.

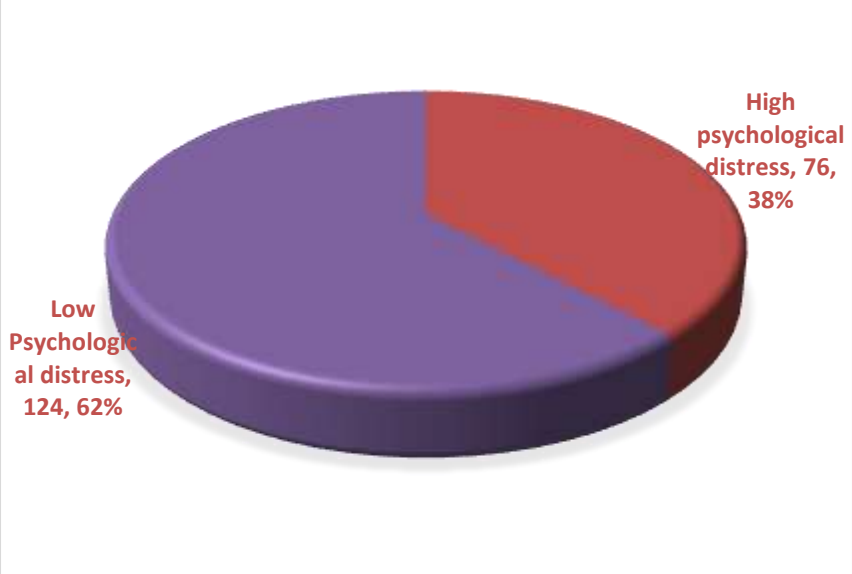

Figure 1: Categorisation of respondents according to level of psychological distress

The distribution of the respondents according to their level of diabetes self-care activities is presented in Figure 2. The score ranges from 0 to 84. The minimum score was 11, the maximum was 77, and the mean was 41.48 ± 12.486. Values from 50% and above were categorised as good compliance, while values less than 50% were categorised as poor compliance. More than half, 116(57.7%) of the respondents are compliant with diabetic self-care activities.

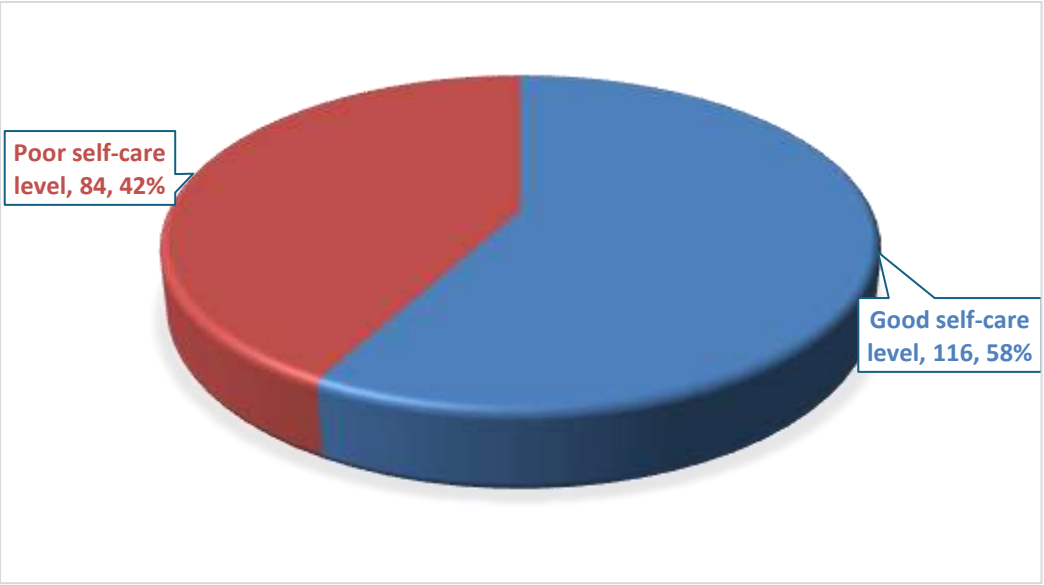

Figure 2: Level of diabetes self-care activities

Coping methods adopted by people living with Diabetes mellitus.

As shown in Table 2, the three most used coping mechanisms were 'taking actions to make things better' (problem-focused), seeing DM in a different light (problem-focused), and 'getting comfort and emotional support from others' (emotion-focused). The least used method was 'criticising self' (emotion-focused self-blame); giving up the attempt to cope (avoidant), and 'saying to self, this isn't real' (avoidant).

Table 2: Coping methods adopted by people living with Diabetes mellitus.

Type of coping method	Coping method	**Not doing this at all** **f (%)**	**little bit** **f (%)**	**medium amount** **f (%)**	**doing this a lot** **f (%)**
Avoidant	Turning to work or other activities to get my mind off things	43 (21.5)	75(37.5)	36 (18.0)	46 (23.0)
	Saying to self, "This isn't real."	123 (61.6)	30 (15.5)	27 (13.5)	20 (10.0)
	Given up the attempt to cope	133 (66.5)	20(10.0)	27 (13.5)	20 (10.0)
Problem Focused	Taking actions to make the situation better	16 (8.0)	82(41.0)	40 (20.0)	62 (31.0)
	Trying to see it in a different light to make it more positive	18 (9.0)	82(41.0)	47 (23.5)	53 (26.5)
Emotion-Focused	Getting comfort and emotional support from others	21 (10.5)	80(40.0)	45 (22.5)	54 (27.0)
	Criticising self	156 (78)	31 (15.5)	7 (3.5)	6 (3.0)
	Turning to faith and religion	57(28.5)	73(36.5)	35 (17.5)	35 (17.5)

Table 3 shows that there was a significant association between the level of psychological distress and the use of the avoidant coping method, with participants with high psychological distress using more avoidant coping.

Table 3: Association between psychological distress and use of avoidant coping.

Use of avoidant coping					
Level of psychological distress	N	Mean	Std. Deviation	t-test value	p value
Low psychological distress	124	4.6935	1.36255	-10.063	<0.001
High psychological distress	76	7.5526	2.64522	-8.739	

Pearson's Chi-square test revealed a statistically significant association between psychological distress and patients' self-care, with a higher proportion of patients with low psychological distress having better compliance (Table 4).

Table 4: Association between the level of psychological distress experienced by people living with Diabetes mellitus in UCH, Ibadan and the level of self-care.

	Self-care			
	Poor	Good	X^2 –value	p-value
Psychological Distress Level				
Low Distress	32.9%	67.1%	4.172	0.041
High Distress	47.6%	52.4%		

Discussion

This study investigated the level of psychological distress experienced by people living with diabetes mellitus attending the medical outpatient clinic of University College Hospital (UCH), Ibadan. About a third of the participants experienced a high level of psychological distress associated with managing diabetes mellitus. Specifically, 38% of participants were classified as having a high level of diabetes distress. This figure is similar to the global prevalence of diabetes distress, which was 36%. [13] However, the rate in this study is lower than the 13.4% experienced by PWD in Egypt [11] and the 29.4% reported in Saudi-Arabia. [12]Patients in this study, on the other hand, did much better than their counterparts in Pakistan, where 85% of PWD experience diabetes distress.[10]The different rates are not surprising since diabetes distress is largely affected by patients' social, emotional and clinical characteristics, and these vary from one country to another. [11, 12] Nevertheless, having one out of three PWDs in a Nigerian hospital suffer from diabetes distress has implications for providing formal and structured psychosocial support for clinic patients to improve their overall quality of life.

Participants in this study used positive problem-focused coping strategies, including 'taking actions to make things better' and 'seeing things in a different light.' This is a useful approach as it is often associated with a better self-care outcome.[22]. The findings are in line with those of PWD in the Netherlands, where patients also used problem-focused approaches to cope with diabetes distress. [19] Some of the patients in this study also used adaptive coping strategies, including religiosity, to manage diabetes distress. This was previously reported among PWD in Zambia.[4] Few patients in this study used negative or avoidant coping methods,

such as 'saying to self 'This isn't real', criticising self or giving up the attempt to cope. This is unlike in India, where a high score for negative coping was reported among PWD. [20]

Regarding patients' self-care practices, as elicited from the summary of the Diabetes Self-Care Questionnaire, only 58% of participants scored above average on the SDSQ scale. This is a poor situation, as poor self-care can lead to the development of diabetes complications. However, the level of self-care among participants in this study is higher than that of Ethiopian PWDs [25]and that of patients in the rural Indian community. [26] This is not too surprising since the wealth index is associated with good self-management of diabetes because of the cost of a good diet, glucometer strips, etc.[27]Unfortunately, PWD in Nigeria and many LMICs have to pay out of pocket for their diabetes management and do not earn enough to support an optimum management of diabetes. This has implications for the inclusion of diabetes care in both private and public health insurance. Moreover, we found an inverse association between diabetes self-care and diabetes distress. This means that people with a high level of diabetes distress are likely to practice poor self-care. Conversely, poor self-care could also lead to diabetes distress, hence the necessity of providing not just effective self-care management support but also psychological support to patients. Our findings are in keeping with those of other authors in a similar study among PWD in Egypt. [28] This finding also corresponds with that of Akbari et al., which reported that physiological distress diminishes motivation for self-care activities, leading to a progressive decline in patients' overall quality of life. [29]

The result further showed a statistically significant association between the level of psychological distress and the use of either positive or negative coping methods. Those with high psychological distress used avoidant (negative) significantly more than patients with low psychological distress. The findings thus reveal a shared interplay between these two variables, as observed among Zambian PWD. [4] Similar findings were made among Chinese PWD, among whom negative coping styles were related to a higher level of DD. [30] Also, maladaptive coping and psychological distress were positively associated with diabetes distress in a study among Hong Kong patients with diabetes. [31] The findings imply that PWD need to be provided with effective strategies to cope with their illness so that they use positive coping strategies.

Conclusion and implications

The study examined the level of psychological distress among people with diabetes, including their coping methods and self-care. Psychological distress was high among the participants, and this significantly impacted their self-care. Participants who used the negative avoidant coping style had significantly higher psychological distress than those who used less of this method of coping. A good number of participants used positive problem-focused coping methods. The study therefore underscores the need to pay more attention to the psychological effects of diabetes on patients to motivate them to continue to take steps towards managing their illness effectively. This can be achieved by designing a more robust and multi-pronged self-care programme. More importantly, interventions targeting the use of avoidant coping by patients should be well incorporated into such a self-care programme. These actions will ultimately help in forestalling diabetes complications.

Study limitations

Fasting blood glucose values were self-reported by the patients, which makes the values less objective compared to those checked at the point of care by the Researcher.

The inclusion of all eligible patients during sampling data collection could have introduced some level of sampling bias.

Generally, the use of a cross-sectional design, which was employed in this study, limits the establishment of a strong cause-and-effect relationship among variables.

Recommendations for clinicians

Since diabetes self-care is largely affected by patients' psychological well-being, people with diabetes ought to have a psychological evaluation at the initial stage of diagnosis and routinely, in line with best international

practices. The initial psychological evaluation could be carried out by a diabetes nurse educator before commencing individualised diabetes education (DSME), using such tools as the diabetes distress scale (DDS). This is recommended for issues of practicality since psychologists are not always present at every outpatient clinic. Patients with a high distress score can then be referred to the physician who carries out further evaluation and directs the patient to a psychologist/mental health professional. Routine psychological evaluation should also be conducted at every clinic visit or at least twice a year, particularly when patients' treatment patterns change or there is the development of complications.

Additionally, positive coping strategies such as problem-solving by setting small achievable goals, speaking to a healthcare professional, among others, should be incorporated into individualised and group diabetes self-management education (DSME). Other positive coping methods include having a strong social support system, including encouraging the patients to be part of an existing diabetes association.

References

1. International Diabetes Federation. Diabetes Atlas. 11th edition. 2025. Brussels. [Internet] [cited 2025 Sept 14] https://diabetesatlas.org/media/uploads/sites/3/2025/04/IDF_Atlas_11th_Edition_2025.pdf.
2. Wade AN, Maposa I, Agongo G, Asiki G, Boua P, Choma SSR, et al. Diabetes care cascade and associated factors in 10 700 middle-aged adults in four sub-Saharan African countries: a cross-sectional study. BMJ Open. 2023 Apr 27;13(4).
3. Olamoyegun MA, Alare K, Afolabi SA, Aderinto N, Adeyemi T. A systematic review and meta-analysis of the prevalence and risk factors of type 2 diabetes mellitus in Nigeria. Clin Diabetes Endocrinol. 2024 Dec 6;10(1).
4. Hapunda G. Coping strategies and their association with diabetes specific distress, depression and diabetes self-care among people living with diabetes in Zambia. BMC EndocrDisord. 2022 Dec 1;22(1).
5. Blangeti GK, Chima T, Kamanga CN, Mkwinda E. Prevalence and Associated Factors of Psychological Distress Among Diabetic Patients at Thyolo District Hospital in Malawi: A Hospital-Based Cross-Sectional Study. Diabetes, Metabolic Syndrome and Obesity. 2024;17:893–900.
6. Akhaury K, Chaware S. Relation Between Diabetes and Psychiatric Disorders. Cureus. 2022 Oct 27; 14(10): e30733.
7. Polonsky WH, Fisher L, Hessler DM, Desai U, King SB. Toward a more comprehensive understanding of the emotional side of type 2 diabetes: A re-envisioning of the assessment of diabetes distress. J Diabetes Complications [Internet]. 2022 Jan [cited 2025 Nov 1];36(1). Available from: https://www.sciencedirect.com/science/article/abs/pii/S1056872721003275
8. Poongothai S, Anjana RM, Radha S, Sundari BB, Rani CSS, Mohan V. Epidemiology of Depression and Its Relationship to Diabetes in India. Journal of the Association of Physicians of India ■ [Internet]. 2017 [cited 2025 Nov 8];65(8):60–6. Available from: https://pubmed.ncbi.nlm.nih.gov/28799308/
9. Huang H, Wei WX, Huang T, Wang F, Zhang HT. Prevalence and associated factors of depressive symptoms among older adult diabetic patients in China: a nationally representative cross-sectional study. Front Psychol. 2025;16.
10. Kamrul-Hasan ABM, Pappachan JM, Nagendra L, Muthukuda D, Dutta D, Bhattacharya S, et al. Prevalence of diabetes distress among people with type 2 diabetes in South Asia: A systematic review and meta-analysis. World J Diabetes. 2025 Aug 15;16(8).
11. Sayed Ahmed HA, Fouad AM, Elotla SF, Joudeh AI, Mostafa M, Shah A, et al. Prevalence and Associated Factors of Diabetes Distress, Depression and Anxiety Among Primary Care Patients With Type 2 Diabetes During the COVID-19 Pandemic in Egypt: A Cross-Sectional Study. Front Psychiatry. 2022 Jun 3;13.
12. Batais MA, Alfraiji AF, Alyahya AA, Aloofi OA, Almashouq MK, Alshehri KS, et al. Assessing the Prevalence of Diabetes Distress and Determining Its Psychosocial Predictors Among Saudi Adults with Type 2 Diabetes: A Cross-Sectional Study. Front Psychol. 2021 Dec 22;12.
13. Perrin NE, Davies MJ, Robertson N, Snoek FJ, Khunti K. The prevalence of diabetes-specific emotional distress in people with Type 2 diabetes: a systematic review and meta-analysis. Vol. 34, Diabetic Medicine. Blackwell Publishing Ltd; 2017. p. 1508–20.

14. Gupta J, Khandelwal D, Gupta L, Dutta D, Mittal S, Khandelwal R, et al. Occurrence and Predictors of Diabetes Distress in Adult Patients with Type 2 Diabetes from North India. Indian J Endocrinol Metab. 2025 Mar 1;29(2):202–8.
15. Gupta SK, Rastogi A, Kaur M, Lakshmi PVM. Diabetes-related distress and its impact on self-care of diabetes among people with type 2 diabetes mellitus living in a resource-limited setting: A community-based cross-sectional study. Diabetes Res Clin Pract [Internet]. 2022 Sep [cited 2025 Nov 1];191. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0168822722008841
16. Hoogendoorn CJ, Schechter CB, Llabre MM, Walker EA, Gonzalez JS. Distress and Type 2 Diabetes Self-Care: Putting the Pieces Together. Annals of Behavioural Medicine. 2021 Oct 1;55(10):938–48.
17. Kintzoglanakis K, Gkousiou A, Vonta P, Sagmatopoulos A, Copanitsanou P. Depression, anxiety, and diabetes-related distress in type 2 diabetes in primary care in Greece: Different roles for glycemic control and self-care. SAGE Open Med. 2022;10.
18. WojujutariAjele K, Sunday Idemudia E. The role of depression and diabetes distress in glycemic control: A meta-analysis. Diabetes Research and Clinical Practice. 2025; 221.DOI 10.7759/cureus.30733
19. Embaye J, Snoek FJ, de Wit M. Coping strategies for managing diabetes distress in adults with type 1 and type 2 diabetes: a cross-sectional study on use and perceived usefulness. Frontiers in Clinical Diabetes and Healthcare. 2024;5.
20. Verma M, Sidana S, Kumar P, Singh O, Esht V, Balasubramanian K, et al. Distress and coping mechanisms among people with diabetes: cross-sectional assessment from an NCD screening clinic of a tertiary care hospital in North India. Diabetology and Metabolic Syndrome. 2025 Dec 1;17(1).
21. Onyenekwe BM, Young EE, Nwatu CB, Okafor CI, Ugwueze C V. Diabetes Distress and Associated Factors in Patients with Diabetes Mellitus in Southeast Nigeria. Dubai Diabetes and Endocrinology. 2020 Aug 31;26(1):31–7.
22. Joseph JG, Olagunju AV, Bulus I, Ishaku S, Toroh LI, Ephraim OD. Coping mechanisms among patients with diabetes mellitus (type 1 & 2) in University College Hospital, Ibadan, Nigeria. Journal of Public Health and Diseases [Internet]. 2021 Feb 28;4(1):11–9. Available from: https://integrityresjournals.org/journal/JPHD/article-full-text-pdf/29D05CE52
23. Onwuchuluba EE, Aina BA, Ngolube CP, Ogbonna BO. Diabetes-related Distress and Self-care Practices among Patients attending two Secondary Care Hospitals in Lagos: A strategy for tailored Interventions. Journal of Basic and Social Pharmacy Research. 2019;1(1):22–9.
24. Toobert DJ, Hampson SE, Glasgow RE. The summary of diabetes self-care activities measure:Results from 7 studies and a revised scale. Diabetes Care. 2000; 23(7), 943-950
25. Ketema DB, Leshargie CT, Kibret GD, Assemie MA, Alamneh AA, Kassa GM, et al. Level of self-care practice among diabetic patients in Ethiopia: A systematic review and meta-analysis. BMC Public Health. 2020 Mar 12;20(1).
26. Chittooru CS, Gorantla Ananda K, Panati DD, Chaudhuri S, Prahalad H. Self-care practices and its determinants among diabetic population in rural Andhra Pradesh, India: A cross-sectional study. Clin Epidemiol Glob Health. 2022 Jul 1;16.
27. Woodward A, Walters K, Davies N, Nimmons D, Protheroe J, Chew-Graham CA, et al. Barriers and facilitators of self-management of diabetes amongst people experiencing socioeconomic deprivation: A systematic review and qualitative synthesis. Health Expectations. 2024; 27. e14070.
28. Abd El Kader AI, Ibrahim ME, Mohamed HS, Osman BM. Diabetes Distress and Self-Care Activities Among Patients with Diabetes Type II: A Correlation Study. SAGE Open Nurs. 2023 Jan 1;9.
29. Akbari F, Molavynejad S, Rokhafroz D, Nia HS. Effect of Diabetes Distress and Self-care Activities on the Quality of Life of Type 2 Diabetic Patients: A Structural Equation Model. Jundishapur Journal of Chronic Disease Care. 2022 Jan 1;11(1).
30. Zhang YY, Li W, Sheng Y, Wang Q, Zhao F, Wei Y. Prevalence and Correlators of Diabetes Distress in Adults with Type 2 Diabetes: A Cross-Sectional Study. Patient Prefer Adherence. 2024;18:111–30.
31. Lau CYK, Kong APS, Joseph T.F., Chan V, Mo PKH. Coping skills and glycaemic control: the mediating role of diabetes distress. Acta Diabetol [Internet]. 2021 Mar [cited 2025 Oct 30];58:1071–9. Available from: https://link.springer.com/article/10.1007/s00592-021-01679-w