

Study of Serum TSH Level in Premenopausal Women and Postmenopausal Women.

Dr Chetana K. Patwa¹ Dr S.T. Khan² Dr Anjali Shete³ Dr Syeda Afroz⁴
Department of Physiology, Government Medical College Aurangabad, Maharashtra India

Abstract:

Introduction: Thyroid gland plays a vital role in regulating overall body metabolism including sexual development and reproductive function. Worldwide diseases of the thyroid gland disorders are among the most prevalent endocrine disorders especially in women, second only to diabetes. Menopausal age is more prone to get overt hypothyroidism. Symptoms of hypothyroidism are similar to postmenopausal complaints so can be difficult to differentiate. As Thyroid stimulating hormone (TSH) is the single best screening test for vast clinical outpatient, routine screening of serum TSH level in climacteric period is recommended. With this perspective, this comparative cross sectional study of serum TSH levels in premenopausal and postmenopausal women was undertaken.

Objectives- To evaluate and compare serum TSH levels in premenopausal and postmenopausal women. To find out any effect of postmenopausal hormonal changes on serum TSH levels in women.

Method : 30 premenopausal women of age group 20-30 years and 30 postmenopausal women of age group 50-60 years evaluated for serum TSH level by ELFA technique on VIDAS instrument.

Statistical Analysis: Unpaired student's t test

Result : Mean serum TSH level in postmenopausal women (3.30 ± 2.43 uIU/ml) found higher than that in premenopausal women (2.53 ± 1.25 uIU/ml) but difference was not statistically significant.

Conclusion : Postmenopausal women should be monitored for serum TSH levels for reducing risk of thyroid dysfunction.

Keywords : Premenopausal women, postmenopausal women. Serum TSH

I. Introduction

The human life especially of women relies in a delicate balance of hormones, such as estrogen, progesterone, and testosterone. She has to go through many physiological changes during her lifetime e.g. Menarche, pregnancy, menopause for which the female hormones are one of the main responsible factors. The thyroid hormones influence the heart, brain, kidney, along with reproductive system development and overall body metabolism.

In women diseases of the thyroid gland are among the most prevalent disorders worldwide, second only to diabetes.^[1] With time, overt hypothyroidism can develop in menopausal age, the symptoms of which can be similar to postmenopausal complaints and are clinically difficult to differentiate. There can also be an absence of clinical symptoms. It is of importance that even mild thyroid failure can have a number of clinical effects such as depression, memory loss, cognitive impairment and a variety of neuromuscular complaints. Myocardial function has been found to be subtly impaired. Therefore, routine screening of thyroid function in the climacteric period to determine subclinical thyroid disease is recommended.^[2]

Elevated TSH in elderly, especially in women can be physiological or pathological. History of nutritional status, associated illness and follow up with TSH measurement helps to differentiate. Most professional organizations agree for screening in postmenopausal women for thyroid dysfunction. The American Thyroid Association (ATA), the Endocrine Society and the American Association of Clinical Endocrinologists (AACE) had recommended aggressive case finding in elderly women. As Thyroid stimulating hormone (TSH) is the preferred test to assess thyroid function as stated by National Academy Of Clinical Biochemistry,^[3] The 2012 clinical practice guidelines co-sponsored by the AACE and ATA the serum TSH is the single best screening test for primary vast majority of outpatient clinical situations.^[4]

With this perspective, this comparative cross sectional study was undertaken with the objective to evaluate serum TSH status in pre-menopausal women (reproductive age group) and postmenopausal women in whom other hormones like estrogen, progesterone, and androgen are at low level.

II. Material And Methods

Study was conducted on 30 premenopausal and 30 postmenopausal volunteer female patients attending the outpatient department of Medical College and Hospital. IEC approval was taken for the study. Premenopausal women of age group 20-30 years and postmenopausal women of age group 50-60 years were

included. Informed consent was taken. The basic data was recorded. Patient with history of major chronic illness e.g. diabetes mellitus, hypertension, endocrinal disorder, patient on Hormone Replacement Therapy or on drug altering serum TSH, operated patients of hysterectomy, women who have not achieved puberty yet or pregnant woman or premature menopause were excluded.

In each group serum TSH were estimated and analyzed. TSH in blood was measured by using Enzyme Linked Fluorescent Assay (ELFA) technique using an automated mini VIDAS instruments. The assay principle combines a one-step enzyme immunoassay sandwich method with a final fluorescent detection. The concentrations are expressed in $\mu\text{IU/ml}$. Participants having values between 0.25 to 5.0 $\mu\text{IU/ml}$ were considered euthyroid as indicated by manufacturer's assay kit.

III. Observation And Results

Table 1 shows The mean values for the age, body weight, height and body mass index in premenopausal women and postmenopausal women.

Parameter	Premenopausal women		Postmenopausal women	
	Mean \pm SD	RANGE	Mean \pm SD	RANGE
Age (years)	25.60 \pm 2.82	20 – 30	54.97 \pm 3.06	50 – 60
Weight(kilograms)	60.07 \pm 11.69	35 – 84	63.93 \pm 10.57	40 – 87
Height(centimetres)	159.42 \pm 8.36	137 – 173	158.00 \pm 7.19	142 – 170
Body Mass Index	23.85 \pm 5.38	12.1 – 36.2	25.77 \pm 4.88	15.2 – 34.5

SD: Standard Deviation. RANGE: Range of values obtained in present study subjects.

Table 2: Serum TSH levels in premenopausal and postmenopausal women.

	Premenopausal Women	Postmenopausal Women	'p' value
Serum TSH Mean \pm SD ($\mu\text{IU/ml}$)	2.53 \pm 1.25	3.30 \pm 2.43	0.12
Range ($\mu\text{IU/ml}$)	0.40 TO 4.68	0.11 TO 11.3	

N.S. - statistically not significant.

Table 2 shows the mean value of serum TSH in premenopausal and postmenopausal women.

IV. Discussion

In the present study, we encountered that the mean serum TSH level in postmenopausal women 3.30 (\pm 2.43) $\mu\text{IU/ml}$ was comparatively higher than premenopausal women 2.53 (\pm 1.25) $\mu\text{IU/ml}$, however the difference was statistically not significant. Multiple causes were proposed for increase in TSH in elderly, like anti-thyroid antibodies, nutritional iodine supply, hidden thyroid autonomy. Also problems regarding sleep disturbances and altered sleep patterns with increasing age may lead to increase in TSH level.^[5] Aging is associated with changes in pituitary-thyroid axis. There was a progressive shift in the serum TSH distribution curve towards higher TSH values with increasing age.^[6] Many endocrine systems exhibit changes with aging in the absence of overt disease thus age-related fall in circulating T4, reduction in TSH bioactivity or reduced responsiveness of the thyroid to TSH could result in increased TSH secretion. Another possibility is that it may be due to occult thyroid disease in older people or simply an age-related alteration in TSH set point.^[7,8] It might be possible that variation in the level of serum TSH is not great enough (nonsignificant), as the endocrine functions those are essential to life, such as adrenal and thyroid functions, show a minimal overall changes in basal levels with ageing.^[8,9]

Legier V. Rojas et al.(2008)^[10] found higher TSH level in postmenopausal women (2.80 mIU/L) compared to premenopausal (2.52 mIU/L). They found average TSH values increased with age, although the changes between groups were not significant. They suggest evaluation of TSH levels within groups and within locations to establish appropriate baseline levels

Elizabeth N Pearce et al.(2007)^[11] study in USA point towards increased TSH levels in post menopausal women. Hollowell J.G.et al (2002) found higher TSH levels in women in the older age group in the National Health And Nutrition Examination Survey –NHANES^[12] conducted in United States on large population. Analysis of the NHANES III (2007) showed that age-related shifts in TSH distribution were not significantly changed when individuals with antithyroid antibodies were excluded.

Some of the the studies showed lower serum TSH in postmenopausal and older women than premenopausal women. Studies by Mariotti et al.(1993)^[13] done in Italy, found significantly higher TSH levels in younger women and claim that due to an age related decrease in TSH secretion by the pituitary. Hershman JM et al. (1993)^[14] found the mean TSH in older women, (1.21), was slightly but significantly lower than that in middle-aged women, (1.52).

Previous studies suggested that, aging was associated with reduced TSH secretion. However, more recent data (National Health and Nutrition Examinations Survey-NHANES III) showed that, in conditions of iodine sufficiency, serum TSH concentration increases with age in people with no clinical or biochemical evidence of thyroid disease.^[12]

V. Conclusion

Higher serum TSH level in postmenopausal women needs further clinical and other thyroid hormonal assay to differentiate physiological and pathological condition. Large scale study is needed to elucidate more the relationship between serum TSH and postmenopausal women.

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