Original Article

A Clinical Study of Mental Depression in Diabetes Mellitus

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Abstract

Background : Diabetes and mental depression occur together twice as common. With both present, Quality of Life is decreased, diabetes self-management gets impaired, the incidence of complications is increased and all this leads to reduced life expectancy of patients.

Aims and Objectives : To study the prevalence of depression in diabetic patients, its impact on Quality of Life and association with physical parameters as well as treatment modalities.

Settings and Design : Cross-sectional, interview based, prospective study.

Materials and Methods : Diagnosed type1 and 2 diabetic patients for minimum one year, aged 15 to 75years; capable of independent communication and informed verbal consent, treated on out-patient basis; willing to participate were included. Patients treated for any psychiatric illness, with comorbidities other than diabetes; aged otherwise; not capable of independent communication, refusing to participate were excluded. Data collected using structured interviewer administered questionnaire. Patients evaluated for mental depression by nine-item Patient Health Questionnaire (PHQ- 9). Statistical analysis used - Chi- square test.

Results : Prevalence of depression in diabetics is 74%. There is no association of age or waist hip ratio of diabetic patients with depression but there is significant correlation with body mass index, waist circumference, duration of diabetes, use of insulin preparation alone or with oral hypoglycaemic agents.

Conclusions : Prevalence of mental depression is higher in diabetic individuals. Body mass index, waist circumference, duration of diabetes, use of insulin preparations alone or with oral hypoglycaemic agents is associated with depression.

Key words : Diabetes Mellitus, Mental depression, PHQ-9.

Diabetes affects approximately 8.3%population and depression affects approximately 10% population of the world[1]. Epidemiologic studies have shown consistently that the diabetes and depression occur together approximately twice as common as would be predicted by chance alone due to depression or diabetes[2]. There is evidence from different studies suggesting that treatment of depression improves glycaemic control[2]. When both conditions are present together, they worsen the outcome of each other. Quality of life is decreased, diabetes self-management is impaired, the incidence of complications is increased and ultimately patient's life expectancy is reduced[3]. Eventually the costs of treatment rise for both individual patients and health economies but these costs do not necessarily result in significant improvement in disease or Quality of Life outcome[4].

The study was undertaken to evaluate depression in diabetic patients. Its correlation with physical parameters of patients as well as treatment modalities was also studied.

Editor's Comment :

- As the prevalence of mental depression is high in diabetic patients, all diabetic patients should be screened for it.
- Depression and diabetes affect each other adversely hence addressing depression is an essential part of diabetes management in such patients.

Materials and Methods

One hundred patients with type 1 or type 2 diabetes with good glycaemic control based on laboratory results (Fasting Blood Sugar <140, Post Prandial Blood Sugar <200 and/or HbA1c <7%) and stable clinical findings for at least one year, were included in the study. These patients were between the age group 15-75 years and were capable of independent communication. All were taking treatment on out-patients basis. Patients already taking treatment for mental depression or any other psychiatric illness were excluded from the study. Patients having any other major comorbidity like cancer, recent major

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surgery, stroke or recent myocardial infarction were also excluded from the study. Quantitative and qualitative data was collected by using structured interviewer administered questionnaire. The Patient Health Questionnaire-9 (PHQ-9)[5] was used to evaluate depression status of patients. The questionnaire was used in local language. The collected data was evaluated by statistical analysis.

Results: In this study overall prevalence of depression was 74%. Prevalence of mild depression was 55%, moderate depression 14%, moderately severe depression 2%, severe depression 3%.

Out of 100 patients, 58 patients were male and 42 patients were female. Most of the patients from male and female group had mild depression with respective percentage of 30% for male and 25% for female. Majority patients with depression were from age group 40-60 indicating no corelation of age with severity of depression (p-value = 0.057) (Table 1). Among patients with higher body mass index (BMI >25), 18% patients had no depression, but 72 % patients had mild to severe depression (p-value <0.001) (Table 2). Among patients with abnormal waist circumference, 8 patients were without depression as compared to 31 patients with depression (p-value = 0.010).

Waist-to-hip Ratio (WHR) of diabetic patients was abnormal in 20 nondepressed patients as compared to 64 patients with depression but it was found to be statistically insignificant (p- value = 0.602).

In the present study, 7 patients without depression had duration of diabetes >5 years, but at the same time 44 patients with depression had duration of diabetes >5 years (p value = 0.003) (Table 3).

In the present study, 78 patients were on Oral Hypoglycaemic Agents (OHA) and 22 patients were either on insulin alone or insulin with OHA. Out of these 22 patients, 21 patients were found to have mental depression. Thus, there was significant correlation between severity of depression and use of insulin alone or OHAs plus insulin than OHAs alone (p-value <0.001). 48 patients on OHA had mild depression, but 11 patients out of 22 on insulin alone or OHA with insulin had moderate depression.

Table 1 — *Correlation of age and PHQ-9 score in diabetic patients*

Age group	PHQ-9 group						P-value
	≤4	5-9	10-14	15-19	≥20	Total	
≤40	9	7	5	0	2	23	
41-50	8	18	3	1	0	30	
51-60	6	19	3	0	0	28	0.057
61-70	2	10	3	1	0	16	
>70	1	1	0	0	1	3	
Total	26	55	14	2	3	100	

Table 2 — *Correlation of BMI and PHQ-9 score in diabetic patients*

BMI	PHQ-9 group						P-value
	≤4	5-9	10-14	15-19	≥20	Total	
<18.5	0	1	0	0	0	1	
18.5-24.99	8	0	1	0	0	9	
25.00-29.99	12	17	1	0	0	30	<0.001
≥30.00	6	37	12	2	3	60	
Total	26	55	14	2	3	100	

Discussion

Comorbid diabetes and depression is a challenging and under-recognized clinical problem. Depressive symptoms affect up to one-third of people with diabetes and not only impair quality of life but also add to the difficulties experienced in diabetes self-management. Diabetes and depression occur together approximately twice as frequently as would be predicted by chance alone[6].

In our study, relation of age of diabetic patients is not correlating with severity of depression (p-value = 0.057) (Table 1). Zhao, *et al*[7] studied a total of 53072 people aged 20-64 years in the analysis and found that the association is stronger among young adults than among older adults. In our study we didn't find this significant correlation due to small sample size.

In the present study 58% patients were male and 42% patients were female and there is no statistically significant difference between depression in both sexes.

Studies by Anderson and Freedland[8] showed that the odds of depression were significantly elevated in both women and men with diabetes compared with control subjects. This study showed similar results like present study showing no significant difference between male and female diabetics with relation of depression (p-value = 0.691).

This study shows a strong relation between Body Mass Index (BMI) and depression in diabetic patients

Table 3 — *Correlation of duration of diabetes and PHQ-9 score*

Duration of DM	PHQ-9 group						P-value
	≤4	5-9	10-14	15-19	≥20	Total	
≤5	19	23	11	1	2	56	0.003
6 -10 years	4	26	1	0	0	31	
11 -15years	3	1	1	0	1	6	
>15 years	0	5	1	1	0	7	
Total	26	55	14	2	3	100	

(p-value <0.001). In a study by Raval, *et al*[9] total of 300 Type 2 Diabetics including 147 (49%) men and 153 (51%) women were evaluated and strong association with Type 2 Diabetes and central obesity was found.

From this study we can conclude that there was significant association between waist circumference and prevalence and severity of depression in diabetic patients (p-value = 0.010). Zhao G, *et al*[7] study has also shown significant association of central obesity and depression among 2,439 US adults (1,325 men and 1,114 non pregnant women) aged ≥20years who were either overweight or obese with BMI of ≥25.0 kg/m^2.

In this study Waist-to-hip Ratio (WHR) of diabetic patients was not related to prevalence and severity of depression (p- value = 0.602). Zheng, *et al*[10] has done similar study to explore the relationship between depressive symptoms assessed by the Patient Health Questionnaire-9 (PHQ-9) diagnostic algorithm and waist-to-hip ratio, dyslipidaemia, glycaemic levels and blood pressure among 2,511 diabetic and 9,397 non-diabetic Chinese women and have observed no significant relationship between WHR and depression in diabetic women.

This study shows duration of diabetes is strongly related to severity of depression (p-value = 0.003). Almeida, *et al*[11] has done Cross-sectional study of a community-derived sample of 5462 men aged 70-89 years suggesting that longer duration of diabetes is more frequently and more severely associated with depression.

There is significant correlation between severity of depression and use of insulin alone or OHAs plus insulin than OHAs alone (p-value <0.001). Higher grade of depression and greater prevalence of depression is associated with use of insulin or OHAs plus Insulin than OHAs alone. In a study by Noh, *et al*[12] among 204 type 2 diabetics, the insulin group showed a significantly higher frequency of depressive symptoms (p<0.01) compared to the oral drug group.

Conclusion

Hence the study concludes that, prevalence of depression is higher in diabetic individuals. Age of the patients and gender difference in diabetics is not associated with prevalence of depression. Body mass index, waist circumference and duration of diabetes of diabetic patients are strongly associated with prevalence and severity of depression.

Use of insulin alone or insulin with OHAs is significantly associated with prevalence and severity of depression in diabetic patients.

Overall diabetes is associated with higher prevalence and severity of depression in diabetic patients.

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