

Section

Psychiatry

Original

Article

Depression and Routine Biochemical Markers: A Cross Sectional Study

Haseeb Khan¹, Vimlesh Kumar Verma^{2*}, Dharmendra Uraiya², Anoop Kumar²

¹Assistant Professor, Department of Psychiatry, Hind Institute of Medical Sciences, Safedabad, Barabanki, U.P. India. 225001.

²Associate Professor, Department of Medicine, Hind Institute Of Medical Sciences, Safedabad, Barabanki U.P. India 225001

ABSTRACT

Background: Today, globally up to 6–12% of the adult population suffered mental disorder and recurrent depression. The prevalence of depression in India was reported as 4.5% by WHO. Currently the diagnosis of major depression is carried out through symptom-based assessment process, which has limitation of the development of personalised treatment plans. **Objective:** To determine the association between various biochemical markers of the inflammation, lipid profile, BMI, thyroid profile and depression among the patients attending department of psychiatry in a tertiary care centre.

Methods: A cross-sectional study conducted among 50 patients attending the psychiatry department at S.N. Medical college, Agra and diagnosed as Depression disorder, during April 2012 to December 2012. Hamilton rating scale (HAM-D) was used to assess the severity of depression. The patients were also assessed for their vitals, lipid profile, thyroid profile, ESR, CRP and BMI. **Results:** 19 (38%) study subjects were in the age group of 18yrs to 30 yrs with mean age as 34.2 ±14.57 years. 36(72%) were of normal weight or under-weight and 14 (28%) were pre-obese. Among 14 pre-obese and obese study subjects, 2(15.4%) had mild, 4(18.2%) had moderate and 8(53.3%) had severe type of depression(p=0.03). ESR is more in severe depression as compared to mild and moderate depression. (p<0.001%). C-reactive protein is statistically more in severe depression (T =2.25; P= < 0.001). **Conclusions:** There is a positive and significant relationship between the severity of depression and ESR, CRP and BMI among the patients attending department of psychiatry.

Keywords: Thyroid profile, CRP, ESR, Obesity, BMI, Depression, Sociodemographic factors, Age, Gender.

DOI:10.21276/iabcr.2018.4.3.14

Received: 14.06.18

Accepted: 13.07.18

*Corresponding Author

Dr Vimlesh Kumar Verma MD DM
Associate Professor, Department of Medicine, Hind Institute Of Medical Sciences, Safedabad, Barabanki U.P. India 225001. Email:drvimleshverma@gmail.com

Copyright: © the author(s) and publisher. IABCR is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882.




This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial

INTRODUCTION

Depression is a mental disease with global public health concern, especially in developing countries. There was evidence that up to 6–12% of the adult population suffered mental disorder and recurrent depression.^[1] Currently the diagnosis of major depression is carried out through a combination of patient interviews, checklists and self-report questionnaires. These generally rely on a list of symptoms derived from the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V).^[2] Unfortunately, there is debate about the value and objectivity of this symptom-based assessment process^[3-5] particularly around limitations associated with the development of personalised treatment plans. Biomarkers are indicators of normal biological

processes, pathogenic processes or pharmacological responses to a therapeutic intervention that can be measured and evaluated objectively.^[6] In medical practice, biomarkers are regularly used to support the presence or absence of specific diseases (diagnostic biomarkers), predict optimal treatment options (treatment biomarkers), measure treatment progress (treatment-response biomarkers), and predict the onset of future disease (predictive biomarkers).^[7-9] Unfortunately, progress in biomarker research on depression is hindered by the considerable heterogeneity associated with depression. Only handful studies are available in western literature regarding role of biomarkers like lipid profile, ESR, CRP, BMI and thyroid hormone in

Access this article online

Website: www.iabcr.org	Quick Response code
DOI: 10.21276/iabcr.2018.4.3.14	

How to cite this article: Khan H, Verma VK, Uraiya D, Kumar A. Depression and Routine Biochemical Markers: A Cross Sectional Study. Int Arch BioMed Clin Res. 2018;4(3):50-53.

Source of Support: Nil, **Conflict of Interest:** None

depression. But in Indian scenario, due to paucity of literature, we are not in a state to comment about the utility of these markers in the etio-pathogenesis of depression. Hence, considering the practical feasibility of study in our research settings the present study is designed to probe into the association between various biochemical markers of the inflammation, lipid profile, BMI, thyroid profile and depression.

METHODS

This cross-sectional study was conducted from April 2012 to December 2012 at S.N. Medical college and Hospital, a tertiary care centre in Agra, Uttar Pradesh. The convenient sampling method used and 50 consecutive patients, attending the psychiatry O.P.D. and consenting to participate were included in the study. The inclusion criterion being: - Patients in the age group of 18-55 years and diagnosed as Depression disorder. The exclusion criteria being: Subjects with history suggestive of manic, hypo manic or mixed episodes, with severe depression with psychosis, seizure disorders, other co-morbid psychiatric illness, co-morbid major medical illness, history of head injury, history of psychiatric medication in prior 3 months, substance abuse except nicotine and caffeine, history of ECT in prior 3 months, pregnant and lactating women. Data was collected taking interview of the patients. The study tool used was a predesigned and pretested structured questionnaire. The questionnaire includes two parts; First part consists of: socio demographic profile including, age, sex, education, income per month, residence, religion, marital status, family history of depression. Height and weight was measured for calculating BMI. The second part of the questionnaire include the questions from Hamilton rating scale for depression (HAM-D).¹⁰The HAM-D clinician-administered depression assessment scale, originally was developed by Max Hamilton. It provides a simple way of assessing the severity of depression, higher the score, more severe is the depression. Total HAM-D score and severity of depression are correlated as follows: 0-7 = normal, 8-13=mild depression, 14-18=moderate depression, 19-22=severe depression, >23=very severe depression. The patients were also assessed for their vitals, lipid profile (serum cholesterol, low-density lipoprotein, high-density lipoprotein and triglycerides), thyroid profile (T3, T4, TSH); body mass index, erythrocyte sedimentation rate and C –reactive proteins values. After taking approval from the institutional ethic committee, the data was collected. The participation of study subjects was on voluntarily basis, written informed consent obtained from those who were willing to participate.

Statistical Test: The data was entered in Microsoft excel 2007. All the continuous variable was summarized using mean & SD, while the categorical variables as percentage & proportion. For showing the association student t test was applied on continuous variables while chi-square test was applied for categorical variables. The significance considered when the p value is less than 0.05.

RESULTS

Total 50 patients were studied. Table no 1 shows sociodemographic wise distribution of study subjects, which shows that 19 (38%) study subjects fall in age group between 18yrs to 30 yrs and 2 (4%) were in the age group of 51yrs to 60yrs. Mean age of subject was 34.2 ±14.57.

Maximum,34(68%) were female and 16(32%) were male. Most of the study subjects, 27 (54%) were studied upto intermediate, 9 (18%) were illiterate and only 3(6%) were professional. Maximum, 36 (72%) were Hindu, rest were Muslims. 29 (58%) of the study subjects were from urban area. 14 (28%) of study subjects had positive family history of mood disorders. Table no.2 shows that 23(68%) of female and 9 (57%) of male study subjects were married. Remaining 11(32%) female and 7(43%) male study subjects were unmarried. None of the study subjects were divorced or separated. Table no.3 shows that 20 (40%) study subjects were C – Reactive positive and 3(6%) of study subjects were having abnormal thyroid profile. Table no.4 shows that ESR is more in severe depression as compared to mild and moderate depression. It is statistically significant. (p<0.001%). C-reactive protein is statistically more in severe depression (T =2.25; P= < 0.001). Among 14 pre-obese and obese study subjects, 2(15.4%) had mild, 4(18.2%) had moderate and 8(53.3%) had severe type of depression (p=0.03). Abnormal cholesterol level and thyroid level is not statistically associated with severity of depression.

Figure no.1 shows that 13(26 %) of study subjects had mild depression as per HAM-D score, 22 (44 %) of study subjects had moderate degree of depression and 15 (30%) had severe degree of depression as per HAM-D score.

Table 1. Socio-demographic wise distribution of study subjects

Sr.No	Socio- demographic variable	Study subjects (N= 50)	Percentage(%)
1	Age group		
	18-30	19	38
	31-40	15	30
	41-50	14	28
	51-60	2	4
	Mean age (mean±s.d.)	34.2±14.57	
2	Gender		
	Male	16	32
	Female	34	68
3	Education		
	Illiterate	9	18
	Middle class	8	16
	High class	9	18
	Intermediate class	10	20
	Graduation	7	14
	Post-graduation	4	8
4	Religion		
	Hindu	36	72
	Muslim	14	28
5	Residence		
	Rural	21	42
	Urban	29	58
6	Family h/o mood disorder		
	Present	14	28
	Absent	36	72

Table no. 2. Marital status wise distribution of study subjects

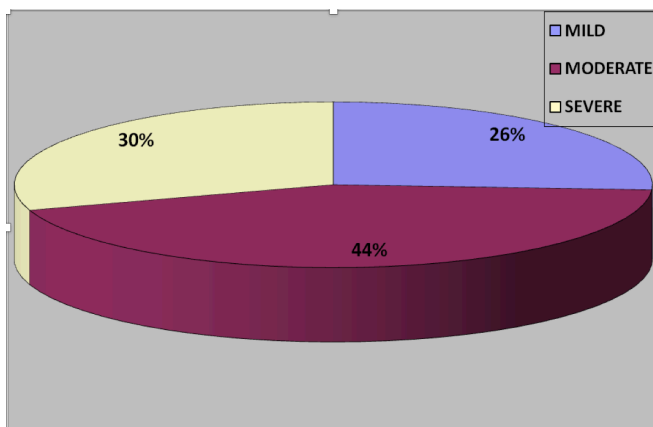
Marital status	Female		Male	
	No.	(%)	No.	(%)
Unmarried	11	32	7	43
Married	23	68	9	57
Divorced	0	0	0	0
Separated	0	0	0	0
Total	34	100	16	100

Table no. 3: CRP and Thyroid profile status wise distribution of study subjects.

Sr.No	Biochemical marker	No.of study subjects (N=50)	Percentage(%)
1	C-Reactive Protein		
	Positive	20	40
	Negative	30	60
2	Throid Profile		
	Normal	47	94
	Abnormal	3	6

Table no. 4: Distribution of study subjects according to severity of depression on Ham-d score and their relation with Biochemical marker & BMI.

Sr.No	Variables	Depression			Statistical Analysis
		MILD (N = 13)	Moderate (N =22)	Severe (N= 15)	
1	Cholesterol (Mean ± SD)	189.46 ± 45.47	186.31 ± 45.96	214 ± 49.42	p= 0.1942
2	ESR (Mean ± SD)	18.23 ± 7.19	25.14 ± 7.24	33.53 ± 7.30	p= < 0.0001
3	C-reactive Protein Positive (N=20)	1	8	11	T=2.25; P= < 0.001
4	AbnormalThyroid (N=3)	0	1	2	T=1.732, p= 0.225
BMI					
5	Normal weight (N= 36)	11	18	7	Chi-square= 6.89, df=2, p= 0.03
	Pre-obese and obese (N= 14)	2	4	8	

**Fig . 1: Severity of depression wise distribution of subjects**

DISCUSSION

The results showed that there is a positive and significant relationship between C-reactive protein (CRP) and severe depression among the patients attending psychiatry department of a tertiary care centre which is similar as that of Howren et al which confirmed that major depression is associated with increased CRP levels.^[11,12] In a recent meta analysis on longitudinal studies by Valkanova et al.^[12] it was also established that raised CRP levels were associated with an increased risk of subsequent depression. Danner M et al^[13], Ford DE^[14],Wium- Aderson MK, et al^[15] found the similar positive correlations between depression and increased CRP. The elevated levels of CRP are associated with increased risk for psychological distress and depression in the general population. Our study found, non-significance of thyroid association in relation to depression. This finding also corresponds to Roberts LM et al^[16] who found subclinical thyroid dysfunction was not associated with depression, anxiety, or cognition. Similarly Almeida OP et al^[17] concluded that subclinical thyroid disease is not associated with depression. These findings do not support the routine screening of subclinical thyroid dysfunction among adults with depression. Another biological marker in the list of this study is erythrocytes sedimentation rates (ESR). Chavda et al^[18] identified higher ESR in depressed patients compared to healthy volunteers, this finding is consistent with our observation. We found no definitive relation between severity of depression (mid, moderate, severe depression) and cholesterol level. These results of our study supported by number of studies done in past. Morgan et.al^[19] and another study by Brown^[20] and associates found no relationship between cholesterol concentrations and severe depressive.

There is a positive and significant relationship between BMI and depression, which is similar as that of Markowitz et al^[21] who conducted a review of the literature for understanding the relation between obesity and depression. Our results are consistent with those of other studies^[22-24] and suggest that there is a significant relationship between obesity and the degree of depression. De Wit et al^[25] conducted a meta-analysis of community-based studies and observed the significant positive association between depression and obesity in the general population, especially among women.

CONCLUSION

It was seen that statistical significant correlation between CRP, ESR, BMI and depression exist. It was also found that with severity of depression the value of both CRP and ESR proportionally raises. There was no significant association between depression and thyroid status and cholesterol status of patients. CRP and ESR has got a good potential as a future diagnostic tool and assessing the severity of depression as well as could serve as prognostic markers in managements of depression.

Limitation:

One limitation of our study was we did not assess categories of depressive disorders diagnostically. The strength of our study was measurement of CRP, ESR, thyroid profile, cholesterol, height, weight, and BMI through standard methods by researchers' team.

REFERENCES

- Peng YF, Xiang Y, Wei YS. The significance of routine biochemical markers in patients with major depressive disorder. *Scientific Reports* | 6:34402 | DOI: 10.1038/srep34402
- Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V). American Psychiatric Association.
- Hilsenroth M. J, Baity M. W, Mooney, M. A, Meyer, G. J. DSM-IV Major Depressive Episode criteria: Anevaluation of reliability and validity across three different rating methods. *Int J Psychiatr Clin Pract.* 2004;8(1):3-10.
- Stein D. J, Phillips K. A, Bolton D, Fulford K. W, Sadler J. Z, Kendler K. S. What is a mental/psychiatric disorder? From DSM-IV to DSM-V. *Psychol Med* 2010;40(11):1759-65.
- Phillips J, Frances A, Cerullo M. A, Chardavoyne J, Decker H. S, First M. B, Ghaemi N, Greenberg G, Hinderliter A. C, Kinghorn W. A, LoBello S. G, Martin E. B, Mishara A. L, Paris J, Pierre J. M, Pies R. W, Pincus H. A, Porter D, Pouncey C, Schwartz M. A, Szasz T, Wakefield J. C, Waterman G. S, Whooley O, Zachar P. The six most essential questions in psychiatric diagnosis: a pluralogue part 1: conceptual and definitional issues in psychiatric diagnosis. *Philos Ethics Humanit Med* 2012;7:3.
- Biomarkers Definitions Working Group. Biomarkers and surrogate endpoints: preferred definitions and conceptual framework. *Clin Pharmacol Ther* 2001;69(3):89-95.
- Boksa, P. A way forward for research on biomarkers for psychiatric disorders. *J Psychiatry Neurosci.* 2013;38(2):75- 7.
- Kluge W, Alsaif M, Guest P. C, Schwarz E, Bahn S. Translating potential biomarker candidates for schizophrenia and depression to animal models of psychiatric disorders. *Expert Rev Mol Diagn.* 2011;11(7):721-33.
- Schmidt H. D, Shelton R. C, Duman R. S. Functional biomarkers of depression: diagnosis, treatment, and pathophysiology. 2011;36(12):2375-2394.
- Hamilton M. A rating scale for depression. *J. Neurol. Neurosurg, Psychiatr.* 1960; 23 : 56.
- Howren M. B, Lamkin D. M, Suls, J. Associations of depression with C-reactive protein, IL-1, and IL-6: a metaanalysis. *Psychosom Med.* 2009;71(2):171-86.
- Valkanova V, Ebmeier K. P, Allan C. L. CRP, IL-6 and depression: A systematic review and meta-analysis of longitudinal studies. *J Affect Disord.* 2013;4(3): 212-216
- Danner M, Kasl SV, Abramson JL, Vaccarino V. *Psychosom Med.* 2003;65(3):347-56
- Ford D. E, Erlinger T. P. Depression and C-reactive protein in US adults: data from the Third National Health and Nutrition Examination Survey. *Arch Intern Med* 2004;164(9):1010-4.
- Wium-Andersen M. K, Orsted D. D, Nielsen S. F, Nordestgaard B. G. Elevated C-Reactive Protein Levels, Psychological Distress, and Depression in 131 Individuals. *JAMA Psychiatry* 2013;70(2):176-84.
- Roberts LM, Pattison H, Roalfe A, Franklyn J, Wilson S, Hobbs FD, Parle JV. Is subclinical thyroid dysfunction in the elderly associated with depression or cognitive dysfunction? *Ann Intern Med.* 2006;145(8):573-81.
- Almeida OP, Alfonso H, Flicker L, Hankey G, Chubb SA, Yeap BB. Thyroid hormones and depression: the Health in Men study. *Am J Geriatr Psychiatry.* 2011;19(9):763-70.
- Chavda N, Kantharia ND, Jaykaran . Effects of fluoxetine and escitalopram on C-reactive protein in patients of depression. *J Pharmacol Pharmacother.* 2011; 2(1): 11–16.
- Morgan RE. Plasma cholesterol and depressive symptoms in older men. *Lancet.* 341(8837):75-9.
- Brown SL. Low cholesterol concentrations and severe depressive symptoms in elderly people. *BMJ.* 21; 308 (6940):1328-32.
- S. Markowitz, M. A. Friedman, S. M. Arent. "Understanding the relation between obesity and depression: causal mechanisms and implications for treatment," *Clinical Psychology: Science and Practice.* 2008; 15(1):1–20.
- A. M. Keddie, "Associations between severe obesity and depression: results from the national health and nutrition examination survey, 2005–2006." *Preventing Chronic Disease.* 2011; 8(3): A57.
- C. Dong, L. E. Sanchez, R. A. Price. "Relationship of obesity to depression: a family-based study." *International Journal of Obesity.* 2004; 28(6): 790–795.
- F. S. Luppino, L. M. De Wit, P. F. Bouvy. "Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies." *Archives of General Psychiatry.* 2010; 67(3):220–229.
- De Wit L, Luppino, F. van Straten, A. Penninx, B. Zitman, F. Cuijpers, P. Depression and obesity: A meta -analysis of community based studies. *Psychiatry Research.* 2010; 178: 230 235.

