

Estimation of Thyroid-Stimulating Hormone Level in Normal College Female Students in a Semi-Urban Indian Town: Kumbakonam Urban-Rural Epidemiological Study- KURES – 7

Abstract

Background: Subclinical hypothyroidism (SCH) is a biochemical disease which is characterized by elevated serum levels of thyroid stimulating hormone (TSH) with normal thyroid hormone levels. In an attempt to correct the disease at its entry point, we wished to find out the incidence of subclinical hypothyroidism in female college students in Kumbakonam, a semiurban town of India. **Methods:** Around 260 female college students who had no history of thyroid disease were screened for thyroid dysfunction by a TSH assay. **Results:** The mean age \pm standard deviation was 18.72 ± 2.27 years. The mean TSH value was 3.98 mIU/mL. The incidence of abnormally high TSH values was around 11.5%. The number of such cases was 30 with low T3 values in six students. One had a value of 150 with no symptoms. Another student had a value of 0.15 and her T3-T4 profile was normal. All students were asymptomatic. None of the students had goiter. **Conclusions:** In an unpublished but accepted study, we found an incidence of 3.5% in the school female children in the age group of 15–17. A sudden jump in the incidence is occurring in the age group of 18–22. This needs a workup of the causative factors and their possible correction.

Keywords: Female, hypothyroidism, incidence, students

Introduction

Subclinical hypothyroidism (SCH) is biochemical than a clinical condition which is characterized by elevated serum levels of thyroid stimulating hormone (TSH) above the upper limit of the reference range but mostly asymptomatic with a normal concentration of thyroid hormones. It is still not clear that these clinically normal college girls will go in future to develop increased incidence of complications. As such, there are very few studies which randomly sample normal college female children in Indian semiurban population. In a study conducted among young females in south India,^[1] the incidence of thyroid dysfunction is around 11.7%. There are a few studies which state that the incidence of subclinical hypothyroidism is around 4.15 to 13% in Asian pregnant population.^[2,3] Detecting subclinical thyroid dysfunction in asymptomatic teenage females may go a long way in avoiding menstrual and fertility problems later. In view of such variations and importance in preventive health, we proposed to conduct

an estimation of TSH levels in normal asymptomatic female school children in Kumbakonam, a semiurban town of south India. We aimed to estimate the level of TSH in asymptomatic college female students from which to detect the incidence of students with thyroid dysfunction in them.

Methods

This prospective epidemiological observational study was conducted in a semiurban town of south India with a population of 150000 in September 2019. It was done in female college students between 18–22 years of age. The institutional ethics and review board (IRBSTH 106/2019) has approved the study. The administration of the college has accepted to conduct the study. The procedure of collecting blood from students was explained to students after getting consent. TSH assay was done in all the randomly collected blood samples as a thyroid screening test. It was confirmed that no student was a known thyroid patient. All patients who received drugs for any other cause have been excluded. TSH assay

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was done using electrochemiluminescence immunoassay to the accuracy guidelines given by the World Health Organization (WHO) as standard.

Abnormal TSH values were grouped into two basic categories:

- TSH elevation: TSH of more than 5 mIU/mL⁵ (SCH)
- Suppressed TSH: TSH <0.4 mIU/mL
- Others.

Any abnormal values are followed up with further tests and necessary treatment.

Statistics

With a town population of 150000 and a target population of 3500 of the age group described above, the application of Qualtrix software in sample size estimation for epidemiological studies was performed. For a study to have a 90% confidence level and a margin of error 5%, a sample size of 252 was necessary. Hence a sample size of 260 was made in our study. All data were entered in an excel spreadsheet and fed into the statistics software SPSS 20.0 for descriptive statistics and confidence intervals.

Results

All the 260 students cooperated well for the investigation. There were no dropouts which means that there was no student out of this 260 from whom the sample was not taken. No student was a known hypothyroid and on no drugs affecting the estimation. All the students belonged to the age group of 18–22. The mean TSH with the standard error was 3.98 ± 0.64 mIU/L. The variation was from 0.15 to 150. The upper and lower bound 95% confidence intervals were 5.25 and 2.73, respectively. [Table 1]. Thirty students out of 260 showed a high TSH value. This accounted for average thyroid dysfunction in the hypothyroid range to be 11.5%. The values were more than twenty in four cases. In all these cases, the T4 values

were near normal. There were six cases in which the T3 were found to be lower than 100 which suggest frank hypothyroidism. All these students were also not having any major symptoms of hypothyroidism. There was only one case of a TSH value of 0.15. The student was advised to follow-up with repeat profiles and take appropriate medical advice.

Discussion

The prevalence of asymptomatic thyroid disorders depends on various factors such as age, sex, iodine intake, and other geographical factors. The focus was on young females, as a lot of menstrual problems leading on to infertility are linked with thyroid disorders. Nair *et al.*^[4] demonstrated that postprandial TSH levels were less than fasting values. Our samples were taken randomly. Hence, in borderline cases, we counselled for fasting profiles. Early and effective treatment of any thyroid disorder will ensure a safe obstetric journey. Hence, screening at the age of 18–21 and their correction may be useful in reducing infertility. An earlier epidemiological research work by us revealed an incidence of 3.5% of subclinical hypothyroidism with a mean TSH value was 2.99 among female school children of age 15–17. (accepted but yet to be published). In this study, the incidence has risen to around 11% in a similar population but among college students. It can be presumed that a transition phase of increased thyroid dysfunction is happening at the age of around 18–20. Rao *et al.*^[5] in their study on adolescent females, found an incidence of 4.9% of subclinical hypothyroidism, but their age group is less than 19. Nikhita *et al.*^[6] have found an incidence of one student among 70 young medicos which are far less than our results. As such there are very minimal data on TSH levels of college students who are not known patients of thyroid dysfunction. Only one patient in our study had a value of less than 0.4 but asymptomatic. The hormone profiles were also normal and advised for a strict follow-up. In one patient of our study, the TSH level was 150, yet did not know, she was hypothyroid. None had clinical goitre in our study. Dadia^[7] *et al.* in their review have clearly stated that the prevalence of subclinical hypothyroidism would increase with age which goes along with our findings. Paul *et al.*^[8] in their study have found out the incidence of subclinical hypothyroidism to be 6.5% but they have included females and males with and without goiter. We have not included goiter cases to note asymptomatic students with subclinical hypothyroidism We did not enquire the details of the dietary habits of each student, but the area of the study is a delta one.

Conclusions

In a sample epidemiological survey of subclinical hypothyroidism in 260 asymptomatic semi-urban school female college students of India, we found a TSH value of 3.98 ± 0.64 mIU/L. (mean with SE). Lower TSH values

Table 1: Showing descriptives

	Statistic	Std. Error
TSH		
Mean	3.986385	0.6399739
95% Confidence Interval for Mean		
Lower Bound	2.726170	
Upper Bound	5.246599	
5% Trimmed Mean	2.755171	
Median	2.445000	
Variance	106.487	
Std. Deviation	10.3192698	
Minimum	0.1500	
Maximum	150.0000	
Range	149.8500	
Interquartile Range	2.1025	
Skewness	11.788	0.151
Kurtosis	159.107	0.301

(<0.4) were noted only in one student. The incidence of hypothyroidism including subclinical (TSH >5) was 11.5%. We propose that a sudden transition to a higher incidence occurred in the age group of 18–21. Strong research is needed to go through the causative factors which make this happen in this age so that we can decrease the incidence of thyroid disorders in adult females.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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