

# A Study of Age Dependent Changes in Thyroid Stimulating Hormone in Elderly

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## ABSTRACT

Thyroid stimulating hormone is the main hormone and 80 microgram is secreted per day. Ageing changes occur in all body systems including endocrine system. In elderly individuals the non-specific clinical manifestations of hypo and hyperthyroidism has confusion in the clinical setup. In females, up to the age of 30, there is a decrease in TSH levels thereafter there is a slight but definite increase in TSH levels. In males, there is a slight increase in TSH with age up to 90 years. Thyroid treatment in the elderly should take into consideration symptoms and TSH values.

**Key Words:** TSH, Thyroid changes in elderly, Effect of ageing on TSH, Thyroid hormone.

## INTRODUCTION

Thyroid hormone along with a much lesser amount of triiodothyronine are secreted by the thyroid gland under the influence of the hypo physical thyrotropin releasing hormone and thyroid stimulating hormone of the anterior pituitary [1]. Thyroxine is the main hormone of the thyroid gland and 80 microgram ( $\mu\text{g}$ ) is secreted per day. Only 4  $\mu\text{g}$  triiodothyronine is secreted per day [2]. Normally 93% of thyroid hormone is released as thyroxine and approximately 7% of the thyroid hormone released is triiodothyronine [3]. In proportionate secretion of thyroid hormone may occur in many Thyroid disorders. In primary hypothyroidism  $T_3$  and  $T_4$  is suppressed while TSH is high but in primary hyperthyroidism,  $T_3$  and  $T_4$  is high while TSH is suppressed [4].

Ageing changes occur in all body systems including the endocrine system. These changes may be due to the decreased amount of hormone secreted in the decreased sensitivity of the organ considered [5]. There has been long-standing

controversy about the thyroid function test results in the elderly [6].

In elderly individuals, the non-specific clinical manifestations of hypo and hyperthyroidism also confuse the clinical setup. In subclinical hypothyroidism the  $T_3$  and  $T_4$  levels increases while TSH decreases [7]. Similarly, high TSH with normal  $T_3$  and  $T_4$  indicate hyperactivity of TSH as a result of negative feedback mechanism [8].

## METHODOLOGY

All the samples were from patients of SK Hospital. Thousand six hundred and forty-two (1642) healthy adults aged 1 to 90years were studied. None had a history of thyroid diseases, goitre or medication known to alter thyroid function. None was severely ill or was suffering from wasting diseases or liver diseases or renal failure. Most were middle-class economic status.

Subjects above 60 were carefully segregated. Samples were collected using disposable syringes and needle of BD in clot tubes. Serum separated by centrifugation and TSH measured in the serum sample

using ABBOTT Architect i1000SR by the CMIA method.

**Table 1: Thyroid stimulating hormone in normal subjects ages 31-90yr**

Age (Yrs)	Males			Females		
	No.	%	TSH*	No.	%	TSH*
31-40	49	32	1.82	104	68	2.87
41-50	87	47	2.29	99	53	2.66
51-60	145	48	2.4	163	52	2.14
61-70	170	50	2.42	170	50	2.78
71-80	230	56	2.56	178	44	2.88
81-90	57	61	2.98	36	39	3.15
<b>Total</b>	<b>738</b>	<b>49%</b>		<b>750</b>	<b>51%</b>	

\*TSH values are expressed as  $\mu\text{IU/mL}$ .

## DISCUSSION

Thyroid function changes in ageing and has their consequences on heart function [9]. Despite a large body of population data, a unifying model has not been established. The incidence of both slightly elevated and slightly suppressed have been reported. TSH increases with age. A progressive significant negative effect of mild hypothyroidism occurs with ageing. Hypothyroidism is associated with type 2 diabetes. Clinical hypothyroidism is seen in around  $\frac{1}{10}$ <sup>th</sup> of Indian type 2 DM [10].

Weintraub BD et al [8] have suggested that serum TSH level increases with age. The process of ageing is known to affect the entire endocrine systems. The thyroid is also affected by ageing. Thyroid disease effects in the elderly are very similar to symptoms of normal ageing.

No clear benefits are seen in increasing a high TSH in the elderly. As the TSH levels are altered with age it would be wise to treat elderly people with thyroid medication only based on symptoms and not on TSH levels alone.

A much larger study alone can bring about the effect of TSH in the elderly.

## RESULTS

TSH was measured in males and females from 1 to 90 years. The TSH levels in females were slightly higher in all age groups than males. There were 1678 patients out of which 49% were males and 51% females. The TSH levels showed a small but definite increase in TSH in the case of males. The pattern was different in

the case of women. A small decrease in TSH from 30 to 60 years and thereafter the TSH levels almost remained the same. The value after 60 years was much higher compared up to 30 years.

## CONCLUSIONS

Thyroid stimulating hormone is altered with age. It is slightly higher in females than men of all age groups studied. Females show a fall in TSH up to 30 years and thereafter slow but steady increase. In males TSH increase with age. Hence while treating thyroid diseases in elderly both symptoms and TSH levels should be taken into consideration.

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