



Internationally indexed journal

Indexed in Chemical Abstract Services (USA), Index copernicus, Ulrichs Directory of Periodicals, Google scholar, CABI ,DOAJ , PSOAR, EBSCO , Open J gate , Proquest , SCOPUS , EMBASE ,etc.



Rapid and Easy Publishing

The "International Journal of Pharma and Bio Sciences" (IJPBS) is an international journal in English published quarterly. The aim of IJPBS is to publish peer reviewed research and review articles rapidly without delay in the developing field of pharmaceutical and biological sciences



Pharmaceutical Sciences

- Pharmaceutics
- Novel drug delivery system
- Nanotechnology
- Pharmacology
- Pharmacognosy
- Analytical chemistry
- Pharmacy practice
- Pharmacogenomics



Biological Sciences

- Polymer sciences
- Biomaterial sciences
- Medicinal chemistry
- Natural chemistry
- Biotechnology
- Pharmacoinformatics
- Biopharmaceutics
- Biochemistry
- Biotechnology
- Bioinformatics
- Cell biology
- Microbiology
- Molecular biology
- Neurobiology
- Cytology
- Pathology
- Immunobiology

**Indexed in Elsevier Bibliographic Database
(Scopus and EMBASE)**

SCImago Journal Rank 0.288

Impact factor 2.958*

Chemical Abstracts
Service (www.cas.org)



A division of the American Chemical Society

CODEN IJPBJ2



Elsevier Bibliographic databases (Scopus & Embase)

SNIP value – 0.77

SJR - 0.288

IPP - 0.479

SNIP – Source normalised impact per paper

SJR – SCImago Journal rank

IPP – Impact per publication

Source – www.journalmetrics.com

(Powered by scopus (ELSEVIER))



LUND
UNIVERSITY



JACKSONVILLE STATE UNIVERSITY

Jacksonville State University
Houston Cole Library
USA (Alabama)



UNIVERSITY OF
OXFORD

Oxford, United Kingdom



*And indexed/catalogued in
many more university*



*Instruction to Authors visit www.ijpbs.net

For any Queries, visit "contact" of www.ijpbs.net



BIDIRECTIONAL ASSOCIATION BETWEEN DEPRESSION AND DIABETES

**MANASI BEHERA*¹, DIPTI MOHAPATRA², NIBEDITA PRIYADARSINI³
AND PRIYAMBADA PANDA⁴**

Department of Physiology, IMS and SUM Hospital, Bhubaneswar, India.

ABSTRACT

Diabetes mellitus is a major health problem not only in developing countries but also in developed countries. Depression and diabetes are two major health disorders that are bidirectionally associated. Some studies show strong relationship between diabetes and depression. Sometimes diabetes and depression combinedly increase the mortality and morbidity rate. Early identification and proper treatment of depression can improve the quality of life.

KEYWORDS: Depression, Diabetes, Mortality, Neurotrophic, Catecholamine.



MANASI BEHERA

Department of Physiology, IMS and SUM Hospital, Bhubaneswar, India.

*Corresponding author

INTRODUCTION

Depression is a known comorbid condition of diabetes¹. Diabetes and depression are major public health conditions causing significant morbidity and mortality². Diabetes is associated with depression and depressive symptoms, but the strength and causal direction of these associations are unclear³. Meta-analyses have shown that the risk for depression is elevated in type 2 diabetes, compared with non diabetic control subjects⁴. Worldwide, the prevalence of diabetes in all age groups was estimated to be 2.8% in 2000 and 4.4% in 2030⁵. Two recent meta analyses of longitudinal studies suggest that depression is associated with a 40 – 60% increased risk of developing type 2 diabetes⁶. It has been suggested that physical inactivity, smoking, obesity and use of psychotropic medication may be parts of the causal pathway linking depression to diabetes^{6, 7}. Persons with a sedentary life style, a poor diet is associated with obesity and type-2 diabetes⁸. Talbot and Nouwen⁹ stated that there is no solid evidence that the initial occurrence of clinically significant depression results either from biochemical changes directly attributable to type 2 diabetes or its treatment or from the psychosocial demands imposed by the illness or its treatment. Depressed patients visit their Primary care physicians more often than patients who are not depressed. Depression is a medical disorder due to imbalance between different hormones and neurotransmitters. Major depression is seen in 20 -25% of patients with Diabetes mellitus, Cancer, HIV/AIDS and Asthma. Approximately 11-15% of patients with diabetes suffer from major depression. There are more than 25 FDA approved anti – depressant medications available for the treatment of depression. The 2004 NYC HANES study showed that 8% of the New York population had a diagnosis of depression at the time of survey but only 37% were receiving clinically appropriate treatment¹⁰. Depression is associated with increased mortality in general population, especially among older adults according to many study reports^{9, 11, 12}. Wulsin et al¹³ identified 57 studies carried out between 1966 and 1996, of which 29 demonstrated positive results, 13 negative results and 15 mixed result according

review of the relation between depressions and mortality. Excess mortality is seen when subjects have depression and other certain illnesses such as coronary artery disease, myocardial infarction, stroke, congestive heart failure or ischemic heart disease^{14, 15, 16}. People with diabetes mellitus have a high risk of depression and depression increases mortality among people with other conditions. Both depression and diabetes have been found to be at increased risk for the development of cardiovascular complications of diabetes and have increased mortality rates¹⁷.

ASSOCIATION BETWEEN DEPRESSION AND DIABETES

Diabetic patients are at twice the risk of developing depression than the normal persons. Prevalence of depressed patients with type 2 diabetes is higher than non diabetics. Individuals with diabetes are more prone to develop depression than individuals who are non – diabetic. However the reasons for the high prevalence of depression in type 2 diabetes remains unclear. Most probably depression may result from having a chronic disease with its associated complications¹⁸. Depressed persons isolate themselves, decreasing the social contacts and supports, this could be crucial for glycemic control, treatment compliance and survival for diabetes^{19, 20}. But the exact nature of the relationship between hyperglycaemia and depression remain unclear^{3, 8}. Depression may result from hyperglycaemia by two mechanisms: (1) through symptoms such as fatigue and difficulty in concentration, fear of complications²¹ and (2) through physiological processes, including inflammatory reactions, and reductions in neurotropic functions, which in turn lead to reduced plasticity of nervous system leading to depression^{22, 23, 24}. Neuro-hormonal changes mediated through the hypothalamic – pituitary – adrenal axis may be related to depression and diabetes. Counter regulatory hormones like cortisol and catecholamines have been found to increase in depression²⁵. Activated hypothalamo – pituitary – adrenal axis, sympathetic system and counter regulatory hormones related to

depression increase susceptibility to insulin resistance, obesity and type 2 diabetes²⁶. Diabetic patients with depression have poor self management without maintaining good physical activities, not checking blood glucose level regularly, uncontrolled diet and do not take medicines regularly^{27, 28}. Other risk factors like socioeconomic status, race and ethnicity also develop depression in patients with diabetes mellitus. Depression also plays a negative role in treatment for diabetes. Persons with depression may result diabetes due to increased inflammatory activation, alterations in the glucose transport system and release of different hormones²⁹. Some hormones like catecholamine, growth hormone, glucocorticoids can lead to increase blood sugar level³⁰. In a study it has been seen that improvement in depressive symptoms may lead to improvement in hyperglycaemia³¹. Cytokines like IL – 6 which is released more in diabetic persons may induce depressive psychosis²⁴. Studies that have been examined showed that there is bidirectional association between diabetes and depression, although the causal relationship is unclear. Several studies assessed the presence of severe depressive symptoms significantly elevated mortality risk among adults with diabetes; the same pattern is not observed among people without diabetes. [From NHANES I Epidemiologic Follow-up Study] According to Beck's Hopelessness Scale some studies showed the

role of diabetes in suicidal attempt scored higher³². By the year 2020, type 2 diabetes will overtake infectious diseases as the biggest killer worldwide³³.

CONCLUSION

Depression and diabetes are bidirectionally associated. Both have major impact on health and economic outcomes. Improvement in depression score is correlated with improvement in glycaemic control. Also improvements in glycaemic control are correlated with improvements in depressive symptoms. Over the past two decades, depression is still undiagnosed and untreated in some cases. This has a crucial impact when the patient has a coexisting chronic disorder like diabetes mellitus. It is important for screening and treating adults for depression at an early stage to avoid a worse outcome. All individuals with diabetes and their families should be regularly screened for symptoms of psychological and social distress. Multidisciplinary team should be in the diseases clinic that includes psychiatrists and psychologists for further management of depression. Concerning awareness and identifying these conditions early improves the outcomes of depression and diabetes and ultimately improve health outcomes and quality of life.

REFERENCES

1. P. Dimakakos, Mary B. Pierce, Rebecca Hardy, Diabetes Care, 33: 792 – 797, (2010).
2. Vishal Patel, International Journal of Medical Science and Public health, Volume- 3, Issue-1, (2014).
3. de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ. Association of depression and diabetes complications: a Meta analysis, Psychosom Med, 63: 619 – 630, (2001).
4. Ali S, Stone MA, Peters JL, Davies MJ, Khuntik, The prevalence of co morbid depression in adults with type 2 diabetes :a systematic review and meta – analysis. Diabet Med, 23: 1165 – 1173, (2006).
5. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care, 27: 1047 – 1053, (2004).
6. Knol MJ, Twisk JWR, Beekman ATF, Heine RJ, Snoek FJ, Pouwer F. Depression as a risk factor for the onset of type -2 diabetes mellitus: a Meta analysis. Diabeto – logia, 49: 837 – 845, (2006).
7. Carnethon MR, Kinder LS, Fair JM, Stafford RS, Fortmann SP. Symptoms of depression as a risk factor for incident

- diabetes: findings from the National Health and Nutrition Examination Epidemiologic Follow – up Study, 1971 – 1992. *AM J Epidemiol*, 158: 416 – 423, (2003).
8. Lustman PJ, Griffith LS, Clouse RE, et al. Psychiatric illness in diabetes mellitus: relationship to symptoms and glucose control. *J Nerv Ment Dis*, 174: 736 -42, (1986).
 9. Talbot F Nouwen A. A review of the relationship between depression and diabetes in adults: is there a link? *Diabetes Care*, 23: 1556 – 1562, (2000).
 10. New York City Department of Health and Mental Hygiene (NYC DOHMH) , Health and Nutrition Exam Survey (HANES) , (2004) .
 11. Schulz R, Beach SR, Ives DG, et al. Association between depression and mortality in older adults: The Cardiovascular Health Study. *Arch Intern Med*, 160: 1761 – 1768, (2000).
 12. Steffens DC , Levy RM , Wagner R , et al. Sociodemographic and clinical predictors of mortality in geriatric depression . *Am J Geriatric Psychiatry*, 10: 531 – 540, (2002).
 13. Wusulin LR, Vaillant GE, Wells VE. A systematic review of the mortality of depression. *Psychosom Med*, 61: 6 – 17, (1999).
 14. Sheps DS, Mc Mohan RP, Becker L, et al. Mental stress – induced ischemia and all – cause mortality in patients with coronary artery disease: results from the psychophysiological investigations of Myocardial Ischemia Study. *Circulation*, 105: 1780 – 1784, (2002).
 15. Eaker ED, Pinsky J, Castelli WP. Myocardial infarction and coronary death among women: psychosocial predictors from a 20 – year follow – up of women in the Framingham Study. *Am J Epidemiol*, 135: 854 – 864, (1992).
 16. Lewis SC , Dennis MS , O'Rourke SJ, et al . Negative attitudes among short – term stroke survivors predict worse long – term survival. *Stroke*, 32: 1640 – 1645, (2001).
 17. Bruce DG, Davis WA, Starkstein SE, Davis TM. A prospective study of depression and mortality in patients with type 2 diabetes : the Fremantle Diabetes Study . *Diabetologia*, 48: 2532 – 2539, (2005).
 18. Power F , Skinner TC , Pibernik – Okanovic M , et al . Serious diabetes – specific emotional problems and depression in a Croatian – Dutch – English. Survey from the European Depression in Diabetes [EDID] Research Consortium. *Diabetes Res Clin Pract*, 70: 166 – 173, (2005).
 19. Everson SA , Maty SC , Lynch JW , et al. Epidemiologic evidence for the relation between socioeconomic status and depression , obesity and diabetes . *J psychosom Res*, 53: 891 – 895, (2002).
 20. Lustman PJ, Clouse RE, Freedland KE. Management of major depression in adults with diabetes: implications of recent clinical trials. *Semin Clin Neuropsychiatry*, 3: 102 – 114, (1998).
 21. Edge LE. Effect of comorbid chronic diseases on prevalence and odds of depression in adults with diabetes. *Psychosom Med*, 67: 46 – 51, (2005).
 22. Fujinami A, Ohta K, Obayashi H, et al. Serum brain – derived neurotrophic factor in patients with type 2 diabetes mellitus : relationship to glucose metabolism and biomarkers of insulin resistance. *Clin Biochem*, 41: 812 – 817, (2008).
 23. Krabbe KS , Nielsen AR , Krogh – Madsen R , et al. Brain – derived neurotrophic factor (BDNF) and type 2 diabetes. *Diabetologia*, 50: 431 – 438, (2007) .
 24. Pickup JC. Inflammation and activated innate immunity in the pathogenesis of type 2 diabetes. *Diabetes Care*, 27: 813 – 823, (2004).
 25. Roy A , Pickar D , De Jony J , et al. Norepinephrine and its metabolites in cerebrospinal fluid, plasma , and urine : relationship to hypothalamo – pituitary – adrenal axis function in depression . *Arch Gen Psychiatry*, 45: 849 – 857, (1988).
 26. 26 – Depression symptoms and occurrence of type 2 diabetes among Japanese men. *Diabetes Care*, 22: 1071 -1076 (1999).
 27. Simon GE, Oliver M, et al. Relationship of depression and diabetes self – care, medication adherence, and preventive

- care. *Diabetes Care*, 27: 2154 – 2160, (2004) .
28. Ciechanowski PS, Katon WJ, Russo JE. Depression and diabetes: impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med*, 160: 3278 – 3285, (2000).
 29. Phillips LS. Relationship of depression to diabetes types 1 and 2 : epidemiology , biology and treatment. *Biol Psychiatry*, 54(3): 317 – 329, (2003).
 30. Winokur A, maislin G, Philips JL, Amstrolam JD. Insulin resistance after oral glucose tolerance testing in patients with major depression. *Am J Psychiatry*, 145: 325 -330, (1988).
 31. Lustman PJ , Griffith LS , Freedland KE , Kissel SS , Clouse RE . Cognitive behaviour therapy for depression in type 2 diabetes: a randomized controlled trial. *Ann Intern Med*, 129: 613 – 621, (1998).
 32. Pompili M , Lester D , Innamorati M , De Pisa E , Amore M , Ferrara C , et al . Quality of life and suicide risk in patients with diabetes mellitus. *Psychosomatics*, 50 (1): 16 – 23.
 33. Dipti Mohapatra , Prakash Sasmal , Non-invasive assessment of cardiovascular autonomic dysfunction in patients with type 2 Diabetes Mellitus, *International Journal of Pharma and Biosciences*,3 (1): 299 – 305, (2012).