

The ADRIFT study - Assessing Diabetes Distress and its associated factors in the Pakistani population

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Abstract

Objective: To assess diabetes distress and its associated factors in Pakistani population.

Methods: The cross-sectional study was conducted at Pakistan Institute of Medical Sciences, Islamabad, Pakistan, from July to December 2017, and comprised patients of diabetes type 2. After noting down demographic and clinical parameters, diabetes distress of the subjects was measured by applying the 17-item diabetes distress scale which also assesses sub-domains like emotional burden, physician-related distress, regimen-related distress and interpersonal distress. SPSS 20 was used to analyse data.

Results: There were 349 subjects with a mean age of 53.14 ± 11.77 years, mean diabetes duration of 8.36 ± 6.64 years and a mean glycated haemoglobin value of $9.05 \pm 1.93\%$. Mean overall diabetes distress score was 2.55 ± 0.75 , signifying moderate distress. Overall, prevalence of diabetes distress was found among 266(76.2%) subjects; 164(47%) moderate and 102(29.2%) high level distress. Emotional burden was most substantially elevated, with 296(84.8%) patients reporting moderate to high levels. Total diabetes distress was significantly related to demographic background ($p < 0.0001$), education level ($p = 0.015$), monthly income, frequency of administration of medication, adherence to medical treatment ($p < 0.05$), number of complications ($p < 0.05$) and overall glycaemic control ($p < 0.001$).

Conclusion: Modifiable factors, such as frequency of medication and compliance to treatment, should be addressed with the aim of decreasing diabetes distress and improve glycaemic control.

Keywords: Diabetes distress, Emotional burden, Type 2 diabetes mellitus, Adherence to medical therapy, Glycaemic control. (JPMA 68: 1590; 2018)

Introduction

Type 2 diabetes mellitus (T2DM) is one of the most common non-communicable diseases and one of the most challenging health concerns worldwide. According to the International Diabetes Federation (IDF) 2017 estimates, 425 million individuals globally have T2DM, with figures projected to reach 629 million by 2045. At present, almost 8.8% of the world's population has T2DM, with almost 80% living in developing countries. With regards to Pakistan, over 7 million individuals, almost 10% of the population, have T2DM.¹

The management of T2DM involves a close liaison

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between the patient and the healthcare provider, and adequate care necessitates lifestyle modification that may be cumbersome for the patient. The adjustments needed in the patients' routine, a multitude of medical interventions and fear of developing diabetes-related complications may lead to anxiety, stress or depression.² Diabetes distress (DD) is an affective disorder, a syndrome comprising multidimensional components such as worry, conflict, frustration and discouragement that can accompany living with diabetes, and are closely related to, but distinct from, depression.³ DD is defined as an emotional response characterised by extreme apprehension, discomfort or dejection, due to perceived inability in coping with the challenges and demands of living with diabetes.⁴

The focus of a vast majority of healthcare providers is

centred on glycaemic control. Research has suggested that psychosocial issues have an effect in diabetes self-management that is neither fully understood nor adequately addressed by healthcare providers.⁵ The primary focus of interventions for people with diabetes has been on improving self-management by increasing knowledge pertaining to diabetes. To the contrary, researchers have concluded that there are factors other than knowledge that contribute to achieving a sustained change in behaviour and thus postulate that psychosocial factors may account for the absence of a consistently positive relationship between diabetes knowledge and glycaemic control.⁶

The DD spectrum ranges from limited psychological problems to constant behaviours associated with diabetes self-care, including regular blood sugar monitoring, administration of medicines, including insulin injections, and overall adherence to treatment regimen. The cornerstone of the problem lies in the significant impact of Diabetes self-care practices and self-efficacy.⁷ A high level of self-efficacy, which deals primarily with the ease or difficulty of performing a given behaviour, is positively associated with diabetes self-management.⁸

Research suggests that the control of diabetes via adopting self-management behaviours is strongly predicted by DD and the way it is managed.⁹ The current study was planned to quantify DD prevalence in the largest tertiary care hospital in Islamabad, Pakistan, and to identify the associated factors among T2DM patients.

Subjects and Methods

The cross-sectional study was conducted at Pakistan Institute of Medical Sciences (PIMS), Islamabad, Pakistan, from July to December 2017, and comprised T2DM patients after approval was obtained from the institutional ethics committee. PIMS is the largest tertiary care hospital in Islamabad and caters to patients from all over the country. Since DD prevalence was not known in the local population, we assumed the prevalence as 18% in line with literature,¹⁰ 95% confidence level with 5% absolute precision and 80% power.

Patients were enrolled using convenience sampling. Written informed consent was obtained from each patient. Those included were aged over 25 years with diagnosed T2DM for at least one year. Patients who could not

comprehend the questionnaire secondary to mental illness, were excluded.

The questionnaire administered consisted of three sections. The first comprised patients' demographic data and regimen-based questions, including age, gender, height, weight, body mass index (BMI), T2DM duration, centres visited for T2DM care (primary care, secondary care or tertiary care), marital status, ethnicity, rural or urban background, education status, occupation, monthly income, recent documented hypoglycaemia episode or hospitalisation for T2DM, patients' perspective about glycaemic control, adherence to treatment measured by the 4-point morisky medication adherence scale¹¹ (MMAS-4), treatment being taken for T2DM (oral agents, injectable therapy including insulin, or a combination of both), and the total number of drugs being taken over 24 hours.

The second section explored the presence of comorbidities like hypertension and ischaemic heart disease, diabetes-related macrovascular complications like peripheral vascular disease, cerebrovascular accidents and myocardial infarctions which were assessed via review of patients' medical records, and microvascular complications. Neuropathy was assessed by microfilament examination, nephropathy by the presence of microalbuminuria or frank proteinuria and retinopathy was assessed by detailed fundoscopic examination. Routine laboratory parameters, including glycated haemoglobin (HbA1c), fasting and random blood glucose measurements, complete blood count (CBC), urea and creatinine, alanine transaminase (ALT) and the fasting lipid profile, were also documented.

The third section involved the 17-item diabetes distress scale (DDS-17)¹². DDS-17 is a scale in which the patient responds to each statement by giving a rating on a 6-point frequency scale where 1 is 'not a problem', to 6 being 'a very serious problem'. The scale features statements pertaining to four distinct subscales of diabetes-related distress. These include the emotional burden (5 items), physician-related distress (4 items), regimen-related distress (5 items) and interpersonal distress (3 items). The Urdu version of the DDS-17, available online free of cost from the Behavioural Diabetes Institute¹³ was used with further simplification of language to make it easily understandable. The final questionnaire contained both the English and Urdu scales together and was employed after determining its validity and reliability in a subset of 20 patients who were proficient in both English and Urdu

($\alpha=0.91$).

Mean values along with standard deviation (SD) of the overall DDS-17 score was calculated along with the mean item score (MIS) of each of the subscale domains. If the MIS was <2 , the patient was considered to have little or no distress. AMIS of 2-2.9 was considered moderate distress and ≥ 3 was considered high distress.^{12,14} SPSS 20 was used to analyse the data. Descriptive statistics were employed for qualitative variables, with quantitative variables being presented as means \pm SD. After confirming that the data was normally distributed, the variables were compared using parametric tests, including chi square test, independent samples t-test, analysis of variance (ANOVA) and Pearson correlation coefficient. Statistical analysis was considered significant at $p < 0.05$.

Table-1: Demographic and clinical characteristics of the study population.

Variables	Mean \pm SD
Age (Years)	53.14 \pm 11.77
BMI (kg/m ²)	26.59 \pm 4.34
Duration of T2DM (Years)	8.36 \pm 6.64
HbA1c (%)	9.05 \pm 1.93
Variables	Frequency (n, %)
Sex	
Male	136 (39)
Female	213 (61)
Education Level	
Nil	132 (37.8)
Primary	85 (24.4)
Middle	46 (13.2)
Secondary	56 (16)
Graduate	30 (8.6)
Social Background	
Rural	160 (45.8)
Urban	189 (54.2)
Average Monthly Family Income (in rupees)	
< 20,000	189 (54.2)
20,000 - 40,000	108 (30.9)
> 40,000	52 (14.9)
Medical Treatment for T2DM	
Oral Agents alone	217 (62.2)
Insulin or other injectable therapy	47 (13.5)
Oral Agents plus Insulin	85 (24.4)
Glycaemic Control	
Optimal Control (HbA1c $<7\%$)	38 (10.9)
Borderline Control (HbA1c 7 - 8.5%)	123 (35.2)
Poor Control (HbA1c $>8.5\%$)	188 (53.9)
Complications	
Macrovascular	60 (17.2)
Microvascular	266 (76.2)

BMI: Body mass index

T2DM: Type 2 diabetes mellitus

HbA1c: Glycated haemoglobin

Results

There were 349 patients with a mean age of 53.14 \pm 11.77 years (range: 26-85 years). Mean duration of T2DM was 8.36 \pm 6.64 years and mean HbA1c was 9.05 \pm 1.93%. Of the total, 213(61%) were female. Demographic and clinical data was noted for all subjects (Table-1).

The average score for overall DD was 2.55 \pm 0.75, which signifies moderate distress. The mean scores for each individual domain of the DDS-17 were 3.10 \pm 1.95 for emotional burden, 1.98 \pm 0.92 for physician-related distress (PD), 2.83 \pm 1.49 for regimen-related distress (RD), and 2.20 \pm 1.09 for interpersonal distress (IP). DD prevalence was found among 266(76.2%) subjects; 164(47%) moderate and 102(29.2%) high level distress. Emotional burden (EB) was most substantially elevated, with 296(84.8%) patients reporting moderate to high levels (Table-2).

Total DD (TDD) was significantly related to demographic background ($p < 0.0001$), education level ($p = 0.015$), monthly income ($p < 0.0001$), patients' perspective about glycaemic control ($p < 0.0001$), frequency of administration of medication ($p = 0.001$), adherence to medical treatment ($p < 0.0001$), number of macrovascular ($p = 0.01$) and microvascular ($p = 0.006$) complications and overall glycaemic control ($p < 0.001$).

Table-2: Quantification of diabetes related distress and its sub-domains in the study population.

Extent of Overall Diabetes Related Distress	N	%
Little/No Distress (<2.0)	83	23.8
Moderate Distress (2.0 - 2.99)	164	47.0
High Distress (>3.0)	102	29.2
Extent of Emotional Burden		
Little/No Distress (<2.0)	53	15.2
Moderate Distress (2.0 - 2.99)	114	32.7
High Distress (>3.0)	182	52.1
Extent of Physician Related Distress		
Little/No Distress (<2.0)	172	49.3
Moderate Distress (2.0 - 2.99)	121	34.7
High Distress (>3.0)	56	16.0
Extent of Regimen Related Distress		
Little/No Distress (<2.0)	61	17.5
Moderate Distress (2.0 - 2.99)	153	43.8
High Distress (>3.0)	135	38.7
Extent of Interpersonal Distress		
Little/No Distress (<2.0)	159	45.6
Moderate Distress (2.0 - 2.99)	97	27.8
High Distress (>3.0)	93	26.6

Table-3: Mean Diabetes Distress scores and associated factors.

		Mean Item Score of Total Diabetes Distress Scale			Mean Item Score of Emotional Burden			Mean Item Score of Physician Related Distress			Mean Item Score of Regimen Related Distress			Mean Item Score of Interpersonal Distress		
		Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Sex ^{NS}	Male	2.47	0.71	0.519	3.06	2.83	0.010	2.00	0.92	0.895	2.66	0.92	0.387	2.20	1.02	0.442
	Female	2.60	0.78		3.12	1.08		1.97	0.92		2.93	1.75		2.21	1.14	
Age Group (Years) ^{NS NS}	26 - 35	2.97	0.97	0.067	3.28	1.03	0.777	2.59	1.35	0.003	3.25	1.13	0.009	2.76	1.46	0.160
	36 - 45	2.42	0.60		2.90	0.97		1.85	0.61		2.93	2.64		2.13	0.92	
	46 - 55	2.60	0.81		3.38	3.09		1.93	0.96		2.86	1.04		2.19	1.14	
	56 - 65	2.51	0.68		2.90	0.98		1.99	0.83		2.72	0.93		2.21	1.07	
	66 - 75	2.42	0.78		2.89	0.99		2.04	1.09		2.50	0.97		1.98	0.87	
	76 - 85	2.58	0.77		3.23	1.08		1.90	0.86		2.72	1.02		2.18	1.17	
Duration of T2DM (Years) ^{NS NS}	< 5	2.52	0.77	0.651	3.13	2.72	0.823	2.00	0.89	0.645	2.85	1.97	0.882	2.26	1.07	0.484
	6 - 10	2.55	0.79		3.01	1.13		1.99	0.95		2.80	1.01		2.08	1.10	
	11 - 15	2.60	0.77		3.04	0.92		1.96	0.90		2.81	1.00		2.37	1.23	
	16 - 20	2.68	0.65		3.33	1.01		1.99	0.94		2.95	0.94		2.25	1.01	
	> 20	2.45	0.65		3.02	0.93		1.87	1.03		2.64	0.79		1.95	0.95	
Background ^{NS}	Rural	2.71	0.69	<0.0001	3.36	2.64	0.032	2.18	0.90	<0.0001	2.96	0.88	<0.0001	2.27	1.04	0.101
	Urban	2.41	0.78		2.87	1.03		1.82	0.90		2.71	1.85		2.15	1.13	
Education ^{NS NS}	Not Literate	2.61	0.78	0.015	3.15	1.11	0.031	1.97	0.90	0.442	3.04	2.08	0.073	2.16	1.13	0.373
	Primary	2.57	0.68		3.32	3.48		2.00	0.89		2.77	0.93		2.32	1.10	
	Middle	2.61	0.73		3.10	0.86		1.91	0.81		2.81	0.98		2.44	1.05	
	Secondary	2.47	0.72		2.95	1.09		2.19	1.07		2.64	0.86		1.97	1.00	
	Graduate	2.23	0.90		2.47	1.11		1.70	0.86		2.43	1.10		2.14	1.07	
Monthly Income (PKR) ^{NS NS}	< 20,000	2.67	0.72	<0.0001	3.34	2.46	<0.0001	2.00	0.88	0.038	2.85	0.90	0.001	2.39	1.15	0.001
	20,000 - 40,000	2.54	0.77		2.95	1.00		2.13	0.99		2.76	1.02		2.14	1.04	
	> 40,000	2.11	0.67		2.52	1.03		1.62	0.79		2.85	3.16		1.67	0.74	
Patients' Perspective about Glycaemic control ^{NS NS}	Good	2.09	0.68	<0.001	2.34	0.92	<0.001	1.69	0.78	<0.001	2.20	0.81	<0.001	1.97	1.02	<0.001
	Average	2.58	0.74		3.01	0.97		2.07	0.95		2.93	1.87		2.21	1.05	
	Poor	2.76	0.71		3.66	3.10		2.02	0.90		3.00	0.88		2.34	1.18	
Medical Treatment for T2DM ^{NS NS}	Oral Agents alone	2.47	0.77	0.068	2.93	1.09	0.004	1.92	0.88	0.014	2.77	1.75	0.013	2.18	1.06	0.015
	Insulin alone	2.51	0.64		3.23	0.97		1.94	0.97		2.63	0.76		1.80	0.98	
	Oral Agents plus Insulin	2.75	0.73		3.46	3.47		2.18	0.96		3.07	0.95		2.49	1.15	
Frequency of Medication ^{NS NS}	Once Daily	2.26	0.83	0.001	2.68	1.35	0.067	1.72	0.85	0.001	2.46	1.10	0.002	2.06	1.06	0.103
	Twice Daily	2.48	0.74		2.96	1.01		1.87	0.89		2.80	1.78		2.14	1.13	
	Thrice Daily	2.72	0.71		3.41	2.96		2.20	0.92		2.95	0.97		2.34	1.02	
	Four Times a day	2.78	0.99		3.40	1.30		2.50	1.51		2.75	0.93		2.08	1.20	
Compliance with Medical Treatment ^{NS NS}	Good	2.29	0.73	<0.0001	2.74	1.08	<0.0001	1.73	0.86	<0.0001	2.48	0.91	<0.0001	2.02	1.08	<0.0001
	Moderate	2.55	0.75		2.95	0.94		2.05	0.91		2.77	0.94		2.17	1.04	
	Poor	3.02	0.54		3.93	3.38		2.39	0.88		3.53	2.40		2.60	1.07	
Macrovascular Complications ^{NS}	Yes	2.68	0.71	0.133	3.41	0.99	0.001	1.93	0.92	0.588	2.98	0.99	0.590	1.99	1.06	0.107
	No	2.52	0.76		2.93	1.03		1.99	0.91		2.72	0.95		2.25	1.09	
Number of Macrovascular complications ^{NS NS}	None	2.52	0.76	0.010	2.93	1.03	0.025	2.00	0.91	0.371	2.72	0.95	0.133	2.25	1.09	0.177
	1	2.69	0.70		4.03	4.64		1.87	0.93		3.50	3.22		2.04	1.07	
	2	2.65	0.81		3.55	0.74		2.04	0.92		2.82	1.28		1.83	1.15	
	3	2.77	0.59		3.50	0.14		2.50	1.06		2.60	1.13		2.17	0.23	
Microvascular Complications ^{NS}	Yes	2.57	0.71	0.215	3.07	1.02	0.042	1.98	0.89	0.973	2.80	0.96	0.157	2.19	1.07	0.671
	No	2.46	0.86		2.81	0.86		1.99	0.99		2.63	0.97		2.24	1.15	
Number of Microvascular complications ^{NS NS}	None	2.45	0.87	0.006	2.80	1.07	0.202	1.97	0.98	0.421	2.62	0.97	0.053	2.26	1.15	0.485
	1	2.60	0.74		3.03	1.02		2.07	0.97		2.83	1.00		2.28	1.08	
	2	2.39	0.70		2.94	1.10		1.78	0.68		2.56	0.89		2.00	0.98	
	3	2.70	0.67		3.51	3.20		2.06	0.95		3.18	2.29		2.24	1.12	
Glycaemic Control ^{*** NS NS}	Optimal	2.24	0.77	<0.001	2.62	1.22	<0.001	1.68	0.74	0.001	2.28	0.84	<0.001	2.24	1.04	0.116
	Borderline	2.36	0.72		2.76	1.02		1.82	0.88		2.56	0.93		2.07	1.01	
	Poor	2.73	0.72		3.41	2.43		2.15	0.94		3.11	1.80		2.29	1.14	

p-values in bold are significant at the <0.05 level. *OD = Once daily, BD = Twice daily, TDS = Thrice daily, QID = Four times a day

***Optimal glycaemic control defined as HbA1c <7%, borderline glycaemic control as HbA1c 7 - 8.5% while poor glycaemic control is HbA1c >8.5%

NS ANOVA applied for statistical analysis. NS Independent samples t-test applied for statistical analysis. SD: Standard deviation T2DM: Type 2 diabetes mellitus

Table-4: Association of comorbidities and diabetes related macrovascular and microvascular complications with diabetes distress.

		Mean Item Score of Total Diabetes Distress Scale			Mean Item Score of Emotional Burden			Mean Item Score of Physician Related Distress			Mean Item Score of Regimen Related Distress			Mean Item Score of Interpersonal Distress		
		Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Hypertension [Ⓝ]	Yes	2.60	0.70	0.190	3.16	1.02	0.012	2.00	0.92	0.718	2.82	0.93	0.326	2.20	1.09	0.92
	No	2.49	0.79		2.88	1.02		1.97	0.92		2.72	0.99		2.21	1.08	
Ischaemic Heart Disease [Ⓝ]	Yes	2.73	0.80	0.150	3.16	1.05	0.378	2.02	1.02	0.796	3.01	1.04	0.124	2.41	1.37	0.276
	No	2.53	0.75		2.99	1.03		1.98	0.91		2.74	0.95		2.18	1.05	
Macrovascular Complications ^{*Ⓝ}	Yes	2.68	0.71	0.133	3.41	0.99	0.001	1.93	0.92	0.588	2.98	0.99	0.590	1.99	1.06	0.107
	No	2.52	0.76		2.93	1.03		1.99	0.91		2.72	0.95		2.25	1.09	
Number of Macrovascular complications ^{Ⓝ Ⓝ}	None	2.52	0.76	0.010	2.93	1.03	0.025	2.00	0.91	0.371	2.72	0.95	0.133	2.25	1.09	0.177
	1	2.69	0.70		4.03	4.64		1.87	0.93		3.50	3.22		2.04	1.07	
	2	2.65	0.81		3.55	0.74		2.04	0.92		2.82	1.28		1.83	1.15	
	3	2.77	0.59		3.50	0.14		2.50	1.06		2.60	1.13		2.17	0.23	
Microvascular Complications ^{**Ⓝ}	Yes	2.57	0.71	0.215	3.07	1.02	0.042	1.98	0.89	0.973	2.80	0.96	0.157	2.19	1.07	0.671
	No	2.46	0.86		2.81	0.86		1.99	0.99		2.63	0.97		2.24	1.15	
Number of Microvascular complications ^{Ⓝ Ⓝ}	None	2.45	0.87	0.006	2.80	1.07	0.202	1.97	0.98	0.421	2.62	0.97	0.053	2.26	1.15	0.485
	1	2.60	0.74		3.03	1.02		2.07	0.97		2.83	1.00		2.28	1.08	
	2	2.39	0.70		2.94	1.10		1.78	0.68		2.56	0.89		2.00	0.98	
	3	2.70	0.67		3.51	3.20		2.06	0.95		3.18	2.29		2.24	1.12	

p-values in bold are significant at the <0.05 level *Macrovascular complications include myocardial infarction, peripheral vascular disease and cerebrovascular disease

**Microvascular complications include neuropathy, nephropathy and retinopathy. [Ⓝ] ANOVA applied for statistical analysis.

[Ⓝ] Independent samples t-test applied for statistical analysis. SD: Standard deviation

EB was significantly impacted by gender, with females being more distressed than males ($p=0.01$). EB was also found to be related to an urban background ($p=0.032$) and being illiterate or having a lower level of education ($p=0.031$). The type of medical therapy being administered also had a statistically significant association with the EB, with patients receiving both insulin along with oral agents being under more emotional distress ($p=0.004$). Age was found to be significantly associated with PD ($p=0.003$) and RD ($p=0.009$), with younger patients exhibiting higher degrees of distress.

The relationships between mean total DDS score, the subscales of EB, PD, RD and IP distress, and the patients' clinical and socio-demographic factors were tabulated (Table-3).

Hypertension and the presence of macrovascular complications were significantly associated with EB ($p=0.012$, $p=0.0001$ respectively). An increase in the number of macrovascular complications led to a significant increase in overall DD and EB ($p=0.01$, $p=0.025$ respectively) (Table-4).

Diabetes related distress had a direct relationship with HbA1c ($p<0.0001$), and compliance with medical treatment ($p<0.0001$).

Discussion

Our results revealed a very high prevalence of moderate to severe DD in the study population (76.2%) with only 23.8% of patients having little or no distress. In contrast, research carried out by Islam et al. estimated that 48.5% patients with T2DM experienced moderate to high levels of distress.¹⁰ The mean item scores for overall DD, and the four subscales were also consistent with the findings of research carried out in Iran.⁷

We found that factors such as social background, monthly income, patients' perspective about glycaemic control, adherence to medication and metabolic control (HbA1c) correlated significantly across all domains of the DDS-17. We found no association between duration since diagnosis of T2DM and the presence of complications in their relation to DD. Our findings are in agreement with other studies that have highlighted that age itself is not associated with psychosocial factors.¹⁵⁻¹⁸

The current study was planned to help identify the factors associated with DD, enabling us to focus on those modifiable, in an effort to help propose an interventional strategy. EB was the most significant domain in terms of high distress and exhibited statistically significant correlations with almost all parameters mentioned above. Emotional distress has been found to be a strong predictor of glycaemic control in previous clinical research.¹⁹ Two parameters significantly associated with DD, namely

adherence/compliance with medication and the frequency of administration of medication, were also significantly associated with each other. Over 72.9% patients who were taking medicines thrice daily exhibited either poor or moderate adherence to their medication regimen ($p < 0.0001$). Conversely, 71.4% patients receiving a once-daily regimen exhibited good adherence to medical therapy. Thus, it can be postulated that reducing the frequency of administration, by using sustained release preparations of drugs, would improve compliance and lessen DD.

The direct correlation between HbA1c and DD suggests that by lessening DD, a reduction in HbA1c would be possible. Patients with diabetes experiencing DD have been found to have lower levels of self-efficacy and practice poorer self-care.^{20,21} Applying a patient empowerment approach, based on mutual respect, trust and ensuring an equal relationship between patients and physicians, is widely accepted to enhance autonomous self-regulatory behaviour in T2DM patients.^{22,23} Leyva et al. reported that high levels of psychological distress, caused by T2DM and life stressors, affect diabetes related behaviour and are strongly associated with biological indicators such as HbA1c and blood pressure.²⁴ This was further supported by Albright et al. who showed that personal stress and family context were significantly associated with poor adherence to diabetes self-care.²⁵

In a review article on adherence to therapies in patients with T2DM, Garcia-Perez et al. highlighted the fact that reduced adherence to medical treatment was associated with polypharmacy, complexity of medication regimens, perception of efficacy and safety (both on the part of the patient and the healthcare provider), economic considerations and the patient-healthcare provider relationship²⁶.

In their article on DD management, Kalra et al. opined that DD is a self-perceived insufficiency of coping skills and its management is non-pharmacological in nature. From the standpoint of a medical professional, they have recommended an approach to help patients reduce the discomfort and distress associated with the diagnosis and management of diabetes. This approach incorporates 'ask and assess coping styles', 'eliminate negative coping styles', 'internalise positive coping mechanisms', 'observation on an on-going basis' and 'upgrading one's understanding; (AEIOU).⁴

An important point is that healthcare providers tend to often underestimate the adverse health effects of DD, perhaps due to the notion that distress is anticipated to be a feature of any chronic ailment or disease process.²⁷

The current study has its limitations. The results represent study subjects who were T2DM patients being managed at a government tertiary healthcare centre. In order for our results to be generalised, a multi-centre replication should be performed to diversify patient groups. The study was of a cross-sectional nature and thus causality cannot be inferred.

Conclusion

A reduction in DD through patient empowerment, improving their self-efficacy and self-care behaviours, thus increasing adherence to medical therapy, needs to be a strategy that gets implemented at every level of healthcare. The simple provision of information cannot pass as diabetes education, and strategies that involve patients in problem-solving, shared decision-making and a roadmap for the journey with diabetes need to be developed.

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