Relationship between Depression and Diabetes mellitus

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Abstract

Background: Depression in diabetes is common. There is association between diabetes and comorbid depression in adults in both types of diabetes, depression association with hyperglycemia and increases of diabetes and release of depression association with improvement glucose control.

Objective: To determine the effect of diabetes on depression in as well as to evaluate the effect depression in etiology of diabetes.

Patients and Methods: Fifty patients attended causality unit of Baqubah Teaching Hospital were screened for diabetes then assessed by General Health Questionnaire for depression during the period from 1st of August till 1st November 2015, relationship was studied and another 50 patient complaining from depression and psychiatric disorders were evaluated by blood glucose test. Statistical analysis of the data were done using SPSS version 20.

Results: This study identified the relationship between diabetes and depression, the depression was significantly associated (72%) with diabetic than control (14%), and also blood glucose level was higher in psychiatric patients.

Conclusion: The presence of diabetes increase the depression also presence of depression increase blood glucose level. Control of diabetes significantly improves depression.

Key words: Diabetes mellitus, psychiatric, depression, diabetic stress.

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Received: 23th March 2016

Accepted: 12th June 2016

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Introduction

Relationship between depression and Diabetes mellitus had been hypothesized for some time; recent studies have contributed important information concerning this association [1].

Eaton et al found two fold increase of depressive system in diabetic and occurrence of diabetes after depressive symptom in all types of DM [2]. A study suggest that depression may precede the onset of diabetes type 2 and possibly type 1 and play very important role in development of disease [3]. There is some evidence that major depression may be caused in part by an overactive hypothalamic-pituitary-adrenal axis (HPA axis) that results in an effect similar to the neuro-endocrine response to stress. Investigations reveal increased levels of the hormone cortisol and enlarged pituitary and adrenal glands, suggesting disturbances of the endocrine system may play a role in some psychiatric disorders, including major depression. Over secretion of corticotropin-releasing hormone from the hypothalamus is thought to drive this, and is implicated in the cognitive and arousal symptoms [4]. Depressive disorders have also been associated with dysregulation of

hypothalamic pituitary adrenal axis resulting in increase of blood glucose up take and elevated glucose level [5].

Diabetes is metabolic disorder characterized by: Body does not produce or properly uses insulin, blood glucose becomes too high. There are three main types of diabetes: type 1Diabetes, type 2 Diabetes and Gestational Diabetes. The ability to handle carbohydrate load may be impaired by increase release of these counter regulatory hormones in depression which could increase the developing type 2 diabetes [6]. Medical treatment of depression also change in diet, and physical activity associated with depression also contribute with association between depression and occurrence of diabetes type 2 [7]. According to the International Diabetes.

Federation, 189 million individuals have Diabetes worldwide. Individuals with Diabetes have a two-fold increased risk for Depression, affecting approximately 1 in every five Diabetes patients [7].

According to the American Diabetic Association, While Depression affects may be 3 or 5% of the population at any given time, the rate with Diabetes is between 15% and 20% .Depression is under-recognized in patients with Diabetes When they co-exist; one may worsen the other [8].

In this study we used self-report measure of mental health status to quantify the relationship between depression and incidence of diabetes type 2.

Patients and Methods

Fifty psychiatric patient attended to psychiatric unit of Baqubah Teaching Hospital, during the period from 1st of August till 1st November 2015, were assessed by General Health.

Questionnaire (GHQ) and then sent to laboratory of same hospital to check their glucose levels .Other 50 patients attended hospital complaining of diabetes and on management were assessed to quantify depression criteria by using DSM4 scale compared to another 50 patient were chosen randomly from outpatient unit of Baquba teaching hospital.

Statistical analysis

The results expressed as absolute number, percent, mean ± SD. The data analyzed using Pearson chi. Square test and Fischer exact test, taking the $p \leq 0.05$ as lowest limit of significance these are completed using SPSS version 20.

Results

The result of this study demonstrated that depression more common in diabetic patient than control, the statistical analysis shows significant differences as shown in table (1).

Table (1): Association between patients with type 2 diabetes and occurrence of depression in the studied groups.

Patient	Depression +ve	%	No depression -ve	%	Total
Diabetic	36	72%	14	28%	50
Control	10	20%	40	80%	50

Account (27,214) **x2** = 3.84, **p value** = 0.003

Polymerase Diabetes more common in psychiatric patient than control as shown in tables (2).There is significant association between stress condition and occurrence of diabetes. Highly significant differences in the prevalence of diabetes in patients with depression than in control group with p value = 0.001as shown in table (3).

Table (2): Association between stress and occurrence of diabetes in the studied groups.

Patient with psychiatric disorder	Diabetic + ve	%	-No diabetic -ve	%	Total
Stress	24	48%	26	52%	50
Control	8	16%	42	84%	50

Account=11,76 , **p value**=0.001x2=3.84

Table (3): Prevalence of depression in psychiatric patient.

Patient with psychiatric disorders	Diabetic + ve	%	Non diabetic -ve	%	total
Stress	24	48%	26	56%	50
Control	8	16%	42	84%	50%

X2=3.84 **Account**= 11.76 **P.value** = 0.001

General Health Questionnaire for psychiatric disorders showed significant association between occurrence of diabetes and stress with p value = 0.004 as in table (4).

Table (4): Patient with psychiatric disorders have diabetes more than stress disorders.

GHQ for Diabetes	+ve 38	-ve 12	50
GHQ for stress	24	26	50

X2=3.89 **P. value** = 0.004

Discussion

The result of this study demonstrated that of depression was significantly higher in diabetic patient, the result was commitment with previous study that done in other part of world by Eaton *et al* study 37% of diabetic patient complaining from depression [2]. Other study showed that the presence of diabetes doubles the odds of comorbid depression [5]. The results of present study showed that diabetes more common in psychiatric patient. Also Golden *et al* firstly documented that there is bidirectional reaction between diabetes and depression [9]. Also agree with another study done by Mezuk *et al* stated that increase diabetes attack in psychiatric cases' like depression [10]. In this study we found that there is strong relationship between depression and diabetes type 2. Our results agree with previous observation of Eaton et al that there is higher risk of type 2 diabetes among individual who expended depressive symptoms [2].

Also this study agreed with previous studies that there is high risk of developing depression in diabetic patient type 2, a recent meta-analysis of nine cohort studies suggested that depressed adults have a 37% increased risk of developing type 2 diabetes [11]. The diabetic patient complain from depression more than non-diabetic patient of the same age and sex and culture. Also the occurrence and blood glucose level of

patients exposed to stress factors and depression have significant ratio to patient that don't exposed to these factors. In our country as the stressful factors very common, the incidence of diabetes also increased accordingly [12]. Prevalence of depression in diabetic patient is very high and three fold more than in normal population, this result was concomitant with other studies that done and concluded that depression is more prevalent in diabetic patient than non-diabetic ones this may occur as a result of diabetes and its complication as well as with drugs that used in treatment [13].

Our study couldn't determine whether a causal relationship exists between depression and diabetes and we cannot exclude an independent risk factor leading to both conditions. However, the study does at least allow the possibility that depression may predispose to diabetes.

One possible mechanism for the association between depression and diabetes is hyperactivation of the hypothalamic pituitary adrenal axis and sympathetic nervous system [14]. These observations, first made in the 1950s, have shown that there is hypersecretion of corticotropin-releasing hormone (CRH), hypercortisolaemia and enlarged pituitary and adrenal glands in individuals with severe mood disorders [14]. The consequences of hypercortisolaemia are well recognized in people with Cushing syndrome who frequently have diabetes. Lesser degrees of cortisol excess have also been implicated in the pathogenesis of the metabolic syndrome and the development of insulin resistance [15].

Chronic inflammation may also underlie the association as cytokines and other inflammatory markers, such as increased C-reactive protein, tumor necrosis factor-alpha and pro-inflammatory cytokines, are increased in diabetes and the metabolic syndrome and are implicated in sickness behavior and depression [14][16]. Future studies however, are needed to understand the mechanisms underlie the association between depression and diabetes.

The high rates of depression in patients with diabetes suggest that diabetes healthcare professionals should enquire about depression, as management of this may lead to improved outcomes.

In conclusion, this study the presence of depressive symptoms was associated with modest increase in the risk of type 2 diabetes. These data provide further evidence that depression may predispose to diabetes. The relationship between these conditions should lead clinicians to consider screening for diabetes in those with depression and vice versa.

References

[1] Anthony SD, Simon F, Michael DK, Simon L, John DC, Mellers Lishman's: Organic Psychiatry: A Textbook of Neuropsychiatry, Fourth Edition Published Online: 29 JUL 2009 Print ISBN: 9781405118606 Online, ISBN: 9781444316803: 689-690.

[2] Eaton WW, Armenian H, Gallo J, Pratt L, Ford DE. Depression and risk for onset of type II diabetes. A prospective population-based study. Diabetes Care 1996; 19: 1097-1102.

[3] Lobo AP, Echeria MJ, Campayo A: Endocrine disorders text book in Curr Psychiatry Rep 2011; 30: 432-433.

[4] Monteleone P. Endocrine disturbances and psychiatric disorders. Current Opinion in Psychiatry. Lippincott Williams and Wilkins, Inc. 2001; 14 (6): 605-10.

[5] The Diabetes Control and Complications Trial Research Group. The Effect of Intensive Treatment of Diabetes on the Development and Progression of Long-Term Complications in Insulin-Dependent Diabetes Mellitus. N Engl J Med 1993; 329:977-986.

[6] Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid

depression in adults with diabetes: a meta-analysis. Diabetes Care. 2001; 24(6): 1069-78.

[7] Hermans SN, Caputo S, Dzida G Khunti K Snoek F. Screening, evaluation and management of depression in people with diabetes in primary care. Primary Care Diabetes 2013; 7 (1): 1-10.

[8] American psychiatric association Task force in DSM-4. Diagnostic and Statistical Manual mental disorders. john Hopkins university 2006; 77-79.

[9] Golden SH, Lazo M, Carnethon M, Berton AG, Schreiner PJ, Diez Roux AV *et al.* Examining a bidirectional association between depressive symptoms and diabetes. JAMA 2008;299:2751-9.

[10] Mezuk B, Eaton WW, Albrecht S, Golden SH: Depression and type 2 diabetes over the lifespan: a meta-analysis. Diabetes Care 2008; 31: 2383- 2390.

[11] Knol MJ, Twisk JW, Beekman AT, Heine RJ, Snoek FJ, Pouwer F. Depression as a risk factor for the onset of type 2 diabetes mellitus. A meta-analysis. Diabetologia 2006; 49: 837-845.

[12] Min Hyun Maeng. Non-communicable diseases (NCDs), including diabetes, increasingly contribute to morbidity and mortality in conflict settings, Posted by Caroat.15,2012
http://www.sipri.org/media/blogs/global-health/world-diabetes-day-2013-diabetes-in-conflict-areas.

[13] Katon, WJ, Russo JE, Von Korff M, *et al*., Long-term effects on medical costs of improving depression outcomes in patients with depression and diabetes. Diabetes Care, 2008. 31(6): 1155-9.

[14] Musselman DL, Betan E, Larsen H, Phillips LS. Relationship of depression to diabetes types 1 and 2: epidemiology, biology, and treatment. Biol Psychiatry 2003; 54: 317–329.

[15] Phillips DI, Barker DJ, Fall CH, Seckl JR, Whorwood CB, Wood PJ *et al.* Elevated plasma cortisol concentrations: a link between low birth weight and the insulin resistance syndrome? J Clin Endocrinol Metab 1998; 83: 757–760.

[16] Dantzer R, O'Connor JC, Freund GG, Johnson RW, Kelley KW. From inflammation to sickness and depression: when the immune system subjugates the brain. Nat Rev Neurosci 2008; 9: 46–56.