Assesment of Diabetic Distress and Medication Adherence in Diabetic Patients at a Tertiary Careteaching Hospital

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Abstract

Introduction: *Diabetes distress (DD) refers to the unique, often hidden, emotional burdens and worries that a patient experiences when they are managing a severe chronic disease, such as diabetes.****Objectives:****This study mainly aims to measure the diabetes distress score and its related factors among patients with diabetes and the level of adherence toanti-diabetic drugs and to identify drug drug interactions and to educate the importance of physical exercise and dietary modification.* ***Method:*** *A prospective observational study conducted in a tertiary care hospital among 250 patients; demographics, past medical history, duration of diabetes, modality of treatment were recorded. Data was collected from by using diabetic distress scale (DDS17) and morisky 8 item medication adherence scale through interviewing each subject.* ***Results:*** *Majority of patients (33.6) were under the age group of 51-60. Males (63.2) are more in number than females (36.8). Most commonly affected system was musculoskeletal system (82) followed by gastrointestinal system(50).Out of 250 prescriptions 16 drug interactions were found. Majority of patients 25.6%(172) are suffering with DM from 1-5 years. Most of the patients are suffering from emotional burden 54.6% (141).* ***Conculsion:*** *DDS 17 is a valid and reliable tool to identify distress in patients with Diabetes. Most prevalent distress in overall population was Emotional Burden due to low adherence.*

Key Words: *Diabetic distress, medication adherence, Emotional burden, Drug interactions.*

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I. Introduction

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels.According to a 2009 Diabetes care article by psychologists William Polonsky, Lawrence Fisher, et al., "Living with diabetes can be tough. In the face of a complex, demanding, and often confusing set of self-care directives, patients may become frustrated, angry, overwhelmed, and/or discouraged. Diabetes-related conflict with loved ones may develop, and relationships with health care providers may become strained. The risk of depression is elevated.The prevalence of diabetes is increasing and approximately 171 millionpeople worldwide have diabetes, with 82 million in the Association of South East Asian Nations (ASEAN) region (WHO, 2009). In Malaysia, a drastic increase in the prevalence of diabetes has been reported, from 8.3% to 14.9% among those aged 30 years and above within a 10-year period (Ministry of Health Malaysia, 2006). Studies have demonstrated that poor glycemic control resulted in the development of long term complications and was also associated with disease progression, hospitalization, premature disability and mortality. A retrospective analysis concluded that the adherence rate to oral antidiabetic agents ranged from 36 to 93%. Adherence to antidiabetic agents was found to be positively associated with a decrease in HbA1c. Accurate assessment of medication adherence is necessary for effective management of diabetes.

II. Materials and Methods

STUDY DESIGN: Prospective observational study
STUDY SITE:SVRRGGH (Sri Venkateshwara Ramnarain Ruia Government General Hospital), tertiary care teaching hospital, in the department of general medicine and general surgery.
STUDY DURATION: 6 months
 STUDY POPULATION: 250 patients
STUDY MATERIALS:

- Patient data collectionproforma

- Informed consent form(ICF)
- Diabetic distress scale(DDS-17)
- Morisky 8 - item medication adherencescale

INCLUSION CRITERIA:
- Patients over 18 years ofage.
- Patients who are willing toparticipate.
- Only in patients who are admitted in the department of general medicine and generalsurgery.
- Diabetic patients with or without comorbities.

EXCLUSION CRITERIA:
- Pregnancy and lactating diabeticpatients.
- Critically illpatients.
- Patients with psychiatricillness.

METHOD OF DATA COLLECTION:
This prospective study was carried out after obtaining the permission of institutional review board, Sri Padmavathi School of Pharmacy, Tiruchanoor, Tirupati, A.P, India. All diabetic patients (>18 years) admitted in the general medicine and general surgery in-patient ward of SVRRGGH will be included in the study.We informed them about the anonymity and confidentiality of the data and the voluntary nature of their participation. Patients who are willing to participate were asked to sign the informed consent form. Data was collected via a specially designed proforma consisting of two parts. The first part include questions on socio demographic characteristics past medical history, family and surgical history, co-morbidities, diabetes duration, marital status, modality of treatment, history of documented diabetic complications,diagnosis and presentmedicationsprescribed for each patientandthesecond part consisted of two questionnaires, entitled diabetic distress scale and morisky 8-item medication adherence scale.

The data was obtained by direct patient interview and from patient case profile. During patient interview, patients are asked to answer the questions of diabetic distress scale (DDS-17) to assess DRD (diabetic related distress) in study participants and Morisky 8 item medication adherence scale. Diabetic distress scale questionnaire was translated to local language.

Score:
DDS-17 has a six-point scale for response:A mild to moderate problem is 1 or 2,A moderate to serious problem is 3 or 4, and A serious problem is 5 or 6.
Morisky 8-Item Medication Adherence Scale:<6= Poor adherence, 6-<8=Medium adherence, 8=High adherence

III. Results

In a total of 250 patients, males were found to be more 158 (63.2) than the females 92(36.8) and the highest number of patients was under the age group of 51-60 followed by 41-50, 61-70 i.e., 84 (33.6), 62(24.8), 4(21.6)patients respectively.

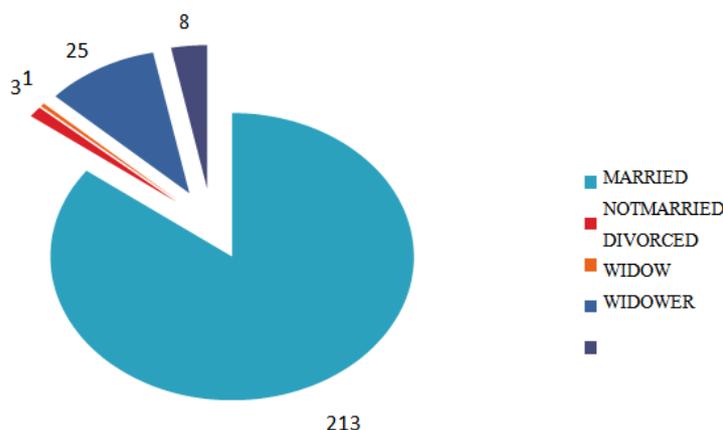**Classification based on Marital Status:**

FIG.1: MARITAL STATUS

Out of 250 patients, most of the patients are married followed by widowsi.e 82 and 14respectively. Out of 250 patients, 56 (22.4) were diagnosed with Type -1 DM, 194(77.6) were diagnosed with Type -2 DM.

TABLE 1: CLASSIFICATION OF PATIENTS BASED ON MODALITY OF TREATMENT

S.NO	MODALITY OF TREATMENT	NO OF PATIENTS	PERCENTAGE (%)
1	OHA	85	34
2	INSULIN	83	33.2
3	BOTH	54	21.6
4	UNKNOWN	28	11.2
	TOTAL	250	100

The majority number of patients were prescribed with OHA followed by Insulin i.e 85 (34),83(33.2) respectively.

TABLE 2: CLASSIFICATION OF PATIENTS BASED ON DURATION OF DM:

S.NO	DURATION	NO.OF PATIENTS	PERCENTAGE (%)
01	<1YR	2	0.8
02	1-5	149	59.6
03	6-10	73	29.2
04	11-15	14	5.6
05	>15	12	4.8
	TOTAL	250	100

Most of patients are suffering with DM from 1-5 YRS followed by 6-10 YRS i.e., 149 and 73 respectively.

TABLE. 3: CLASSIFICATION OF PATIENTS BASED ON PAST MEDICATION DRUGS

S.NO	NO OF PAST MEDICATION DRUGS	NO OF PATIENTS	PERCENTAGE (%)
01	1	118	47.2
02	2	92	36.8
03	>3	21	8.4
04	UNKNOWN	19	7.6
	TOTAL	250	100

Out of 100 patients, highest number of patients is using mono anti hyperglycemic drug followed by combination anti hyperglycemic drugs i.e., 118 (47.2), 92(36.8) respectively.

TABLE 4: CLASSIFICATION OF PATIENTS BASED ON SOCIAL HABITS

S.NO	SOCIAL HABITS	NO.OF PATEINTS	PERCENTAGE (%)
1.	SMOKING	5	2
2.	ALCOHOL	23	9.2
3.	TOBACCO	7	2.8
4.	ALCOHOL+SMOKING	56	22.4
5.	ALCOHOL+TOBACCO	2	0.8
6.	NIL	157	62.8
	TOTAL	250	100

Out of 250 patients, 157 patients have no social habits 56 patients have two social habits (Alcohol+Smoking).

TABLE 5: CLASSIFICATION OF PATIENTS BASED ON NO.OF DRUGS PRESCRIBED

S.NO	NO.OF DRUGS	NO.OF PRESCRIPTIONS	PERCENTAGE (%)
1.	1-5	64	25.6
2.	6-10	159	63.6
3.	> 10	27	10.8
	TOTAL	250	100

Highest numbers of patients were prescribed with 6-10drugs followed by 1-5 drugs i.e, 159 (63.6), 64 (25.6) respectively

TABLE 6: CLASSIFICATION OF PATIENTS BASED ON TYPE OF DISTRESS

S.No	DDS-17 SUBSCALE	NO.OF PEOPLE AFFECTED	PERCENTAGE (%)
1	EmotionalBurden	141	47.2
2	PhysicianRelated	44	14.8

3	Regimen RelatedDistress	63	21
4	InterpersonalDistress	51	17
	TOTAL	299	100

Out of 250 patients, highest number of patients comes under Emotional related distress, lowest number of patients is under Interpersonal distress, i.e., 141 (47.2) and 44(14.8) patientsrespectively.

TABLE 7: CLASSIFICATION OF PATIENTS BASED ON NUMBER OF DISTRESSES

S.NO	NO OF DISTRESS	NO OF PATIENTS	PERCENTAGE (%)
1	ONE	75	30
2	TWO	42	16.8
3	THREE	25	10
4	FOUR	3	1.2
5	NO DISTRESS	105	42
	TOTAL	250	100

Most of patients are having No distress, lowest number of patients are having four types of distress i.e., 105, 3(1.2) respectively.

TABLE 8: DIABETIC DISTRESS BASED ON DURATION OF DM

S.NO   TYPEOFDISTRESS   NO.OF PATIENTS BASED ONDURATION (YRS)

		1 -5	6-10	11-15	>15
1.	EMOTIONALBURDEN	87	40	10	4
2.	PHYSICIAN RELATEDDISTRESS	26	15	2	1
3.	REGIMEN RELATEDDISTRESS	35	22	3	3
4.	INTERPERSONALDISTRESS	29	15	5	2

Out of 250 patients,172 patients were suffering with diabetes from 1-5 years in that 87 patients were suffering with emotional burden,24 patients were suffering with physician related distress,36 patients were suffering with regimen related distress and 29 patients were suffering with interpersonal distress followed by 6-10 years i.e.,40, 15,22,15.

TABLE 9: RELATIONSHIP BETWEEN MEDICATION ADHERENCE AND DIABETIC DISTRESS

S.NO	TYPE OF DISTRESS	NO.OF PATIENTS	NO.OF PATIENTS NOT ADEHEREDTO MEDICATIONS	PERCENTAGE (%)
1.	EMOTIONAL BURDEN	141	111	46.6
2.	PHYSICIAN RELATED DISTRESS	44	32	13.4
3.	REGIMENRELATED	63	51	21.6
4.	INTERPERSONAL	51	44	18.4
	TOTAL	299	238	100

Highest number of patients were found to have emotional burden followed by regimen related distress i.e.,141, 63 respectively. Out of 141 and 63 patients 111 and 51 patients were not adhered to medications.

TABLE 10: CLASSIFICATION OF DIABETIC DISTRESS BASED ON GENDER

S.NO	GENDER	NO OF PATIENTS	NO OF PATIENTS AFFECTED WITHDRD	PERCENTAGE (%)
1.	MALE	158	94	52
2.	FEMALE	92	67	48
	TOTAL	250	161	100

Out of 250 patients, males are more prone to diabetic distress than females i.e., 94 (52) and 67 (48) respectively. Most of the patients having diabetic distress are married followed by singles i.e, 125 and 16 respectively**.**

TABLE 11: CLASSIFICATION OF PATIENTS BASED ON DIAGNOSIS:

S.NO	DIAGNOSIS BASED ON SYSTEM	NO.OF PATIENTS
1	GIT SYSTEM	50
2	CVS	28
3	GENITO URINARY SYSTEM	20

4	NERVOUS SYSTEM	21
5	RESPIRATORY SYSTEM	14
6	MUSCULO SKELETAL SYSTEM	82
7	INFECTIVE DISEASE	35
	TOTAL	250

The morbidity pattern shows that most of the respondents was found to have musculo skeletal problems 82 and Gastro intestinal disorders 50 followed by cardio vascular system 28.

TABLE 12: RELATIONSHIP BETWEEN SOCIODEMOGRAPHIC, CLINICAL AND OTHER CHARACTERISTICS ON ADHERNCE TO ANTIDIABETIC MEDICATIONS

CHARACTERISITICS	ADHERENT	NON-ADHERENT
AGEGROUP		
21-30	1	1
31-40	1	12
41-50	13	44
51-60	16	68
61-70	8	0
>70	8	16
SEX		135
M	23	65
F	27	
MARITAL STATUS		175
Married	38	1
Divorced	0	2
Notmarried	1	16
Widow	9	6
Widower	2	
TYPE OF DM		41
		159
TYPE-1	15	
TYPE-2	35	2
DURATION		116
<1YR	0	60
1-5YRS	33	
6-10YRS	13	

11-15 YRS	1	13
>15 YRS	3	9
MODALITY OF Rx		
OHA	7	78
INSULIN	24	59
BOTH	9	45
BLANK	10	18
SOCIAL HABITS		
ALCOHOL	1	12
ALCOHOL+ TOBACCO	1	14
ALCOHOL + SMOKING	5	12
NIL	17	48

TABLE.13: DRUG INTERACTIONS OBSERVED IN PRESCRIBING DRUGS

S.No	DRUG	OUTCOME
1	Metformin + Insulin + Glimepiride	Increased effects each other by pharmacodynamics mechanisms results in hypoglycaemia
2	Metformin + Furosemide	Metformin decreases levels of furosemide there by increased levels of Metformin
3	Metformin + Ciprofloxacin	Increased effects of Glimepiride
4	Metformin + Phenytoin	Phenytoin decreases effects of Metformin by Antagonism
5	Metformin + Levothyroxine	Decreased effects of Metformin by antagonism
6	Metformin + Ranitidine	Ranitidinewill increase level ofMetformin by decreasing renal clearance
7	Metformin + Enalapril	Increases toxicity of Metformin , risk oflacto Acidosis
8	Metformin + Amlodipine	Decreased effects of Metformin by antagonism
9	Glimepiride + Aspirin	Increases effects of Glimepiride
10	Glimepiride + Ciprofloxacin	Increases effects of Glimepiride
11	Glimepiride + Enalapril	Increases effects of Glimepiride
12	Glimepiride + Propranolol	Decreased effects of Glimepiride by Antagonism
13	Insulin + Ciprofloxacin	Increases effects of Insulin
14	Insulin + Enalapril	Increases effects of Insulin by synergism
15	Insulin + Propranolol	Pharmacodynamic antagonism
16	Torsemide+clopidogrel	Increased risk of torsemide toxicity

Drug – drug interactions of Anti diabetic drugs with certain anti- hypertensives, anti- biotics and cardiac drugs was found to cause hypoglycaemia due to pharmacodynamics changes like antagonism and synergistic effects.

IV. Discussion

▸ Among 250 patients 85% are married and rest of them are single due to various reasons. Married people were more adherent than people being single, in contrast married people showed greater distress (Regimen related) due to strain in their relationships and family burden supported by Majed.o.Aljuaid *et al.,* Social support variables including supportive behaviors from healthcare providers and family were significantly

associated with lower diabetes distress.

▶ In our study 194 patients were Type 2 diabetic which is more compared to Type 1 supported by Lawrence fisher Phd, ABPP et al.,. Due to its cost and favorable effects Metformin is the commonly prescribed drug about 46% and in combination with Glimepiride 30% other than insulin. Participants were receiving oral anti hypoglycemic agents and insulin almost equally. About 50% were receiving both Insulin and OHA's. But the adherence rate was found to be high in patients receiving Insulin which was opposed by S.S. Chua and S.P Chan.

▶ Physician related distress showed least frequency (9%) and reported that no problem regarding the physician does not have sufficient information about diabetes supported by Martinez Vega *et al.,*

▶ Regimen related distress is the second majorly affected domain (17%) which might be occurred due to poly pharmacy in turn leads to poor adherence as a result of regimen complexity observed in 64 prescriptions with 6-10 drugs. Adherence rate decrease as the pill burden increases as with study by Dailey *et al.,*

▶ Interpersonal distress was also markedly seen in our study i.e., about (19%) which is often associated with difficulties in coping with restricted life style.

▶ Depression creates a deep sense of futility, demotivation, lack of energy and hopelessness.

▶ It is not surprising that when Diabetes Mellitus and Depression co-exist patient cannot show a good level of adherence to the anti-diabetic medication which may leads to vascular and non-vascular complications.

▶ Health care providers often miss diabetes distress- inquiring about emotional side of diabetes hence pharmacist should play active role in reducing DD and thereby increasing treatment adherence might be an intermediate pathway to prevent complications in this population.

V. Conclusion

DDS 17 is a valid and reliable tool to identify distress in patients with Diabetes. Most prevalent distress in overall population was Emotional Burden due to low adherence. Due to the important role of diabetes-related distress in improving diabetes control and regimen adherence, the assessment of this factor should be integrated into patients' self-care plan. Most clinically relevant interactions of anti-diabetic agents and other agents which are taken for chronic time are counseled regarding the interaction and life style changes were recommended.

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