INTERNATIONAL JOURNAL OF ADVANCES IN PHARMACY MEDICINE AND BIOALLIED SCIENCES
An International, Multi-Disciplinary, Peer-Reviewed, Open Access, Quarterly Published Biomedical Journal
|www.biomedjournal.com|
ISSN 2348-2109

Prevalence of depression among the rural population suffering from type 2 diabetes

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ORIGINAL RESEARCH ARTICLE

ARTICLE INFORMATION

Article history
Received: 12 December 2013
Revised: 22 December 2013
Accepted: 25 December 2013
Early view: 30 December 2013

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Keywords:
Type 2 Diabetes
Depression
Beck's Depression inventory
Hba1c.

ABSTRACT

Background: Both diabetes and depression are diseases which have a chronic course and when occur together can have a devastating effect on the patient's health. This dual relationship can lead to lack of interest in doing any work and decreased self care can make them more prone for decreased control of blood sugar. The aim of the study was to estimate the prevalence of depression among rural population suffering from type 2 diabetes and the association of demographic details, Hba1c with depression.

Subject and Methods: It was a prospective study in which all the patients with type 2 diabetes at Bhaskar Medical College and General Hospital, Moinabad, AP, India were included during the period of January to July 2013. A detailed interview including their demographic details was taken and the presence of depressive symptoms was assessed using Beck's Depression Inventory.

Results: Majority of the study sample were in the age group of 41-50 years females recently diagnosed (<6 months), have Hba1c levels between 6.1-8%. When all the individuals were evaluated for depression using Becks Depression Inventory, most of them (46%) were found to be suffering from mild mood disturbance. Depression was more common in the age group of 41-60 years, females. Patients with increased Hba1c had more severe depressive symptoms.

Conclusion: The risk of having depression along with type 2 diabetes was found to be significant in the studied population. We suggest that all the individuals suffering with type 2 diabetes must undergo a thorough psychiatric evaluation.

INTRODUCTION

Dr. Thomas Willis, a British physician more than 300 years ago, made the observation that there was a relationship between diabetes and depression and he suggested that diabetes was the result of ''sadness or long sorrow''(Willis 1971).

The prevalence of depression is relatively high in patients with type 1 and type 2 diabetes (Anderson et al., 2001; Pouwer et al., 2010). When compared with non-diabetic individuals, patients with type 2 diabetes have a 24% increased risk of developing depression (Nouwen et al., 2010). The reasons for the increased prevalence and incidence of depression in diabetes patients are still not well understood, and it remains unclear whether the presence of patients with diabetes increases risk for depression, or whether depression increases risk for diabetes (Cosgrove et al., 2008). Reports from the International Diabetes Federation (IDF, 2005) indicate that the prevalence of diabetes mellitus has reached epidemic levels globally. Estimates for 2010 indicate that 285 million adults have diabetes in the seven regions of the IDF. These numbers represent an increase of 39 million from 2007 and an expected continued increase to 439 million in 2030 (Brussels, 2009).

It is also believed that by 2025, more than 75% of the world population with diabetes will reside in developing countries and the countries with the largest populations of adults with diabetes will include: India, China and the United States. In developing countries, the majority of adults with diabetes are between 45 and 64 years old, whereas in developed countries the majority of adults with diabetes are 65 years and older (King et al., 1998). However, worldwide estimates of depression prevalence among individuals with diabetes appear to vary by diabetes type and among developed and developing nations (Li et al., 2008).

According to the World Health Organization (WHO), depression is responsible for the greatest proportion of burden associated with non-fatal health outcomes accounting for approximately 12% total years lived with disability (WHO 2002). In 2000, it was estimated that depressive disorders were higher in women (4930 per 100,000) than men (3199 per 100,000) and that globally depressive disorders were the fourth leading cause of disease burden in women and seventh leading cause in men (Ustun et al., 2004). Major depression is the second leading cause of disability-adjusted life years (DALYs) lost in women and the tenth leading cause of DALYs in men (Michaud et al., 2001).

In a systematic review designed to estimate the prevalence of clinically depressed patients with type 2 diabetes, Ali et al., (2006) found that the prevalence of depression was significantly higher among patients with diabetes (17.6%) than those without diabetes (9.8%) (Ali et al., 2006). They also found that the prevalence of depression among females with diabetes (23.8%) was higher than their male counterparts (12.8%). Overall, studies have demonstrated that individuals with diabetes are more likely to have depression than in individuals who do not have diabetes.

Evidence suggests a bi-directional relationship between depression and type 2 diabetes. For example, research by Knol et al. (2006) suggests that in addition to depression being a consequence of diabetes, depression may also be a risk factor for the onset of diabetes (Knol et al., 2006). Golden et al., (2008) in his study found that among individuals without elevated depressive symptoms at baseline, patients treated for diabetes had higher odds of developing depressive symptoms during the follow-up period (Golden et al., 2008).

The increased risk of type 2 diabetes in individuals with depression is believed to result from increased counter regulatory hormone release and action, alterations in glucose transport function, and increased immune inflammatory activation (Musselman et al., 2003). These physiologic alterations are thought to contribute to insulin resistance and beta islet cell dysfunction, which ultimately lead to the development of type 2 diabetes. Another hypothesis is that depression in patients with both type 1 and type 2 diabetes results from chronic psychosocial stressors of having a chronic medical condition (Talbot et al., 2000). In addition to possibly increasing the risk for depression, diabetes may make symptoms of depression worse. The stress of managing diabetes every day and the effects of diabetes on the brain may contribute to depression (Golden et al., 2008; Kumar et al., 2009).

Practice guidelines from the International Diabetes Federation indicate that because patients with diabetes are more likely affected by depression, periodic assessment and monitoring of depression and other mental health conditions is required in the management of patients with diabetes. These guidelines also noted that detection in brief encounters are problematic, and as such diabetes health professionals require basic training in identification and management of depression in patients with diabetes (Keeling et al., 2010).

At the same time, some symptoms of depression may reduce overall physical and mental health, not only increasing the risk for diabetes but making diabetes symptoms worse. Studies have shown that people with diabetes and depression have more severe diabetes symptoms than people who have diabetes alone (Egede et al., 2002). Although most research has highlighted the importance of co-morbidity of depression and diabetes most of the patients with diabetes do not usually get screened for depressive disorders. With this background this study has been conducted to evaluate the prevalence of depression among the rural population with type 2 diabetes.

SUBJECT AND METHODS

It was a prospective study in which the patients with type 2 diabetes diagnosed in the General Medicine Department of Bhaskar Medical College and General Hospital, Moinabad, AP, India were included. It was conducted during the period of January 2013 to July 2013. Studied population belongs to surrounding rural areas of Hyderabad region of India (Telangana region). The subjects were initially managed by General Medicine Department of the Institute and as per the routine standard protocol were referred to Psychiatric Outpatient Department for further evaluation interview including their demographic details and complete evaluation for depression using Beck's Depression Inventory (BDI). The end point of the psychiatric management was counseling and medication if needed. Permission was granted by Institutional Ethics Committee and Institutional Authorities for the study.

Inclusion criteria

- Individuals of all age groups suffering from type 2 diabetes.

Exclusion criteria

- Those who had medical complications.
- Those who have suffered from severe stress form immediate stressors in the family.

RESULTS

In the present study a total of 87 cases were studied in which 38 were female and 49 were male. The majority of the patients (29.9%) belonged to the 41-50 years of age group followed by 51-60 years of age group (28.7%) (Table 1 & 2).

Table 1. Gender.

	Frequency	Percent
Male	38	43.7
Female	49	56.3
Total	87	100.0

Table 2. Age.

	Frequency	Percent
20-30 years	3	3.4
31-40 years	12	13.8
41-50 years	26	29.9
51-60 years	25	28.7
61-70 years	17	19.5
>70 years	4	4.6
Total	87	100.0

Most of the study sample constituted the patients who had diabetes from the past 2-5 years. Overall, majority of the study sample had mild mood disturbance and among them, those individuals suffering from diabetes from 2-5 years duration were more (Table 3).

Table 3. Duration vs depression

Duration	Depression				Total
	No depression	Mild mood disturbance	Borderline clinical depression	Moderate depression	
0-6months	14	9	2	1	26
6 months-12 months	2	4	1	2	9
1year to 2 years	4	8	0	0	12
2 years-5 years	6	13	3	3	25
5 years-10years	3	3	0	1	7
10 years-20 years	1	1	2	2	6
>20 years	0	2	0	0	2
Total	30	40	8	9	87

In our study the subjects who were suffering from type 2 diabetes for less than 6 months formed the bulk that is 29.9% followed closely by 2-5 years duration which is 28.7% and the subjects who were suffering from 1-2 years were about 13.8% (Table 4).

Table 4. Duration of diabetes.

	Frequency	Percent
0-6 months	26	29.9
6 months-12 months	9	10.3
1year to 2 years	12	13.8
2 years-5 years	25	28.7
5 years-10 years	7	8.0
10 years-20 years	6	6.9
>20 years	2	2.3
Total	87	100.0

In the studied population it was observed that the levels of Hbalc was most commonly fell in the range of 6.1-8% indicating poor controls in the bulk of the population that is 42.5% followed by 4.1-6% which was 27.6% and the rest of the 29.8% had very poor controls which is in the range of above 8% indicating a dangerous levels for a possible impending complications related to diabetes (Table 5).

Table 5. Hba1c levels.

Hba1c	Frequency	Percent
4.1-6	24	27.6
6.1-8	37	42.5
8.1-10	10	11.5
10.1-12	9	10.3
>12	7	8.0
Total	87	100.0

Bulk of the subjects that is 65.5% of them suffered from some kind depressive symptoms of which the majority 46% had mild mood disturbance followed by 10.3% from moderate depression and 9.2% fell in the category of borderline clinical depression (Table 6 & Figure 1).

Table 6. Depression according to Becks depression inventory.

	Frequency	%
No depression	30	34.5
Mild mood disturbance	40	46.0
Borderline clinical depression	8	9.2
Moderate depression	9	10.3
Total	87	100.0

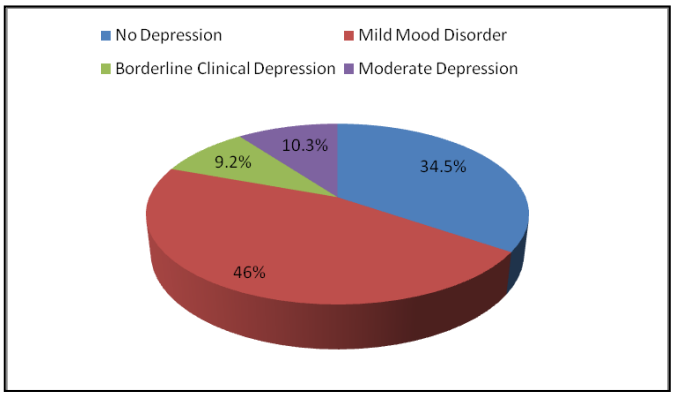

Figure 1. Depression according to Becks depression inventory.

It has been observed upon cross tabulation that the age range of 41-50 years (29.9%) and 51-60 years (28.7%) has more overall prevalence of depression than other age groups (Table 7).

The category of patients with no depression was more prominently seen in the group with Hba1c levels 4.1-6% that is well controlled category and in 6.1-8% no depression was equally seen. Mild mood disorder was most predominant in the 6.1-8% range and it has gradually declined as the Hba1c levels were going higher. It can be remarkably said that the moderate depression was predominately present in the study group of Hba1c levels above 6%. While borderline clinical depression showed a bimodal presentation in the groups with Hba1c levels form 4-8% and more than 12% categories.

DISCUSSION

This is a cross sectional study conducted to evaluate the prevalence of depression in rural diabetic patients. Majority of the study sample were in the age group of 41-50 years females. Many (29.9%) were recently (<6 months) diagnosed to be having diabetes. Most of them (42.5%) had Hba1c levels ranging from 6.1-8%.

When all the individuals were evaluated for depression using Becks depression inventory, most of them (46%) were found to be suffering from mild mood disturbance. Majority of the individuals in all the age groups had mild mood disturbance. We also found that the individuals with borderline clinical depression and moderate depression were more in the age groups of 41-50 years and 51-60 years. This could be

Table 7. Depression vs. age.

	Age						Total
	20-30 years	31-40 years	41-50 years	51-60 years	61-70 years	>70 years	
No depression	0	6 (20%)	9 (30%)	7 (23.3%)	8 (26.7%)	0	30 (100%)
Mild mood disturbance	2 (5%)	6 (15%)	11 (27.5%)	12 (30%)	7 (17.5%)	2 (5%)	40 (100%)
Borderline clinical Depression	0	0	3 (37.5%)	3 (37.5%)	1 (12.5%)	1 (12.5%)	8 (100%)
Moderate depression	1 (11.1%)	0	3 (33.3%)	3 (33.3%)	1 (11.1%)	1 (11.1%)	9 (100%)
Total	3 (3.45%)	12 (13.8%)	26 (29.9%)	25 (28.7%)	17 (19.5%)	4 (4.6%)	87 (100%)

Table 8. Depression vs gender

Depression	Gender		Total
	Male	Female	
No depression	14 (36.9%)	16 (32.6%)	30 (34.4%)
Mild mood disturbance	16 (42.1%)	24 (48.9%)	40 (45.9%)
Borderline clinical depression	4 (10.5%)	4 (8.1%)	8 (9.1%)
Moderate depression	4 (10.5%)	5 (10.2%)	9 (10.3%)
Total	38 (100%)	49 (100%)	87 (100%)

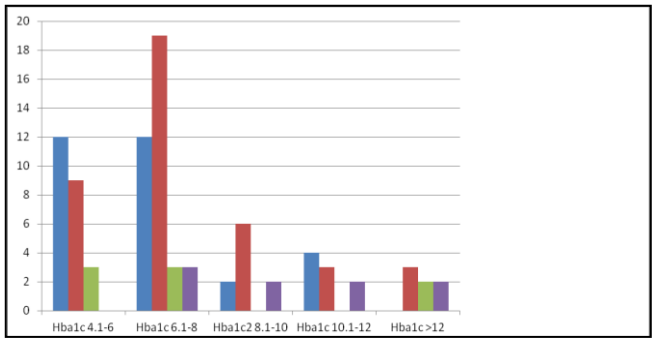

Figure 2. Hba1c vs depression.

probably because of the high study sample in the corresponding age groups.

The prevalence of depression in females was comparatively higher than in males in all the domains of Becks depression inventory. Majority of the males and females had mild mood disturbance. Out of 38 males, 24 had depressive symptoms and out of 49 females, 33 had depression. This is in accordance with the findings of Jain and Aras (2001), in a study conducted in geriatric population. Nandi et al. (1997) also reported that there was an increased prevalence of depression among females than males. Using Becks depression inventory (BDI), we found that a gradual increase in the severity of depression with increase in Hba1c levels. This phenomenon is prominently noticeable in the category of moderate depression. This finding is in accordance with the findings of Lustman et al. (2000) who, in a meta-analysis of 24 studies reported that depression was significantly associated with poor glycemic control in individuals with type 1 and type 2 diabetes (Lustman et al., 2000).

Among the recently diagnosed depressive patients most of them had no depression. In the duration of 6-12 months, 12 months to 2 years and 2-5 years, 5-10 years with diabetes, majority of the individuals had mild mood disturbance. In the group of individuals with diabetes for more than 10 years, most of them had borderline clinical depression and moderate depression. This suggests that with the increase in duration with diabetes, the severity of depression also increases. Richardson et al. (2008) on assessing the longitudinal effects of depression on glycemic control, found that over 4 years of follow-up there was a significant longitudinal relationship between depression and glycemic control and that depression was associated with persistently higher Hba1c levels over the time period (Richardson et al., 2008).

Limitations

- A larger sample size is required to make more robust association of diabetes and depression.
- Control population was not taken in the study to compare the depression in general population in this area.
- Although we have excluded the patients who have obvious life events stressors from the study population, we have not used a life events scale to quantify the effects of life events on the patient's with depression.

CONCLUSIONS

In the study sample population who have been newly diagnosed or who have been diagnosed less than six months ago were not very prone to depressive symptoms where as the population who have been suffering from 2 to 5 years developed the most depressive symptoms especially mild mood disturbances. In our study 65.5% of the patients suffered from some kind of depressive symptoms of which the majority 46% (overall) suffered from mild mood disturbance. It was found that in general overall female gender was prone for depressive symptoms than the male population and more so with the mild mood disturbances.

In the present study we have found that the age at which the population is most prone for depressive symptoms was in the age range of 41-60 years. It can be concluded for the current study that good control of Hba1c of range of 4.1-6% was not much associated or less associated with depressive

symptoms than where higher Hba1c levels was noticed to have greater chances for the patients to be suffering from depressive symptoms. We suggest that appropriate screening for depression among diabetic patients has to be done for better prognosis and better treatment outcomes. Adequate education for the patients by the physician about the diabetes and its association with depressive symptoms is appropriate. Further necessary referral will go a long way in appropriate patient care management in rural setting.

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