Exploring Neuropsychiatric Symptoms in Post-therapy Thyroid Disorder Patients: Anxiety Level Assessment

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ABSTRACT

Thyroid disorders often present with an array of cognitive impairment symptoms, including dysphoria, depression, anxiety, psychosis, and apathy. While most of these problems do not impose any severe physical risk, they nonetheless significantly reduce quality of life and wellbeing. Moreover, some symptoms, like anxiety, tend to persist even after the restoration of biochemical euthyroid status. Hence, this study was designed to evaluate the level of anxiety with a structured questionnaire (the Hamilton Anxiety Rating Scale) in post-therapy thyroid carcinoma as well as hyperthyroidism patients. Study findings implied that most of the post-therapy patients experience only a low level of residual anxiety symptoms, which are unrelated to their initial diagnosis and biochemical thyroid status.

Keywords: Neuropsychiatric symptom, Hamilton Anxiety Rating Scale, thyroid disorder, anxiety

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INTRODUCTION

There is an intricate relationship between thyroid hormone and neuropsychiatric function. Thyroid hormones play a pivotal role in the development of the central nervous system during the antenatal period, and often adult thyroid disorders present with an array of cognitive impairment symptoms (1, 2). Hypothyroidism patients sometimes suffer from depression, whereas hyperthyroidism can induce anxiety, dysphoria, mania, depression, emotional lability, or intellectual dysfunction (3). Many thyroid carcinoma patients are also kept in an iatrogenic hyperthyroid state after radio-iodine therapy by a suppressive dose of thyroxine supplement. While most neuropsychiatric manifestations do not impose any severe physical risk for thyroid disorder patients, they nonetheless significantly reduce quality of life and wellbeing. Moreover, some symptoms tend to persist even after restoration of biochemical euthyroid status (4). Anxiety is a common manifestation of this kind and can be assessed easily with a structured questionnaire. Therefore, this study was designed to evaluate the level of anxiety experienced by patients with thyroid carcinoma and hyperthyroidism after getting radio-iodine therapy.

PATIENTS AND METHODS

This study was conducted at the Institute of Nuclear Medicine & Allied Sciences, Mitford, Dhaka, from July to September 2023. Thirty subjects were randomly selected from the regular follow-up patient pool who received radio-iodine therapy from the institute more than one year ago. They were interviewed by the nuclear medicine physician of the thyroid clinic regarding their anxiety symptoms. For measuring the severity of their symptoms, the Hamilton Anxiety Rating Scale (HAM-A) was used, which is one of the most well-established instruments for this purpose (Figure 1). This public-domain scale contains 14 items, each comprising a series of symptoms, and measures both psychic and somatic anxiety. The score is on a scale of zero (absent) to four (severe), with a possible total range of 0–56, where 0–17 implies mild severity, 18–24 mild to moderate severity, and 25–30 moderate to severe (5).

The latest serum TSH values of the patients were also documented for understanding their biochemical thyroid status. Finally, statistical analyses were performed using Microsoft Excel and SPSS version 25. Quantitative data were described as mean, standard deviation, and range, and qualitative values were given as numbers and percentages. An independent sample test was used, where values at the level of $P < 0.05$ were considered to be statistically significant. The Pearson coefficient was calculated for the analysis of correlation.

Hamilton Anxiety Rating Scale (HAM-A)

Name: Date:

Below is a list of phrases that describe certain feeling that people have. Rate the patients by finding the answer which best describes the extent to which he/she has these conditions. Select one of the five responses for each of the fourteen questions.

0 = Not present, 1 = Mild, 2 = Moderate, 3 = Severe, 4 = Very severe

	0	1	2	3	4
1. Anxious mood Worries, anticipation of the worst, fearful anticipation, irritability.	☐	☐	✔	☐	☐
2. Tension Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax.	☐	☐	☐	✔	☐
3. Fears Of dark, of strangers, of being left alone, of animals, of traffic, of crowds.	☐	☐	☐	☐	✔
4. Insomnia Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors.	☐	☐	☐	☐	✔
5. Intellectual Difficulty in concentration, poor memory.	☐	☐	✔	☐	☐
6. Depressed mood Loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing.	☐	☐	☐	☐	✔
7. Somatic (muscular) Pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone.	☐	☐	☐	✔	☐
8. Somatic (sensory) Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation.	☐	☐	✔	☐	☐
9. Cardiovascular symptoms Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beat.	☐	☐	☐	✔	☐
10. Respiratory symptoms Pressure or constriction in chest, choking feelings, sighing, dyspnea.	☐	☐	✔	☐	☐
11. Gastrointestinal symptoms Difficulty in swallowing, wind abdominal pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, loss of weight, constipation.	☐	☐	☐	✔	☐
12. Genitourinary symptoms Frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence.	☐	☐	☐	✔	☐
13. Autonomic symptoms Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headache, raising of hair.	☐	☐	☐	✔	☐
14. Behavior at interview Fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc.	☐	☐	☐	✔	☐

Reference: Hamilton M.The assessment of anxiety states by rating. Br J Med Psychol 1959; 32:50–55.

Figure 1: Sample of Hamilton Anxiety Rating Scale (HAM-A) used for the current study.

RESULTS

The study subjects comprised of 20 females and 10 males, with ages ranging from 19 to 66 years (mean 40.2 ± 12.4 years). They were divided into two groups based on their initial diagnosis of hyperthyroidism and thyroid carcinoma, each with 15 patients. The mean HAM-A scores in the hyperthyroidism group were slightly higher than those in the carcinoma group. However, it was not statistically significant (Table 1).

Group Parameter	Mean Ham-A Score (Group 1)	Mean Ham-A Score (Group 2)	P Value
Gender (Male Vs Female)	7.6	9.7	0.484
Age (≥50 Vs <50 years)	12.1	7.4	0.114
S.TSH (≥0.3 Vs <0.3 mIU/L)	7.5	9.9	0.412
Diagnosis (Hyperthyroidism Vs Ca Thyroid)	9.5	8.4	0.707

Table 1: Differences of mean HAM-A scores between groups with respective P values.

In the hyperthyroidism group, biochemically, eight patients were euthyroid, five were hyperthyroid, and two were hypothyroid. On the other hand, all but two patients in the thyroid carcinoma group showed an iatrogenic suppressed TSH level (Figure 2). Most of the patients (about 93.3%) showed a mild level of anxiety symptoms, i.e., a HAM-A score of 0–17. 3).

However, there was almost no correlation between serum TSH levels and HAM-A scores (Figure-3)

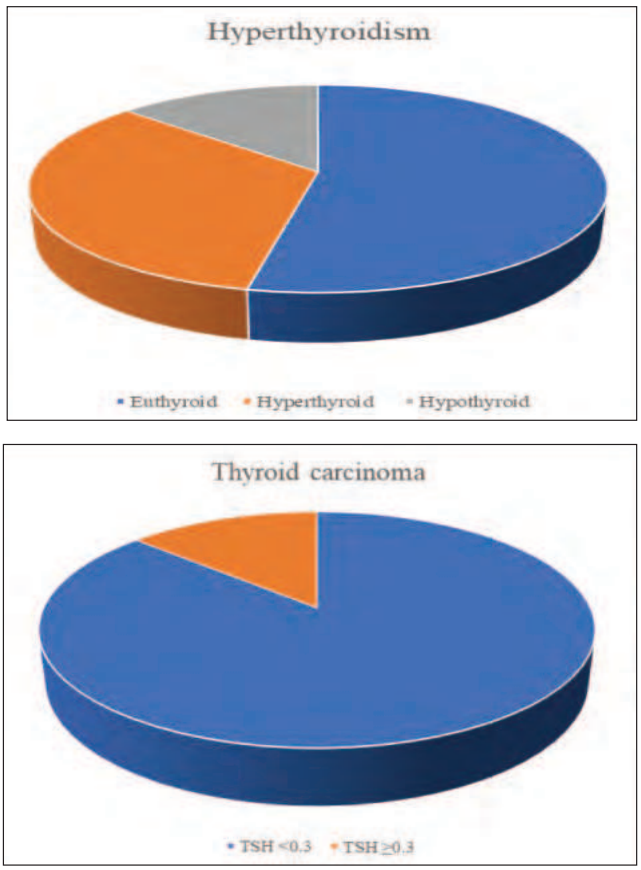

Figure 2: Biochemical status of the study subjects according to serum TSH level

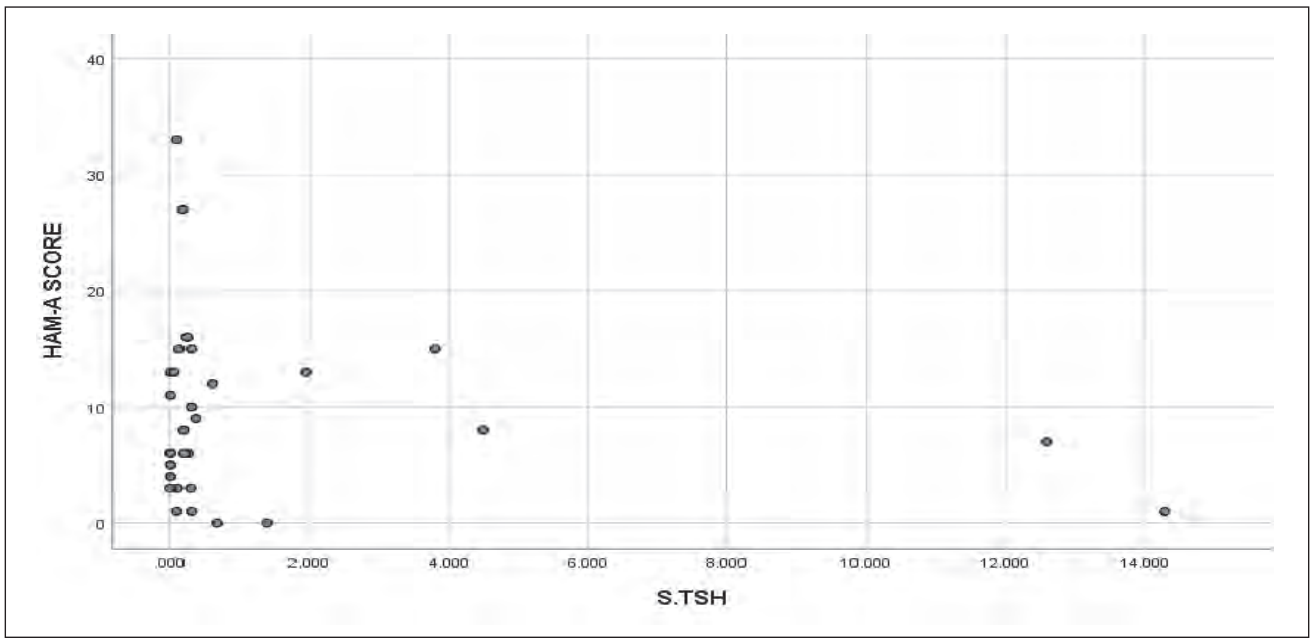

Figure 3: The scatter plot shows a very weak negative correlation between the HAM-A score and S.TSH levels, with a Pearson correlation coefficient of - 0.168.

Difference in HAM-A scores were also analyzed by dividing study subjects into age and genderwise groups, and findings were not statistically significant (Table 1).

DISCUSSION

The association between various neuropsychiatric disorders and thyroid diseases has been extensively studied. Thyroid dysfunction is known to induce changes in neuronal activity and cellular metabolism, as well as an alteration of the blood-brain barrier and genetic expression, leading to neuropsychiatric symptoms (3, 6–8). Hypothyroidism patients may manifest psychiatric disorders, e.g., psychosis, depression, and bipolar disorder. On the other hand, anxiety, uneasiness, quick temper, paranoia, dysphoria, emotional lability, insomnia, and cognitive deterioration might accompany hyperthyroidism. The prevalence of anxiety disorders in thyrotoxic patients has been found to be as high as 33–61%, whereas the prevalence of depressive disorder is up to 31-69% (9). However, restoration of euthyroid status does not always completely resolve neuropsychiatric symptoms in all patient groups. One study observed that anxiety and depressive features, as well as quality of life, were less improved in subclinical hyperthyroidism patients after treatment compared to hypothyroidism and overt hyperthyroidism (9). Whereas, another study reported that a significant number of treated Grave's disease patients were still having anxiety symptoms (4). The authors recommended prescribing medications tailored to these persistent psychiatric manifestations. With this background, the current study aimed to comprehend the level of residual or persistent anxiety symptoms in post-radio-iodine therapy patients at our institute in order to instigate better management.

Anxiety is a natural human reaction to stressful situations and manifests itself in multiple domains like physical, behavioral, affective, and cognitive symptoms. There are several evidence-based approaches to determining and assessing clinically important levels of anxiety, the most common being the Hamilton Anxiety Scale. It is a 14-item clinician-rated scale that, despite various criticisms, remains the most used tool for measuring anxiety severity across conditions and also for treatment outcome studies (10). A study in Romania utilized HAM-A to evaluate the anxiety level of 66 Grave's disease patients before and after treatment (4). About 52.5% of patients in that study retained anxiety symptoms of variable severity, whereas the current study reports a much higher percentage of subjects (93.3%) having anxiety features. But again, our patient pool does not consist exclusively of those with Grave's disease, and they are at different points of post-therapy follow-up, all exceedingly at least one year.

Several authors found that the resolution of neuropsychiatric manifestations of hyperthyroidism also depends on time. Patients who have been euthyroid for a short duration are more likely to report residual psychiatric symptoms (11, 12). This can explain the high number of patients with anxiety symptoms in the current study because about 60% of them were biochemically hyperthyroid at that time, and half of the sample population were thyroid carcinoma patients who were maintained at a suppressed TSH level since radio-iodine therapy.

This study found that most patients with hyperthyroidism had mild anxiety symptoms, with a HAM-A score of 0–17, but there was no significant correlation between serum TSH levels and anxiety symptoms. Similar findings were reported by Trzepacz et al. (13).

The study was done with a limited sample and cross-sectional data. A larger prospective study with a comparison between pre- and post-therapy anxiety levels can provide a more comprehensive insight.

CONCLUSION

Neuropsychiatric symptoms like anxiety are very distressing for patients, and their presence might warrant symptom-based strategic management. Our study implies that most post-therapy thyroid disorder patients experience only a low level of residual anxiety symptoms, which is also unrelated to their initial diagnosis and biochemical thyroid status.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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