PREVALENCE OF DEPRESSION AMONG TYPE2 DIABETES MELLITUS IN PAKISTANI POPULATION.

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ABSTRACT... Diabetes is a very prevalent problem in Pakistan. Depression along with diabetes affects not only quality of life but compliance and management of patient. Various studies have found high prevalence of depression among T2DM depression. In our study we shall determine the prevalence of depression among T2DM patients in Pakistan. The objective of this study was to find out the prevalence of depression in Type2 diabetes mellitus patients. **Study Design:** Cross-sectional study. **Setting:** Jinnah Post Graduate Medical Centre Karachi. **Period:** May 2017 to December 2017. **Materials and Methods:** The patients with a diagnosis of type 2 diabetes above age 30 years (Male= 50 (30.1%) Female=116 (69.9%) Total=66 Patients), were recruited after informed consent. Type 2 diabetes mellitus patients both male and female above age 30 were included in the study. **Results:** Mean PHQ- Score is 10.83±5.6. 81.9% had PHQ Score > 4. According to PHQ-9 scale, 18.1% (n=30) had no depression, 26.5% (n=44) had moderately severe depression and 3.6% (n=6) had severe depression. In our study females had more severe depression in comparison with male (5.2% vs. 0%). **Conclusion:** Depression is very common in Pakistan among Type 2 Diabetic patients. Antidepressant has key role to break the vicious cycle of depression and type2 diabetes mellitus diabetes.

Key words: Co-Morbid   Conditions,   Diabetic   Complications,   Depression,   Oral Antiglyceamic Drugs, PHQ-9 Score, Insulin, Type 2 Diabetes Mellitus.

INTRODUCTION

Prevalence of diabetes is high in Pakistan ranging from 7.6 to 11%.[1] Diabetes is contributing a significant load to global burden of diseases and many studies have linked it with depression. Diabetes along with depression has significant impact on quality of life of patient along with its role in significantly increasing the health care cost.[2] Depression is associated with non compliance to diabetes self-care in term of glucose level monitoring, medications and diet.[3] Depression may be linked to severe neuropathy in diabetes.[4] In few studies depression in diabetes is linked to retinopathy, frequent hospital admissions and sexual problems.[5] Various socio-demographic risk factors are also identified for reason of depression in diabetic which includes younger age, low socioeconomic status, less education, being unmarried, poor social support, and female sex.[6]

Co morbid depression in patients with diabetes is also associated with increased numbers and severity of diabetic symptoms and complications. Groot in his meta-analysis demonstrated a clinically significant relation between diabetic complications like neuropathy, retinopathy, sexual dysfunction and macro vascular complication and depression.[7]

In a meta-analysis of 39 studies, 11% of diabetic patients met the diagnosis of co morbid major depressive disorder (MDD) and 31% experienced significant depressive symptoms. Another observation was that prevalence of depression in patients with diabetes was significantly higher in women than men (28% and 18%, respectively; P <0.0001).[8] Another meta-analysis showed the prevalence of depression is higher in diabetic patients than those without diabetes.[9]

In our study we determined the prevalence of

depression among type 2 diabetic patients. The purpose of this study was to add whatever little data is available, on prevalence of depression in diabetic patients in Pakistan.

The aims and objectives of present study were to find out the prevalence of depression among type 2 diabetes patients in Pakistan.

MATERIAL AND METHODS
This cross-sectional study was carried out in May 2017-Dec 2017 in Jinnah Post Graduate Medical Centre, Karachi. The patients with a diagnosis of type 2 diabetes above age 30 years (Male= 50 (30.1%) Female=116 (69.9%) Total=66 Patients), were recruited after informed consent. Type 2 diabetes mellitus patients both male and female above age 30 were included in the study. Patients with abuse (physical, social and sexual) Certain medications e.g. beta blocker, methyldopa, reserpine, and benzodiazepine, Conflict, Death or a loss, Genetics, Serious illnesses like malignancy, and Substance abuse were excluded from study.

The Patient Health Questionnaire-9 (PHQ-9) was used for evaluation of depression, and relevant clinical details were obtained. No intervention was part of the study.

Depression was assessed by administering the nine-item PHQ-9, a self-report version of Primary Care Evaluation of Mental Disorders that assesses the presence of major depressive disorder using modified Diagnostic and Statistical Manual, Fourth edition criteria. The questionnaires were filled by author himself after explaining to participants. It assesses the symptoms experienced by participants during the 2-week period before they take the survey. A total score ranging from 0 to 27 was obtained; with higher scores indicating patients' increased self-report of depression severity.

Total Score / Qualitative Symptom Classification
1-4 / Minimal depression
5-9 / Mild depression
10-14 / Moderate depression
15-19 / moderately severe depression
20-27 / severe depression

The variables included in the study were gender, age and current mode of treatment. Data was analyzed using SPSS Version 23. Numerical data were presented as mean ± standard deviation or percentages. Categorical data like medications, gender and grade of depression was presented as frequencies. Data was stratified according to gender, medications and time since diagnosis. A sample size of 166 was taken using 11% prevalence of diabetes, confidence interval of 95% and chances of alpha error 5%.

INCLUSION CRITERIA
Type2 diabetes mellitus patients.

Exclusion Criteria
1. Patients with abuse (physical, social and sexual)
2. Certain medications e.g. beta blocker, methyldopa, reserpine and benzodiazepine
3. Conflict, Death or a loss
4. Genetics, Serious illnesses like malignancy
5. Substance abuse

Study Design
A cross-sectional study.

Data Analysis

Gender	n(%)
Male	50 (30.1%)
Female	116 (69.9%)
Total	166
Table-I. Gender	

Medication	n(%)
Insulin	8 (4.8%)
Oral-(Metformin/DPPT-4 Inhibitors/ Gliptins /Sulphonylurea)	138 (83.1%)
Both	20 (12%)
Total	166
Table-II. Medications	

Grade of Depression	n(%)
None	30 (18.1%)
Mild	34 (20.5%)
Moderate	52 (31.3%)
moderately severe	44 (26.5%)
Severe	6 (3.6%)
Table-III. Grades according to severity of depression	

Time since Diagnosis	Diagnosis				
	None	Mild	Moderate	Moderately Severe	Severe
less than 5 years	20 (22.7%)	16 (18.2%)	26 (29.5%)	24 (27.3%)	2 (2.3%)
between 5 to 10 years	4 (9.1%)	10 (22.7%)	14 (31.8%)	16 (36.4%)	0
between10to20years	6 (33.3%)	4 (22.2%)	4 (22.2%)	2 (11.1%)	2 (11.1%)
more than 20 years	0	4 (25%)	8 (50%)	2 (12.5%)	2 (12.5%)

Table-IV. Time since diagnosis and severity of depression.

Gender	Diagnosis					
	None	Mild	Moderate	Moderately Severe	Severe	Total
Male	16(32.0%)	12(24%)	14 (28%)	8 (16%)	0	50
Female	14(12.1%)	22(19%)	38(32.8%)	36 (31%)	6 (5.2%)	116

Table-V. Gender wise diagnosis

Medication	Diagnosis				
	None	Mild	Moderate	Moderately Severe	Severe
Insulin	0	2(25%)	2 (25%)	4 (50%)	0
Oral	30 (21.7%)	26 (18.8%)	44 (31.9%)	34 (24.6%)	4 (2.9%)
Both	0	6 (30%)	6 (30%)	6 (30%)	2 (10%)

Table-VI. Medication wise diagnosis

RESULTS

Mean age of participants in our study was 51.9±10.4 years. 30.1% (n=50) participants were male and 69.9% (n=116) were female (Table-I). 83.1% (n=138) patients were on oral medication (Table-II).

Mean PHQ- Score is 10.83±5.6. 81.9% had PHQ Score > 4. According to PHQ-9 scale, 18.1% (n=30) had no depression, 26.5% (n=44) had moderately severe depression and 3.6% (n=6) had severe depression (Table-III).

Mean time since diagnosis in our study is 6.59±8.04 years. Those participants with less than 5 years of diagnosis had 77.3% participants with score > 4, while all 100% of participants had a PHQ score of > 4 in participants with over 20 years with diagnosis of diabetes (Table-IV).

In our study females had more severe depression in comparison with male (5.2% vs. 0%). 87.9% (n=102) females had PHQ-9 score of greater than 4 while only 68% (n=36) male had PHQ-9 score greater than 4 (Table-V).

In our study 100% (n=8) of participants on insulin had PHQ-9 score > 4, while 78.3% (n=108) participants on oral had PHQ-9 score > 4 (Table-VI).

Mean PHQ- Score is 10.83±5.6. 81.9% had PHQ Score > 4. According to PHQ-9 scale, 18.1% (n=30) had no depression, 26.5% (n=44) had moderately severe depression and 3.6% (n=6) had severe depression. In our study females had more severe depression in comparison with male (5.2% vs. 0%).

DISCUSSION

Depression is common psychiatric disorder in any chronic illness, like anaemia, hypertension and asthma. This study demonstrated that the prevalence of depression in type2 diabetes mellitus was 50(30.12%) in male and116 (69.87%) in female.[11] Chronic diseases itself make patient depressed due to many reasons. For example as in our study, diabetes mellitus has many systemic complications e.g. myocardial infarction, cerebral stroke, diabetic retinopathy, nephropathy, diabetic foot, sensory and motor neuropathy. All these have both organic and psychological impact on human body.[12] Persistent chronic sign and symptoms, cost of treatment, and loss of job due to functional disability ultimately leads to depression. As counter body response, depression leads to increased sympathetic over activity witch increases glucose production, which further worsen the diabetes mellitus. So a vicious cycle is established. It is essential to break this cycle to improve both depression and blood glucose levels. Here antidepressant has key role to break this vicious

cycle. SSRI antidepressant like fluoxentin, paroxitin has important role to control the depression as well as type2 diabetes mellitus12. SRRI anti depressant has particular role in those type2 diabetic patients who are overweight and increased appetite. As weight is reduced, beside dietary measures, insulin receptors are increased which increase sensitivity to insulin and Metformin. So anti depressant has important role in the management of depressions as well as type2 diabetes mellitus.[13]

According to local study conducted by farhan in department of general medicine, Pakistan Institute of Medical Sciences Islamabad-Pakistan, depression has been estimated to affect around 30–40% of Pakistani population. A study conducted by Naskar S[1], Victor R[2], Nath K in India, 08%-84% rate of depression was found in type 2 diabetic patients.[14]

Patient Health Questionnaire-9 (PHQ-9, was used in our study, because of short length of questionnaire, to evaluate the severity depressions. We found that moderate to severe depression was more common in women than men 36 (31%), 8 (16%) respectively. Moderately to severe depression was found more in oral 34 (24.6%) than in insulin 4 (50%),[15]

CONCLUSION
Depression is very common in Pakistan among Type 2 Diabetic patients. Antidepressant has key role to break the vicious cycle of depression and type2 diabetes mellitus diabetes.
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REFERENCES

1. **Depression In Type-2 diabetic patients presenting to a Tertiary Care Hospital in Pakistan Ahmed Farhan,** Amir Raza Ayub, Jamal Zafar Department Of General Medicine, Pakistan Institute Of Medical Sciences Islamabad-Pakistan; J Ayub Med Coll Abbottabad 2017; 29(2).

2. **Frequency of depression in type 2 diabetes mellitus and an analysis of predictive factors-JAMA.** APRIL 2016 Abdul Rehman Arshad, Kamran Yousaf Alvi (Department of Medicine, 1 Mountain Medical Battalion, Bagh, Azad Kashmir, Pakistan.)

3. **Depression in diabetes mellitus-A comprehensive systematic review of literature from an Indian perspective.** Naskar S[1], Victor R[2], Nath K[2].

4. David Russell Jones, Frans Pouwer and Kamlesh Khunti, **Identification of barriers to insulin therapy and approaches to overcoming them, Diabetes, Obesity and Metabolism, 20, 3, (488-496), (2017).** Wiley Online Library

5. Merel Huisman, Sabita Soedamah-Muthu, Esther Vermeulen, Mirthe Muilwijk, Marieke Snijder, Mary Nicolaou and Irene van Valkengoed, **Does a high sugar high fat dietary pattern explain the unequal burden in prevalence of type 2 diabetes in a multi-ethnic population in The Netherlands?** The HELIUS Study, Nutrients, 10, 1, (92), (2018).

6. Sue Pearson, Karen Wills, Michelle Woods and Emma Warnecke, **Effects of mindfulness on psychological distress and hba1c in people with diabetes, Mindfulness,** (2018).

7. Willy Marcos Valencia and Hermes Florez, **Exercise and quality of life, diabetes and exercise,** 10.1007/978-3-319-61013-9_15, (221-230), (2017).

8. .C. Dolan, R. Glynn, S. Griffin, C. Conroy, C. Loftus, P. C. Wiehe, M. L. Healy and B. Lawlor, **Brain complications of diabetes mellitus: A cross‐sectional study of awareness among individuals with diabetes and the general population in Ireland,** Diabetic Medicine, 35, 7, (871-879), (2018).

9. B. Cleal, U. H. Panton, I. Willaing and R. I. G. Holt, **Diabetes and depression in Denmark 1996–2010: National data stratified by occupational status and annual income,** Diabetic Medicine, 34, 1, (108-114), (2016).

10. S. Westra, S. Simsek, F. Rutters, Y. M. H. Krul‐Poel, C. D. A. Stehouwer, J. M. Dekker and F. Pouwer, **Low vitamin D levels are not a contributing factor to higher prevalence of depressive symptoms in people with Type 2 diabetes mellitus: The Hoorn study,** Diabetic Medicine, 34, 4, (577-581), (2016).

11. David A. Zhang, Vicky Lam, Vanessa Chu and Ming Li, **Type 2 diabetes with comorbid depression in relation to cognitive impairment: An opportunity for prevention?,** Molecular Neurobiology, (2017).

12. Rebecca M. Sacks, Jessica Greene, Judith Hibbard, Valerie Overton and Carmen D. **Parrotta, does patient activation predict the course of type 2 diabetes?** A longitudinal study, Patient Education and Counseling, 100, 7, (1268), (2017).

13. Chiara Conti, Chiara Mennitto, Giulia Di Francesco, Federica Fraticelli, Ester Vitacolonna and Mario Fulcheri, **Clinical characteristics of diabetes mellitus and suicide risk,** Frontiers in Psychiatry, 10.3389/fpsyt.2017.00040, 8, (2017).

14. Brenna N Renn, Vanessa Obetz and Leilani Feliciano, **Comorbidity of depressive symptoms among primary care patients with diabetes in a federally qualified health center,** Journal of Health Psychology, 10.1177/1359105318755260, (135910531875526), (2018).

15. Panayotes Demakakos, Graciela Muniz-Terrera, Arie Nouwen and Stephen D. Ginsberg, **Type 2 diabetes, depressive symptoms and trajectories of cognitive decline in a national sample of community-dwellers: A prospective cohort study,** PLOS ONE, 10.1371/journal.pone.0175827, 12, 4, (e0175827), (2017).

16. Redouane Rebai, Luc Jasmin and Abdennacer Boudah, **The antidepressant effect of melatonin and fluoxetine in diabetic rats is associated with a reduction of the oxidative stress in the prefrontal and hippocampal cortices,** Brain Research Bulletin, 10.1016/j.brainresbull.2017.07.013, 134, (142-150), (2017).

17. Crossref Abdulrahman A. Al-Mohaimeed, **Prevalence and factors associated with anxiety and depression among type 2 diabetes in Qassim: A descriptive cross-sectional study,** Journal of Taibah University Medical Sciences, 12, 5, (430), (2017).

18. Hadi Abou-El-Hassan, Batoul Dia, Khalil Choucair, Stephanie A. Eid, Farah Najdi, Lama Baki, Farid Talih, Assaad A. Eid and Firas Kobeissy, **Traumatic brain injury, diabetic neuropathy and altered-psychiatric health: The fateful triangle,** Medical Hypotheses, 10.1016/j.mehy.2017.08.008, **108**, (69-80), (2017).

19. **Thways for the relationship between diabetes distress, depression, fatalism and glycemic control in adults with type 2 diabetes,** Journal of Diabetes and its Complications, 31, 1, (169), (2017).

20. Attarad Ali, Sidra Ambreen, Rabia Javed, Saira Tabassum, Ihsan ul Haq and Muhammad Zia, ZnO **nanostructure fabrication in different solvents transforms physio-chemical, biological and photodegradable properties,** Materials Science and Engineering: C, 74, (137), (2017).

21. Helen McGloin, Declan Devane, Caroline D McIntosh, Kirsty Winkley and Georgina Gethin, **Psychological interventions for treating and preventing recurrence of foot ulcers in people with diabetes,** Cochrane Database of Systematic Reviews, (2017).

22. Kelley Newlin Lew, Yolanda McLean, Sylvia Byers, Helen Taylor and Karina Cayasso, **Type 2 diabetes prevention and self-management among Nicaraguan ethnic minorities: Findings from phase 3 of a community-based participatory research study,** International Journal of Human Rights in Healthcare, 10, 1, (28), (2017).

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