Original Article

Significance of glycemic status in patients of major depressive disorder with suicidal behaviour

Mahendra T Kamble[1], Prashant V Dharme[2*], Prerna D Nandedkar[3], Arvind V Gaikwad[4], Kamalakar B Mane[5]

[1,4,5]Assistant Professor, Department of Biochemistry, Government Medical College and Cancer Hospital, Aurangabad, Maharashtra, INDIA.
[2]Associate Professor, Department of Biochemistry, Government Medical College and Superspeciality Hospital, Nagpur, Maharashtra, INDIA.
[3]Assistant Professor, Department of Biochemistry, Government Medical College and Hospital, Akola, Maharashtra, INDIA.
Email: dr.mtkamble@gmail.com, pvdprashant@gmail.com, pvdprashant@gmail.com

Abstract

Background: Suicidal ideation is common in major depressive disorder, and it is thought to be a strong contributing factor for completed or attempted suicide. Hyperglycemia and hyperinsulinemia may increase the risk of depression and also suicide risk. Therefore this study was conceived to explore the possible relationship between suicidal behaviour and impaired glucose metabolism in major depressive disorders. **Materials and Method:** This study was undertaken in Department of Biochemistry and Psychiatry, Government Medical College, Nagpur. 60 diagnosed cases of major depressive disorder in the age range of 21-60 years of either sex were enrolled. The diagnosis was determined by DSM IV criteria. HAMD scale was used to assess the severity of depression. Fasting and postprandial blood glucose along with HbA1c was determined in the study participants. **Results:** Out of 60 patients, nearly more than half of (53.33%, n=32) patients were having suicidal ideation and attempt. The male depressive cases (73.33%, n=22) outnumbered the female depressive cases (33.33%, n= 10) in having suicidal ideation and attempt. Statistically significant differences were found in fasting, postprandial blood glucose and HbAa1c of the major depressive cases with no suicidal ideation and behaviour, and with suicidal ideation and attempt. **Conclusion:** The observed association between blood glucose levels, HbA1c and suicidal behaviour suggests that disturbances in glucose metabolism are associated with suicidal ideation and attempts.
Key Words: Blood glucose levels, Major depressive disorder, Suicidal behaviour, Suicidal ideation, Suicidal attempt.

[*]**Address for Correspondence:**
Dr. Prashant V. Dharme, Associate Professor, Department of Biochemistry, Government Medical College and Superspeciality Hospital, Nagpur, Maharashtra, INDIA.
Email: pvdprashant@gmail.com
Received Date: 10/02/2017 Revised Date: 27/03/2017 Accepted Date: 28/04/2017
DOI: https://doi.org/10.26611/202319

Access this article online	
Quick Response Code:	Website: www.statperson.com
	Volume 7 Issue 2

INTRODUCTION

Altered lifestyle of the modern society and tendency to excel has ultimately culminated in the increasing incidence of depression. Depression is major health concern, in that it leads to significant dysfunction[1], disability2, and poor quality of life in sufferers[3] and pose a significant burden on the care givers[4]. Being multicentric in origin, depression has always attracted the researchers and still continuing. Suicidal ideation is one of the most serious and commonly seen symptom of the depression which often remains undetected. Depression is thought to be a strong contributing factor for completed or attempted suicide. Approximately 50% of those who commit suicide, suffers from serious depressive disorder[5].The relationship between depression and suicidal behaviour is complex. Little literature is available on the association between depression, suicidal behaviour, glucose levels or insulin resistance although some studies suggested that higher glucose levels are associated with dysthymia[6] and higher HbA1c concentrations with recurrent or psychotic depression.[6] Association between suicidal ideation and HbA1c levels in diabetic patients has been reported[7]. A recent meta-analysis reported an association between depression and

How to cite this article: Mahendra T Kamble, Prashant V Dharme, Prerna D Nandedkar, Arvind V Gaikwad, Kamalakar B Mane. Significance of glycemic status in patients of major depressive disorder with suicidal behaviour. *International Journal of Recent Trends in Science and Technology* April to June 2017; 7(2): 37-40. http://www.statperson.com

insulin resistance.[8]Hyperglycemiaand insulin resistance may increase the risk of depression and also the risk of suicide, therefore this increases our need to explore the possible relationship between suicidal behaviour and disturbances in glucose metabolism in depressive patients.

MATERIAL AND METHODS

The present study has been carried out in Department of Biochemistry, Government Medical College and Hospital Nagpur, during 2011- 2012. The study protocol was approved by the Institutional Ethical Committee. Informed written consent was obtained from all the study participants enrolled in the study. Study sample consisted of 60 diagnosed cases of major depressive disorders in the age group of 21 -60 years, of either sex, attending psychiatry department. The diagnosis of major depressive disorder was determined by DSM-IV criteria.[9] Hamilton's depressive rating scale was used to assess the severity of the depressive symptoms,[10] higher scores on the HAMD expressed more severe symptomatology. The following severity range for the HAMD score was used to classify the depressive symptom severity: mild depression (8-16); moderate depression (17-23); and severe depression (≥24).[11] in the present study suicidal behaviour was defined as 'suicidal ideation during the past month' or 'suicide attempt during the past month or in a lifetime. The patients with a prior clinical and / or laboratory evidence of hypo or hyperthyroidism, somatic illness (diabetes and renal or hepatic disorders), infections or autoimmune diseases, a recent surgical treatment or a significantly changed body weight, axis I and axis II diagnoses and pregnant or lactating female subjects were excluded from the study. We measured the fasting blood glucoselevels and HbA1c between 8 and 9 am after 10-12 hours of fasting. Postprandial blood glucose was measured 2 hours after the meal. Blood glucose was estimated by enzymatic (Glucose oxidase - peroxidase method) whereas HbA1c was determined by Latex agglutination method which is measured as turbidity.

Statistical Analysis

All values are reported as mean ± SD. Statistical analysis was done by using the chi – square test, the student's t-test. Differences were considered statistically significant at a probability value p<0.05. All statistical analyses were performed with SPSS statistics version 19.0.

RESULTS

Table 1: Sexwise distribution of depressive cases according to suicidal ideation and behaviour

Sex	No suicidal ideation and behaviour (n= 28)	Suicidal ideation and attempt (n= 32)	Total
Male (n=30)	08 (26.66 %)	22 (73.33 %)	30 (100%)
Female (n=30)	20 (66.66%)	10 (33.33%)	30 (100%)

Table 1 shows Sexwise distribution of depressive cases according to suicidal ideation and behaviour. Out of 60 patients, nearly more than half of (53.33%) patients were having suicidal ideation and attempt. The male depressive cases (73.33%, n=22) outnumbered the female depressive cases (33.33%, n= 10) in having suicidal ideation and attempt.

Table 2: Age wise distribution of depressive cases according to suicidal ideation and behaviour

Age group (In years)	No suicidal Ideation and behaviour (n= 28)	Suicidal Ideation and attempt (n= 32)	Total
21-30	06 (21.42 %)	08 (25%)	14 (23.33%)
31-40	07 (25 %)	06 (18.75%)	13 (21.66 %)
41-50	08 (28.57%)	14 (43.75%)	22 (36.66 %)
51-60	07 (25 %)	04 (12.5 %)	11 (18.33 %)
Total	**28 (100%)**	**32 (100%)**	**60 (100%)**

Table 2 shows Age wise distribution of depressive cases according to suicidal ideation and behaviour. There were 08 (25%) depressive case in the age group 21 -30 yrs, 06 (18.75%) depressive cases in the 31-40, 14 (43.75%) depressive cases in the age group 41-50 and 04 (12.5 %) depressive cases in the age group of 51-60 seen.

Table 3: Comparison of Blood Sugar Levels in Controls and Major Depressive Cases With and Without Suicidal Ideation and Behaviour

Study participants and Biochemical parameters	No suicidal Ideation and behaviour (n= 28)	Suicidal Ideation and attempt (n= 32)	P value
Fasting blood glucose (mg/dl)	102.78 ± 07.06	109.26 ± 08.24	<0.001
Postprandial blood glucose (mg/dl)	105.30± 08.94	120.42 ± 11.18	<0.01
HbA1c (%)	5.68 ± 1.07	6.4 ± 1.02	<0.05
HAMD Score	21± 7	26 ± 8	<0.01

Table 3 shows Comparison of Blood Sugar Levels in Controls and Major Depressive Cases with and without Suicidal Ideation and behaviour. The mean value of fasting blood glucose was 102.78 ± 07.06 mg/dl in depressive patients with no suicidal ideation and behaviour, whereas it was 109.26 ± 08.24 mg/dl in depressive patients with suicidal ideation and attempts and the difference was statistically significant (p<0.001). The mean value of Postprandial blood glucose was

105.30± 08.94 mg/dl in depressive patients with no suicidal ideation and behaviour, whereas mean value of Postprandial blood glucose was 120.42 ± 11.18 mg/dl in depressive patients with suicidal ideation and attempts, and the difference was statistically significant ($p<0.01$). Statistically significant difference ($p <0.05$) was seen in the mean values of HbA1c indepressive patients with no suicidal ideation and behaviour and depressive patients with suicidalideation and attempt. HAMD Score was 21± 7 and 26 ± 8 in depressive cases with no suicidal ideation and behaviour, and with suicidal ideation and attempt respectively. The difference was statistically significant ($p< 0.01$).

DISCUSSION

In our study, the observed association between higher blood glucose levels, HbA1c and suicidal behaviour in depressive cases is an interesting finding. More than half of the participants in our study reported suicidal ideation or previous attempts of suicide, a similar observation was made by Sokero PT *et al*[12]. The male depressive cases outnumbered the female depressive cases in having suicidal ideation and attempt in our study. A similar preponderance of male suicides was also observed by Nandi etal[13] and Hedge *et al*[14]. In the present study 22 depressive cases (36.66 %) with suicidal ideation and attempt were found to be in the age group of 41- 50 years. This is supported by the fact that 71% of suicides in India (National Crime Records Bureau. Ministry of Home Affairs, Government of India: 2005) are by persons below the age of 44 years. In the present study, higher fasting and postprandial blood glucoselevels were observed in patients with suicidal ideation or who had previously attempted suicide. A similar observation of three-fold higher suicidal ideation rates in insulin-treated type 2 diabetic patients was made by Ceretta *et al* (2012)[6].Which suggested an association between suicidal tendenciesand blood glucose levels. We also observed higher HbA1c values in patients with suicidal ideation or who had previously attempted suicide. Bot *et al* (2013)[7] reported an association between higher HbA1c values and depressive mood, sleep disturbances, appetite problems and suicidal ideation. Various studies[15] reported an increased risk for suicidal ideation in adults with diabetes and depression, but to our knowledge no study have specifically studied the association between glucose levels and suicidal behaviour in depressed patients. The association observed between glucose levels and suicidal behaviour may be related to the cytokine mediated inflammatory process that results in the activation. of indoleamine 2,3-dioxygenase, the depletion of tryptophan and suicidal behaviour related to emerging serotonergic hypofunction, depression and impulsivity[16,17,18,]. Patients with suicidal behaviour in our study also had higher HAMD Scores which was also observed by Brent DA *et al* (1988).[20] Subjects scoring high on depression rating scale tend to have lack of ability to overcome suicidal wishes and may have plan and wishes to commit suicide. Therefore depression may be regarded as potent risk factor for suicidal ideation and suicide risk itself. In addition, hyperactivation of the hypothalamic-pituitary-adrenal axis has been reported in 20 to 80 % of depressed individuals.[21]this hyperactivity has been considered as an important mechanism that explains the pathophysiology of depression. Higher cortisol levels are associated with age and more severe forms of depression, may thus also contribute to the association between higher HAMD score and risk of suicidal behaviour.[21, 22]

CONCLUSION

The observed association between blood glucose levels, HbA1c and suicidal behaviour suggests that disturbances in glucose metabolism are associated with suicidal ideation and attempts. However further studies are necessary to elaborate the pathophysiology behind these associations.

REFERENCES

1. Chadda RK. Social support and psychosocial dysfunction in depression. Indian J Psychiatry.1995; 37:119-23.
2. Chaudhary PK, Deka K, Chetia D. Disability associated with mental disorders. Indian J Psychiatry. 2006; 48:95-101.
3. Tharoor H, Chauhan A, Sharma PS. Across sectional comparison of disability and quality of life in euthymic patients with bipolar affective or recurrent depressive disorder with and without comorbid chronic medical illness. Indian J Psychiatry. 2008;50:24-9.s
4. Chakrabarti S, Kulhara P, Verma SK. Extent and determinants of burden among families of patients with affective disorders. ActaPsychiatr Scand. 1992; 86:247-52.
5. Gabrielle A, Carlson MD, Dennis P, Cantwell MD. Suicidal behaviour and depression in children and adolescents. Journal of American Academy of Child Psychiatry. 1982; 21:4:361-368.
6. CerettaLB,ReusGZ,Albelaira HM, Jordana LK, Schwalm MT, Hoepers NJ, *et al*. Increased prevalence of mood disordesr and suicidal ideation in type 2 diabetes patients. ActaDiabetol. 2012;49 suppl 1:S227-34
7. Bot M, Pouwer F, de jonge P, Tack JC, Geelhoed-Duijvestin PHLM, Snoek FJ. Differential associations between depressive symptoms and glycemic control in outpatients with diabetes. Diabet Med. 2013;30:e115-22
8. Kan C, Silv N, Golden SH, Rajala U, Timonen M, Stahl D, *et al*. A systemic review and meta-analysis of the association between depression and insulin resistance. Diabetes Care. 2013; 36:480-9.
9. American Psychiatric Association. Diagnostic and Statistical manual of mental disorders, fourth edition.

4th edn. American Psychiatric Association: Washington,DC (2001)
10. Hamilton, M. A rating scale for depression. J. Neurol Neurosurg.23,56-62 (1980)
11. Zimmerman M, Martinez J, H Young, D Chelminski I andDalrymple K. Severity classification on the Hamilton Depression Rating Scale. J Affect Disord. 150,384e8 (2013).
12. Sokero PT, Melartin TK, Rytsala HJ, Leskelä US, Lestela-Mielonen PS, IsometsaET. Suicidal ideation and attempts among psychiatric patients with majordepressive disorder. J Clin Psychiatry. 2003; 64:1094–100.
13. Nandi D N, Banarjee G, Boral GC. Suicide in west Bengal- A Century apart. Indian J Psychiatry.1978; 20:155-60.
14. Hedge RS. Suicide in rural community. Indian J Psychiatry. 1980;22:368-70.
15. Han SJ, Kim HJ, Choi YJ, Lee KW, Kim DJ. Increased risk of suicidal ideation In Korean adults with both diabetes and depression. Diabetes Res ClinPract. 2013; 101:14–7.
16. Dunn AJ, Swiergiel AH, de Beaurepaire R. Cytokines as mediators of Depression: What can we learn from animal studies? NeurosciBiobehav Rev. 2005; 29:891–909.
17. Banerjee M, Saxena M. Interleukin-1 (IL-1) family of cytokines: Role in Type 2 Diabetes. ClinicaChimicaActa. 2012; 413:1163–70.
18. Kressel G, Trunz B, Bub A, Hülsman O, Wolters M, Lichtinghagen R, *et al*. Systemic and vascular markers of inflammation in relation to metabolic Syndrome and insulin resistance in adults with elevated atherosclerosis risk. Athetosclerosis. 2009; 202:263–71.
19. Sublette ME, Galfalvy HC, Fuchs D, Lapidus M, Grunebaum MF, Oquendo MA, *et al*. Plasma kynurine levels are elevated in suicide attempters with Major disorder. Brain Behav Immun. 2011; 25:1272–8.
20. Brent DA, Perper JA, Goldstein JE, KolkoDJ,Allan MJ. Risk factors in adolescent suicide: A comparison of adolescent suicide victims with suicidal inpatients. Archives of General Psychiatry, 45, 581-588.
21. Stetler C, Miller GE. Depression and hypothalamic-pituitary-adrenalactivation: A Quantitative summary of four decades of research. Psychosomatic Med. 2011; 73:114–26.
22. Belvedere Murri R, Pariante C, Mondelli V, Masotti M, Atti AR, Mellacqua Z ,*et al*. HPA axis and aging in depression: Systematic review andmeta-analysis. Psychoneuroendocrinology. 2014; 41:46–62.

Source of Support: None Declared
Conflict of Interest: None Declared