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To Examine Relationships Between Diabetes Distress and Performance of Diabetes Self-Care

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ABSTRACT

Introduction : Diabetes mellitus (DM) is a main, highly prevalent, and challenging public health issue. Suboptimal self-care for type II diabetes can lead to poor glycemic control, complications, and even death.

Objective: This study investigated the relationships between diabetes distress and performance of diabetes self-care activities.

Methods: A correlational, cross-sectional design with a convenient sample of 450 participants was chosen from the population of Dehradun was used to conduct this study. Two questionnaires were administered: (A) the demographic and medical data questionnaire; (B) the diabetes distress scale.

Results: Most of the participants were employed (49.8%), gender distribution was relatively balanced, with 48.7% male and 51.3% female participants. Regarding age, 48.4% of the participants were 50 years older. The HbA1c readings showed that 42.4% of participants fell within the 7-8.9% range, suggesting a significant proportion with suboptimal glycemic control. The mean difference between pre- and post-DDS scores is 0.406 (SD = 0.122), indicating a reduction in diabetes distress following the intervention.

Conclusion: Diabetes-specific self-efficacy and distress may be important mechanisms linking social support with diabetes self-care and clinical outcomes. Social support interventions could explore whether improving diabetes self-efficacy and decreasing diabetes distress could help improve self-care.

Keywords: *Patients with diabetes, Diabetes Distress, Self-care activities*

1. INTRODUCTION

'Type II Diabetes Mellitus (T2DM), a chronic metabolic disorder characterized by insulin resistance and beta-cell dysfunction. Around 4.6% of about 285 million diabetic patients in 2010 in the world, and the expectation will move higher in 2030 to 7.7% about 439million[1].

It is predicted that in 2025 it will be doubling the number of people who suffer from diabetes and 76% of them in low-income countries[2]. The condition is a major contributor to global mortality, with high blood glucose levels causing nearly 4 million deaths annually, and it incurs substantial economic costs, with global healthcare spending on diabetes among adults reaching approximately $850 billion in 2017. Beyond the individual, diabetes has far-reaching socio-economic impacts, burdening families, societies, and economies, particularly in low- and middle-income countries where it often coexists with other diseases, further threatening national productivity and economic stability[3]. The rapid rise in diabetes cases is attributed to a combination of factors, including population aging, urbanization, and lifestyle changes that promote unhealthy diets rich in processed foods and sedentary behaviours[4].

Potential barrier to engagement with these self-management behaviors is diabetes distress, which is defined as patient concerns about disease management, support, emotional burden, and access to care[5]. High diabetes distress has been associated with suboptimal glycemic control both in patients with type 1 and type 2 diabetes[6,7,8].

Diabetes distress is amenable to treatment, but if not addressed, it can persist and even worsen the glycemic control, which can lead to chronic complications[9]. The American Diabetes Association recommends psychosocial care, including screening for diabetes distress at regular intervals, to be integrated with medical care[10]. However, this does not take place in routine settings and diabetes distress usually remains undiagnosed. The psycho-social problems faced by people living with diabetes remain largely unaddressed in today's healthcare setup. Considering more than 75% of adults with DM live in low and middle income countries where the burden of distress in the community has not been explored extensively, there is scope for further research on the prevalence and determinants of diabetes distress as well as its management, so that it can effectively be addressed[10,11].

A growing body of literature has shown that diabetes distress is more closely linked to poorer self-management and treatment outcomes compared with depression[6.] However, most of these data are self-reported, with limited quantitative data available to support this. Furthermore, the majority of the literature focuses on patients with type 2 diabetes and data about self-management behaviours in type 1 diabetes are limited. Few studies have quantified the relationship between diabetes distress and self-management behaviors diabetic in patients. Therefore, in this study we set out to explore the association between diabetes distress and various self-management behaviour's.

2. METHODOLOGY

The study employed a mixed-methods research design to comprehensively assessed the relationship between self-care practices and therapeutic outcomes in individuals with Type II Diabetes Mellitus. The quantitative component consists of a cross-sectional survey, which evaluated self-care behaviors and their direct impact on key therapeutic outcomes, such as HbA1c levels, blood pressure, and cholesterol. Complementing this, the qualitative component involves in-depth interviews with a subset of participants. The research included individuals who were 18 years of age or older and had been diagnosed with Type II Diabetes for a minimum of one year, ensuring they had established self-care routines. A sample size of 450 participants was chosen from the population of Dehradun using Convenience Sampling to assure the study's statistical power and reliability, yielding sufficient data to identify significant connections between self-care habits and therapy results. Pregnant women or those with gestational diabetes, Individuals with cognitive impairments, Individuals with a recent history of acute illness or hospitalization were excluded from participation in study. Diabetes mellitus was operationally defined as fasting blood glucose level of 126 mg/dL or higher or a 2-hour postprandial glucose level of 200 mg/dL or more, validated by two different tests and therapeutic outcomes are assessed by monitoring key indicators such as HbA1c levels (with a target of <7%), blood pressure, lipid profile, and incidence of diabetes-related complications over a specified period.

Participants were required to complete a comprehensive survey, either in paper-based format or online. The survey was designed to capture self-reported data on four key variables: diabetes distress, social support, self-efficacy, and performance in diabetes self- care activities. The DDS consists of 17 items, each rated on a Likert scale ranging from 0 to 6, with higher scores indicating greater levels of distress. The Modified Medical Outcomes Study Social Support Survey (mMOS-SS) was a widely used tool for assessing perceived social support. The survey includes both Instrumental Support (I) and Emotional Support (E) components, each evaluated through specific questions.

Ethical Considerations

All participants were required to provide informed consent before participating in the study. Participant confidentiality and anonymity were maintained throughout the research process.

Data Analysis

Once collected, the survey responses were systematically entered into an Excel spreadsheet for analysis. The data analysis was conducted using SPSS version 26, incorporating both quantitative and qualitative methods.

3. RESULTS & DISCUSSION

Important factors were examined, including psychological health, medication compliance, physical activity, food adherence, and glucose monitoring. The demographic characteristics of the study revealed significant patterns in terms of age, gender, employment status, and socioeconomic background.

Table 1 indicates that most of the participants were employed (49.8%), followed by unemployed (31.3%). The gender distribution was relatively balanced, with 48.7% male and 51.3% female participants. Regarding age, 48.4% of the participants were 50 years older, highlighting a demographic that may face increased challenges in managing diabetes. This observation aligns with findings from Bellary et al. (2021) who emphasized that older adults often encounter more difficulty managing diabetes due to cognitive and physical declines associated with aging[12]. The socioeconomic profile revealed that 48.4% of the participants belonged to the middle-income group. This demographic is linked to better healthcare access and

improved glycemic control, as noted by Okereke et al. (2021) who found that middle-income individuals have better access to healthcare resources[13]. Employment status also played a crucial role in self-care adherence, with Singh et al. (2021) highlighting that unemployed individuals face financial stress and reduced healthcare access, which negatively impacts their diabetes management[14].

Table 1: Demographic Characteristics of Participants

Variable	Frequency	Percent
Gender		
Male	219	48.7
Female	231	51.3
Employment Status		
Employed	224	49.8
Unemployed	141	31.3
Retired	85	18.9
Age group		
18-20	18	4.0
21-30	51	11.3
31-40	41	9.1
41-50	122	27.1
50 and above	218	48.4
Socioeconomic Status		
Low income	80	17.8
Middle income	218	48.4
High income	152	33.8

The HbA1c readings showed that 42.4% of participants fell within the 7-8.9% range, suggesting a significant proportion with suboptimal glycemic control. BMI analysis revealed that 42.4% of participants had normal weight, while 34.7% were overweight. Cholesterol levels were predominantly in the 150-199 mg/dL range (49.1%), while elevated blood pressure was observed in both diastolic and systolic measurements. These elevated values suggest a heightened risk of cardiovascular complications also found in study by Guo et al. (2020)[15]. Educational background and diabetes duration were also significant factors. Most participants (71.8%) had received an education on diabetes management, while 40.9% had been living with the condition for 5 to 10 years. These findings underscore the importance of continuous education and support for individuals with diabetes. The overall demographic profile highlights the need for targeted, patient-centered interventions that address age, employment, and socioeconomic factors to promote better diabetes outcomes.

Table 2: Baseline characteristics of study participants

HbA1c		
5-6.9	158	35.1
7-8.9	191	42.4
9-11.9	101	22.4
BMI		

Underweight (< 18.5)	19	4.2
Normal (18.5 – 24.9)	191	42.4
Overweight (25.0 – 29.9)	156	34.7
Obese (≥ 30.0)	84	18.7
Cholesterol Level		
0-149	89	19.8
150-199	221	49.1
200-249	104	23.1
250-299	36	8.0
Systolic Pressure		
0-119	72	16.0
120-139	126	28.0
140-159	120	26.7
160-179	132	29.3
Diastolic Pressure		
0-79	104	23.1
80-89	105	23.3
90-99	117	26.0
100-109	124	27.6
Diabetes Education		
Yes	323	71.8
No	127	28.2
Duration of Diabetes		
Less than 5 years	131	29.1
5-10 years	184	40.9
More than 10 years	135	30.0

Diabetes Distress - Screening Scale (Pre) Table 3 presents the pre-screening responses of participants to the Diabetes Distress Screening Scale(DDSS), highlighting the extent of distress across 17 specific concerns related to diabetes self-management. The highest distress was observed for the statement, "Feeling angry, scared, and/or depressed when I think about living with diabetes," with 88 participants rating it as 'A Very Serious Problem,' indicating significant emotional burden. This finding is consistent with Bassi et al. (2021) who identified emotional distress as one of the most prevalent psychological burdens in diabetes patients, often linked to frustration and anxiety about long-term disease management[16]. Similarly, Hoogendoorn et al. (2021) reported that addressing emotional responses, such as anger and fear, significantly improves self-care behaviors and mental well-being in people with diabetes[17]. Dietary adherence was another notable concern, with 96 participants identifying "Feeling that I am not sticking closely enough to a good meal plan" as 'A Moderate Problem.' This challenge reflects the difficulty of sustaining dietary modifications over time, as highlighted by Marshall et al. (2019) who emphasized that maintaining a structured meal plan requires continuous support from healthcare providers and family members[18]. Dissatisfaction with healthcare provider support was also evident, with 96 respondents rating "Feeling that my doctor doesn't know enough about diabetes and diabetes care" as 'A Serious Problem.' These findings align with the work of van der Peimani et al., (2020) who emphasized that perceived inadequacy of healthcare provider support can increase diabetes-related distress,

underscoring the importance of effective patient-provider communication[19]. Another critical concern was blood glucose monitoring, with 84 participants rating "Feeling that I am not testing my blood sugars frequently enough" as 'A Somewhat Serious Problem.' This observation aligns with the findings of Liu et al. (2022) who demonstrated that perceived inadequacy in blood glucose monitoring is a major source of distress, often linked to fear of complications and treatment failure[20]. Conversely, 82 participants indicated "Not feeling motivated to keep up my diabetes self-management" as 'Not a Problem,' suggesting that many participants had adequate intrinsic motivation. Alhuseen et al. (2023) highlighted that higher self-motivation is a key determinant of adherence to self-care practices, which include diet, exercise, and glucose monitoring[21]. While family and social support were highlighted as issues, they appeared less critical than other concerns. For instance, 72 respondents marked "Feeling that friends or family don't give me the emotional support that I would like" as 'A Very Serious Problem.' This aligns with findings from Lambrinou et al. (2019) who noted that while family support plays a crucial role in diabetes management, it is not always perceived as essential by all patients[22]. Kontoangelos et al.(2022) further emphasized that emotional support from family is a key factor in reducing diabetes-related distress, especially in patients with a history of emotional instability. These findings underscore the need for a multifaceted approach to diabetes management that addresses emotional well-being, self-monitoring, dietary adherence, and patient-provider communication[23].

Table 3: Diabetes Distress - Screening Scale (Pre)

Question	Not a Problem	A Slight Problem	A Moderate Problem	Somewhat Serious Problem	A Serious Problem	A Very Serious Problem
1) Feeling that diabetes is taking up too much of my mental and physical energy every day.	76	83	73	70	71	77
2) Feeling that my doctor doesn't know enough about diabetes and diabetes care.	74	77	79	57	96	67
3) Feeling angry, scared, and/or depressed when I think about living with diabetes.	70	75	74	77	66	88
4) Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.	64	79	82	81	68	76
5) Feeling that I am not testing my blood sugars frequently enough.	64	62	79	84	80	81
6) Feeling that I am often failing with my diabetes routine.	68	82	77	64	86	73
7) Feeling that friends or family are not supportive enough of self-care efforts.	67	83	75	74	74	80
8) Feeling that diabetes controls my	74	76	76	84	69	71

life.						
9) Feeling that my doctor doesn't take my concerns seriously enough.	73	68	77	86	69	77
10) Not feeling confident in my day-to-day ability to manage diabetes.	75	72	76	75	86	66
11) Feeling that I will end up with serious long-term complications, no matter what I do.	74	67	88	72	75	74
12) Feeling that I am not sticking closely enough to a good meal plan.	73	60	96	72	82	67
13) Feeling that friends or family don't appreciate how difficult living with diabetes can be.	80	73	74	84	66	73
14) Feeling overwhelmed by the demands of living with diabetes.	80	77	64	74	73	82
15) Feeling that I don't have a doctor who I can see regularly about my diabetes.	76	68	84	76	81	65
16) Not feeling motivated to keep up my diabetes self-management.	82	83	70	81	65	69
17) Feeling that friends or family don't give me the emotional support that I would like.	69	76	70	82	81	72

Diabetes Distress - Screening Scale (Post) Table 4 illustrates dissatisfaction with healthcare support was also prominent, as 96 participants rated "Feeling that my doctor doesn't know enough about diabetes and diabetes care" as 'A Serious Problem.' Blood glucose monitoring challenges were also notable, with 84 participants marking "Feeling that I am not testing my blood sugars frequently enough" as 'A Somewhat Serious Problem.' While emotional support from family and friends was a concern, it appeared relatively less severe, with 80 respondents rating "Feeling that friends or family are not supportive enough of self-care efforts" as 'A Very Serious Problem.' Notably, 82 participants did not perceive "Not feeling motivated to keep up my diabetes self-management" as a problem, indicating that many respondents maintained adequate self-motivation. The pre-intervention analysis of diabetes distress revealed significant emotional and psychological burdens, particularly with feelings of anger, fear, and dissatisfaction with healthcare provider support. Post-intervention, a reduction in emotional distress was observed, indicating the effectiveness of the intervention. This outcome aligns with the findings of

Costa et al. (2022) who reported that targeted interventions addressing emotional distress led to improved emotional well-being and better adherence to diabetes self-care[24]. Similarly, Dineen et al. (2019) emphasized that addressing patients' emotional responses to diabetes enhances their capacity for self-care, particularly in managing dietary adherence[25]. Misra et al. (2021) further validated that post- intervention support programs significantly reduce diabetes-related distress, especially when mental health components are integrated into self-care education[26].

Table 4: Diabetes Distress - Screening Scale (Post)

Question	Not a Problem	A Slight Problem	A Moderate Problem	Somewhat Serious Problem	A Serious Problem	A Very Serious Problem
1) Feeling that diabetes is taking up too much of my mental and physical energy every day.	76	83	73	70	71	77
2) Feeling that my doctor doesn't know enough about diabetes and diabetes care.	74	77	79	57	96	67
3) Feeling angry, scared, and/or depressed when I think about living with diabetes.	70	75	74	77	66	88
4) Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.	64	79	82	81	68	76
5) Feeling that I am not testing my blood sugars Frequently enough.	64	62	79	84	80	81
6) Feeling that I am often failing with my diabetes routine.	68	82	77	64	86	73
7) Feeling that friends or family are not	67	83	75	74	71	80

supportive enough of self-care efforts.						
8) Feeling that diabetes controls my life.	74	76	76	84	69	71
9) Feeling that my doctor doesn't take my concerns seriously enough.	73	68	77	86	69	77
10) Not feeling confident in my day-to-day ability to manage diabetes.	75	72	76	75	86	66
11) Feeling that I will end up with serious long-term complications, no matter what I do.	74	67	88	72	75	74
12) Feeling that I am not sticking closely enough to a good meal plan.	73	60	96	72	82	67
13) Feeling that friends or family don't appreciate how difficult living with diabetes can be.	80	73	74	84	66	73
14) Feeling overwhelmed by the demands of living with diabetes.	80	77	64	74	73	82
15) Feeling that I don't have a doctor who I can see regularly about my diabetes.	76	68	84	76	81	65
16) Not feeling motivated to keep up my diabetes self-	82	83	70	81	65	69

management.						
17) Feeling that friends or family don't give me the emotional support that I would like.	69	76	70	82	81	72

The Modified Medical Outcomes Study Social Support Survey (mMOS-SS)

Table 5: Correlation Between Average Diabetes Distress Scale (DDS) Scores and KeyDemographic, Clinical, and Lifestyle Variable

Age	Pearson Correlation	.040
	Sig. (2-tailed)	.039
	N	450
Socioeconomic Status	Pearson Correlation	.012
	Sig. (2-tailed)	.798
	N	450
HbA1c	Pearson Correlation	.034
	Sig. (2-tailed)	.046
	N	450
BMI Category	Pearson Correlation	.106
	Sig. (2-tailed)	.025
	N	450
Cholesterol Level	Pearson Correlation	.000
	Sig. (2-tailed)	.056
	N	450
Systolic Pressure	Pearson Correlation	.027
	Sig. (2-tailed)	.567
	N	450
Diastolic Pressure	Pearson Correlation	.041
	Sig. (2-tailed)	.384
	N	450
Diabetes Education	Pearson Correlation	.029
	Sig. (2-tailed)	.054
	N	450
Duration of Diabetes	Pearson Correlation	.093
	Sig. (2-tailed)	.050
	N	450

Table 6 showed the paired samples test presented in Table 4.9 evaluates the difference in Diabetes Distress Scale (DDS) scores before and after the intervention. The mean difference between pre- and post-DDS scores is 0.406 (SD = 0.122), indicating a reduction in diabetes distress following the intervention which was statistically significant. These results suggest that the intervention had a meaningful impact in reducing diabetes-related distress among participants similar with Misra et al. (2021) study[26].

Table 6: Paired Samples Test Comparing Pre and Post Diabetes Distress Scale (DDS) Scores

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre DDS-Post DDS	.40601	.12226	.00576	.39469	.41734	70.445	449	.000

. Correlation is significant at the 0.05 level (2-tailed). **t** student t-test, **df** Degree of freedom

4. CONCLUSION

In conclusion, the study demonstrated that most participants were females aged 50 and above, employed and were belonging to middle income group. Furthermore, they demonstrated poor levels of diabetes self-care practice and high levels of emotional distress and regimen distress. In addition, the study found that self-care is correlated with diabetes distress.

5. ACKNOWLEDGMENT

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6. CONFLICT OF INTREST

The authors declare no conflict of interest and all authors have read the final manuscript, have approved the submission to the journal, and have accepted full responsibilities pertaining to the manuscript's delivery and contents and we omitting to pay an Article Processing Charge (APC).

REFERENCES

[1] Padma, K.; Bele, S.; Bodhare, T.; Valsangkar, S.: evaluation of knowledge and self-care practices in diabetic patients and their role in disease management, National Journal of Community Medicine, 2012, 3(1), p.p.: 3- 6.

[2] Ayele, K.; Tesfa, B.; Abebe, L.; Tilahun,T.; Girma, E.: Self Care Behavior among Patients with Diabetes in Harari, Eastern Ethiopia: The Health Belief Model Perspective, PLoS ONE , 2012, 7(4): p.p. : 1-6.

[3] CHEAH CH. Financial catastrophe from non-communicable diseases: a case study on the economic burden of diabetes on households in Malaysia (Doctoral dissertation, Monash University).

[4] International Diabetes Federation Diabetes Atlas. IDF Diabetes Atlas, 7th edn Brussels, Belgium: International Diabetes Federation, 2015 http://www.diabetesatlas.org.

[5] Fisher L, Glasgow RE, Mullan JT, Skaff MM, Polonsky WH. Development of a brief diabetes distress screening instrument. Ann Fam Med. 2008;6(3):246-252.

[6] Fisher L, Mullan JT, Arean P, Glasgow RE, Hessler D, Masharani U. Diabetes distress but not clinical depression or depressive symptoms is associated with glycemic control in both cross-sectional and longitudinal analyses. Diabetes Care. 2010;33(1):23-28.

[7] Indelicato L, Dauriz M, Santi L, et al. Psychological distress, self-efficacy and glycemic control in type 2 diabetes. Nutr Metab Cardiovasc Dis. 2017;27(4):300-306.

[8] Strandberg RB, Graue M, Wentzel-Larsen T, Peyrot M, Rokne B. Relationships of diabetes-specific emotional distress, depression, anxiety, and overall well-being with HbA1c in adult persons with type 1 diabetes. J Psychosom Res. 2014;77(3):174-179.

[9] Fisher L, Skaff MM, Mullan JT, Arean P, Glasgow R, Masharani U. A longitudinal study of affective and

anxiety disorders, depressive affect and diabetes distress in adults with type 2 diabetes. Diabet Med. 2008;25:1096–101.

[10] Young-Hyman D, de Groot M, Hill-Briggs F, Gonzalez JS, Hood K, Peyrot M. Psychosocial care for people with diabetes: a position statement of the American Diabetes Association. Dia Care. 2016;39:2126–40.

[11] Tareen RS, Tareen K. Psychosocial aspects of diabetes management: dilemma of diabetes distress. Transl Pediatr. 2017;6:383–96.

[12] Bellary S, Kyrou I, Brown JE, Bailey CJ. Type 2 diabetes mellitus in older adults: clinical considerations and management. Nature Reviews Endocrinology. 2021 Sep;17(9):534-48.

[13] Okereke M, Ukor NA, Adebisi YA, Ogunkola IO, Favour Iyagbaye E, Adiela Owhor G, Lucero-Prisno III DE. Impact of COVID-19 on access to healthcare in low-and middle-income countries: current evidence and future recommendations. The International journal of health planning and management. 2021 Jan;36(1):13-7.

[14] Singh K, Kondal D, Mohan S, Jaganathan S, Deepa M, Venkateshmurthy NS, Jarhyan P, Anjana RM, Narayan KV, Mohan V, Tandon N. Health, psychosocial, and economic impacts of the COVID-19 pandemic on people with chronic conditions in India: a mixed methods study. BMC public health. 2021 Dec;21:1-5.

[15] Guo T, Fan Y, Chen M, Wu X, Zhang L, He T, Wang H, Wan J, Wang X, Lu Z. Cardiovascular implications of fatal outcomes of patients with coronavirus disease 2019 (COVID-19). JAMA cardiology. 2020 Jul 1;5(7):811-8.

[16] Bassi G, Gabrielli S, Donisi V, Carbone S, Forti S, Salcuni S. Assessment of psychological distress in adults with type 2 diabetes mellitus through technologies: literature review. Journal of medical Internet research. 2021 Jan 7;23(1):e17740.

[17] Hoogendoorn CJ, Schechter CB, Llabre MM, Walker EA, Gonzalez JS. Distress and type 2 diabetes self-care: putting the pieces together. Annals of Behavioral Medicine. 2021 Oct 1;55(10):938-48.

[18] Marshall AP, Takefala T, Williams LT, Spencer A, Grealish L, Roberts S. Health practitioner practices and their influence on nutritional intake of hospitalised patients. International journal of nursing sciences. 2019 Apr 10;6(2):162-8.

[19] Peimani M, Nasli-Esfahani E, Sadeghi R. Patients ʼperceptions of patient–provid e r communication and diabetes care: A systematic review of quantitative and qualitative studies. Chronic illness. 2020 Mar;16(1):3-22.

[20] Liu Y, Jiang J, You W, Gong D, Ma X, Wu M, Li F. Exploring facilitators and barriers to self- management engagement of Chinese people with type 2 diabetes mellitus and poor blood glucose control: a descriptive qualitative study. BMC endocrine disorders. 2022 Nov 26;22(1):294.

[21] Alhuseen OA, Ismail NA, Hasan L, Embarak F. A comprehensive review of modern methods to improve diabetes self-care management systems. International Journal of Advanced Computer Science and Applications. 2023(9).

[22] Lambrinou E, Hansen TB, Beulens JW. Lifestyle factors, self-management and patient empowerment in diabetes care. European journal of preventive cardiology. 2019 Dec;26(2_suppl):55-63.

[23] Kontoangelos K, Raptis A, Lambadiari V, Economou M, Tsiori S, Katsi V, Papageorgiou C, Martinaki S, Dimitriadis G, Papageorgiou C. Burnout related to diabetes mellitus: a critical analysis. Clinical practice and epidemiology in mental health: CP & EMH. 2022;18.

[24] Costa PD, Oliveira-Neta MS, Azevedo TF, Cavalcanti LT, Rocha SR, Nogueira MF. Emotional distress and adherence to self-care activities in older adults with diabetes mellitus. Rev. Rene. 2022;23:72264-.

[25] Dineen-Griffin S, Garcia-Cardenas V, Williams K, Benrimoj SI. Helping patients help themselves: a systematic review of self-management support strategies in primary health care practice. PloS one. 2019 Aug 1;14(8):e0220116.

[26] Misra R, Shawley-Brzoska S, Khan R, Kirk BO, Wen S, Sambamoorthi U. Addressing diabetes distress in self-management programs: results of a randomized feasibility study. Journal of Appalachian health. 2021;3(3):68.