DIU Journal of Health and Life Sciences Volume 01, No.01 & 02, 2014
https://doi.org/10.36481/diuhls.v01i1-2.15fk5f34

DIABETES DISTRESS AMONG TYPE 2 DIABETIC PATIENTS

Falguny Roy[1], Nadira Mehriban[1], Galib Ferdous[2], Nahian Fyrose Fahim[2], Jeasmin Akter[2], S.M. Keramat Ali[1]

[1]Department of Public Health, Daffodil International University, [2]Department of Pharmacy, Daffodil International University

Abstract: *A cross sectional study is carried out among 165 adult type 2 diabetes patients attending at the outpatient department of Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) Dhaka. Sample is taken purposively. Data are collected through face to face interview and records review. Diabetes distress scale (DDS 17) was measured cut-off value of <2 for little or no distress 2-2.9 for moderate distress and >3 for high distress. It wes observed that 22.42% had high distress,26.1% moderate distress and rest of the 51.5% had little or no distress. The average score of total diabetes distress is 2.17 ± 0.75. The average score of each domain such as emotional burden physician related distress, regimen–related distress and interpersonal distress is (3.49± 1.52), (1.13±0.32), (2.12±0.85) ."Emotional Burden" is considered as the most important domain in measuring diabetes distress. The influence of age on level of diabetes distress is statically significant (p<0.001). The distress scale gradually increase higher from 40 years and continue till 59. The influence of residential status on level of diabetes distress is also statically significant (p<0.001). Respondents from sub-urban areas suffered more distressed symptoms than those from urban areas (53.3% vs.45.7%). The influence of smoking on level of diabetes distressed is statistically significant (p<0.005). Respondents who were the members of the having ever smoker group had highest percentage of distressed symptoms (58.5%). The influence of BMI on level of diabetes distressed is statistically significant (p<0.001). Respondents who were the members of the obese group had highest percent of distress symptoms (100%) they also the group of experience highest percentage of high distress (83.3%). There is a strong positive correlation between two variable [r=0.64,p<0.001] ; diabetes distress score with duration of diabetes mellitus. The influence of duration since detection of diabetes mellitus on level of diabetes distress is statistically significant (p<0.001). Respondents who were having diabetes of >10 years had highest percentage of distressed symptoms. Diabetes distress showed significant relationship with glycemic status. Respondents who were the members of the insulin group had highest percentages of distressed symptoms. The influence of diabetic complication on level of diabetic distress is statistically significantly (p<0.001). Respondents who were the members of having complications group had highest percentage of distressed symptoms.*

Keywords: *DD (Diabetes Distress) ,DM(Diabetes Mellitus) Diabetes Distress Scale (DDS17), Glycemic Index*

Introduction

Diabetes-distress is a part of having diabetes and is non-psychiatric distress. Addressing Diabetes-distress improves both self-care and glycemic control[1]. Diabetes mellitus (DM) is a genetic disorder and also metabolic disorder most threat in the globe[2]. It is the fourth and fifth leading cause of death in most high income countries[3]. The total number of people with diabetes is projected to rise from 171 million in 2000 to 3156 million in 2030[4].Diabetes mellitus (DM) is now recognized as a global health challenge of the 21st century.85% to 95% of the world diabetes has diabetes type 2 [5].Current projections estimate that prevalence and incidence of type 2 DM is also increasing in Bangladesh had 3.2 million people with diabetes and was feted 10th position, which will occupy the 7th position with 11.1 million in 20303. The prevalence of Type-2 diabetes observed in Bangladesh was 5.2% (rural 4.3%,urban 6.9%) at 1994-5 and 11.2%(urban) and 6.8% (rural) at 2003-4. Diabetes contributes to 6.2% of total death in Bangladeshi[6] .Prevalence of diabetes is just double in urban areas due to unplanned urbanization that lacks in environment for physical activity, consumption of junk food and explore to stressful life in cities[7].

According to the number of people with diabetes Bangladesh is in 8th position among the top 1O countries in the world[8]. The magnitude of diabetes mellitus in Bangladesh is increasing day by day. But in our country it is remained unknown due to lack of country wide survey. More than 50% of people in Bangladesh are unaware that diabetes exists. Type 2 diabetes (formerly called non-insulin-dependent or adult onset) results from the body's ineffective use of insulin. As type 2 diabetes mellitus is a chronic disease burden is high as well as the mortality morbidity is also remarkable. Therefore, type 2 diabetes mellitus is a major health problem in the country. This study has been planned to know the magnitude of the diabetes distress in Type 2 diabetes mellitus among the patients of countries largest tertiary level hospital BIRDEM. Findings of the study will help in the research field and also the planner to develop appropriate policy for prevention, control and rehabilitation of Type 2 diabetes mellitus. This study was designed to determine the level of Diabetes distress and factors associated with it among adult type 2 diabetes mellitus (DM) patients in Bangladesh

Materials and Methods

A hospital based cross sectional study was conducted; a sample 165 patient from was selected to find out the level of diabetes distress among type 2 diabetic patients and factors associated with it. The period of study was a total duration of six month from July 2013 to December 2013.

Study was conducted at BIRDEM Hospital, Dhaka. This Centre is selected because patients with 'diabetes come to this hospital from different locations, clinics, peripheral diabetic centers and from different corners of Bangladesh for proper treatment and better management.

Diabetes Distress Scale: Diabetes Distress Scale English version was translated into Bangla and was used to measure diabetes distress. Cut-off point was selected. At first DDS2 was used for screening purpose. If a patient answered affirmatively to the DDS2 question, the DDS17 can be administered to help define the content of the distress and to distress and to direct intervention. A patient diabetes distress was measured by DDS self-report scale with subscales reflecting four domains including Emotional Burden, Physician Distress, Regimen Distress and Interpersonal Distress. We consider a mean item score as a level of distress worthy of clinical attention. The investigator collected the data through face to face interview.

Data analysis: The proportion of presence and level of diabetes distress were determined by percentages. Statistical comparisons between different groups were made using Independent-Sample t-test, One-Way ANOVA for diabetes distress scores and chi-square tests for level of diabetes distress. Bivariate correlation was done to find out the associations between diabetes distress scores and duration of DM and glycemic status. All the tests were two tailed and $p<0.05$ was considered to be statistically significant.

Result

Figure 1: Distribution of the Respondents according to family history of DM (n=165)

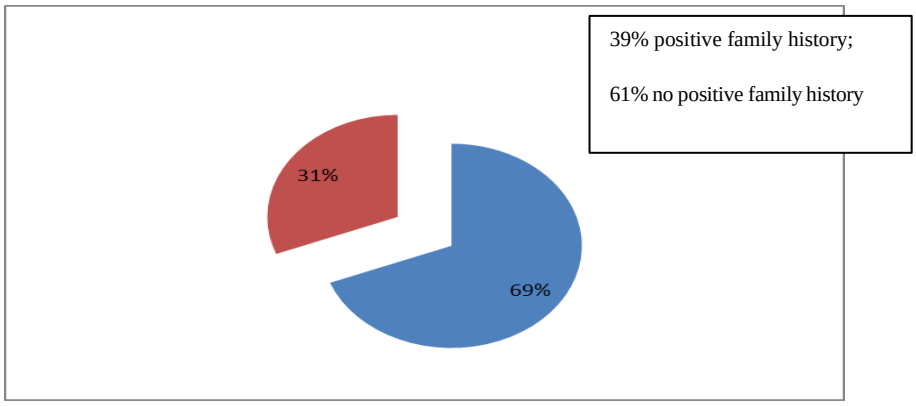

Table 1:Distribution of respondents according to diabetic management (n=165)

Management		Number		Percentage	
Non-pharmacological		4		2.4	
Pharmacological	Oral	91	161	55.2	97.6
	Insulin	45		27.3	
	Oral + Insulin	25		15.2	

For the management of diabetes mellitus most of the respondents (97.6%) received drugs in addition to" diet and discipline. Among them 55.2% took oral anti-diabetic agent and 27.3% took insulin. Only 15.5% took both oral hypoglycemic agents and insulin.

Table 2: Distribution of respondents according to anti-hypertensive treatment (n=100)

Anti-hypertensive agents	Number	Percentage
B-blockers	14	8.5
Ca-channel blockers	9	5.5
ACE inhibitors or ARBs	42	25.5

As antihypertensive agents more than half of the hypertensive respondents took either angiotensin converting enzyme inhibitors (ACEI) or Angiotencine Converting receptor blockers (ARBs) and B-blockers were used by 8.5% respondents alone or in combination.

Table 3: Distribution of respondents according to smoking status n =165)

Never smoker	60.6%
Past smoker	23%
Occasional smoker	9.7%
Current smoker	6.7%

Majority of the respondents were non-smokers (60.6%). Past smokers constitute 23.0% and total 39.4% had smoked at least once in their life time which included current smoker, past smokers occasional smokers.

Table 4: Distribution of respondents according to BMI (n=165)

Normal body waight	46.1%
Over waight	50.3%
Obes	3.6%

Anthropometric measurement should that 46.1% respondents had normal weight (BMI<25.0). About fifty four percent respondents had over weight (BMI 25.0 TO 29.9) and only 3.6% were obese (BMI ±30.0).

Table 5: Distribution of respondents according to glycemic control (HbAlc)

HbAlc level of the respondents (%)	Number	Percentage
Normal (Up to 6)	5	3
Good(<7)	60	36.4
Fair(7 to 8)	29	17.6
Poor(>8)	71	43.0
Mean±SD=8.42±2.09 Median = 8 Min=5.6 Max =13.5		

Respondents had poor glycemic control as revealed by HbAlc level >8% in majority of the cases (43.0%) and between 7 and 8 there was 17.6%. Only 3.0% was normal.

Table 6: Total Distress characteristics of the respondents (n=165)

Characteristics		No. of respondents	Depression		Test Statistics	*P*
			Mean	SD		
Age(in years)	<40	13	1.86	0504	F=l 0.763 df=3	<0.001
	40-49	47	1.81	0.704		
	50-59	65	2.21	0.700		
	>60	40	2.62	0.007		*i*
Sex	Male	81	2.07	0.708	t= 1.543 dM63	ns
	Female	84	2.25	0.788		
Residence	Sub urban	60	2.36	0.807	t= 2.571 dM63	<0.05
	Urban	105	2.05	0.700		
Religion	Muslim	159	2.19	0.750	t= 3.775 d£=6.129	<0.05
	Non-Muslim	6	1.47	0.445		
Marital Status	Married	155	2.15	0.738	t= -0.887 dM63	ns
	Unmarried	10	2.37	0.978		
Educational Status	Pre-primary	33	2.22	0.653	F= 3.301 df=4.	<0.05
	Primary	49	2.38	0.796		
	Secondary	37	2.16	0.759		
	Higher Secondary	31	2.03	0.770		
	Graduate and above	15	1.64	0.480		
Main Occupation	Unemployed	6	2.28	0.543	F=3.268 df=5	<0.05
	Service Holder	50	1.84	0.703		
	Agricultural Worker	15	2.24	0.773		
	Businessman	14	2.11	0.701		
	House wife	65	2.34	0.732		
	Retired	15	2.43	0.732		

Respondents were divided into 4 groups according to their income (Group 1:<15000; Group 2: 15000-30000; Group 3: 31000-45000 and Group 4: < 45000). There was a statistically significant difference at the p <0.05 in the diabetes distress score.

Table 7: Sex and Age of the Respondents and Level of Diabetes Distress (n=165)

Characteristics	Level of diabetes distress			Total n (%)	Test statistic	P
	Little/No n(%)	Moderate n(%)	High n(%)			
Age						
<40	11(84.6)	1(7.7)	1(7.7)	13(7.9)	X^2=30.64[b]	< 0.001
40-49	34(72.3)	8(17.0)	5(10.6)	47(28.5)		
50-59	29(44.6)	24(36.9)	12(18.5)	65(39.4)		
>60	11(27.5)	10(25.0)	19(47.5)	40(24.2)		
Sex						
Male	47(58.0)	18(22.2)	16(19.08)	81(49.1)	X^2(2)=2.715	ns
Female	38(45.2)	25(29.8)	21(25.0)	84(50.9)		

b=Fisher's exact test value

Female were suffering more from both moderate and high distress than male (29.8% vs. 22.2% for moderate and 25% av. 19.8% for high distress).

Table 8: Socio-demographic Characteristics and Level of Diabetes Distress (n=165)

Characteristics	Level of diabetes distress			Total n(%)	Test statistic	P
	Little/No n(%)	Moderate n(%)	High n(%)			
Type of Famiy						
Nuclear	77(52.0)	38(25.7)	33(22.3)	148(89.7)	X*=0.319[b]	ns
Non-Nuclear	8(47.1)	5(29.4)	4(28.5)	17(10.3)		
Family Size(in number)						
0-5	60(57.7)	25(24.0)	19(18.3)	104(63.0)	7=4.691 df=2	ns
>5	25(41.0)	18(29.5)	18(29.5)	61(37.0)		
Average monthly family income(in taka)						
<15000	22(39.3)	19(33.9)	15(26.8)	56(38.9)	3^=8. 156[b]	ns
15000-30000	40(52.6)	20(26.3)	16(21.1)	76(46.1)		
31000-45000	13(68.4)	2(10.5)	4(21.1)	19(11.5)		
> 45000	10(71.4)	2(14.3)	2(14.3)	14(8.5)		

b=Fisher's exact test value

Characteristics	Level of diabetes distress			Total n(%)	Test statistic	P
	Little/No n(%)	Moderate n(%)	High n(%)			
Duration of DM (in year)						
0-10	79(70.5)	26(23.2)	7(6.3)	112(67.9)	X^2=0.319 df=2	<0.001
>10	6(11.3)	17(32.1)	30(56.6)	53(32.1)		

Respondents who were the members of average monthly income <15000 taka group had highest percentages of distressed symptoms.The influence of monthly income on level of diabetes distress was not statistically significantly (x2=8.156, p>0.005).

Table 9: Diabetic Management and Level of Diabetes Distress (n=165)

Characteristics	Level of diabetes distress			Total n(%)	Test statistic	P
	Little/No n(%)	Moderate n(%)	High n(%)			
Type of Diabetic Management						
0-10	3(75.0)	0(0.0)	1(25.0)	4(2.4)	xM.299"	Ns
>10	82(50.9)	43(26.7)	36(22.4)	161(97.6)		
Treatment modalities(Type of Anti-diabetic agents)						
Oral	63(69.2)	18(19.8)	10(11.0)	91(56.5)	X2=33.716[b] df=2	<0.001
Insulin	16(35.6)	13(28.9)	16(35.6)	45(28.0)		
Oral+Insulin	3(12.0)	12(48.0)	10(4.0)	25(15.5)		

b=Fisher's exact test value

Respondents who were the members of the insulin group had highest percentages of distressed symptoms 64.5%.

Table 10:Diabetic Complications and Level of Diabetes Distress (n=165)

Characteristics	Level of diabetes distress			Total n(%)	Test statistic	P
	Little/No n(%)	Moderate n(%)	High n(%)			
Diabetic Complications						
Absent	69(83.1)	9(10.8)	5(6.0)	83(50.3)	X^2=67.281 df=2	<0.001
Present	16(19.5)	34(41.5)	32(39.0)	82(49.7)		

Respondents who were the members of the having complications group had highest percentage of distressed symptoms (80.5%). They were also the group to experience highest percentage of both high and moderate distress 939.0% and 41.5% respectively). The influence of diabetic complications on level of diabetes distress was statistically significant (x^2 =67.8, p<0.001).

Table 11: Hemoglobin A1 C and Level of Diabetes Distress (n=165)

Characteristics	Level of diabetes distress			Total n(%)	Test statistic	P
	Little/No n(%)	Moderate n(%)	High n(%)			
HbAlc(%)						
Good<7	56(86.2)	5(7.7)	4(6.2)	65(39.4)	X^2=57.602 df=2	<0.001
Fair 7-8	14(48,3)	8(27.6)	7(24.1)	29(17.6)		
Poor>8	15(21.1)	30(42.3)	26(36.6)	71(43.0)		

Respondents who were the members of the having poor glycemic status (>8%) group had highest percentage of distressed symptoms (78.9%). The were also the group to experience highest percentages of both high and moderate distress (36.6% and 42.3% respectively). The influence of glycemic status on level of diabetes distress was statistically significant ($x^2 = 57.60$; $p<0.001$).

Table 12: Diabetic Complications and Level of Diabetes Distress (n=165)

Characteristics	Level of diabetes distress			Total n(%)	Test statistic	P
	Little/No n(%)	Moderate n(%)	High(%)			
Diabetic Complications						
Never Smoker	58(58.0)	28(28.0)	14(14.0)	100(60.6)	x^2=67.281 df=2	<0.001
Ever Smoker	27(41.5)	15(23.1)	23(35.4)	65(39.4)		

Respondents who were the members of the having ever smoker group had highest percentage of distressed symptoms (58.5%). They were also the group to experience highest percentage of both high and moderate distress (35.4% and 23.1% respectively). The influence of smoking on level of diabetes distress was statistically significantly (X^2 =10.47, P<0.05).

Table 13: Distribution of the Respondents According to the Four sub Scale Scores

Traits	Number	Level of diabetes distress		
		Little/No	Moderate	High n(%)
Emotional Burden	165	27.30	16.40	56.40
Physician-related distress	165	98.20	1.80	-
Regimen-related distress	165	53.90	30.90	15.20
Interpersonal distress	165	76.40	20.00	3.60

Among them distressed symptom for emotional burden (high distress 56.40%, 16.40% moderate distress)

Discussion

This was a cross sectional study carried out among 165 diagnosed adult Type-2 diabetes patients. The samples were taken from the out patient department of BIRDEM, Dhaka. HbAlc level was taken into consideration to measure the glycemic status of the individual. Measurement of height and weight of the respondents were taken from their diabetic guide books. HbAlc report being done within 3 months of interview were taken as inclusion criteria. The study estimated that among the adult Type-2 diabetic patients 51.5% had little or no distress. Rest of 26.1%had moderate distress and 22.4% had high distress.

This proportion of diabetes distress in this study was consistent with the study findings of Fisher, where they found prevalence of high diabetes distress among Type-2 diabetic patients was 18% - 35%.[9]

The average score of total diabetes distress was 2.17± 0.75.The average score for each domain such as emotional burden, physical-related distress, regimen-related distress and interpersonal distress was (3.49±1.52), (1.13±0.32), (2.12±0.85) and (1.40±0.65) respectively. Emotional Burden was considered as the most important domain in measuring diabetes distress. Another study was conducted by Shojaeezadeh[10] showed that Diabetic distress an efficient pathway to tailor more effective invention programs. These study findings were also consistent with their study findings[11]. There was a statistically significant difference at $p<0.05$ level in diabetes distress score for the four age groups [$F(3) =10.736$, $p < 0.001$].The influence of residential status on level of diabetes distress was statistically significant ($x^2=9.24$, $p <0.05$). There is a statistically significant difference at the $p<0.05$ level in diabetes distress score for the six occupational groups [$F(5) =3.268$, $p =< 0.05$]. The influence of occupation on level of diabetes distress was not statistically significant ($x^2 =0.902$, $p > 0.05$).

There is a strong, positive correlation between the two variables [$r = 0.64$, $n = 165$,$p= 0.001$] with diabetes distress score with duration of diabetes mellitus. The influence of duration since detection of diabetes mellitus on level of diabetes distress is statistically significant *(%* $=66.249$, $p < 0.001$). There is a medium, positive correlation between the two variables [$r = 0.43$, $n = 165$, $p= <0.001$] with diabetes distress score with glycemic status (HbAlc level). The influence of glycemic status on level of diabetes distress is statistically significant ($X^2 =57.602$, $p< 0.001$).

There is a statistically significant difference at the $p<0.05$ level in diabetes distress score for the three treatment modalities groups ($p < 0.05$).The influence of treatment modalities on level of diabetes distress is statistically significant ($X^2 =69.794$, $p < 0.001$). The influence of smoking on level of diabetes distress is statistically significant ($x^2 =10.472$, $p < 0.005$). The influence of BMI on level of diabetes distress is statistically significant ($x^2 = 22.642$, $p< 0.001$).

The study is conducted by Fisher[10] when is diabetes distress clinically meaningful They found in their both 3D and BIRDEM study significant for age ($p = 0.001$; HbAlc significant ($p=0.13$); in this study HbAlc ($p<0.001$), DDS 17 ($x= 2.10±0.96$); in this study ($x= 2.17±0.75$). Their findings are more or less consistent with this study findings. A cross-sectional study, was conducted by Rhman[12] on depression and associated factors in diabetic patients attending an urban hospital of Bangladesh[12-13.] The study place was outpatient department of BIRDEM Hospital among 178 adult Type-2 diabetic patients. Their findings of age ($x= 54.96 ± 9.76$); sex (M=51.1%, F=48.9); Residential status (Urban 71.9%); Religion (Muslim 95.5%); Marital status (Married 82%); Monthly family income ($x= 26556.18±12410.57$); Duration since detection of diabetes mellitus ($x= 10.1±6.15$ years) and so on.

Conclusion

Half the of respondents had been suffering from some sorts of distress symptoms. Emotional burden was considered as the most important domain in measuring diabetes distress. Total diabetes distress reveled a significant relationship between variable such as age, residence, smoking status, treatment modalities and complication. Distress score highly present with any diabetic complication. Glycemic status measured by HbA1c was found to be best predictor of distress. This study has identified distress as a significant health problem among adult Type 2 Diabetes Mellitus and offer important guideline for future work in these areas.

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