Estimation of Thyroid Stimulating Hormone Level in Normal Female School Children in A Semi Urban Indian Town - Kumbakonam Urban Rural Epidemiological Study- KURES -2

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Abstract

Symptoms of thyroid dysfunction are non-specific, yet common and hence screening for abnormalities becomes a necessity. To identify subclinical thyroid dysfunction and offer them the correct medical treatment especially in adolescent female children is an excellent option as a public health prophylactic measure. Hence in this study, we sampled 264 asymptomatic school female children for TSH and found an incidence of 3.4% of high TSH (>5). On the other side, the lower values were found in six (if TSH <0.5) or only two children (if TSH < 0.4). The mean with standard error of TSH values were 2.99 ±0.567. The fasting status was not complied with, and all were random blood samples. All children with abnormal results were counselled with parents and necessary medical advice given. This prevalence is the lowest among similar studies done in any Asian country which is a new finding in our study. Only one child showed a value of 150 who was given drugs and followed up. We theorize that this lesser incidence may be partly due to the study being done in a delta area of a semiurban town.

Key words*: children, female, TSH, hypothyroidism, subclinical,*

Introduction

Subclinical hypothyroidism (SCH) is more a biochemical than a clinical condition which is characterized by serum levels of Thyroid Stimulating Hormone (TSH) above the defined upper limit of reference range, but with normal concentration of thyroid hormones. There are no frank clinical features of hypothyroidism. It's still not clear that these clinically normal children will go in future to develop increased incidence of complications. As such there are very few studies which randomly sample normal children in Indian semi urban population. In a study of 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]. In view of such variations, we proposed to conduct estimation of TSH levels in normal asymptomatic female school children in kumbakonam, a semiurban town of South India.

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Aims

The primary aim was to find out the incidence of subclinical hypothyroidism in female school children in kumbakonam , a semiurban town of India.

The other aims were to counsel the students and parents and the need for drug therapy in affected children

Material and Methods:

This prospective epidemiological observational study was conducted in a semiurban town of India

with a population of 150000 in October 2018. It was done in school going female children between 15 – 17 years of age. The institutional review board (IRBSTH 02/2018) has approved the proposal to conduct the study. The administration of the school has accepted to conduct the study. The procedure of collecting blood from children was explained to parents in vernacular language and consent was obtained from each of them. TSH assay was done in all the collected blood samples as a screening test for thyroid disease. TSH assay was done using electro chemiluminescence immunoassay to the accuracy guidelines given by WHO as standard.

Abnormal TSH values were grouped into two categories:

- TSH elevation: TSH of more than 5 mIU/ml
- Suppressed TSH: TSH <0.4 mIU/ml.

All the subjects with abnormal TSH were instructed to come for follow-up with parents for further testing and advice.

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 done. For a study to have 90 % confidence level and a margin of error 5 %, a sample size of 252 was necessary. Hence a sample size of 264 was made in our study. All data were entered in an excel spread sheet and fed into the statistics software SPSS 20.0 for descriptive statistics and confidence intervals.

Results

All the 264 subjects completed the study. There were no untoward events. All the children were females in the age group of 15-17. The mean with standard error of TSH values were 2.99 ±0.567.The descriptive statistics is tabled below (see Table 1). Only 9 children out of 264 had a TSH value of more than 5. The incidence of abnormally high TSH is 3.4 %. One child had a value of 150, yet she did not have symptoms. Only two out of 264, had a value less than 0.4. but children with values between 0.4 and 0.5 were four in number. Hence If 0.5 had been the cut off for a low TSH , 6 out of 264 had a low TSH values which is around 2.27%.Hence the abnormal TSH values overall is only 5.67%. The parents were called and a counselling session was held along with students giving them proper advice regarding drug intake and further tests.

Table 1 showing descriptive statistics

			Statistic	Std. Error
TSH	Mean		2.998862	.5672822
	95% Confidence Interval for Mean	Lower Bound	1.881869	
		Upper Bound	4.115855	
	5% Trimmed Mean		2.289267	
	Median		2.155000	
	Variance		84.958	
	Std. Deviation		9.2172453	
	Minimum		.0600	
	Maximum		150.0000	
	Range		149.9400	
	Interquartile Range		1.5600	
	Skewness		15.548	.150
	Kurtosis		248.642	.299

Discussion

The prevalence of thyroid disorders especially subtle subclinical dysfunctions depends on a number of factors such as age, sex, geographical factors and iodine intake. The focus should be young females, as a lot of menstrual problems with infertility is on the rise with a possible link with thyroid disorders. Nair et al [4]demonstrated that TSH levels showed a statistically significant decrease postprandial when compared to fasting values. Our samples were taken randomly. Early and effective treatment of any thyroid disorder will ensure a safe pregnancy with minimal maternal and neonatal complications[5]. Hence any screening at the age of 15 – 17 and their correction may be highly useful in reducing infertility and pregnancy associated complications. Hence in this study, we focussed on adolescent female children. Kumaravel et al[1] have shown a prevalence of TSH abnormalities in young females as 12.5 % with a higher TSH in 9.7 %. In a study in Lebanese children[6], the prevalence was found to be 5.4%- 5.7 %. The mean serum TSH 2·57–3·6 mIU/l for boys and 1·83–3·58 mIU/l for girls in an Indian study by Marvaho et al[7], But our study proved the subclinical hypothyroid values to be less than that of the earlier studies to be only 3.4%. But the prevalence of lower TSH values coincides with earlier studies by kumaravel et al. In yet another study in Indian population, the prevalence of high TSH is around 7.7 %. The authors have also correlated the TSH values with abnormal lipid profiles which we have not done[8]. Many of the studies were not clearly mentioning the timing of taking the blood sample whether it's fasting or postprandial. We conducted the study in children where they have taken a very mild breakfast 4 hours ago. We consciously omitted children from the study who have symptoms and are on thyroid drugs. One patient of our study where the TSH was 150 also did not know she was a hypothyroid. She was prescribed drugs with a follow up advice of a complete thyroid profile check-up along with antibody titres. None of the children with subclinical thyroid dysfunction had goitre in our study. We did not enquire whether they are on iodine rich diet or not, as the area of the study is a delta. Nonrandomized continuous sampling may be a limitation in our study. Only two out of 264 children had a TSH value below 0.4 which is also less than the earlier studies. These patients were also advised to have follow up for full thyroid profile testing.

Conclusion

In a sample epidemiological survey of subclinical hypothyroidism in asymptomatic semi urban school female children of India, we found a mean TSH value of 2.99 mIU/l. Lower TSH values (<0.4) were noted only in two children. The prevalence of subclinical hypothyroidism (TSH >5) was 3.4% only which is far less than the previous studies. We probably hypothesize that the decreased incidence may be due to the fact that study being conducted in a delta area of a semiurban town.

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Conflict of Interest – Nil

Dr. MRS designed and conducted the study. DR.TSS helped in data collection. Dr. SPS did the supervision with write up.

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