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Impact of socio-demographic factors on Thyroid-Stimulating Hormone and Thyroid Hormone Levels

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Introduction

Thyroid hormones are critical in sustaining proper development and the health of all bodily systems. The hypothalamic-pituitary-thyroid (HPT) axis regulates thyroid hormone production through feedback mechanisms. Low thyroid hormone levels prompt the anterior pituitary gland to produce thyroid stimulating hormone (TSH). TRH is produced in the hypothalamus in response to low thyroid hormone levels. TSH stimulates the production of thyroid hormones by thyrocytes. Tg synthesis and iodination by the thyroid peroxidase (TPO) enzyme are critical processes in the production of thyroid hormones, which need active iodide absorption through the sodium/iodide symporter (NIS). As Tg is proteolyzed, two thyroid hormones are produced: thyroxine (T4) and triiodothyronine (T3). The thyroid gland produces much more T4 than T3. Yet, the great majority of T4 is converted to T3 in the tissues for which it is designed (through the activity of type 1 and type 2 iodothyronine deiodinases). Thyroid hormones spend practically all of their time (99.7% or more) linked to plasma proteins rather than in their unbound (free) condition when released into plasma (fT4 and fT3). Thyroid hormones are most effective when they are free and unbound. Variations in TSH and thyroid hormone levels may indicate a thyroid function imbalance. Thyroid issues are rather prevalent (about 12% of Americans will be diagnosed with one at some time in their life). Understanding the mechanisms that drive TSH and thyroid hormone levels to vary is crucial. Although heredity may account for up to 65% of the variation in TSH and thyroid hormone levels across persons, there are various other factors that might affect thyroid health. Age, gender, and sexual orientation are only two of the demographic factors that have a role. This review of the literature tries to shed light on the many research that have investigated the impact of environmental variables (including lifestyle factors and pollutants) on TSH and thyroid hormone levels. Pregnant women and those with thyroid disorders are two groups who might benefit immensely from learning about any possible impacts on TSH and thyroid hormone levels.

Methodology

The study was conducted at selected Hospital in Indore. The design adopted for this study was observation design. The sample size was 500 patients under the treatment for thyroid issues. The sampling technique was used for the study was purposive sampling technique. The data collection tools like socio demographic data, Thyroid screening details were used.

Results

Smokers had lower TSH levels and greater T3 and T4 levels than nonsmokers, according to the research. Alcoholism is often blamed for decreased thyroid volume since it has been shown to destroy thyroid cells. Researchers studying the influence of body mass index (BMI) on TSH and T3 concentrations discovered a positive relationship between BMI values and TSH and T3 concentrations. Soy, brassica vegetables, diets associated with the development of endemic goitre, beverages (coffee and tea), other foods (junk food, seaweed, spices), and micronutrients may all have an effect on TSH and thyroid hormone levels in the body (vitamins, trace minerals and macrominerals). Several plant-based meals include cyanogenic glucosides and flavonoids, which have been proven to alter thyroid hormone (TSH) and TSH levels. Coffee interferes with the absorption of thyroid hormone replacement therapy in hypothyroid people (levothyroxine). After using soy supplements, TSH levels increased somewhat while thyroid hormone levels remained same. Brassica vegetables include broccoli, cabbage, cauliflower, rutabaga, choy sum, and turnips. Thiocyanate and goitrin, two compounds present in brassica crops, have been linked to goitre. Myrosinase catalyses the degradation of indole glucosinolates and progoitrin, resulting in thiocyanate and goitrin. Thyroid hormone levels are influenced by how often and what kind of processed meals are consumed. The body accumulates weight and insulin resistance increases when certain meals are consumed. As previously stated, an increase in BMI induces a change in TSH and thyroid hormone levels. Thyroid hormone levels have also been connected to white wheat products such as bread and spaghetti. One method in which exercise alters biological functioning is via the involvement of the HPT axis in homeostasis management. Consequently, it was discovered that TSH and thyroid hormone levels alter in response to physical exercise.

Conclusion

The study concluded that comprehensive assessment of the literature on the impact of environmental factors on TSH and thyroid hormone levels in healthy people. We took into account both pollutants and lifestyle factors (smoking, alcohol use, food, and exercise). Based on our analysis of the literature, we believe that there is still substantial heterogeneity in results between studies. The lifestyle factors that caused the most consistent effects across studies were smoking, obesity, and iodine (micronutrient taken from the diet). Smoking lowers TSH levels while raising T3 and T4 levels. TSH and fT3 levels demonstrated a positive relationship with BMI levels. Excess iodine also increased TSH levels while decreasing thyroid hormone levels. Future study should concentrate on the effect of environmental factors on thyroid function. Meta-analyses and research involving a large number of participants should be conducted. Further research in this area will provide researchers with critical information for understanding the complex background of gene-environment interactions that drive the development of thyroid disease.

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