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Psychiatry

A STUDY OF THYROID ABNORMALITIES IN FIRST EPISODE AND RECURRENT DEPRESSIVE DISORDER

Dr. Manish Borasi	Assistant Professor, Chirayu Medical College and Hospital, Bhopal
Dr. Hemika Agrawal*	Senior Resident, Deep Chand Bandhu Hospital, Delhi *Corresponding Author
Dr. Nimesh G Desai	Professor, Department of Psychiatry, IHBAS, Delhi
Dr. Vijender Singh	Associate Professor, Department of Psychiatry, IHBAS, Delhi
Dr. Neelam Chhillar	Associate Professor and Head of Department of Neurochemistry, IHBAS, Delhi

ABSTRACT

Introduction: Depression is one of the leading causes of disease worldwide. Depression is not only a common, often chronic, and recurrent disorder, but it is cardinally associated with significant impairment in work and daily social and psychological well-being. Depression is projected to be the second leading cause of disease burden for both men and women across age groups by the year 2020. A key variable influencing rates of recovery, relapse, and recurrence is the presence of medical or psychiatric comorbid illnesses. Among medical co-morbid illness, thyroid abnormalities are very common. Both excess and insufficient thyroid hormones can cause mood abnormalities including depression that is generally reversible with adequate thyroid treatment.

Materials and method: The study was carried out over a period of 9 months on patients registered in psychiatry clinic at tertiary neuropsychiatry center suffering from depressive disorder as per the ICD-10(DCR). Then after applying inclusion and exclusion criteria and explaining the purpose of study, those patients who give consent were included. Severity of depression will be rated using HAM-D. Thyroid profile of those patients who gave consent were done in laboratory of neurochemistry department. The results thus generated were subjected to appropriate statistical analysis.

Results and conclusion: Our study reveals that 12% of the subjects had decreased T3 levels, 36% subjects were found to have increased TSH levels . Subclinical and clinical hypothyroidism were seen in 35% of subjects with depressive disorder.The occurrence of subclinical hypothyroidism was more common in RDD (25.9%) in comparison to first episode (19.6%).

KEYWORDS :

Introduction

Depression is one of the leading causes of disease worldwide. Depression is not only a common, often chronic, and recurrent disorder, but it is cardinally associated with significant impairment in work and daily social and psychological well-being (1). Historically conceived as either a disease of the mind or of the brain, treatment options followed this aetiology. Current diagnostic assessment of depression is based on descriptions of symptoms, their presence and magnitude over time. The World Health Organisations` (WHO) International Classification (2) for Diseases and Related Disorders (ICD-10) describes the criteria for a depressive episode, where at least four items, such as loss of interest in activities, lack of emotional reactions, sleep disturbance, loss of appetite, motor retardation, weight loss, loss of libido, and decreased energy are present for a duration of two weeks (World Health Organization).

Epidemiological studies demonstrate that depressive disorders are highly prevalent: displaying high rates of lifetime incidence, early age onset, high chronicity, and role impairment. In the year 2000, it was the fourth leading cause of disease burden worldwide; and it is projected to be the second leading cause of disease burden for both men and women across age groups by the year 2020 (3, 4). Currently depression is classified as the third cause of morbidity in the world and is estimated to account for 12–15% of years on disability (5).

A key variable influencing rates of recovery, relapse, and recurrence of the depressive episode is the presence of medical or psychiatric comorbid illnesses. Among medical co-morbid illness, thyroid abnormalities are very common. Both excess and insufficient thyroid hormones can cause mood abnormalities including depression that is generally reversible with adequate thyroid treatment (6). Depressive symptoms are frequently an early or first manifestation of thyroid disease (7). Hypothyroidism can produce signs and symptoms of depression and can co-exist as a secondary illness in depressed patients (7). Subclinical hypothyroidism may lower the threshold for occurrence of depression (8). The alterations in Triiodothyronine (T_3) levels could have an important role in the stress induced atrophy and death of neurons, which is related to the pathophysiology and treatment of depression (9) .

THYROID DYSFUNCTION IN PSYCHIATRIC DISORDER

Apart from depression, HPT axis disturbances have been occasionally reported among other psychiatric disorders. The association of thyroid deficiency and mental retardation is well known. In the perinatal period, thyroid deficiency results in irreversible brain damage and mental retardation. This syndrome is referred to as cretinism (10). More recently, it has been demonstrated that mutations in transporter proteins such as MCT8 can also result in severe mental retardation, axial hypotonia, and speech retardation (10, 11). The potential association between Alzheimer's disease and thyroid dysfunction has also been investigated and found to be ambiguous (10, 12). Non-specific decrease in serum concentrations of T4 or FT4 I, or both, has been associated with the diagnosis of alcohol dependence, but is possibly due to the direct toxic effects of alcohol upon thyroid function (13). HPT axis abnormalities have also been documented in psychotic conditions such as schizophrenias (14). The association between thyroid dysfunction and anxiety disorders, particularly panic disorder, generalized anxiety disorder and post-traumatic stress disorder has been documented more consistently. (10, 15)

THYROID ABNORMALITIES IN DEPRESSION

The similarity and overlapping between symptoms of depression and thyroid disorders has been the theoretical base for the hypothesis regarding a possible relationship between both entities. As per different studies hypothyroidism could induce cognitive dysfunction and depressive symptoms besides psychological distress in a very similar way to primary depression (17, 18, 19). Likewise, TH effect as augmentation therapy in refractory depression, and thyroid disorders as risk factors for rapid cycling in bipolar disorder sustain a possible association between both types of diseases. The involvement of HPT

axis in the pathogenesis of depression is supported by multiple data. There are few studies that show normal range TH levels during a depressive episode; however most of them demonstrate diverse changes in different hormones associated with this axis. Concerning TSH levels, data are contradictory, some authors have reported a decrease in basal TSH values as well as in those observed in response to exogenous TRH Depressive Disorders and Thyroid Function (9) and other studies showed TSH elevation in bipolar depression (21, 22).

In reference to T3 levels, results are more conclusive, showing a trend to decrease in the presence of depression, as well as an association with high risk of long term relapse. In addition there seems to be a more pronounced T3 decrease in direct relation with the severity of depression (9, 22).

Reported T4 levels in depression are also contradictory, since there is evidence showing a rise as well as a decrease of T4 during depressive episodes. (22, 23). A study conducted by Forman-Hofmann & Philibert in 2006 on more than 6,000 subjects, they found that a low TSH and a high T4 levels were associated with depression specially in young men but, in women only a higher T4 levels correlated with current depression syndrome (20).

OBJECTIVES OF THE STUDY

1. To study the thyroid abnormalities (both clinical and subclinical hypothyroidism) in first episode depressive disorder.
2. To study the thyroid abnormalities (both clinical and subclinical hypothyroidism) in recurrent depressive disorder.

Materials and methods

Universe of the study were patients of first episode depressive disorder and recurrent depressive disorder attending the outpatient services of neuropsychiatric hospitals. The study is cross sectional involving the patients attending OPD of tertiary neuropsychiatry centre, who had been diagnosed with first episode depressive disorder and recurrent depressive disorder .Total number of 100 patients suffering from depressive disorders either first episode depressive disorder or recurrent depressive disorder were studied. So a total sample size of 100 patients were studied. Sample size was calculated on the basis of practical aspect. Sampling method is through systematic random sampling.

INCLUSION CRITERIA

1. Patient fulfilling the criteria for first episode depressive disorder and recurrent depressive disorder as per ICD-10(DCR).
2. Patient in age range from 18-60 years.
3. Patients of either gender.
4. Patients providing informed consent.

EXCLUSION CRITERIA

1. Patients with other co-morbid psychiatric illness (except nicotine & caffeine use disorder).
2. Patients with severe depressive episode with psychotic features or suicidal attempts.
3. Patients with chronic debilitating physical illnesses which might have impaired assessment.

METHODOLOGY OF STUDY

The study was carried out over a period of 9 months. Detailed clinical assessment was done of the patient registered in psychiatry clinic at tertiary neuropsychiatry center suffering from depressive disorder. After making diagnosis of first episode depressive disorder and recurrent depressive disorder clinically as per the ICD-10(DCR).Then after applying inclusion and exclusion criteria and explaining the purpose of study, those patients who give consent were included. Severity of depression will be rated using HAM-D. Thyroid profile of those patients who gave consent were done in laboratory of neurochemistry department. Thyroid function test including fT3, fT4, TSH of every patient fulfilling the criteria for first episode depressive disorder and recurrent depressive disorder. The blood sample was drawn in the fasting state between 9 am to 10 am and free thyroxin (T4), free triiodothyronine (T3) and thyroid stimulating hormone (TSH) were estimated by commercially available kit (Cobas, Roche Diagnostics, US) by Eclecsys 2010 Immunoassay System, Roche Diagnostics Tests for FT3 and FT4 were based on the competitive principle, while TSH assessment was based on Sandwich

Results and Observations

Table 1- Distribution of T3 Levels among First Episode Depressive Disorder and Recurrent Depressive Disorder

		Type of Depression		Total	P-value
T3levels(mean)		First Episode	RDD		
Decreased Count(%)		5(10.90%)	7(13.00%)	12(12.00%)	0.748
Normal Count(%)	41(89.10%)	47(87.00%)	88(88.00%)		
Total Count(%)		46(100.00%)	54(100.00%)	100(100.00%)	

principle*Chi-Square test **P-value significant at 0.05

In **table 1** majority of the subjects were found to have normal T3 levels. Total 12%subjects were found to have decreased T3 levels with 13% subjects in RDD in comparison to 10.90% in first episode depressive disorder. There was no significant difference observed in this two groups.

Table 2- Distribution of T4 levels among first episode depressive disorder and recurrent depressive disorder

	T4 levels (mean)	Type of Depression		Total	P -value
		First Episode	RDD		
Decreased Count (%)	6(13.00%)	1(1.90%)	7(7.00%)		
				0.029	
Normal Count(%)	40(87.00%)	53(98.10%)	93 (93.00%)		
Total Count (%)	46(100.00%)	54(100.00%)	100(100.00%)		

*Chi-Square test **P-value significant at 0.05

In **table 2** majority of the subjects were found to have normal T4 levels. Total 7% subjects were found to have decreased T4 levels with 13% subjects in first episode depressive disorder in comparison to 1.90% in RDD.

Table 3- Distribution of TSH Levels among First Episode Depressive Disorder and Recurrent Depressive Disorder

TSH levels (mean)	Type of Depression		Total	p-value
	First Episode	RDD		
Normal Count(%)	32(69.60%)	32(59.30%)	64(64.00%)	0.285
Increased Count(%)	14(30.40%)	22(40.70%)	36(36.00%)	
Total Count(%)	46(100.00%)	54(100.00%)	100(100.00%)	

*Chi-Square test **P-value<0.05

In **Table 3** majority of the subjects were found to have normal TSH levels. Total of 36% subjects were found to have increased TSH levels which is more in RDD (40.70%) in comparison to first episode depressive disorder (30.40%).

Table 4 - Thyroid Dysfunction in Subjects with Type of Depression

Thyroid function	Type of Depression		Total	p-value
	First Episode	RDD		
Euthyroid	32 (69.6%)	33 (61.1%)	65(65.0%)	0.723
Subclinical hypothyroidism	9(19.6%)	14(25.9%)	23(23.0%)	
Clinical hypothyroidism	5(10.9%)	7(13.0%)	12(12.0%)	
Total	46(100.0%)	54(100.0%)	100(100.0%)	

*Chi-square test **P-value significant at 0.05

In **table 4** majority of subjects in our study are found to be Euthyroid, with 69.6% of Euthyroid in first episode and 61.1% in RDD. Among subclinical and clinical hypothyroidism the frequency of subclinical hypothyroidism was found to be more in depression, with 23% subclinical hypothyroidism in comparison to 12% clinical hypothyroidism cases. The subclinical hypothyroidism was more in RDD 25.9% in comparison to first episode 19.6%. findings of clinical hypothyroidism was more in RDD in comparison to first episode.

DISCUSSION OF RESULTS

The results of lower free T3 and higher TSH levels in patients with depression are in agreement with previous studies (16, 21), but are in contrast to the reports of the unaltered or increased secretion of thyroid hormones in patients with depression (24). Majority of the subjects were found to have normal T3 levels. A total of 12% subjects were found to have decreased T3 levels . Majority of the subjects were found to have normal T4 levels. Total 7% subjects were found to have decreased T4. A total of 36% subjects were found to have increased TSH levels which was more in RDD (40.70%) in comparison to first episode depressive disorder (30.40%). The results of the present study confirm the presumption that major depression might be associated with altered levels of thyroid hormones. The difference between previous studies might be due to a relatively small number of participants and inadequate exclusion criteria.

Various factors influence thyroid hormone levels like stress, malnutrition, smoking, circadian variation, sleep deprivation, pregnancy, aging, thyroid medications, other medications (lithium, corticosteroids, phenytoin, salicylates, furosemide, propranolol, amiodarone) and concomitant clinical disease, which greatly complicates the designs of the possible studies with thyroid hormones. Although depression is clearly not caused by the thyroid dysfunction and patients are generally viewed as Euthyroid, many patients with depression show subtle alterations in thyroid function as a consequence of altered hypothalamus-pituitary-thyroid axis (HPT) activity.

Results of the present study, showing lower T3 and higher TSH in patients with depression, resemble euthyroid sick syndrome, related to abnormalities in thyroid function occurring often in patients with nonthyroidal illnesses. It is manifested with normal, low or high serum TSH occurring in conjunction with normal or low total T4 and low total T3 levels, that generally return to normal values with successful treatment of the primary disease (25, 26).

Conclusion

Our study conclude that 12% of the subjects had decreased T3 levels , a total of 36% subjects were found to have increased TSH levels .Subclinical and clinical hypothyroidism were seen in 35% of subjects with depressive disorder. The occurrence of subclinical hypothyroidism was more common in RDD (25.9%) in comparison to first episode (19.6%).

Limitations

However there were few shortcomings in this study. It was a clinic-based study done in a tertiary neuropsychiatry hospital so findings of the study cannot be generalized to whole population unless repeated in the community. Various factors which could not be taken care of during the study were Medications like antithyroid drugs, other medications which can lead to depression, any on-going psychosocial stressors and coping skills.

REFERENCES

1. Kessler RC, Berglund P, Demler O et al. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). JAMA. 2003;289:3095-3105.
2. World Health Organization. The international classification of mental and behavioural disorders:Diagnostic research criteria (10th rev.). Geneva: World Health Organization; 1993.
3. World Health Organization. (2011). Mental health: Depression. Retrieved May 16, 2011 from <http://www.Who.int/mental_health/management/ depression /definition/en/>.
4. Roberts LW, Louie AK, Guerrero APS, Balon R, Beresin EV, Brenner A, Coverdale J. Premature Mortality Among People with Mental Illness: Advocacy in Academic Psychiatry. Acad Psychiatry. 2017 Aug;41(4):441-446.
5. Lazarou C, Kapsou M. The role of folic acid in prevention and treatment of depression: an overview of existing evidence and implications for practice. Complement Ther Clin Pract. 2010 Aug;16(3):161-6.
6. Hage MP, Azar ST. The Link between Thyroid Function and Depression. J Thyroid Res. 2012; 2012:590648.
7. Gold MS, Pottash AL, Extein I. Hypothyroidism and depression. Evidence from complete thyroid function evaluation. JAMA. 1981 May 15; 245(19):1919-22.
8. Haggerty JJ Jr, Stern RA, Mason GA, Beckwith J, Morey CE, Prange AJ Jr. Subclinical hypothyroidism: a modifiable risk factor for depression? Am J Psychiatry. 1993 Mar;150(3):508-10.
9. Stipcević T, Pivac N, Kozarić-Kovacić D, Mück-Seler D. Thyroid activity in patients with major depression. Coll Antropol. 2008 Sep;32(3):973-6.
10. Bunevicius R, Prange AJ Jr. Thyroid disease and mental disorders: cause and effect or only comorbidity? Curr Opin Psychiatry. 2010 Jul;23(4):363-8.
11. Visser WE, Friesema EC, Jansen J, Visser TJ. Thyroid hormone transport in and out of cells. Trends Endocrinol Metab. 2008 Mar;19(2):50-6.
12. Tan ZS, Beiser A, Vasan RS, Au R, Auerbach S, Kiel DP et al. Thyroid function and the risk of Alzheimer disease: the Framingham Study. Arch Intern Med. 2008 Jul 28;168(14):1514-20.
13. Hermann D, Heinz A, Mann K. Dysregulation of the hypothalamic-pituitary-thyroid axis in alcoholism. Addiction. 2002 Nov;97(11):1369-81.
14. Santos NC, Costa P, Ruano D, Macedo A, Soares MJ, Valente J et al. Revisiting thyroid hormones in schizophrenia. J Thyroid Res. 2012;2012:569147.
15. Radhakrishnan R, Calvin S, Singh JK, Thomas B, Srinivasan K. Thyroid dysfunction in major psychiatric disorders in a hospital based sample. Indian J Med Res. 2013 Dec;138(6):888-93.
16. Bahls SC, de Carvalho GA. [The relation between thyroid function and depression: a review]. Rev Bras Psiquiatr. 2004 Mar;26(1):41-9. 51 to 57
17. Constant EL, Adam S, Seron X, Bruyer R, Seghers A, Daumerie C. Anxiety and depression, attention, and executive functions in hypothyroidism. J Int Neuropsychol Soc. 2005 Sep;11(5):535-44.
18. Bould H, Panicker V, Kessler D, Durant C, Lewis G, Dayan C et al. Investigation of thyroid dysfunction is more likely in patients with high psychological morbidity. Fam Pract. 2012 Apr;29(2):163-7.
19. Mowla A, Kalantarhormozi MR, Khazraee S. Clinical characteristics of patients with major depressive disorder with and without hypothyroidism: a comparative study. J Psychiatr Pract. 2011 Jan;17(1):67-71.
20. Forman-Hoffman V, Philibert RA. Lower TSH and higher T4 levels are associated with current depressive syndrome in young adults. Acta Psychiatr Scand. 2006 Aug;114(2):132-9.
21. Brouwer JP, Appelhof BC, Hoogendijk WJ, Huyser J, Endert E, Zuketto C et al. Thyroid and adrenal axis in major depression: a controlled study in outpatients. Eur J Endocrinol. 2005 Feb;152(2):185-91.
22. Saxena J, Singh PN, Srivastava U, Siddiqui AQ. A study of thyroid hormones (t(3), t(4) & tsh) in patients of depression. Indian J Psychiatry. 2000 Jul;42(3):243-6.
23. Kirkegaard C, Faber J. The role of thyroid hormones in depression. Eur J Endocrinol. 1998 Jan;138(1):1-9.
24. Berlin I, Payan C, Corruble E, Puech AJ. Serum thyroid-stimulating-hormone concentration as an index of severity of major depression. Int J Neuropsychopharmacol. 1999 Jun;2(2):105-110.
25. Dickerman AL, Barnhill JW. Abnormal thyroid function tests in psychiatric patients: a red herring? Am J Psychiatry. 2012 Feb;169(2):127-33.
26. Nader S, Warner MD, Doyle S, Peabody CA. Euthyroid sick syndrome in psychiatric inpatients. Biol Psychiatry. 1996 Dec 15;40(12):1288-93.