Iran J Psychiatry Behav Sci. 2017 March; 11(1):e4812. doi: 10.5812/ijpbs.4812.

Published online 2016 October 17. **Brief Report**

Dose the Clinical Characteristics of Patients with Anxiety due to Hyperthyroidism Differ from Patients with Generalized Anxiety Disorder? A Comparative Study

Arash Mowla,[1,*] Mohammad Reza Kalantarhormozi,[2] and Samane Khazraee[1]

[1]Department of Psychiatry, Substance Abuse and Mental Health Research Center, Hafez Hospital, Shiraz University of Medical Sciences, Shiraz, IR Iran
[2]Department of Endocrinology, Bushehr University of Medical Sciences, Bushehr, IR Iran

[*]*Corresponding author*: Arash Mowla, Assistant Professor of Psychiatry, Department of Psychiatry, Hafez Hospital, Shiraz University of Medical Sciences, Shiraz, IR Iran. E-mail: mowlaar@gmail.com

Received 2015 November 24; **Revised** 2016 March 04; **Accepted** 2016 October 01.

Abstract

Background: Hyperthyroidism is associated with anxiety symptoms.
Objectives: The aim of this study was to compare the clinical characteristics of patients with anxiety due to hyperthyroidism with patients with generalized anxiety disorder (GAD).
Materials and Methods: This study was carried out in Abolfazl psychiatry clinic affiliated to Bushehr University of Medical Sciences from September 2012 to September 2013. Anxiety severity and characteristics of thirty-two patients with GAD was compared to 34 patients with anxiety due to hyperthyroidism. Hamilton anxiety rating scale (HAM-A) was used to evaluate the overall anxiety severity and anxiety symptom profile of the two groups.
Results: There was no significant difference regarding overall anxiety severity between the two groups (P = 0.65). Autonomic symptoms were more sever in hyperthyroid patients (P = 0.003) whereas anxious mood and fears were more prominent in patients with GAD (P = 0.001 and P = 0.045, respectively).
Conclusions: This study demonstrated that patients with GAD reported more psychology symptoms of anxiety whereas physical symptoms of anxiety were more prominent in hyperthyroid patients. Our findings may help differentiate these two disorders in the clinic, based on the symptom profile. However, it is important to note that this study is preliminary, and larger studies are needed to confirm the results.

Keywords: Generalized Anxiety Disorder, Hyperthyroidism, Symptoms

1. Background

Generalized anxiety disorder (GAD) is a common psychiatric disorder with a one-year prevalence rate of 1.2% to 1.9% and lifetime prevalence rate of 4.3% to 5.9% (1). It consists of both psychology and physical symptoms. Excessive worry, muscle tension, headache, restlessness, nausea, excessive sweating and change in bowel pattern are some of the presentations of this disorder (2).

Thyroid hormones play an important role in the maturation and proper function of the central nervous system (3). Hyperthyroidism is associated with both physical and psychological symptoms. The somatic symptoms include weight loss, tachycardia, excessive sweating, increased appetite, tremor and changes in bowel patterns (4). Two third of patients with thyroid disease have been reported to have psychological symptoms (5, 6). Hyperthyroidism has been associated with anxiety, depression, irritability, insomnia and low concentration in several studies (7, 8). The psychiatry symptoms of hyperthyroidism have been reported to be similar to generalized anxiety disorder (9).

As GAD and hyperthyroidism have similar symptoms, differentiating GAD from hyperthyroidism is a challenge in clinical settings. In this study, the anxiety symptoms of GAD were compared with anxiety symptoms induced by hyperthyroidism. Our aim was to study weather these two disorders can be differentiated by specific anxiety symptoms.

2. Materials and Methods

This study was carried out in Abolfazl psychiatry clinic affiliated to Bushehr University of Medical Sciences from September 2012 to September 2013. Overall, 32 patients with generalized anxiety disorder (GAD), according to Diagnostic and statistical manual of mental disorders, fourth edition (DSM-IV) criteria and 34 patients with hyperthyroidism and anxiety complaints, according to lab data and clinical interview, were enrolled.

The patients with GAD were diagnosed according to DSM-IV criteria using a structured clinical interview for DSM-IV, clinical version (SCID-I) (10). The interview was

done by a board certified psychiatrist. Thyroid functioning tests were in the normal range in this group. Exclusion criteria were pregnancy and presence of other psychiatry or medical disorders.

In the hyperthyroid group, diagnosis was based on clinical examinations and thyroid functioning tests. These evaluations were carried out by an endocrinologist. Thirty-four patients with overt hyperthyroidism (thyroid stimulation hormone (TSH) < 0.2 and total thyroxine (T4) > 12) and complaints of anxiety were entered in the study. Exclusion criteria in this group were positive history of anxiety disorders prior to diagnosis of hyperthyroidism, family history of anxiety disorders, pregnancy and presence of any other psychiatry and medical disorder.

The patients, with diagnosis of GAD and hyperthyroidism that met the inclusion criteria, were referred for the evaluation of the clinical characteristics of anxiety. Hamilton Anxiety rating scale (HAM-A) (11) was instrumented to evaluate the overall anxiety severity and anxiety characteristics of the two groups. The test was administered by a clinical psychologist, who was blind to the diagnosis of the patients. She explained each item of the test in Farsi to the patients and registered their responses. The HAM-A scale is a comprehensive scale, however, it includes multiple symptoms under a single item. For example the item assessing "respiratory symptoms" includes both "shortness of breath", which means that the subject feels there is not enough air, and "dyspnea" which is somewhat different and means that the subject reports that he/she feels it is difficult or tiresome to breath. The HAM-A scale has 14 items, the maximum score is 56 and the score of each part ranges from 0 to 4.The validity and reliability of HAM-A has been confirmed by several studies (12, 13).

Independent sample T-Test was used to carry out the comparison. Statistical assessments were performed by SPSS for Windows version 12.0.

3. Results

The mean age of the patients was 32.15 years old, and 70.9% were female. Baseline demographic data and thyroid functioning levels are depicted in Table 1. The two groups did not differ significantly regarding gender and age.

Differences between the two groups on measures of total anxiety scores and anxiety characteristics are shown in Table 2. Overall anxiety severity (total score on the HAM-A) did not differ between the two groups (P = 0.65). The anxious patients with hyperthyroidism had higher scores on autonomic symptoms compared to the GAD group (P = 0.003). On the other hand, in the GAD group, scores for fear and anxious mood were higher (P = 0.001 and P = 0.045, respectively). The other anxiety subscales were not significantly different between the two groups.

Table 1. Baseline Demographic Data and Thyroid Function Tests

	Hyperthyroidism	Generalized Anxiety Disorder
Gender, Female	24 (70%)	23 (71.87%)
Mean age, y	33.7	30.6
Mean TSH level, mIU/L	12 ±.02	2.2 ± 1.5
Mean Total T4 level, ng/dL	16.4 ± 2.1	7.5 ± 1.2

Table 2. Comparison of Total Anxiety Score and Anxiety Symptoms

Anxiety Symptoms	Hyperthyroidism (Mean)	GAD (Mean)	P Value
Anxious mood	2.00	2.60	0.045
Tension	2.40	1.86	0.093
Fears	0.56	2.13	0.001
Insomnia	2.36	2.16	0.54
Intellectual	2.16	2.20	0.92
Depressed mood	2.36	2.30	0.83
Somatic (muscular)	1.50	1.43	0.86
Somatic (sensory)	1.20	1.00	0.41
Cardiovascular symptoms	2.50	1.90	0.13
Respiratory symptoms	1.76	1.66	0.79
Gastrointestinal symptoms	2.20	1.86	0.33
Genitourinary symptoms	1.26	1.40	0.68
Autonomic symptoms	2.40	1.43	0.003
Behavior at Interview	2.00	2.03	0.90
Total Score	26.46	25.40	0.65

Abbreviation: GAD: generalized anxiety disorder.

4. Discussion

Our study showed that the overall anxiety severity was the same in GAD patients and patients with anxiety due to hyperthyroidism. However, patients with GAD demonstrated more anxious mood (worries, anticipation of worst and fearful anticipation) and fears (of dark, being alone, poverty, strangers and other things). On the other hand,

in the patients with anxiety due to hyperthyroidism, autonomic symptoms (tachycardia, dry mouth, flushing, pallor and sweating) were more prominent.

Several studies have demonstrated that hyperthyroidism is associated with anxiety symptoms (6-9, 12, 13). Chattopadhyay et al. found that anxiety symptoms were the most common psychiatry abnormality in grave's hyperthyroidism (9). Some other studies reported that the psychology symptoms in hyperthyroidism were similar to anxiety disorders (14, 15). Furthermore, Iocovides et al. in their study demonstrated that there was no difference in regards to anxiety severity between patients with anxiety due to hyperthyroidism and patients with GAD (16). In line with these studies, our results show that the overall anxiety severity did not differ between patients of the two groups.

However, there are only a few studies on differentiation of anxiety manifestations of hyperthyroidism from GAD. In our study, we found that patients with GAD complained about the psychology symptoms of anxiety (anxious mood, worries, anticipation of worst, fearful anticipation and fears) more than the anxious hyperthyroid patients. On the other hand, physical symptoms of anxiety (tachycardia, dry mouth, flushing, pallor and sweating) were more observed in patients with anxiety due to hyperthyroidism. These differentiating points may be important in clinical settings to discriminate GAD from hyperthyroidism. Supporting our results, there are studies emphasizing that autonomic symptoms like elevated sleeping pulse rate, hot moist palms, sweating and fine tremor are more commonly present in patients with anxiety due to hyperthyroidism compared to patients with GAD (17, 18). On the Other hand, some authors reported that psychological profile is not a good differentiating means, and physical characteristics like preference of cold and avoidance of heat, excessive eating and weight loss, thyroid bruit, auricular fibrillation, hyperkinetic movements, exophthalmoses, lid retraction, and lid lag have more powerful discriminating value (19-22).

Neuropsychiatric manifestations triggered by thyroid dysfunction likely respond well to reestablishment of the euthyroid state, although some patients have persistent complaints (7, 23). Therefore, treatment of hyperthyroidism and observing psychiatric symptoms that change following treatment can also help differentiate hyperthyroidism from GAD.

This study had a small sample size and our results need to be considered preliminary, unless larger replication studies support our findings. Another disadvantage of our study was that some hyperthyroid patients might have GAD simultaneously, which was not possible to differentiate in this research.

In conclusion, our research demonstrated that the overall anxiety severity was the same in GAD and hyperthyroidism. However, psychology symptoms of anxiety were more commonly reported by patients with GAD whereas the physical symptoms of anxiety were more prominent in hyperthyroid patients with anxiety. Our findings may help differentiate these two disorders in the clinic, based on symptom profile.

Acknowledgments

The study was approved by the ethical committee of Bushehr University of Medical Sciences and adhered to the declaration of Helsinki ethical principles for medical research. Written informed consent was obtained from all the patients. All the participants also gave consent to the authors to publish the results of this research.

Footnotes

Authors' Contribution: Arash Mowla and Mohammad Reza Kalantarhormozi conceived and designed the evaluation, did the administrative, technical and material support, and interpreted the clinical data. Arash Mowla supervised the study, performed the statistical analysis, drafted the manuscript and revised it critically for important intellectual content according to the reviewers' comments. Both authors read and approved the final manuscript.

Declaration of Interest: The authors declare no conflict of interest.

Funding/Support: This study was supported by grant number 435-91 from Bushehr University of Medical Sciences.

Financial Disclosure: The authors declare no conflict of interest. This study was supported by grant number 435-91 from Bushehr University of Medical Sciences.

References

1. Tyrer P, Baldwin D. Generalised anxiety disorder. *Lancet.* 2006;**368**(9553):2156–66. doi: 10.1016/S0140-6736(06)69865-6. [PubMed: 17174708].
2. Cuijpers P, Sijbrandij M, Koole S, Huibers M, Berking M, Andersson G. Psychological treatment of generalized anxiety disorder: a meta-analysis. *Clin Psychol Rev.* 2014;**34**(2):130–40. doi: 10.1016/j.cpr.2014.01.002. [PubMed: 24487344].
3. Dezonne RS, Stipursky J, Araujo AP, Nones J, Pavao MS, Porcionatto M, et al. Thyroid hormone treated astrocytes induce maturation of cerebral cortical neurons through modulation of proteoglycan levels. *Front Cell Neurosci.* 2013;**7**:125.
4. Kravets I. Hyperthyroidism: Diagnosis and Treatment. *Am Fam Phys.* 2016;**93**(5):363–70.
5. Sala-Roca J, Marti-Carbonell MA, Garau A, Darbra S, Balada F. Effects of dysthyroidism in plus maze and social interaction tests. *Pharmacol Biochem Behav.* 2002;**72**(3):643–50. [PubMed: 12175461].

6. Feldman AZ, Shrestha RT, Hennessey JV. Neuropsychiatric manifestations of thyroid disease. *Endocrinol Metab Clin North Am.* 2013;**42**(3):453–76. doi: 10.1016/j.ecl.2013.05.005. [PubMed: 24011880].
7. Bunevicius R, Prange AJ. Psychiatric manifestations of Graves' hyperthyroidism: pathophysiology and treatment options. *CNS Drugs.* 2006;**20**(11):897–909. [PubMed: 17044727].
8. Ittermann T, Volzke H, Baumeister SE, Appel K, Grabe HJ. Diagnosed thyroid disorders are associated with depression and anxiety. *Soc Psychiatry Psychiatr Epidemiol.* 2015;**50**(9):1417–25. doi: 10.1007/s00127-015-1043-0. [PubMed: 25777685].
9. Chattopadhyay C, Chakrabarti N, Ghosh S. An assessment of psychiatric disturbances in Graves disease in a medical college in eastern India. *Niger J Clin Pract.* 2012;**15**(3):276–9. doi: 10.4103/1119-3077.100620. [PubMed: 22960960].
10. First MB, Spitzer RL, Williams JBW. Structured Clinical Interview for DSM-IV (SCID-I) Clinical Version. New York: New York Psychiatric Institute; 1995.
11. Hamilton M. The assessment of anxiety states by rating. *Br J Med Psychol.* 1959;**32**(1):50–5.
12. Shear MK, Vander Bilt J, Rucci P, Endicott J, Lydiard B, Otto MW, et al. Reliability and validity of a structured interview guide for the Hamilton Anxiety Rating Scale (SIGH-A). *Depress Anxiety.* 2001;**13**(4):166–78. [PubMed: 11413563].
13. Clark DB, Donovan JE. Reliability and validity of the Hamilton Anxiety Rating Scale in an adolescent sample. *J Am Acad Child Adolesc Psychiatry.* 1994;**33**(3):354–60. doi: 10.1097/00004583-199403000-00009. [PubMed: 8169180].
14. Rodewig K. [Psychosomatic aspects of hyperthyroidism with special reference to Basedow's disease. An overview]. *Psychother Psychosom Med Psychol.* 1993;**43**(8):271–7. [PubMed: 8378518].
15. Whybrow PC, Prange AJ. A hypothesis of thyroid-catecholamine-receptor interaction. Its relevance to affective illness. *Arch Gen Psychiatry.* 1981;**38**(1):106–13. [PubMed: 6257196].
16. Iacovides A, Fountoulakis KN, Grammaticos P, Ierodiakonou C. Difference in symptom profile between generalized anxiety disorder and anxiety secondary to hyperthyroidism. *Int J Psychiatry Med.* 2000;**30**(1):71–81. [PubMed: 10900562].
17. Placidi GPA, Boldrini M, Patronelli A, Fiore E, Chiovato L, Perugi G, et al. Prevalence of psychiatric disorders in thyroid diseased patients. *Neuropsychobiology.* 1998;**38**(4):222–5.
18. Lader MH. Assessment methods and the differential diagnosis of anxiety. *J Clin Psychopharmacol.* 1981;**1**(6):342–9. [PubMed: 7334147].
19. Dietch JT. Diagnosis of organic anxiety disorders. *Psychosomatics.* 1981;**22**(8):661–9.
20. Artunkal B, Togrol B. In: Brain Thyroid Relationships. Cameron M OM, editor. 55. Boston: Little Brown; 1998. pp. 543–53.Psychological studies in hyperthyroidism.
21. Wallace JE, MacCrimmon DJ, Goldberg WM. Acute hyperthyroidism: cognitive and emotional correlates. *J Abnorm Psychol.* 1980;**89**(4):519–27. [PubMed: 7400452].
22. de Jongh RT, Lips P, van Schoor NM, Rijs KJ, Deeg DJ, Comijs HC, et al. Endogenous subclinical thyroid disorders, physical and cognitive function, depression, and mortality in older individuals. *Eur J Endocrinol.* 2011;**165**(4):545–54. doi: 10.1530/EJE-11-0430. [PubMed: 21768248].
23. Gittoes NJ, Franklyn JA. Current treatment guidelines. *Drugs.* 1998;**55**(4):543–53.