

## Relationship of Hypothyroidism with Chronic Tension-Type Headache

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### Abstract

**Background:** Chronic tension-type headache is not uncommon complaints among patients. **Objective:** This study was undertaken to assess the frequency of subclinical and overt hypothyroidism in patients with chronic tension-type headache. **Methodology:** This study was conducted in Dhaka Medical College, Dhaka, Bangladesh. The study subjects consisted of patients presented with primary headache disorders. Thyroid function test were performed among all patients. The patients were compared with the value of thyroid hormone. **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, January 2022;8(1): 38-41]

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

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### Introduction

Primary headaches are very common medical conditions worldwide and have a significant deleterious effect on public health. Particularly, almost three billion individuals were estimated to have migraine or tension-type headache, with migraine being the third most prevalent disorder in the world<sup>1</sup> and the first cause of disability in individuals under the age of 50 years<sup>2</sup>. Migraine is associated with a variety of comorbidities, including the endocrine system, determining disease progression and therapeutic strategies<sup>3</sup>.

Hypothyroidism is also a very common condition, with the prevalence of clinical hypothyroidism in the general population in Europe being between 0.2 and 5.3% cases<sup>4-5</sup>. Hypothyroidism is characterized by thyroid hormone deficiency and influences nearly all major organs, including the central nervous system<sup>6</sup>. Headache is one of the most common symptoms of hypothyroidism, affecting approximately one-third of the patients<sup>7</sup>.

Tension-type headache (TTH) is the most prevalent form of headache in all age groups across the globe<sup>4</sup>. TTH

leads to considerable disability with up to 60.0% of individuals reporting decreased work effectiveness, increased absenteeism and reduced social engagement<sup>5</sup>. The underlying cause of tension-type headache is uncertain. Activation of Hyper excitable peripheral afferent neurons from head and neck muscles might be the likely explanation for tension-type headache<sup>6</sup>. Muscle tenderness and psychological tension may aggravate tension-type headache but are not clearly its cause.

Abnormalities in central pain processing and generalized increased pain sensitivity are present in some patients with tension-type headache<sup>7</sup>. There are several consistent studies have shown that patients with TTH had significantly higher proportion of subclinical hypothyroidism and overt hypothyroidism as compared to the control subjects<sup>8</sup>. It has been observed that improvement in headache occurs in 30% of hypothyroid patients after initiation of thyroid hormone replacement<sup>9</sup>. There have been few recent advances in treatment options for TTH. Non pharmacologic approach like avoidance of associated factors and reassurance has been proved useful in several studies<sup>10</sup>. This study was undertaken to assess the relationship of hypothyroidism with chronic tension-type headache.

### Methodology

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. Non-probability purposive consecutive sampling method was used to select sample population. Data was collected from the respondents through interview. At first study subjects were screened according to inclusion and exclusion criteria who complaint headache. Then physical examination was done accordingly. Diagnosis of the TTH was made on the basis of ICHD-2 and verified by a consultant neurologist. Following confirmation demographic

profile was collected by face-to-face interview by using a semi-structured questionnaire. In all cases informed written consent was taken after explaining the aims, objectives of the study in each patient. 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 1-125 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. 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 hypothyroidism. P value less than 0.05 was considered statistically significant.

### 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 ( $\pm 9.9$ ). 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
<b>Total</b>	<b>200</b>	<b>100.0</b>

Among 80 patients with infrequent episodic TTH 16 patients had subclinical hypothyroidism and 4 patients had overt hypothyroidism. Among 46 patients with frequent episodic TTH 10 patients had subclinical hypothyroidism and 4 patients had overt hypothyroidism. Out of 18 patients with probable TTH 3 patients had subclinical hypothyroidism but no patient was overt hypothyroid. Out of 42 chronic TTH 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 (Table 2).

Table 2: Thyroid status in relation of different sub-types of TTH

TTH Sub-types	Thyroid Status			P Value
	Subclinical Hypothyroidism	Overt Hypothyroidism	Normal Status	
Chronic	12	12	18	0.001
Others	29	8	121	

\*p value was measured by Pearson's Chi-square Test

## Discussion

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 TTH<sup>8-9</sup>. Two of them were undertaken on small sample population and found no link<sup>11-12</sup>. Rest of them had found a variable number of hypothyroid cases among TTH patients<sup>8</sup>. This study included 200 patients of different subtypes of TTH and tested for evidence of hypothyroidism.

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 al<sup>2</sup> 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 respectively<sup>8</sup>.

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 al<sup>2</sup> 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% cases<sup>13</sup>. In India prevalence of hypothyroidism is 10.9% cases<sup>14</sup>. 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% respectively<sup>15</sup>. 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 colleagues<sup>2</sup>.

In concordance with the later study, incidence of subclinical and overt hypothyroidism was found 20.5% and 10% respectively in this study. Another study<sup>9</sup> 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 al<sup>2</sup> 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.

Limitations of this study includes small sample size, time, logistic supports, availability of patients and lack of sufficient fund. Further case-control study is needed to confirm the consistency of the findings

## 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.

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