

# Level of serum prolactin in patients of hypothyroidism in Western Uttar Pradesh

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## ABSTRACT

**Background:** Hypothyroidism refers to a state that results in a deficiency of thyroid hormones, including hypothalamic or pituitary disease and generalized tissue resistant to thyroid hormone. Thyroid-releasing hormone can cause a rise in serum prolactin levels in patients of primary hypothyroidism. **Objective:** The objective of the study was to find the levels of serum prolactin in patients who are having hypothyroidism and to observe the relationship of prolactin with thyroid-stimulating hormone. **Materials and Methods:** A total of 150 patients coming to endocrinology clinic for thyroid-related problems were selected for the study and analyzed for their serum T3, T4, thyroid-stimulating hormone (TSH), and prolactin levels by enzyme-linked fluorescent assay technique using Vidas autoanalyzer from Biomerieux, France. **Results:** Prolactin level is high in the subclinical hypothyroid patients and hypothyroid patients as compared to euthyroid patients. **Conclusion:** In our study, it was seen that the levels of prolactin rise in relation to rising TSH level in hypothyroid patients.

**KEY WORDS:** Prolactin, Hypothyroidism, T3, T4, Thyroid-stimulating Hormone


## INTRODUCTION

For the first time in 1988, increase in serum prolactin was reported in woman with subclinical hypothyroidism.<sup>[1]</sup> Among the prevalent endocrine disorders in hypothalamic-pituitary axis, hyperprolactinemia is common.<sup>[2]</sup> Pathologic hyperprolactinemia is generally applied for the condition in which level of prolactin increases because of reasons other than physiological causes.

Secretion of prolactin is controlled by prolactin inhibitor factor that is secreted from hypothalamus, and other factors

that increase prolactin secretion are thyroid-releasing hormone (TRH).<sup>[1]</sup> In fact, TRH in addition to increasing thyroid-stimulating hormone (TSH) causes to raise prolactin level.<sup>[3]</sup> In subjects with primary hypothyroidism, increased levels of TRH can cause a rise in prolactin levels and these subjects may have got a condition known as galactorrhea.<sup>[4]</sup> Different increased level of serum prolactin has been reported in 30% of patients with primary hypothyroidism.<sup>[5]</sup> Subclinical hypothyroidism is defined by high TSH and normal thyroid hormones.<sup>[6]</sup> Hypothyroidism refers to a state that results in a deficiency of thyroid hormones but the level of TSH increases in these subjects and also there are disorders that affect the thyroid gland directly.<sup>[7]</sup> Biochemically decrease in T3 and T4 concentrations below the reference range leads to hypersecretion of TSH from pituitary gland and an amplified increase in the TSH level. It is one of the key laboratory findings, particularly in the early detection of thyroid gland failure.<sup>[8]</sup>

The signs and symptoms of hypothyroidism are vague and may be confusing with those of other clinical conditions, especially in the

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elderly subjects. Patients with severe hypothyroidism generally show a group of signs and symptoms that include lethargy, thinning of hair, weight gain, dry skin, forgetfulness, constipation, irritability, difficulty in concentration, and depression. Not all of these signs and symptoms occur in every patient, and many may be mild in patients in subclinical hypothyroidism.<sup>[9]</sup>

Clinically, hypothyroidism is a condition that may present with a variety of symptoms and signs involving various systems of the body such as endocrine, cardiovascular, central nervous system, reproductive, gastrointestinal, and also dermatological.<sup>[10]</sup>

## MATERIALS AND METHODS

The present study was undertaken in the Department of Biochemistry of FH Medical College Agra. After approval by Ethical Committee and obtaining informed consent from each patient, they were subjected to detailed history and clinical examination. A total of 150 patients attending to endocrinology clinic for thyroid-related problems were selected for the study.

Patients were assessed for hypothyroidism and its relation to the level of serum prolactin. T3, T4, TSH, and prolactin were analyzed by enzyme-linked fluorescent assay technique using Vidas auto analyzer from Biomerieux, France. The data were analyzed using SPSS-16 software package. Mean and standard deviation were applied.

### Inclusion Criteria

New cases with diagnosed hypothyroidism were included in the study. The clinical history was taken from all the patients, and the details were recorded.

### Exclusion Criteria

Patients having high levels of prolactin, lactating mothers, pregnant women, and patients on antidepressant or estrogen therapy were excluded from the study.

## RESULTS

Thyroid hormone profile of the subjects participating in the study is shown in Table 1, and the level of TSH is high in females as compared to the male subjects.

The mean of age group, TSH, and prolactin level for subjects [Table 2] which shows that both the level of TSH and the level of prolactin are higher in the study subjects (males and females).

## DISCUSSION

Following were the findings in our study, and TSH level was significantly higher in female patients as compared to males

**Table 1:** Comparison of T3, T4, and TSH level (mean±SD) in study subjects (males and females)

Gender	Hormone level		
	T3 (nmol/L)	T4 (nmol/L)	TSH (mIU/L)
Male	1.99±0.6	87.99±16.7	2.66±2.3
Female	1.44±0.8	86.6±34.8	3.88±1.5

SD: Standard deviation, TSH: Thyroid-stimulating hormone

**Table 2:** Mean±SD of age, TSH, and prolactin of study subjects (patients having hypothyroidism)

Parameters	Patients
Age (years)	34.15±6.18
TSH (mIU/L)	8.31±2.5
Prolactin (ng/ml)	37.96±3.88

SD: Standard deviation, TSH: Thyroid-stimulating hormone

[Table 1]. Serum prolactin level was found to be increased with increase in the levels of TSH, i.e., in hypothyroid patients [Table 2].

A study conducted by Lunenfeld *et al.*<sup>[11]</sup> in Belgium, which showed that the mean serum TSH levels, was significantly higher in women. Kumkum<sup>[12]</sup> stated that amenorrhea occurs in hypothyroidism due to hyperprolactinemia, which results from a defect in the positive feedback of estrogen on luteinizing hormone (LH), and because of the suppression of LH and follicle-stimulating hormone. It also mentioned that the prevalence of ovulatory dysfunction was one of the causes of female infertility. These findings were similar with the report of Raber *et al.*<sup>[13]</sup> that menstrual disorder was seen in 26% of the hyperprolactinemia patients. Thyroid hormones have profound effects on reproduction and pregnancy. In this study, the majority of patients had serum TSH and serum PRL level higher than the normal reference range. This is in not in concordance with a study of Binita *et al.*<sup>[14]</sup> A higher occurrence of hyperprolactinemia (59.37%) was seen in patients. This higher propensity of hyperprolactinemia is in agreement with the findings of Kumkum *et al.* who had depicted a prevalence of 46% in their study.<sup>[15]</sup> Mild hypothyroidism may contribute to disturbing reproductive function. In a study in Vienna, abortions appeared to be associated with higher TSH but not with elevated thyroid antibodies.<sup>[16]</sup> TSH was measured to classify cases with subclinical thyroid disorders. Nath *et al.*<sup>[17]</sup> found a positive association between TSH and prolactin level among the primary infertile females in the Northeast part of India. Das *et al.*<sup>[18]</sup> in their study conducted in the eastern part of India (West Bengal) also found increased prolactin level in hypothyroid patients.

Our study found similar results with other studies done in different parts of India and world. It is found that there is a positive relation of prolactin levels with TSH. Although our study was confined to a limited number of patients, more studies are required on a very large number of patients.

## CONCLUSION

In our study, it was seen that the levels of prolactin rise in relation to rising TSH level in hypothyroid patients. All the female patients having hypothyroidism should be screened for infertility, so proper management could be started in time.

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