



## THYROID FUNCTION IN BANGLADESHI PATIENTS WITH VITILIGO (SHETI)

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### Abstract

Serum thyroid hormone levels have been assayed to evaluate the thyroid hormonal function in Vitiligo patients of Bangladesh. The levels of TSH, T<sub>3</sub> and T<sub>4</sub> in the serum of Vitiligo patients have been analyzed in both the male and female subjects. Results of hormonal assay indicated that some hormonal changes occurred in the Vitiligo patients as compared with the healthy control. In female Vitiligo patient's, TSH level was increased remarkably as compared to the control male patients, but T<sub>3</sub> and T<sub>4</sub> became lower than the normal range whereas, in case of male patients, T<sub>4</sub> level was significantly higher than the T<sub>3</sub> and TSH level. TSH level was significantly elevated in the female patients compared with the male patients.

**Key words:** Thyroid hormones, Vitiligo, TSH, T<sub>3</sub> and T<sub>4</sub> levels.

### Introduction

Vitiligo (Sheti in Bengali) is one of the most common skin disorders affecting approximately 1-2% of world population with cosmetically and psychologically devastating effects (<http://www.answers.com/topic/vitiligo>). The destruction of melanocytes is the cause of depigmented maculae that clinically represents the disease Vitiligo. The condition occurs when pigmented cells are destroyed, causing patches of skin to lose their normal color and appear whiter (Alkhateeb *et al.* 2003, Lacovelli *et al.* 2003). Different theories suggest that autoimmune, genetic disorders, toxic metabolites, and oxidative stimuli are the main factors causing Vitiligo. The nervous system and or the absence of the melanocyte growth factor may be included (Ongenaek *et al.* 2003).

Various studies on Vitiligo suggest that there is a significant association between Vitiligo and other diseases. The most frequently associated disease is thyroid disease; diabetes mellitus, pernicious anemia and Addison's disease. Thyroid diseases are particularly hyperthyroidism, hypothyroidism, Grous disease, toxic goiter and thyroiditis may be found up to 30 to 40 % (Howanitz *et al.* 1981, Henderson *et al.* 1988) in patients with Vitiligo. However, it is hypothyroidism that is most likely to become increasingly prevalent with age, particularly in women.

In a study of 18 Vitiligo patients over the age of 50, seven were found to have evidence for thyroid disease: in these patients, only one of whom had a prior history of thyroid disease (Wood 1980). Abnormal radioactive iodine uptake has been reported in 40 percent cases of Vitiligo (Kumar 1990). Antithyroglobulin and antimicrosomal antibodies are found more commonly in Vitiligo patients (Perrot 1973). The incidence of Vitiligo among those with thyroid disease is reported to be from 0.62 percent to 12.5 percent (Allison and Curtis 1955, Miklaszewska 1975). The multiple endocrinopathy syndromes are found particularly among those with extensive Vitiligo. Among 26 such cases reported by Miklaszewska (1975), 20 had thyroid. As multiple endocrinopathy syndromes are found with extensive Vitiligo but the effect of the hormonal significance of the associate disease is not yet known.

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Therefore, the present study, focuses on the investigation of the thyroid hormonal function of the Vitiligo patients in Bangladeshi population. Some socio-demographic studies and some biochemical analyses have been reported on Vitiligo in Bangladesh. But no study on the effect of thyroid hormone on Vitiligo has ever been done. In previous study, we performed the biochemical analysis on the Vitiligo patients (Rahman 2004). This is probably the first report of the effect of thyroid hormones on Vitiligo patients in Bangladesh.

### Materials and Methods

This cross-sectional study that was conducted in the Department of Biochemistry, Rajshahi Medical College, Rajshahi, Bangladesh, the Molecular Biology Laboratory, Institute of Biological Sciences, University of Rajshahi, Rajshahi, Bangladesh and Medipath Diagnostic Complex, Rajshahi, Bangladesh during 2005 and 2006.

The study included 125 individuals among the patients attending the Department of Skin and Venereal Disease, Rajshahi Medical College Hospital, Rajshahi, Bangladesh and the private chamber of the dermatologist in Rajshahi city during the entire period of the investigation. One hundred twenty five (125) healthy human subjects including child, adolescent, young and old were chosen as control. Twenty-five patients (10 male and 15 female) were selected from the 125 patients who were over 40 years of age and were diagnosed by a qualified Dermatologist to have vitiligo. Thyroid stimulating hormone (TSH) was measured by IRMA (Parts kit). T<sub>3</sub> and T<sub>4</sub> were measured by ELISA method (Parts-kit).

### Results and Discussion

The results of hormonal analysis for T<sub>3</sub>, T<sub>4</sub> and TSH in male vitiligo patients in the present study have been presented in Table 1. The normal value for total serum thyroxine (T<sub>4</sub>) is 5.0 –12.0 µg<sup>-dL</sup>. The calculated mean T<sub>4</sub> levels were 13.64 µg<sup>-dL</sup> and 8.88 µg<sup>-dL</sup> for the study group and control groups, respectively. The results clearly indicated that in the case of male Vitiligo patients, the thyroxine (T<sub>4</sub>) level increased remarkably as compared to the control, which is clinically very important.

The difference of values of total serum thyroxine (T<sub>4</sub>) between the control group and the study group of Vitiligo patients was markedly and statistical analysis by the unpaired t-test showed that P<0.05. Therefore, the markedly elevation observed in total serum thyroxine (T<sub>4</sub>) in male Vitiligo patients was also statistically significant. The normal value for total serum T<sub>3</sub> (Triiodothyronine) is 0.6 –1.85 ng<sup>-ml</sup>. ([http://www.globalrph.com/labs\\_t.htm](http://www.globalrph.com/labs_t.htm)). In the present study, the calculated mean T<sub>3</sub> levels were 1.99 and 1.35 ng<sup>-ml</sup> for the male Vitiligo patients and controls, respectively (Table 1). The total serum T<sub>3</sub> (Triiodothyronine) levels of the male Vitiligo patients appeared to be only slightly increased and were almost the same as the control group. So, the total serum T<sub>3</sub> (Triiodothyronine) level remains almost unaltered among male Vitiligo patients in Bangladeshi population.

**Table 1.** Serum T<sub>3</sub>, T<sub>4</sub> and TSH level in Vitiligo patients.

| Sex    | Parameter    | T <sub>3</sub> (ng <sup>-ml</sup> ) |             | T <sub>4</sub> (µg <sup>-dL</sup> ) |             | TSH (µ.IU <sup>-ml</sup> ) |             |
|--------|--------------|-------------------------------------|-------------|-------------------------------------|-------------|----------------------------|-------------|
|        |              | Patients                            | Control     | Patients                            | Control     | Patients                   | Control     |
|        | N            | 10                                  | 10          | 10                                  | 10          | 10                         | 10          |
| Male   | Average ± SD | 1.99 ± 1.26                         | 1.35 ± 0.74 | 13.64 ± 3.85                        | 8.88 ± 4.32 | 1.29 ± 0.78                | 2.99 ± 3.45 |
|        | t            | 1.36                                |             | 2.60 (P<0.05)                       |             | 1.53                       |             |
|        | N            | 15                                  | 15          | 15                                  | 15          | 15                         | 15          |
| Female | Average ± SD | 1.50 ± 1.15                         | 1.51 ± 0.63 | 7.15 ± 6.01                         | 7.79 ± 3.13 | 11.13 ± 8.07               | 4.63 ± 3.65 |
|        | t            | 0.02                                |             | 0.37                                |             | 2.84 (P<0.05)              |             |

As per literature, the normal value for thyroid stimulating hormone (TSH) is  $0.4\mu\text{IU}^{-\text{ml}}$  to  $6.0\mu\text{IU}^{-\text{ml}}$ . The calculated mean TSH levels in the present study were  $1.29\mu\text{IU}^{-\text{ml}}$  and  $2.99\mu\text{IU}^{-\text{ml}}$  for the male Vitiligo patients and the control subjects, respectively. The results of TSH level determination indicated that the TSH concentration in male Vitiligo patients was lower than the normal values.

The results of hormonal analysis for  $T_3$ ,  $T_4$  and TSH in female Vitiligo patients under the present study have also been presented in Table 1. As per literature, the normal value for total serum thyroxine ( $T_4$ ) is  $5.0 - 12.0\mu\text{g}^{-\text{dL}}$ . The mean serum total thyroxine ( $T_4$ ) level recorded was  $7.15\mu\text{g}^{-\text{dL}}$  for female Vitiligo patients and  $7.79\mu\text{g}^{-\text{dL}}$  for the control individuals. The results clearly indicated that in the case of female Vitiligo patients, the thyroxine ( $T_4$ ) level was lowered compared to the control individuals. The mean serum  $T_3$  level recorded was  $1.50\text{ng}^{-\text{ml}}$  for female Vitiligo patients and  $1.51\text{ng}^{-\text{ml}}$  for the control individuals. The results clearly exhibited that in the case of female Vitiligo patients, the  $T_3$  level remained the same compared to the control individuals.

In the present study, the mean TSH level of the female Vitiligo patients was calculated to be  $11.1\mu\text{IU}^{-\text{ml}}$  and  $4.63\mu\text{IU}^{-\text{ml}}$  for the control individuals. The normal range for TSH for females is  $0.4\mu\text{IU}^{-\text{ml}}$  to  $6.0\mu\text{IU}^{-\text{ml}}$  as per literature. The thyroid-stimulating hormone (TSH) of the female Vitiligo patients was therefore remarkably elevated as compared to the control individuals.  $T_3$  and  $T_4$  level decreased from the normal range.

The average  $T_4$  level was  $13.64\mu\text{g}/\text{dl}$  and  $7.15\mu\text{g}^{-\text{dL}}$  for male and female patients, respectively. The serum  $T_4$  level of male Vitiligo patients was significantly higher than the female patients. There was significant change in  $T_3$  level in male but no change was noticed in female patients. However, in the case of TSH level, female TSH level was highly elevated than the male TSH level. Average TSH level was  $1.29\mu\text{IU}^{-\text{ml}}$  and  $11.13\mu\text{IU}^{-\text{ml}}$  for males and females, respectively.

From above observations it can be concluded that the TSH level of female Vitiligo patients was increased significantly than the male Vitiligo patients and  $T_4$  level of male Vitiligo patients was increased remarkably than the female patients.

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