e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2024; 14(2); 66-68

Original Research Article

A Study to Assess Thyroid Gland Functionality through Biochemical Indicators among the Adults in and Around Rajamahendravaram

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Received: 10-01-2023 / Revised: 08-02-2024 / Accepted: 10-02-2024
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Conflict of interest: Nil

Abstract

Introduction: Disorders of thyroid hormones are one of the most common endocrine diseases in India, diagnostic and management strategies rely on laboratory tests. With this a study was conducted to evaluate thyroid gland function in adults using biochemical parameters.

Methods: It was a prospective research conducted in department Biochemistry, government Medical College, Rajamahendravaram. Study was conducted for a period of 6 months, from May to December 2023. Study protocol was approved by Institutional ethical committee. An informed written consent was taken from the parents of the study participant's. Individuals of > 18 years, both gender those attended on outpatient basis to this institution were included in the research. Individuals with known thyroid defect (TD) were not considered. After recruiting the participant, detailed clinical history was collected, findings were recorded. Blood sample was collected by venue puncture, parameters were estimated by automated analyser as per the manufacturer instructions as per guidelines. thyroid stimulation hormone (TSH) > 5.4µIU/ml was considered as hypothyroid and <0.5µIU/ml as hyperthyroidism. Those with normal TSH were euthyroid and deviation of this were TD. Chisqaure test was used for statistical analysis and P <0.05 were considered to be statistically significant.

Results: Total 106 members were included, gender wise, male female ratio was 0.63. The prevalence of TD was 7.6% (8) and 23.6% (25), respectively among the gender; statistically there was significant difference. Statistically there was no significant difference between the age and TD.

Conclusion: There is high incidence of TD among the women and middle age is commonly effected. However small sample size, short duration of research and not considering iodine estimation are the limitations.

Keywords: Age, Thyroid, gender, Study.

Introduction

Disorders of thyroid hormones (THs) are one of the most common endocrine diseases in India. Various studies projected that approximately 42 million population are affected by thyroid disorders in India. [1] Endocrine disorders are experiencing a global surge, with thyroid diseases exhibiting heightened prevalence, particularly in the sub-Himalayan region, even after the iodination phase. In India, autoimmune thyroid disorders are identified as the predominant endocrine conditions. Notably, autoimmune hypothyroidism surpasses iodine deficiency in frequency, especially in regions where iodine levels are sufficient. Hashimoto's thyroiditis stands out as the most prevalent form of autoimmune thyroiditis. [2]

Thyroid disorders are frequently observed in clinical settings, and diagnostic and management strategies rely heavily on laboratory tests. These tests play a crucial role in determining disease severity and monitoring therapeutic responses. [3] as per the literature, the incidence and nature of thyroid disorders are influenced by a range of factors, such as age, gender, ethnicity, geographical location, nutritional status, national policies, healthcare delivery systems, and medication usage. In particular, the quantity of iodine consumed through food is intricately connected with the pattern of thyroid disorders. [4] With this a study was conducted to evaluate thyroid gland (TG) function in adults using biochemical parameters.

Methods

It was a prospective research conducted in department Biochemistry, government Medical College, Rajamahendravaram. Study was conducted for a period of 6 months, from May to December 2023. Study protocol was approved by Institutional ethical committee. An informed written consent was taken from the parents of the study participant's. Individuals of > 18 years, both gender those attended on outpatient basis to this institution were included in the research. Individuals with known TG defect, those on TG related treatment, non-cooperative individuals were not considered in this research.

After recruiting the participant in the study, detailed clinical history was collected. All the findings were recorded in the study proforma. The study was clearly explained in the local language and the use of TG was explained in local language. The participants were allowed to ask doubts. After clarifying all the doubts beyond the knowledge attempted for blood sample collection. Blood sample was collected by venue puncture by following the universal safety precautions in heparin anticoagulant tube. Blood parameters were estimated by automated analyser as per the manufacturer instructions as well as by using standard guidelines. [5] As per the guidelines, thyroid stimulation hormone (TSH) > 5.4µIU/ml was considered to be hypothyroid and <0.5µIU/ml as hyperthyroidism. [6] Those with normal TSH were considered to be euthyroid and deviation of this were categorised to be thyroid defect (TD).

Statistical Analysis: The data were analysed using SPSS version 21. It was presented in mean and percentage. Chi-square test was used for statistical analysis and P <0.05 were considered to be statistically significant.

Results

Total 106 members were included in this research. Gender wise, male female ratio was 0.63. The prevalence of TD was 7.6% (8) and 23.6% (25), respectively among the gender; statistically there was significant difference (Table 1). Age wise, most (10.4%; 11) of the TD individuals were in 38 – 47 years group followed by 28 – 67 years (7; 6.6%). Statistically there was no significant difference between the age and TD (Table 2).

Table 1: Gender wise distribution of TG function among the study participants; n (%)

Gender	Euthyroid	TD	Total
Male	33 (31.2)	8 (7.6)	41 (38.7)
Female	40 (37.7)	25 (23.6)	65 (61.3)
Total	73 (68.9)	33 (31.2)	106 (100)
Statistical analysis	Ψ^2 value = 4.2107; P value = 0.04017		
	Statistically significant		

Table 2: Age wise distribution of TG function among the study participants; n (%)

Gender	Euthyroid	TD	Total
18 – 27	10 (9.4)	3 (2.8)	13 (12.3)
28 – 37	10 (9.4)	7 (6.6)	17 (16)
38 – 47	13 (12.3)	11 (10.4)	24 (22.7)
48 – 57	12 (11.3)	5 (4.7)	17 (16)
58 – 67	13 (12.3)	3 (2.8)	16 (15)
≥68	15 (14.1)	4 (3.8)	19 (18)
Total	73 (68.9)	33 (31.2)	106 (100)
Statistical analysis	Ψ^2 value = 5.68066; P value = 0.3385		
	Statistically not significant		

Discussion

TSH is the main driver of TH production by the TG. Hence TSH was the only parameter considered in this research to analyse the function of TG. [7] Iodine, a trace element, is crucial for synthesizing THs in the diet. Consequently, a prolonged deficiency in dietary iodine intake leads to a decrease in both the production and effectiveness of THs. [8] The WHO designated India as having optimal iodine nutrition after evaluating the global iodine status. Thyroid diseases are undeniably among the most prevalent endocrine disorders globally, and India is no different. Based on projections from several studies on thyroid disease, it is estimated that approximately 42 million individuals in India are affected by thyroid diseases.

In this study there was high rate of female study members; 41 (38.7%) were male and 65 (61.3%) were female participants (Table 1). Any health defect is usually ignored by the male and they attend the health care setup usually at an advanced stage. Hence high rate of women study participants were enrolled in thus research. Clinical and subclinical TH disorders can contribute to morbidity in female, leading to issues such as infertility, menstrual irregularities, osteoporosis, hyperlipidemia,

hypercholesterolemia, hyperhomocysteinemia, and conditions related to cardiovascular and neuropsychiatric health. [9] All the female study members reported with health issues. Women are predominantly affected by TD, with 5 – 20 times higher incidence compared to men. [10]

The prevalence of TD was 7.6% (8) and 23.6% (25), respectively among the male and female, 3.2 was the female male ratio; statistically there was significant difference (Table 1). The female male ratio among the TD individuals was reported to be 4:1 and 3.1:1, respectively in the literature. [11, 12] The prevalence data documented for women in this study emphasize the escalating health requirements within this crucial segment of the Indian population and our study revealed a predominance of TD in women, aligning with reports from around the world. [13]

Age wise, most (10.4%; 11) of the TD individuals were in 38 – 47 years group followed by 28 – 67 years (7; 6.6%). Statistically there was no significant difference between the age and TD (Table 2). The mean age of the TD study members was 42.8 years. As per the literature, middle age is common group with TD. It was indicated in the literature that reduced pituitary sensitivity to TH in the aging population. [10, 14] Hence there is increased incidence of TD with age.

Conclusion

There is high incidence of TD among the women and middle age is commonly effected. However small sample size, short duration of research and not considering iodine estimation are the limitations.

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