Open Access

Original Article

Frequency of Depression in Patients of Type 2 Diabetes Mellitus

Muhammad Ahsan Sana, Nouman Kashif, Khalid Azam

Combined Military Hospital, Lahore /National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To determine the frequency of depression and associated risk factors in patients with type 2 diabetes mellitus.
Study Design: Cross-sectional study.
Place and Duration of Study: Department of General Medicine, Combined Military Hospital, Lahore Pakistan, from Jan to Apr 2020.
Methodology: One hundred and two patients with type 2 diabetes mellitus visiting OPD were enrolled in the study. Depression was assessed using the Urdu version of Beck's Depression Inventory. In addition, smoking status, history of hypertension, duration of diabetes, drug history and HbA1c levels were recorded.
Results: Of 102 participants 57(55.9%) were males and 45(44.1%) were females. 43(42.2%) showed depression, 28(27.5%) had mild depression, 11(10.8%) had moderate depression and 4(3.9%) had severe depression. 87(85.3%) had poor glycemic control. There was a significant relationship between the duration of diabetes mellitus and depression (r=0.238 p=0.016). The risk of depression was more in patients with hypertension (OR: 2.206, CI: 0.981–4.947, p=0.054), smokers (OR: 2.191, CI: 0.796 – 6.031, p=0.124) and patients on insulin therapy (OR: 1.891, CI: 0.769 – 4.647, p=0.162).
Conclusion: A significant number of patients with type 2 diabetes mellitus have depression. Concomitant hypertension, smoking and insulin therapy are additional risk factors.

Keywords: Depression, Hypertension, Insulin Therapy, Smoking, Type 2 diabetes mellitus.

How to Cite This Article: *Sana MA, Kashif N, Azam K. Frequency of Depression in Patients of Type 2 Diabetes Mellitus. Pak Armed Forces Med J 2022; 72(6): 1949-1952. DOI: https://doi.org/10.51253/pafmj.v72i6.6227*

INTRODUCTION

Diabetes Mellitus is a common health problem characterized by an increased level of glucose in the blood. Type 2 diabetes is the most common form of diabetes mellitus. There is increased resistance to insulin combined with a decreased level of insulin in type 2 diabetes.[1] Globally burden of diabetes mellitus is increasing. It is estimated that 463 million people had diabetes mellitus in 2019, which is expected to increase to 700 million by 2045.[2] Diabetes was responsible for 5 million deaths in 2015 globally. The prevalence of type 2 diabetes in Pakistan is estimated to be 16.98% and is gradually increasing.[3,4]

Depression is a major psychiatric illness usually underreported due to low awareness about mental illness in our society. It has an estimated prevalence of 264 million people globally. It is a major contributor to the overall disease burden and causes significant disability worldwide.[5,6] Symptoms of depressed mood, loss of interest, low self-esteem, loss of enjoyment, pessimism, suicidal thinking, guilt, reduced appetite, loss of libido, weight change, bowel disturbance, disturbed sleep, fatigue, and motor retardation characterize depression. The risk of depression in chronic diseases is 25-33% compared to 5-25% in the general population.[7] Patients with a major depressive disorder are 20 times more likely to commit suicide than the general population.[8] It has a great impact on the quality of life of patients and is a major burden on the healthcare system.

This study aimed to determine the frequency of depression and associated risk factors in patients with type 2 diabetes mellitus.

METHODOLOGY

This cross-sectional study was conducted at the OPD of Department of General Medicine, Combined Military Hospital, Lahore Pakistan, from January to April 2020. The Hospital Ethical Review Committee was granted permission (Number 214/2020).

Inclusion Criteria: patients with type 2 diabetes mellitus were enrolled in the study through non-probability convenience sampling.

Exclusion Criteria: Patients with a history of psychiatric illness and those on anti-depressants were excluded.

Demographic data of patients were recorded in a predesigned form. Smoking status, history of hypertension, duration of diabetes mellitus and whether

Correspondence: Dr Muhammad Ahsan Sana, Resident Medicine, Combined Military Hospital, Lahore, Pakistan
Received: 31 Jan 2021; revision received: 05 May 2021; accepted: 07 May 2021

they are using insulin or are on oral hypogly-cemics were asked from patients and noted. In addi-tion, levels of HBA1C, if done within the past month, were noted. Patients who did not have their HBA1c reports were referred to the laboratory for HBA1c levels, and reports were collected later. Patients were given an Urdu version of Beck's Depression inventory and were asked to fill in the responses. The validity and reliability of Beck's Depression Inventory are accepted worldwide.[7] It has 21 self-reporting questions in multiple-choice format and takes about ten minutes to complete. The Urdu version of BDI has been tested for its validity and reliability and has good and acceptable consistency.[8] Uneducated patients were helped in filling in forms. Patients were diagnosed with minimal, mild, moderate and severe depression based on their BDI score. Scores from 0-9 showed minimal to no depression; scores from 10-18 showed mild to moderate depression; scores from 19-29 showed moderate to severe depression, and scores from 30-63 showed severe depression.[9] Diabetic control was assessed by HbA1c levels. Patients with a level above 7.0 were considered as having uncontrolled diabetes mellitus.[10,11]

Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. Descriptive statistics for gender, age and duration of diabetes were calculated. Pearson correlation was calculated for the relationship between BDI score, duration of diabetes and HBA1c levels. Patients were divided into groups based on risk factors of hypertension, smoking and insulin therapy. The odds ratio for the development of hypertension between the two groups was calculated. The *p*-value of ≤0.05 was set as the cut-off value for significance.

RESULTS

Of one hundred two(102) participants 57(55.9%) were males and 45(44.1%) were females. The mean age was 52.5±8.8 years, and the mean duration of diabetes was 8.5±5.4 years. All participants were married. Demographic and clinical features of the study population were given in Table-I.

Table-I: Demographic and Clinical Features of Study Population (n=102)

Characteristics		n(%)
Hypertension		41 (40.2%)
Smoking		19 (18.6%)
Insulin Therapy		26 (25.5%)
Uncontrolled Diabetes		87 (85.3%)
Depression	Mild	28 (27.5%)
	Moderate	11 (10.8%)
	Severe	4 (3.8%)

Table-II: Correlation of Depression with Duration of Diabetes and HBA1C Levels (n=102)

Duration of Diabetes	Pearson Correlation Coefficient	0.238
	p-value	0.016
HBA1C Levels	Pearson Correlation Coefficient	0.096
	p-value	0.337

There was a positive relationship between the duration of diabetes mellitus and depression (Table-II). The risk of depression was higher in patients with coexisting hypertension, smokers, and patients on insulin therapy (Table-III).

Table-III: Associated risk factors for Depression in Patients of Type II Diabetes Mellitus (n=102)

Risk Factors	Odds Ratio	Confidence Interval	*p*-value
Hypertension	2.206	0.981 – 4.947	0.054
Smoking	2.191	0.796 – 6.031	0.124
Insulin Therapy	1.891	0.769 – 4.647	0.162

DISCUSSION

Depression is commonly encountered in clinical practice. It has a higher incidence of chronic illnesses. Diabetes Mellitus is a common chronic disease in Pakistan associated with many complications. Patients have to visit hospitals for regular follow up and are usually on several drugs.

A study by Thour *et al*. reported the prevalence of depression in patients with diabetes mellitus at 41%.[12] Their study used PHQ-9 and reported severe depression in 4%, moderate depression in 10% and mild depression in 27% subjects. Our study showed similar results, with the frequency of depression at 42.2%. 3.9% had severe depression, 10.8% had moderate depression, and 27.5% had severe depression. Sharif *et al.* reported similar results reporting depression in 40% of diabetic patients.[13]

Our study found a significant correlation between the duration of diabetes mellitus and depression (*p*-<0.05). Similar results have been reported by Davies *et al.*[15] However, some studies have reported no significant relationship between the duration of diabetes and depression.[16]

Patients who have hypertension have a higher risk of depression compared to patients who do not have hypertension. This relationship is well established.[17,18] Our study also found a higher incidence of depression in patients with diabetes mellitus with coexisting hypertension (OR: 2.206, CI: 0.981–4.947). Considerable evidence suggests the role of genetic

influences and hyperactivity of the sympathetic nervous system as underlying mechanisms. Depressive symptoms negatively impact the management of hypertension. Anti-depressive drugs also interfere with blood pressure control through their effects on blood pressure and orthostatic hypertension. Adequate blood pressure control can lower the rate of complications associated with hypertension.[19]

Nicotine has mood-elevating properties, which help with the symptoms in depressed patients, making them more prone to smoking. Our study also found that depression was more likely in smokers compared to no smokers. Depressed patients experience more negative symptoms during attempts to quit and are prone to relapse. They suffer more intense cravings and nicotine withdrawal symptoms, making quitting difficult. However, with motivation, many can quit and maintain long-term abstinence successfully. People with diabetes are already at a higher risk of microvascular complications. This, combined with smoking, increases the risk further. Patients should be asked about their smoking status on each visit. Patients should be helped to quit smoking by offering anti-smoking advice, behavioural support and nicotine replacement therapy.

A meta-analysis of 28 studies by Bai *et al*. showed a significant association between insulin therapy and depression.[20] Our study also found a higher incidence of depression in insulin therapy patients than in patients on oral hypoglycemics. Depressive symptoms are more common in patients receiving more frequent daily insulin injections, and some patients experience significant psychological distress when shifting from oral hypoglycemics to insulin. Special attention should be paid to this aspect during shifting to insulin therapy. The patient should be assessed at the start of therapy and followed up, and support should be provided where required.

We have observed that 87(85.3%) patients in our study had poor glycemic control. This is an alarming number as glycemic control has a direct relationship with the development of micro and macrovascular complications like ischemic heart disease, stroke, diabetic nephropathy, diabetic retinopathy and diabetic neuropathy. This can be controlled by patient education. The inclusion of patients in their management is important. They should be educated about their target HbA1c levels and the maintenance steps, like lifestyle changes and adherence to therapy. This should be reinforced at every visit to the hospital and OPDs. Good glycemic control can delay the development of complications and slow the progress of already-developed complications. This can have a great impact on the quality of life of patients.

LIMITATIONS OF STUDY

Limitations to our study include a small sample size and the absence of a control group comprising non-diabetic subjects. Although our study showed a high frequency of depression in patients with diabetes mellitus, a definite conclusion cannot be made without a control group.

CONCLUSION

A significant number of patients with type 2 Diabetes Mellitus have depression. Concomitant hypertension, smoking and insulin therapy are additional risk factors.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

MAS: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

NK: Conception, data acquisition, data analysis, drafting the manuscript, approval of the final version to be published.

KA: Critical review, drafting the manuscript, approval of the final version to be published.

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.

REFERENCES

1. World Health Organization. Global report on diabetes. 2016. [Internet] available at: https://apps.who.int/iris/bitstream /handle/10665/204871/9789241565257_eng.pdf [Accessed on May 3, 2021]
2. International Diabetes Federation. IDF Diabetes Atlas, 9th edition. Brussels, Belgium: International Diabetes Federation, 2019, [Internet] available at: https://diabetesatlas.org /resources /?gclid=Cj0KCQiA4uCcBhDdARIs AH5jyUnWjmp4AOitGB7nYS1IWJKajWQEWLRXPIUcLG0OtEA FTKDa1uCuulMaAo5bEALw_wcB
3. Aamir AH, Ul-Haq Z, Mahar SA, Qureshi FM, Ahmad I, Jawa A, et al. Diabetes Prevalence Survey of Pakistan (DPS-PAK): prevalence of type 2 diabetes mellitus and prediabetes using HbA1c: a population-based survey from Pakistan. BMJ Open 2019; 9(2): e025300. doi: 10.1136/bmjopen-2018-025300.
4. GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017 Lancet 2018; 392(10159): 1789-1858. doi: 10.1016/S0140-6736(18)32279-7. Erratum in: Lancet 2019; 393(10190): e44-48.
5. Godil A, Mallick MSA, Adam AM, Haq A, Khetpal A, Afzal R, et al. Prevalence and severity of depression in a Pakistani population with at least one major chronic disease. J Clin Diagn Res 2017; 11(8): OC05-OC10. doi: 10.7860/JCDR/ 2017/27519.10329.

6. Ng CW, How CH, Ng YP. Depression in primary care: assessing suicide risk. Singapore Med J 2017; 58(2): 72-77. doi: 10.11 622/smedj.2017006.
7. Toledano-Toledano F, Moral de la Rubia J, Domínguez-Guedea MT, Nabors LA, Barcelata-Eguiarte BE, Rocha-Pérez E, et al. Validity and Reliability of the Beck Anxiety Inventory (BAI) for Family Caregivers of Children with Cancer. Int J Environ Res Public Health 2020; 17(21): 7765. doi: 10.3390/ijerph17217765.
8. Khaliq SA, Gul A. Validity and Reliability of Urdu Version of Beck's Depression Inventory Among Students of Madaris (Islamic Institutes). Isra Med J 2018; 10(3): 175–176.
9. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An Inventory for Measuring Depression. Arch Gen Psychiatr 1961; 4(6): 561–571.
10. Sherwani SI, Khan HA, Ekhzaimy A, Masood A, Sakharkar MK. Significance of HbA1c test in diagnosis and prognosis of diabetic patients. Volume 11, Biomarker Insights. Libertas Academica Ltd; 2016; 11(1): 95–104.
11. International Expert Committee. International Expert Committee report on the role of the A1C assay in the diagnosis of diabetes. Diabetes Care 2009; 32(7): 1327-1334. doi: 10.2337/dc09-9033.
12. Thour A, Das S, Sehrawat T, Gupta Y. Depression among patients with diabetes mellitus in North India evaluated using patient health questionnaire-9. Indian J Endocrinol Metab 2015; 19(2): 252–255.
13. Sharif S, Raza MT, Mushtaq S, Afreen B, Hashmi BA, Ali MH. Frequency of Depression in Patients with Type 2 Diabetes Mellitus and its Relationship with Glycemic Control and Diabetic Microvascular Complications. Cureus 2019; 11(7): e5145. doi: 10.7759/cureus.5145.
14. Moulton CD, Pickup JC, Ismail K. The link between depression and diabetes: The search for shared mechanisms. Vol. 3, The Lancet Diabetes and Endocrinology. Lancet Publishing Group; 2015; 3(1): 461–471.
15. Davies MJ, Heller S, Skinner TC, Campbell MJ, Carey ME. Effectiveness of the diabetes education and self management for ongoing and newly diagnosed (DESMOND) programme for people with newly diagnosed type 2 diabetes: Cluster randomised controlled trial. BMJ 2008; 336(7642): 491–495.
16. Arshad AR, Alvi KY. Frequency of depression in type 2 diabetes mellitus and an analysis of predictive factors. J Pak Med Assoc 2016; 66(4): 425–429.
17. Siddiqui S, Jha S, Waghdhare S, Agarwal NB, Singh K. Prevalence of depression in patients with type 2 diabetes attending an outpatient clinic in india. Postgrad Med J 2014; 90(1068): 552–556.
18. Scalco AZ, Scalco MZ, Azul JB, Lotufo Neto F. Hypertension and depression. Clinics (Sao Paulo) 2005; 60(3): 241-250. doi: 10.1590 /s1807-59322005000300010.
19. Fluharty M, Taylor AE, Grabski M, Munafò MR. The Association of Cigarette Smoking With Depression and Anxiety: A Systematic Review. Nicotine Tob Res 2017; 19(1): 3-13. doi: 10.1093/ ntr/ntw154654640.
20. Bai X, Liu Z, Li Z, Yan D. The association between insulin therapy and depression in patients with type 2 diabetes mellitus: a meta-analysis. BMJ Open 2018; 8(11): e020062. doi: 10.1136/ bmjopen-2017-020062.