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Clinical Depression in Diabetic Geriatric Population

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Introduction

Diabetes mellitus - a common metabolic disorder affecting about 10%-25% of the elderly population [1] - is frequently associated with psychiatric disturbances [2]. Patients with diabetes mellitus are 2-4 times more likely to be diagnosed with major depressive disorder [3]. In elderly diabetic patients the risk of depressive mood symptoms is increased by 30%, (HR 1.31 (95% CI: 1.07-1.61 [4]. The adjusted odds ratio (OR) for functional disability is 7.9 per subject with diabetes and depression; whereas, OR was 2.4 for subjects with diabetes alone and 3 for subjects who had major depression alone [5]. The mechanisms, linking diabetes and major depressive disorders are unknown. Obesity is the risk factor for both- diabetes mellitus and depression. However, data exploring association of body mass index (BMI) in diabetic patients, suffering from depression is sparse.

The goal of this study was to explore if BMI of elderly patients with diabetes differ from BMI of the individuals without depression. Further, we aimed to explore the association of age, gender, health insurance status, ethnicity influence and systolic blood pressure (SBP) and diastolic blood pressure (DBP) with clinical depression in geriatric diabetics.

Methods

Subjects recruitment and characteristics

Nursing home residents were recruited from an outpatient internal medicine clinic in a teaching university setting. After given written consent, patients received Public Health Questionnaire –9 (PHQ-9) in either English or Spanish language. The PHQ is based on DSM-IV (Diagnostic and statistical Manual -IV) criteria and has a 88% sensitivity and 88% specificity for diagnosis of major depression (PHQ score ≥ 10) in comparison to interview by mental health professionals

Statistical method employed

Univariate analysis was conducted to compare depressed and non-depressed nursing home residents with respect to the primary outcome measures of BMI and HgA1c along with secondary outcomes of SBP and DBP. In the absence of any statistical significance (α=0.05) between primary outcomes of the two groups, the age, race, ethnicity, gender, and insurance status between groups were compared in a similar fashion to probe for confounding. A post-hoc analysis was conducted comparing HgA1c and BMI between the depressed and non-depressed groups after adjusting for significant race differences between the two groups.

Results

There was no statistical difference between the depressed (n=67) and non-depressed (n=32) participants in their assessment of primary outcomes of HbA1C (7.5 ± 1.6 vs 7.4 ± 1.4; p= 0.447) or BMI(31.4 ± 5.8 vs 32.8 ± 5.3; p=0.254), nor did the secondary outcomes : systolic blood pressure (142 ± 18.4 vs 143 ± 25.8; p 0.823) or diastolic blood pressure (77.6 ± 9.4, 75.1 ± 11.1; p=0.240) differ by depression status. While the clinically depressed diabetic participants did not differ to that of the non-depressed diabetic participants with respect to age (70.6 ± 6.1 vs 72.1 ± 4.8; p= 0.111); gender (47.2% of males vs 57.1% of females; p=0.754), or ethnicity (69% explain vs 71%, p=1.000), race did appear to differ by depression status: Caucasian, African-American, and other were respectively 37%, 48%, and 15% vs. 32%, 16%, 52%, p=0.0003). Neither the BMI (p>0.499) nor Hemoglobin A1c (p>0.839) differed between the clinically depressed and non-depressed participants when controlled for these race differences.

Discussion

In our sample, diabetic African Americans are three times more likely to be depressed. Diabetic Caucasians also experience higher rates of clinical depression. However, diabetics with depression did not differ from diabetics without depression with regards to their age, gender, BMI, HbA1C, health insurance status, systolic blood pressure or diastolic blood pressure.

Diabetes is a risk factor for high prevalence of depression [6]. It is possible that stress-associated hypothamamic-pituitary adrenal axis reaction with lowered hippocampal volume, upregulation of serotonin receptors (5 HT-2A receptors), decreased BDNF (Brain Derived Neurotropic Factor) and elevated inflammatory cytokines in diabetes may be directly related to the depression in diabetes. Our findings are in agreement with data, reporting higher incidence of depression in African American patients with diabetes [7-9]. However, unlike the previous studies [10,11] presence of clinical depression did not influence HbA1C levels. Similar to Munshi et al. [12], Engum, [13], Lin et al. [14] we did not find an association between the presence of depression and glycemic control. Knol et al. [15] in the cross-sectional study also demonstrated that impaired fasting glucose was not associated with depression in people with diabetes. Only one longitudinal study observed a significant association between elevated mean HbA 1c values and a history of depression among participants with diabetes [16]. In a more recent cross-sectional study involving outpatients with any form of diabetes, Pouwer et al. [17] found that depressive affect was associated with poor glycemic control for type 1 DM only.

Depressed diabetic patients in our study did not differ in their BMI compared to non-depressed diabetic participants. This is contrast to other studies [18], who found increased BMI in the patients with diabetes and depression.

The gender has been reported to play an important role in the psychiatric disorders. Women with diabetes have consistently shown higher rates of depression than men [19-22]. However, in our study we did not find any gender difference in diabetic patients with or without clinical depression. Our results are in line with the findings of one study [23] where, when controlled for BMI, age, race, there was no gender difference in presence of clinical depression, in diabetic patients

Age is associated with the clinical symptoms of depression. Studies found that younger patients with diabetic tend to experience more clinical depression than elderly population with diabetes [14,24,25]. In fact, Collins et al. [21] have reported lower rates of depression in older individuals, suggesting that age might be a protective factor.

It has been argued that diabetes precedes depression and leads to depression either through a direct effect of hyper glycaemia, possibly leading to altered glucose transport in the brain, or as a result of the psychological stress resulting from the knowledge of the diagnosis or from the rigorour treatment, throught the both – lifestyle corrections and pharmacological interventions [3,13,26]. However, this assumption has been challenged by several recent cohort studies that have suggested that depression may be a risk factor for diabetes [6,13,23] while diabetes does not necessarily predict depression or is associated with only a modest risk of development of depression [13].

In summary, in spite being a cross sectional, our study is significant for its unexpected findings.

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