Original Article

A Study of Correlation between Depression and Hypothyroidism in Female Patients

Lokesh Jain, Harish Arora, KK Verma, Harful Singh, Siddharth Aswal
Department of Psychiatry, S.P. Medical College & Associated Group of Hospitals, Bikaner
Contact: Lokesh Jain, E-mail: drjaintvmc@gmail.com

Abstract

Background: Depression is known to mankind since years. It is projected that depression will be the 2nd largest killer after heart disease by 2020 and will be the second leading cause of Disability Adjusted Life Years (DALYS). The thyroid disorders in its various forms are common, affecting some 5% of the population, predominantly females. Studies have underlined the high prevalence of psychiatric symptoms and disorders in thyroid diseases. Patients with hypothyroidism were noted to have a higher than normal life time prevalence of depression, conversely depressed populations also demonstrated a high prevalence of hypothyroidism. Present study was planned to establish a correlation between depression and hypothyroidism in female patients. Material and Methods: The study was conducted on thirty female patients attending the psychiatry department, GGS Medical College and Hospital, Faridkot fulfilling the criteria for major depressive disorder and thirty female patients attending the medicine department showing abnormal thyroid function tests. The results thus generated were subjected to appropriate statistical analysis. Results & Conclusion: Our study revealed that the prevalence of hypothyroidism in depressed subjects was 20.0% and depression in hypothyroid subjects was 36.67%. Sub clinical hypothyroidism (13.3%) was more prevalent than clinical hypothyroidism (6.7%) and a highly significant correlation was found between depression and hypothyroidism.

Key words: Depression, DALYS, Hypothyroidism, Sub-clinical hypothyroidism.

Introduction

Depression is known to mankind since years. The World Health Organization (WHO) has ranked depression fourth in a list of the most urgent health problems worldwide.\(^1\) It is projected that depression will be the 2nd largest killer after heart disease by 2020 and will be the second leading cause of Disability Adjusted Life Years (DALYS).\(^1\)

Etiology of depression, among mood disorders is although most frequently studied, yet it is far away from ideally understood. Increased activity in the Hypothalamic-Pituitary-Adrenal (HPA) axis in depression is viewed as the “most vulnerable finding in all of biological psychiatry”. Along with HPA axis, Major Depressive Disorder (MDD) has been associated with significant changes in the Hypothalamic-Pituitary-Thyroid axis.\(^2\)

The thyroid disorders in its various forms are common, affecting some 5% of the population.\(^2\) Several studies have underlined the high prevalence of psychiatric symptoms and disorders in thyroid diseases.\(^2^4\) Hypothyroidism a form of thyroid disorder which results from inadequate synthesis of thyroid hormone and is categorized as overt or sub-clinical. In overt hypothyroidism, thyroid hormone levels are abnormally low, TSH is elevated, and patients are symptomatic, whereas, in sub-clinical hypo-thyroidism (SCHT), patients are, by definition, asymptomatic, with normal thyroid hormone levels but elevated TSH.

Research findings have extended the relationship between thyroid and mood disorders.
It has long been recognized that frank hypothyroidism can cause depressive symptoms and it almost always does so in severe cases.\textsuperscript{3,4} Patients with sub clinical hypothyroidism have been noted to have a higher than normal life time prevalence of depression.\textsuperscript{5-7} The converse that depressed populations demonstrate a high prevalence of sub clinical hypothyroidism, also has been demonstrated.\textsuperscript{8-10} The conventional wisdom is that hypothyroidism may be a reversible cause of depression. Depression is much more common in females than males thus female depressives are a focus of special care, also depressive symptoms are more prevalent in hypothyroid patients. Thus we planned a study to establish correlation between depression and hypothyroidism in female patients with following aims and objectives.

**Aims and Objectives**

1. Study of prevalence of hypothyroidism in female depressive patients.
2. Study of prevalence of depression in female hypothyroid patients (clinical as well as subclinical).
3. To study the correlation between depression and hypothyroidism (clinical as well as subclinical) in female patients.

**Material and Method**

**Study Design**

The study was conducted on thirty female patients attending the psychiatry department (outpatients as well as inpatients) fulfilling the criteria for major depressive disorder and thirty female patients attending the medicine department (outpatients as well as inpatients) showing low levels of thyroid function tests.

**Result and Observations**

### Table-1: Socio-demographic Variables of the Study Group

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Group I</th>
<th></th>
<th>Group II</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 20</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21-30</td>
<td>6</td>
<td>20</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>31-40</td>
<td>12</td>
<td>40</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>41-50</td>
<td>10</td>
<td>33.3</td>
<td>7</td>
<td>23.33</td>
</tr>
<tr>
<td>51-60</td>
<td>2</td>
<td>6.67</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>6.67</td>
</tr>
</tbody>
</table>

**Inclusion Criteria:**

- Female patients between 18-65 years of age.
- Patients who gave written consent for study.
- Patients fulfilling the DSM-IV-TR criteria for major depressive disorder.
- Patients diagnosed with hypothyroidism (clinical as well as subclinical) for the first time.

**Exclusion Criteria:**

- Patients refusing to give informed consent for study.
- Severe psychiatric co-morbidity.
- Significant co-morbid medical illness.
- Patients consuming any medication which can affect the levels of thyroid hormones.
- Pregnant and lactating women.

**Procedure**

Informed written consent was taken from all subjects under the study. Subjects were grouped into two, group-I patients fulfilling the criteria for major depressive disorder according to DSM-IV-TR, attending the psychiatry department in which thyroid profile was assessed and group-II patients attending the medicine department diagnosed with hypothyroidism in which DSM-IV-TR criteria for major depressive disorder was applied. T\textsubscript{3}, T\textsubscript{4} and TSH was estimated in all patients and routine investigations like Hb, TLC, DLC and other relevant investigations were carried out, if necessary. The association between hypothyroidism and depression was evaluated and compared in both sample groups. The results thus generated were subjected to appropriate statistical analysis to answer the aim and objectives.
Table 2: Prevalence of Hypothyroidism in Major-Depressive-Disorder

<table>
<thead>
<tr>
<th>Hypothyroidism</th>
<th>Major-Depressive-Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Present</td>
<td>6</td>
</tr>
<tr>
<td>Absent</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 3: Prevalence of Major-Depressive-Disorder in Hypothyroidism

<table>
<thead>
<tr>
<th>Major-Depressive-Disorder</th>
<th>Hypothyroidism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Present</td>
<td>11</td>
</tr>
<tr>
<td>Absent</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 4: Correlation between ‘Thyroid Profile’ and ‘Major-Depressive Disorder’ among study subjects

<table>
<thead>
<tr>
<th>Thyroid Profile</th>
<th>Major depressive disorder</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Clinical Hypothyroid</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Normal</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td>Sub clinical Hypothyroid</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>19</td>
</tr>
</tbody>
</table>

\(x^2 = 18.537, df = 2, \ p\text{ value} = 0.001 (HS)\)

In group-II majority of subjects (30%) belong to 21-30 years of age and 31-40 years of age each. The subjects were married, illiterate housewives belonging to Sikh community, who came from rural background in both study groups.

Table 2 and 3 shows the Prevalence of hypothyroidism in depressed subjects was 20.0%, depression in hypothyroid subjects was 36.67% and sub clinical hypothyroidism (13.3%) was more prevalent than clinical hypothyroidism (6.7%). Table 4 shows highly significant correlation between depression and hypothyroidism.

Discussion

In our study we found that 20% of the depressed patients had higher values of thyroid stimulating hormone (TSH), whereas, T3 and T4 levels were either normal (subclinical hypothyroidism) or decreased (clinical hypothyroidism), similar finding was found in a study by Boral G.C. et al in 1980, on thyroid function in different psychiatric disorders and he reported that depressive patients had subclinical or clinical hypothyroidism and Brouwer J.P. et al in 2005 reported higher thyroid stimulating hormone (TSH) in depressed patients. We found that subclinical hypothyroidism was more prevalent than clinical hypothyroidism, which is consistent with the study by Hollowell JG et al in 2002, they reported that 8% of depressed patients have at least subclinical hypothyroidism compared.
to only 5% of the general population and Chakrabarti et al\textsuperscript{14} in 2006 showed that depressive patients have been suffering from subclinical hypothyroidism.

The prevalence of major depressive disorder in hypothyroid subjects was 36.67% in our study, which was higher than the study by Gupta S et al\textsuperscript{15} (20.5%). The study by Aslan S. et al\textsuperscript{16} in 2005, reported higher levels of depressive symptoms in hypothyroid patients supporting our findings.

We found a highly significant correlation between major depressive disorder and hypothyroidism in our study which is supported by the similar finding reported by Joffe et al\textsuperscript{17} (1990) and Danilo et al\textsuperscript{18} (2004).

Many of the previous studies done in this field had various methodological flaws in the sample selection e.g. including the patients having chronic resistant illness or being on psychotropic medication. Our study included only drug-naive patients having first episode of depressive illness. This way, the non specific effects of chronicity of illness and pharmacological agents on thyroid functions were taken care of.

Most of the previous studies were conducted with controls, but in our study subjects were allocated into two groups. In one group subjects were with first episode depressive illness, in whom thyroid profile was assessed, and in another group subjects were newly diagnosed hypothyroid patients in whom depressive status was assessed. Thus unlike most of the previous work done in this field, this study tried to find out correlation between depression and hypothyroidism in female patients.

**Conclusion**

Our study concluded that prevalence of hypothyroidism was 20.0% in major depressive disorder and prevalence of major depressive disorder was 36.67% in hypothyroid patients. We found a highly significant correlation between major depressive disorder and hypothyroidism.

**Limitations**

However there were few shortcomings in this study. It was a hospital based study and findings cannot be generalized unless repeated in the community.

**References**


