

Status of Thyroid Hormones among Chronic Tension Type Headache Patients

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Abstract

Background: Tension-type headache is frequently reported by the patients. **Objective:** The purpose of the present study was to see the status of thyroid hormones among chronic tension type headache patients. **Methodology:** This study was conducted in the Department of Neurology at Dhaka Medical College, Dhaka, Bangladesh. The study subjects consisted of patients presented with primary headache disorders. **Result:** Among the patients 21.0% had chronic sub-type of TTH. Out of 42 chronic tension-type headache patients 12 had subclinical and another 12 had overt hypothyroidism. Statistically significant difference was seen among different sub-types of headache in relation to thyroid status. **Conclusion:** Hypothyroidism is found to be a co morbidity or precipitating factors to be development of chronic type of tension-type headache. [Journal of National Institute of Neurosciences Bangladesh, July 2022;8(2):189-192]

Keywords: Hypothyroidism; Chronic Tension-Type Headache; TTH; neurological disorder

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Introduction

Tension-type headache is a disorder evolving from episodic tension-type headache, with daily or very frequent episodes of headache lasting minutes to days¹. The pain is typically bilateral, pressing or tightening in quality and mild to moderate intensity and it does not worsen with routine physical activity. There may be mild nausea, photophobia or phono-phobia².

The pathophysiology of tension-type headache is multifactorial and varies between individuals³. It has been suggested that episodic tension-type headache is predominantly a disorder of peripheral mechanisms like myofascial nociception, while tension-type headache reflects a central mechanisms like sensitization and inadequate endogenous pain control.

It has been suggested that recurrent bouts of tension-type headache may lower the threshold for new episodes by altering the myofascial tissues (myofascial trigger points) and increase the sensitivity of neurons of the trigeminal tract⁴. Muscle tenderness and psychological tension was found to be associated with and aggravate tension-type headache. Some researchers state that it is linked with raised interleukin (IL)-8 and monocyte chemoattractant protein-1⁵. Other cytokines, IL-1 β and IL-18, have also been found to be raised in the chronic tension-type headaches⁶. Moreover, few studies suggested that there is an association of Nitric oxide with TTH and has been found to play an important role in the pathogenesis⁷. The environment seems to play a more significant role in causing

infrequent episodic tension-type headaches.

Tension-type headaches typically present with mild to moderate pain, which is usually bilateral, with involvement of the temporal regions⁵. A significant number of patients do not present with the commonly described band, i.e. discomfort around the head. The pain may be scattered, extend from the head to the back of the neck, and/or to the temporomandibular joint. A detailed history increases the chances of a correct diagnosis being made, and subsequent effective management⁸. The purpose of the present study was to see the status of thyroid hormones among chronic tension type headache patients.

Methodology

Study Population and Settings: This cross sectional study was conducted in the department of Neurology (Headache Clinic) at Dhaka Medical College Hospital, Dhaka, Bangladesh. Patient with tension-type headache attending in headache clinic in DMCH with the age group 18 to 55 years of age of both male and female with the diagnosis of tension type headache on the basis of ICHD-2 criteria were selected as study population. Patients with any form of thyroid disease prior to the enrolment in the study as revealed by clinical examination or past medical records or patients with abnormal neurological examination, pregnancy, any chronic illness known to affect thyroid hormone levels, chronic kidney disease or other systemic illness or chronic drug intake known to affect thyroid status of the patient like lithium carbonate, amiodarone and anti-thyroid drugs were excluded from this study.

Study Procedure: Researcher filled up whole of the questionnaire and patients were requested to perform thyroid function test from Institute of Nuclear Medicine and Allied Science (INMAS). All the study subjects were tested for serum free T4 and TSH by radio immune assay (RIA) and immune radio metric assay (IRMA) using radioisotope I-125 as tracer. Personal contact numbers were collected during interview and patients were followed up in prefixed scheduled date. During follow up visit, hormonal level were included in their personal data sheet and researcher himself ascertained subtypes of hypothyroidism. Based on TTH and serum T4 and TSH level, study population were divided into two groups designated as group I representing the patients with euthyroid and group II consisted with the patients with hypothyroidism either overt or subclinical.

Statistical Analysis: After collecting the data, it was checked and rechecked for omission, inconsistencies

and improbabilities. After cleaning the data it was edited, coded and entered into the computer. Statistical analysis of the study was done by computer software device as the Statistical Package for Social Science (SPSS) version 22.0. Confidence interval was considered at 95% level. The qualitative variables were expressed as frequency and percentage and the quantitative variables were expressed as mean with standard deviation. During analysis Chi-square test was done to estimate the relationship or association between TTH and fibromyalgia. P value less than 0.05 was considered statistically significant.

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

Results

This study was conducted on 200 patients who met the ICHD-2 diagnostic criteria of Tension Type Headache. Mean age of the patients studied was 35.4 years (± 9.9). Among the respondents, minimum age was 18 years and maximum age was 55 years. Majority of the patients (31.0%) were in between 36 to 45 years (Table 1).

Table 1: Age Group of the Respondents (n=200)

Age Group	Frequency	Percent
18 to 25 Years	48	24.0
26 to 35 Years	50	25.0
36 to 45 Years	62	31.0
46 to 55 Years	40	20.0
Total	200	100.0

Among 60 frequent TTH patients 14 had hypothyroidism and among 42 chronic TTH patients 24 had hypothyroidism. Chronic TTH patients had statistically significantly higher incidence of hypothyroidism in relation to frequent TTH patients. (P value 0.001) (Table 2).

Table 2: Thyroid status in between Frequent and Chronic TTH patients

Sub-type of TTH	Thyroid Status		P Value*
	Hypothyroid	Normal	
Frequent (n=60)	14	46	0.001
Chronic (n=42)	24	18	

*P value determined by Pearson Chi-Square test

Among 18 probable TTH patients 3 had hypothyroidism and among 42 chronic TTH patients 24 had hypothyroidism. Chronic TTH patients had statistically significantly higher incidence of hypothyroidism in relation to probable TTH patients. (P value 0.004) (Table 3).

Table 3: Thyroid status in between Probable and Chronic TTH patients

Sub-type of TTH	Thyroid Status		P Value*
	Hypothyroid	Normal	
Probable (n=18)	3	15	0.004
Chronic (n=42)	24	18	

*P value determined by Pearson Chi-Square test

Discussion

All four sub-types of tension type headache were considered to include in the study, namely: Infrequent episodic or infrequent, frequent episodic or frequent, chronic sub-type and probable sub-type. Forty percent (40%) patients in this study had infrequent TTH, 30% had frequent episodic TTH, 21% had chronic sub-type of TTH and 9% patients had probable sub-type of TTH. In a study done by Khan et al² in a tertiary care hospital of Kashmir, India they found among patients with TTH, 78 (47.6%), 52(31.7%) and 34(20.7%) had infrequent episodic TTH, frequent episodic TTH and chronic TTH respectively⁸.

Patients with daily or frequent headache are commonly seen in neurology clinics. Most of them are diagnosed as having tension type headache (TTH). However, the underlying cause of TTH is uncertain in most of the cases. There are several studies that tried to find any link between hypothyroidism and TTH⁸⁻⁹. Two of them were undertaken on small sample population and found no link¹¹⁻¹². Rest of them had found a variable number of hypothyroid cases among TTH patients⁸. This study included 200 patients of different subtypes of TTH and tested for evidence of hypothyroidism.

Their study used the ICHD-2 criteria for TTH but did not include any patients with probable TTH. In this aspect this present study was a unique one as it had included probable sub-type of TTH along with other subtypes. However, when proportions of other sub-types of headache are compared with the study conducted by Khan et al² nearly equal results can be observed.

Prevalence of hypothyroidism in general population varies from country to country. Overall prevalence of subclinical hypothyroidism in general population is 4.0 to 10.0% cases¹³. In India prevalence of

hypothyroidism is 10.9% cases¹⁴. In one study done in a community of Khulna district of Bangladesh prevalence of subclinical and overt hypothyroidism was found to be 6.59% and 4.97% respectively¹⁵. On the other hand, proportion of both subclinical (22%) and overt hypothyroidism (7.2%) was found high in TTH patients in the study done by Khan and colleagues².

All four sub-types of tension type headache were considered to include in the study, namely: Infrequent episodic (or infrequent), frequent episodic (or frequent), chronic sub-type and probable sub-type. Forty percent (40%) patients in this study had infrequent TTH, 30% cases had frequent episodic TTH, 21% cases had chronic sub-type of TTH and 9% patients had probable sub-type of TTH. In a study done by Khan, et al² in a tertiary care hospital of Kashmir, India they found among patients with TTH, 78 (47.6%), 52(31.7%) and 34(20.7%) had infrequent episodic TTH, frequent episodic TTH and chronic TTH respectively¹²⁻¹³. Their study used the ICHD-2 criteria for TTH but did not include any patients with probable TTH. In this aspect this present study was a unique one as it had included probable sub-type of TTH along with other subtypes. But when proportions of other sub-types of headache are compared with the study conducted by Khan, et al², nearly equal results can be observed.

In concordance with the later study, incidence of subclinical and overt hypothyroidism was found 20.5% and 10% respectively in this study. Another study⁹ in their research did not find any patients of hypothyroidism in the sample population of headache. This was either because of small sample size (only 20 in the earlier study) or because small proportion of sample was tested for thyroid status only 13 among 119 patients in the later study. From above studies it can be inferred that incidence of hypothyroidism is more in TTH than normal people. Among 80 infrequent TTH patients 20 had hypothyroidism and among 42 chronic TTH patients 24 had hypothyroidism. The difference is statistically highly significant (p=0.0001).

The difference in between frequent TTH and chronic TTH in relation to thyroid status (14 and 24 hypothyroid patients respectively) is also statistically significant (p=0.001). These findings again go along with the findings of Khan et al² who compared difference between chronic and infrequent sub-type and in between chronic and frequent sub-type. This implies that chronic TTH patients are statistically more likely to be found hypothyroid than both frequent episodic

and infrequent episodic patients.

Conclusion

Headache particularly chronic tension-type headache and hypothyroidism both affect the quality of life significantly. The study reveals positive correlation between two of them. However, without case-control study significant association between chronic TTH and hypothyroidism cannot be established. But from this study it is recommended that thyroid hormone level should be tested in each case of chronic tension-type headache and hypothyroidism should be considered as a risk factor for primary headache disorder. More study is necessary for a more conclusive statement.

References

1. Spanou I, Bougea A, Liakakis G, Rizonaki K, Anagnostou E, Duntas L, Kararizou E. Relationship of Migraine and Tension-Type Headache With Hypothyroidism: A Literature Review. *Headache: The Journal of Head and Face Pain*. 2019 Sep;59(8):1174-86
2. Khan HB, Shah PA, Bhat MH, Imran A. Association of hypothyroidism in patients with migraine and tension-type headache disorders in Kashmir, North India. *Neurol Asia*. 2015 Sep 1;20(3):257-61.
3. Sacco S, Ricci S, Carolei A. Tension-type headache and systemic medical disorders. *Current pain and headache reports*. 2011 Dec;15(6):438-43.
4. Abou Elmaaty AA, Flifel ME, Belal T, Zarad CA. Migraine and tension headache comorbidity with hypothyroidism in Egypt. *The Egyptian Journal of Neurology, Psychiatry and Neurosurgery*. 2020 Dec;56(1):1-7.
5. Gipponi S, Venturelli E, Rao R, Liberini P, Padovani A. Hypertension is a factor associated with chronic daily headache. *Neurological Sciences*. 2010 Jun;31(1):171-3.
6. Martami F, Ghorbani Z, Abolhasani M, Togha M, Meysamie A, Sharifi A, Jahromi SR. Comorbidity of gastrointestinal disorders, migraine, and tension-type headache: a cross-sectional study in Iran. *Neurological Sciences*. 2018 Jan;39(1):63-70.
7. Larner AJ. Thyroid dysfunction and headache. *Journal of Headache and Pain* 2006;7(1):51-2
8. Bendtsen L. Drug and non-drug treatment in tension-type headache. *Therapeutic advances in neurological disorders*. 2009;2(3):155-61
9. Lima Carvalho MD, de Medeiros JS, Valença MM. Headache in recent onset hypothyroidism: Prevalence, characteristics and outcome after treatment with levothyroxine. *Cephalalgia*. 2017;37(10):938-46
10. Fumal A, Schoenen J. Tension-type headache: current research and clinical management. *The Lancet Neurology*. 2008;7(1):70-83
11. Gharib H, Tuttle RM, Baskin HJ, Fish LH, Singer PA, McDermott MT. Subclinical thyroid dysfunction: a joint statement on management from the American Association of Clinical Endocrinologists, the American Thyroid Association, and the Endocrine Society. *Thyroid*. 2005;15(1):24-8
12. Unnikrishnan AG, Kalra S, Sahay RK, Bantwal G, John M, Tewari N. Prevalence of hypothyroidism in adults: An epidemiological study in eight cities of India. *Indian journal of endocrinology and metabolism*. 2013;17(4):647
13. Paul AK, Miah SR, Mamun AA, Islam S. Thyroid disorders in Khulna district: a community based study. *Bangladesh medical research council bulletin*. 2006;32(3):66-71