ANXIETY AND DEPRESSION AMONG TYPE-2 DIABETIC PATIENTS AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objectives: To determine the frequency and associated factors of anxiety and depression among type-2 DM patients.

Material and Methods: Hospital based cross-sectional analytical study was carried out in outpatient department (OPD) of single public sector hospital of Karachi. Calculated sample size was 323. Subjects were approached by systematic random sampling method. Data was collected by adapted questionnaire. Chi-square test applied to identify the associated factors. P-value less than 0.05was counted as significant.

Results: Out of 323 participants, 290 (89.8%) were males. The mean age was 42.14±7.24 years. The incidence of diabetics with comorbid anxiety and depression was reported 36.5 %. Statistically association of anxiety and depression was established with gender (p-value<0.001), age (p-value<0.001), educational status (p-value<0.001), occupation (p-value<0.006), monthly family income (p-value<0.001) and smoking status (p-value<0.001). Anxiety and depression related to diabetes is affected by age groups, it is observed that middle age-group patients suffering more than younger age-group.

Conclusion: Diabetic patients are facing more psychological problems such as anxiety and depression. Moreover, significant association of anxiety and depression was found with age, gender, educational status, occupation, monthly income and smoking history of the participants.

Keywords: Anxiety, depression, type-2 diabetic clients, Tertiary Care Hospital, Pakistan.

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INTRODUCTION

The worldwide occurrence of diabetes is persistently increasing along with other morbidities and extra cost[1]. According to International Diabetes Federation (IDF) one out of eleven people have diabetes, which comprises of 425 million worldwide. In addition, one in six births are affected by hyperglycaemia in pregnancy and one in two adults with diabetes is undiagnosed as well which consist of 212 million worldwide. Moreover, globally 727 billion dollars are used over diabetes mellitus (DM) annually[2]. A research study was published in 2011 which explored that there were 366 million patients with diabetes, and this is likely to increase to 552 million by 2030. Majority of people with diabetes mellitus live in developing countries. Furthermore, these countries will be on risk for greatest rise over the upcoming 19 years[3].

DM, anxiety and depression are related with early morbidity and mortality, and when these conditions co-exist, the chance of increasing difficulties, patient's distress and related cost usually increase[4]. A current research study revealed that, among individuals with type-2 Diabetes, Depressive indications significantly compromise Health Related Quality of Life[5]. Persons with DM are more prone to experience the effects of anxiety and depression as compared to general population, however this frequently stays unrecognized and untreated[6]. The occurrence of anxiety and depression among diabetic individuals is alarming because it delays the initiation of treatment

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for these associative conditions leading to disappointment and poor outcome. Furthermore, Anxiety and Depression are known to stimulate the hypothalamic-pituitary-adrenal axis which, primarily stimulate the Sympathetic Nervous System (SNS). This results in reduced Insulin sensitivity, poor glycaemic control and increased risk of complications[7].

The diabetic patients are less likely to fulfil self-care. Sedentary routine of life, smoking and high fat diet inevitably prompt poor diabetes control and clinical results[8]. Though, it is obvious that active case discovery and managing Anxiety and Depression can help in improving patient motivation, and contribute to enhanced metabolic control and clinical results, whereas reducing the expenses of patient management[9]. It is obviously understood that timely diagnosis of Depression among Diabetic patients is extremely important to monitor right action and to reduce the rate of morbidity and mortality. Recent study conducted in Azad Kashmir revealed 38.35% Depression among type-2 DM[10]. DM is a major disease, which affects almost 425 million people globally. Whereas prevalence of anxiety and depression related to DM is under reported in developing countries like Pakistan. DM is a disease which directly links with the other health related problems particularly psychological problem, which leads to uncontrolled DM. Hence, identifying and examining the prevalence and associated factors of anxiety and depression will push us to take appropriate action to manage the psychological effects which eventually keep the clients healthy to manage their DM. Therefore, this study was conducted to determine the frequency and associated factors of anxiety and depression among type-2 DM patients at diabetic OPD at Dow University Hospital Karachi, Pakistan.

MATERIAL AND METHODS

This cross-sectional analytical study was performed at OPD of Dow University Hospital (DUH) Karachi upon both genders, known cases of type-2 DM, who came at OPD for follow-up. Those patients, who were above the age of 20 years, were included. Participants were included through systematic random sampling method. Present study was conducted in six months, from May to October 2019. Proportion formula was used for sample size calculation through Open Epi version 3.0. Total 323 patients were included with 95% confidence level and 5% margin of error.11 Study was conducted after the approval of Institutional Review Board (IRB), DUHS. Furthermore, permission also granted from Medical Superintendent of DUH and written informed consent was taken from all the participants as well. Confidentiality of the data was assured. All patients were approached at diabetic OPD of DUH. A validated, structured and self-administered questionnaire "Agha Khan University Anxiety and Depression Scale" (AKUADS) was used to collect data. Researcher assisted the patients where needed. Moreover, Urdu version of questionnaire was also used. The data collection tool contains 25 questions, out of which 13 are psychological & 12 somatic items, thus increasing the reliability for use as a screening instrument. Most of the other available instruments comprise of either psychological or somatic items. At a cut off score of 19 points AKUADS has specificity of 81%, sensitivity of 74%, a positive predictive value of 63%, and negative predictive value of 88%. While, Urdu version of the tool at a score of 20 it has a sensitivity of 66%, a specificity of 79%, a positive predictive value of 83 and a negative predictive value of 60, which is higher than other available scales like the self-reporting questionnaire (SRQ)12. Entry as well as analysis was computed by using SPSS version 21. Firstly, the association of anxiety and depression with demographic variables were determined by using Chi-squire test. P-value ≤ 0.05 was considered as level of significance. Secondly, logistic regression was used to identify the strength and direction of the association with outcome variable.

RESULTS

In this research total 323 type-2 diabetic patients from DUH were recruited. Demographic profile of the study participants was displayed in Table 1. Approximately half (46.4%) of the participant's age group were between 41-50 years. Mean age of study subjects was 42.14 ± 7.24 years. Majority of them (89.8%) were males, nearly half 146 (45.2%) had education matric and above. Monthly income of more than half 173 (53.6%) participants was between Pak Rs. 16,000-25000 and 47 (14.6%) participants were unemployed. Majority 208 (64.4%) of study participants were smokers and duration of the DM was 1-5 years.

Table-2 reveals the association of socio-demographic characteristics of the study subjects with anxiety and depression. There was significant reduction in prevalence of Anxiety and Depression with increasing age ($p = <0.001$). According to our findings, both the anxiety and depression is much more common in females than males that is also significant ($p = <0.001$). Prevalence of anxiety and depression were found less in highly educated than illiterate or primary educated persons, this variable also significant ($p = <0.001$). Patients with lower income and

cigarette smoking were also more depressed (p = 0.001). Anxiety and depression were found less common in unemployed or retired patients than employed patients, this variable also statistically significant (p=0.006). Prevalence of Anxiety and Depression increased with duration of Diabetes (p = 0.644).

Table 3 demonstrates the effect of association between anxiety and depression with socio-demographic characteristics of the participants. It was computed by using logistic regression. Statistically association of Anxiety and Depression was established with gender, age, occupation, monthly income, educational status, and smoking. Age group 41-50 years (OR: 8.8, 95%CI: 4.05-19.10) and in 51years and above age-group (OR: 2.41, 95%CI: 1.36-4.27) as compare to 31-40 years of age-group. Proportion of Anxiety and Depression is more in females' participants (OR: 4.721, 95%CI: 2.160 -10.318). Diabetes linked with anxiety and depression also exaggerated by educational status of the research participants, highly educated subjects are less affected by Anxiety and Depression. In Middle level (OR: 11.53, 95%CI: 5.022-26.49), Matriculation (OR: 9.33, 95%CI: 3.73- 23.30) and for (Intermediate/ Bachelor / Masters) (OR: 2.16, 95%CI: 0.89- 5.24) as compare to Middle level of education. Employment is also one more aspect to enhance anxiety and depressive symptom among diabetic clients (OR: 2.81, 95%CI: 1.21 - 6.49). It is also highlighted by present study that cigarette smokers are at greater risk of anxiety and depression as compare to non-smokers (OR: 2.37, 95%CI: 1.42- 3.93).

Table 1: Demographic Profile of Study Participants.

Characteristics	N	%
Age		
40-31	68	21.1
50-41	150	46.4
51 and above	105	32.5
Gender		
Male	290	89.8
Female	33	10.2
Educational Status		
Illiterate	42	13.0
Primary	30	9.3
Middle	105	32.5
Matriculation	52	16.1
Intermediate	39	12.1
Bachelor / Masters	55	17.0
Occupation Status		
Professional	134	41.5
Non-professional	142	44.0
Unemployed/ Retired	47	14.6
Monthly Income		
<15,000	82	25.4
25,000-16,000	173	53.6
>25,000	68	21.1
Smoking Status		
Smoker	208	64.4
Non-smoker	115	35.6
Duration of Diabetes (years)		
Less than 1 year	33	10.2
5-1 years	208	64.4
10-6 years	31	9.6
More than 11 years	51	15.8

Table 2: Association of Anxiety and Depression with demographic characteristic.

Anxiety and Depression symptom	No		Yes		Chi square test	
	n	%	N	%		
Age					33.957	<0.001
40-31	15	%31.2	33	%68.8		
50-41	106	%62.4	64	%37.6		
51 and above	84	%80.0	21	%20.0		
Gender					17.435	<0.001
Male	195	%67.2	95	%32.8		
Female	10	%30.3	23	%69.7		
Educational Status					59.183	<0.001
Illiterate/ Primary	64	%88.9	8	%11.1		
Middle	43	%41.0	62	%59.0		
Matriculation	24	%46.2	28	%53.8		
Intermediate/Bachelor / Masters	74	%78.7	20	%21.3		
Occupation					10.245	0.006
Professional	85	%63.4	49	%36.6		
Non-professional	81	%57.0	61	%43.0		
Unemployed/ Retired	39	%83.0	8	%17.0		
Monthly Income					27.668	<0.001
<15,000	71	%86.6	11	%13.4		
25,000-16,000	79	%52.0	73	%48.0		
>25,000	55	%61.8	34	%38.2		
Smoking Status					11.435	0.001
Smoker	118	%56.7	90	%43.3		
Non-smoker	87	%75.7	28	%24.3		
Duration of Diabetes (years)					1.667	0.644
Less than 1 year	27	%67.5	13	%32.5		
5-1 years	110	%65.5	58	%34.5		
10-6 years	30	%61.2	19	%38.8		
More than 11 years	38	%57.6	28	%42.4		

DISCUSSION

According to (IDF), global prevalence of DM was approximately 285 million in 2010 and increase is anticipated to approximately 439 million by 2030[13]. WHO surveyed and revealed in 2011that, overall prevalence of DM is about12.9 million in Pakistan[14]. The incidence of mortality increases with depression associated with diabetic patients[15-17]. Prevalence of depression in some neighbouring countries such as Iran was reported 55% United Kingdom and United States of America was30-83%[18- 20].

The comparison of DM with depression first one has more symptoms of illness, like higher risk of complications and higher working incapacity than second one[21]. It is established that in several chronic illnesses[22]. Depression is a leading mental health issue to medical therapy and there is highest threat of noncompliance to hospital medication non-depressed patients[23]. People who have Diabetes and depression have poor dietary, exercise, and medication compliance resulting in reduced glycaemic control[24].

In this study diabetes patients with anxiety and depression were 36.5% affected by younger age group, the frequency of anxiety and depression is higher than the middle age group. Frequency of female patient's depression was higher in this study. Depression was seen higher amongst patients with poor socioeconomic status and little educational level. Finding of this study is not so far from the study conducted in United Kingdom, reported approximately 33% of individuals with DM experience the ill effects of anxiety and one-fourth of them experience the ill effects of depression[25]. Frequency of depression and anxiety was found to be 52.7% as discovered by an updated study. Moreover, occurrence of depression was seen higher amongst uneducated ladies, housewives compare

Table 3: Effect of associated factors with Anxiety and Depression among diabetic patients using logistic regression.

Factors	Beta coefficient	Standard Error	Wald test statistic	Degree of freedom	P-value	OR	%95 C.I for OR	
							Upper	Lower
Age			30.270	2.000	<0.001	1		
40-31	2.175	0.396	30.222	1	<0.001	8.800	4.053	19.108
50-41	0.882	0.291	9.192	1	0.002	2.415	1.366	4.271
51 and above						1		
Gender								
Male						1		
Female	1.552	0.399	15.137	1	<0.001	4.721	2.160	10.318
Educational Status			51.909	3	<0.001			
Primary						1		
Middle	2.445	0.424	33.220	1	<0.001	11.535	5.022	26.495
Matriculation	2.234	0.467	22.884	1	<0.001	9.333	3.738	23.306
Intermediate/Bachelor / Masters	0.771	0.452	2.913	1	0.088	2.162	0.892	5.242
Occupation			9.491	2	0.009			
Professional	1.033	0.428	5.840	1	0.016	2.810	1.216	6.497
Non-professional	1.301	0.0424	9.429	1	0.002	3.671	1.601	8.420
Unemployed/ Retired						1		
Monthly Income			24.307	2	<0.001			
<15,000						1		
25,000-16,000	1.786	0.362	24.279	1	<0.001	5.964	2.931	12.135
>25,000	1.384	0.391	12.550	1	<0.001	3.990	1.856	8.580
Smoking Status								
Smoker	0.863	0.258	11.146	1	0.001	2.370	1.428	3.933
Non-smoker								
Duration of Diabetes (years)			1.661	3	0.646			
Less than 1 year						1		
5-1 years	0.091	0.375	.059	1	0.808	1.095	0.526	2.282
10-6 years	0.274	0.447	.376	1	0.540	1.315	0.548	3.160
More than 11 years	0.426	0.420	1.029	1	0.310	1.530	0.673	3.482

with educated class and working women[26]. Regarding ranking scale of diseases, depression is on number 4 thon the international burden of diseases and is about to rise to rank 2nd by the year 2020[10]. In Malaysia, a latest research study on diabetic clients was conducted on large sample size from eight different areas, which discloses the high prevalence of Depression 26.6%, Anxiety 40% and Stress 19.4% respectively. They have also found significant association among marital status, occupation, family history, monthly household income, presence of co-morbidity, and factors of depression, anxiety and stress[27]. In our research study, statistical association was found between diabetes related anxiety and depression and age, gender, educational status, occupation, monthly household income and smoking status.

Another study conducted in Pakistan by Rehman et al in 2015, it was found that the prevalence of depression, anxiety and stress 47.9%, 69.6% and 62.9% respectively among type-2 diabetes patients[28]. Moreover, prevalence of depression, anxiety and stress was also significantly higher among those patients who were suffering from complications along with type-2 DM as compared to without complications. In our study, nearly 50% of the cigarette smokers and low household income holders were suffering from anxiety and depression. According to IDF three quarters of people with diabetes live in low and middle-income countries. On the other hand, several research studies disclosed that association of low household income and diabetes related anxiety and depression.

In present study, 69.7% female and 32.8% male participants had sign of anxiety and depression. A study done in Qatar also revealed that female had elevated depression, anxiety and stress as compared with male. It is also observed that 13.6% DM patients were suffering from

strict depression, 35.3% were with strict anxiety, 23.4% with strict stress, while in female diabetic clients 63.3% were with depression, 70.1% were with Anxiety and 73.3% were with stress[29].

Another study carried out in Azad Kashmir Pakistan, observation was that Depression among diabetic patients was 38.35%. Depression was mild in about 34 (25.56%), moderate in about 12 (9.02%), less severe in about 4 (3.01%) and severe in about 1 (0.75%) patients. Significant association with depression was of female, lower education level and higher BMI ($p < .05$).10 Sughra et al (2018) found that 61 (55.5%) DM clients were also having comorbid Depression. Mood disorder was found to be greater in females (83.6 %) as compared to males (16.4%). Statistically significant relationship was found between Depression along with HTN ($p< 0.002$)[30]. In current study, statistical association was also found in gender and education variable p=value <0.001.

Haleem et al (2017) compared Type 2 DM patients with and without Depression and found that Depression was three fold greater in females (25.7%) compared to males (7.1%). This may be because of higher BMI in females which predisposes them to significantly higher comorbid conditions[31]. A research study done in Islamabad revealed that Depression among Diabetic population was 21– 26% based on scores of HDRS along with BDI and also observed that Depression was more in females 78% as compare to males and more in uneducated patients 54.4–61.7% as compare to educated.32

LIMITATIONS

This study was conducted only in one institution and on small sample size. Therefore, findings can't be generalized on whole population. Moreover, Cause and effect association could also not be determined as the study was cross-sectional in nature.

CONCLUSION

Diabetic patients are at greatest risk for mental distress. Diabetic patients who are uneducated, unemployed and females, are at greater risk of having comorbid Anxiety and Depression. Diabetes Mellitus when coupled with Depression, leads to non-adherence to medications, diet plan, and exercise, insufficient monitoring, and poor self-care. Moreover, this study gives insight about the problem. This study will potentially help to conduct interventional study in future.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Ali S:	Conception, study design, data collection, manuscriptwriting.
Raja:	Dataentering, analysis and interpretation, helped in manuscript writing.
Badil:	Literature review, editing manuscript and over all supervision.
Kumar P:	Critical review, proof reading and final approval to publish article.
Washdev:	Manuscriptwriting and bibliography.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.