



CORRELATION BETWEEN AGE AND SERUM TSH LEVEL IN YOUNG AND MIDDLE-AGED FEMALE POPULATION OF DIBRUGARH TOWN

Physiology

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ABSTRACT

Background: With increasing age body functions including the hormones begin to decline in people. Various literatures have different opinions whether serum TSH level reflecting thyroid function shows a variation in aged population or not.

Aim: The study was done to find out any correlation between age and serum TSH level in young and middle-aged population of Dibrugarh town, Assam.

Materials and method: A population based study was done during the period of one year which included 304 apparently healthy women from Dibrugarh town. The sera from the blood collected were subjected to TSH estimation in RIA centre with Immunoradiometric assay kit

Results and observation: There was no significant correlation between age and TSH level in the study population but the TSH levels showed an increasing trend with increasing age and there were more cases of hypothyroidism than hyperthyroidism.

Conclusion: Thyroid functions seem to decline in elderly individuals. So regular screenings may be pursued to reduce the morbidity due to thyroid diseases.

KEYWORDS:

Age, Hypothyroidism, Hyperthyroidism

Introduction

Diseases of the thyroid gland are common worldwide and the number of cases have grown in the recent years. Among the endocrine disorders it is second only to diabetes¹. It has been estimated that about 42 million people in India suffer from thyroid diseases. Women are more susceptible to thyroid disorders than men and older adults than younger age groups². Screening for thyroid dysfunction in asymptomatic individuals is not always recommended, but various researchers suggest that aggressive case-finding should be pursued in older women³. The incidences of hypothyroidism seem to be more than hyperthyroidism.

The thyroid function is regulated by thyroid stimulating hormone (TSH) secreted from the anterior pituitary gland. The biological half-life of human TSH is about 60 minutes⁴. Serum concentration of thyroid hormone is inversely related to TSH concentration which is normally 0.5-4.5 mIU/L. Thyroid hormone stimulates the basal rate of metabolism, oxygen consumption, helps regulate lipid and carbohydrate metabolism and are necessary for normal growth and maturation including the nervous system. Conversely excess thyroid secretion (hyperthyroidism) leads to body wasting, nervousness, palpitations, muscle weakness, heat intolerance, tremor, increased appetite, fatigue etc. Low levels of thyroid hormone in adults (hypothyroidism) result in clinical symptoms like weakness, fatigue, lethargy, somnolence, muscle aches, cold intolerance, dry cold skin, weight gain, slow speech, amenorrhoea, psychosis etc⁵. The most valuable screening test to diagnose hypothyroidism is measurement of serum TSH level⁶.

Aim

This study was aimed to find out the correlation between age and serum TSH level in female population of age group 30-60 years of Dibrugarh town, Assam.

Materials and method

Permission from institutional ethics committee was taken prior to the study. A total of 304 apparently healthy women from Dibrugarh town were selected during the period of one year between 1st July 2013 and 1st June 2014 (determined by using the statistical formula $Z^2pq/L2$ taking the prevalence rate of hypothyroidism as 26%). 6 wards were selected randomly from 22 wards of Dibrugarh town & 50 cases were taken from each ward. These subjects had no history of symptoms referable to major diseases and clinical examination did not reveal any major abnormal findings.

The blood samples were collected by venepunctures with disposable syringe and needle. Sera were separated by centrifugation and subjected to TSH estimation in RIA centre with

Immunoradiometric assay kit, IRMAK-9 provided by Board of radiation and isotope technology (BRIT), Vashi, Navi Mumbai. T3 and T4 were also estimated if TSH level was abnormal. The sensitivity of TSH estimation was 0.05 μ IU/ml. Normal level of TSH was taken as 0.5 – 4.5 μ IU/ml. Statistical analyses were done by using the Graphpad prism software. Student's t test was done to analyze the quantitative data and to determine the significance value (p-value). A p-value <0.05 was taken as significant.

Results and observations

The cases were divided into 3 groups: 30-40 years (group 1), 40-50 years (group 2) and 50-60 years (group 3). The number of cases in the first group was 87 (28.62%), in the second group 114 (37.5%) and in the third group 103 (33.88%).

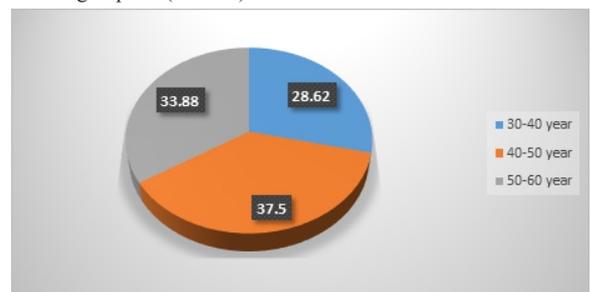


Fig 1: Pie diagram showing distribution of cases according to three age groups

Then total hypothyroid and hyperthyroid cases along with mean TSH levels were calculated.

Groups	Hypothyroid cases	Hyperthyroid cases	Mean \pm SEM of TSH
1	7	0	3.048 \pm 0.127
2	13	1	3.380 \pm 0.127
3	12	2	3.555 \pm 0.158

Table 2: Hypothyroid and Hyperthyroid cases and mean TSH level in three age groups

Total hypothyroid cases came out to be 32 of which the three groups had 7, 13 and 12 cases respectively. Total prevalence of hypothyroidism was 8.05% in the first group, 11.04% in the second group and 11.65% in the third. The first group had no hyperthyroidism cases whereas the second and third group had 0.88% and 1.94% hyperthyroidism cases respectively. The mean \pm SEM of TSH was

highest in the third group (3.555±0.158).

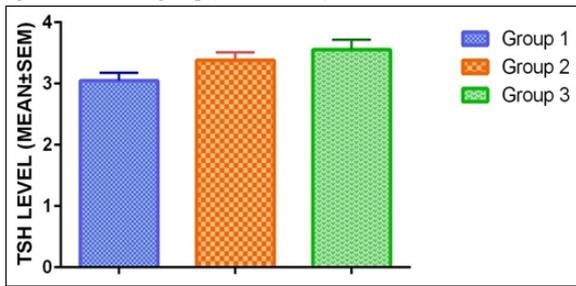


Fig 2: Bar diagram showing mean TSH levels in three age groups

Comparison of TSH levels	P value
Group 1 v/s Group 2	0.07
Group 1 v/s Group 3	0.01
Group 2 v/s Group 3	0.39

Table 3: Multiple comparison between 3 age groups

Tukey-Kramer Multiple Comparisons Test was performed for TSH levels between two groups at a time. Between group 1 and 2 the mean difference was -0.3320 and P value was 0.07 which is *not significant*. Between group 1 and 3 the mean difference was -0.5063 and P value was 0.01 ($q > 3.336$) which is *significant*. Between group 2 and 3 the mean difference was -0.1743 and P value was 0.39 which is *not significant*.

Correlation	r value	P value
Group 1 age and TSH	0.124	0.2543
Group 2 age and TSH	0.179	0.0568
Group 3 age and TSH	-0.049	0.6236

Table 4: Correlation between age and TSH levels in the three groups

Table 4 shows the correlation between age and TSH levels in the three age groups determined by the Pearson correlation coefficient (r value). For group one, the r value was 0.124 and corresponding P value was 0.2543 which is *not significant*. For group two, the r value 0.179 and the corresponding P value was 0.0568 which is *not quite significant*. For group three, the r value was -0.049 and corresponding P value was 0.6236 which is again *not significant*.

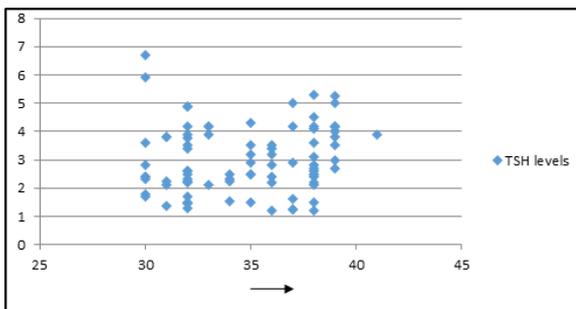


Fig 5: Scatter diagram showing correlation between age and TSH levels in 30-40 years age group

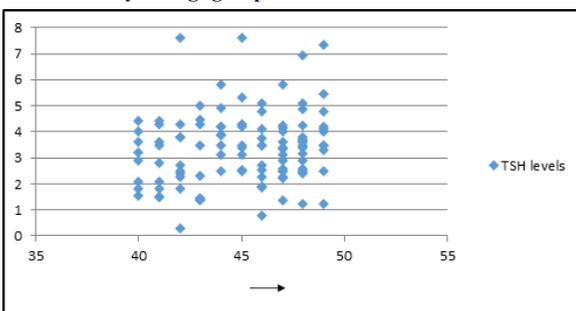


Fig 6: Scatter diagram showing correlation between age and TSH levels in 40-50 years age group

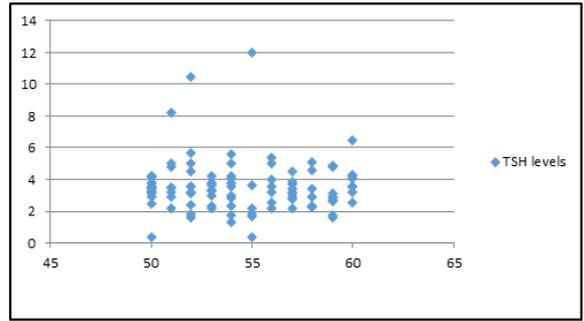


Fig 7: Scatter diagram showing correlation between age and TSH levels in 50-60 years age group.

Discussion:

With ageing, changes naturally occur in the way that body systems are controlled. The endocrine system functions well in older people despite age-related changes. However, some changes may occur because of damage to cells during the aging process and genetically programmed cellular changes. Blood levels of some hormones may increase, decrease, or remain unchanged. Hormones are also metabolized more slowly. There may be less sensitivity of the target tissues to their controlling hormone. Thyroid gland is perhaps no exception. The present study showed no significant correlation between age and TSH levels, but the TSH levels were increased above 40 years showing more cases of hypothyroidism. The variation of TSH level is in accordance with the study by A. Khan⁷, Garg et al⁸, Unnikrishnan et al⁹ and to some extent with the study by Chaurasia¹⁰ and Elizabeth H. Hoogendoorn¹¹.

Conclusion

From the above study it is evident that thyroid functions shows a decreasing trend with increasing age of the individual and number of hypothyroid cases exceeds hyperthyroid cases. So screening test for thyroid disorders may be routinely pursued in elderly women for prompt diagnosis and treatment.

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