A Clinical Study on Patients Presenting with Thyroid Swelling and Its Correlation with TFT, USG, FNAC and Anti TPO Antibodies

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Abstract
Objective*: The aim was to study the clinical presentation of patients with thyroid swelling and to correlate thyroid function test (freeT3, freeT4, TSH), USG thyroid, FNAC and Anti TPO Antibodies.*
Design: *Cross-Sectional study.*
Materials and methods: *30 patients with age above 13 years who presented to our outpatient department with complaints of thyroid swelling who are not under treatment were included in our study. Symptoms regarding hypothyroidism or hyperthyroidism were noted followed by Anti TPO antibody titer, free T3, free T4, TSH, USG thyroid and FNAC were performed.*
Results: *In our study 77% (n=23) were females and 23% (n=7) were males. Most of our study population belongs to the age group of 31-50yrs (n=16). 36.67% (n=11) had neither of hypo or hyperthyroid features and 36.67% (n=11) had features of hypothyroidism. TFT showed predominance of euthyroid state in 40% (n=12) of our study population followed by hypothyroidism in 26.67% (n=8) of study population. Anti TPO titer was raised in 53.33% (n=16) of patients. Colloid goiter was the most common finding in FNAC 30% (n=9), maliganacy was noted in 2 patients (6.66%). Similarly features of colloid goiter was noted in 56.67% (n=17) of patients with USG thyroid. There were no correlations found between TSH levels and anti TPO titer.*

Keywords: *Thyroid swelling, goiter, FNAC, USG, TFT, Anti TPO antibodies.*

I. INTRODUCTION

Thyroid diseases are, arguably, among the commonest endocrine disorders worldwide. India too, is no exception. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. Thyroid diseases are different from other diseases in terms of their ease of diagnosis, accessibility of medical treatment, and the relative visibility that even a small swelling of the thyroid offers to the treating physician. Early diagnosis and treatment remains the cornerstone of management. Iodine deficiency, biosynthesis defect, autoimmune disease, neoplastic and nodular diseases can each lead to thyroid swelling or goiter, although by different mechanism[1].

Biosynthetic defects and iodine deficiency are associated with reduced efficiency of thyroid synthesis, leading to increased TSH, which stimulates thyroid growth as a compensatory mechanism to overcome the block in hormone synthesis. Grave's disease and Hashimotos's thyroiditis are also associated with goiter. In Grave's disease, the goiter results mainly from the TSH-R mediated effects of TSI. The goitrous form of Hashimotos's thyroiditis occurs because of acquired defects in hormone synthesis. Lymphocytic infiltrations and immune mediated growth factors also contribute to thyroid enlargement in Hashimotos's thyroiditis[2]. Nodular disease is characterized by the disordered growth of thyroid cells, often combined with gradual development of fibrosis.

This study was intended to find out the most common associated symptoms of patient with thyroid swelling, their thyroid hormone status, ultrasonographic features, FNAC, and their anti TPO titer. The results were evaluated and correlated in this study.

II. MATERIALS AND METHODS

This study was carried out at Outpatient Department of General Medicine, Rajah Muthiah Medical College and Hospital, from July 2015 to April 2016. A total of 30 patients with age above 13 years who presented to our outpatient department with complaints of thyroid swelling who are not under treatment were included in our study. Symptoms regarding hypothyroidism or hyperthyroidism were noted followed by free T3, free T4[4], TSH[5], Anti TPO antibody titer[6], USG thyroid and FNAC were performed.

III. RESULTS

Of the total study population 23% (N=7) were males and remaining 77% (N=23) were females. Most of our study population belongs to the age group of 31-40 yrs (26.66%) and 41-50 yrs (26.66%) of which most of the male patients belonged to the age group of 41–50 yrs and most of the female patients belonged to the age group of 31-40 yrs. 70% of our study populations are with normal BMI and 23.33% were overweight. Symptoms suggestive of hypothyroidism were predominant in 36.67% (n=11) of cases. Followed by neither of hypo and hyperthyroidism in 36.67% (n=11) and predominantly of hyperthyroidism in 26.67% (n=8) of cases. In our study 40% (n=12) of population was in euthyroid state, 26.6% (n=18) was in hypothyroid state and 10% (n=3) was in hyperthyroid state. Anti TPO titer was found to be elevated in 53.33% (n=16) of study population and normal in 46.67% (n=14) of study population. 26.67% of our study population have Anti TPO titers of more than 1000 IU/ml. FNAC showed most of the study population had colloid goiter which accounted for 30% (n=9) followed by Hashimoto's thyroiditis contributing 26.67% (n=8). USG showed features of colloid goiter in majority of patients accounting 17 (56.67%), followed by thyoiditis accounting 6 (20%). The correlation co-efficient between TSH and anti TPO was found to be insignificant (p=0.631).

Table 1:Gender Wise Distribution

Gender	No. of patients	Percentage
Male	7	23.00
Female	23	77.00

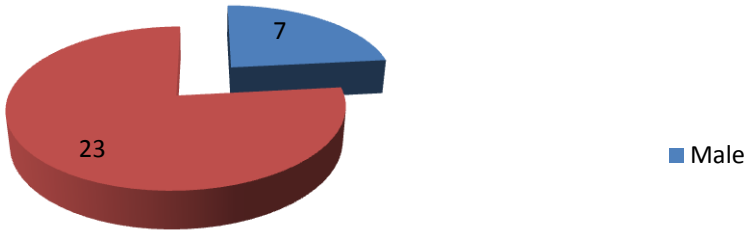

Figure 1: Sex Distribusion

Table 2: Age Wise Distribution

Age (in years)	No. of. patients (n=30)	Percentage
10-20	5	**16.66**
21-30	5	**16.66**
31-40	8	**26.66**
41-50	8	**26.66**
51-60	2	**6.66**
61-70	1	**3.33**
71-80	1	**3.33**

Table 3:Presentation with Symptoms of Hypo or Hyperthyroidism

Symptoms of	No of patients (n=30)	Percentage
Hypothyroidism	**11**	**36.67**
Hyperthyroidism	**8**	**26.67**
Asymptomatic	**11**	**36.67**

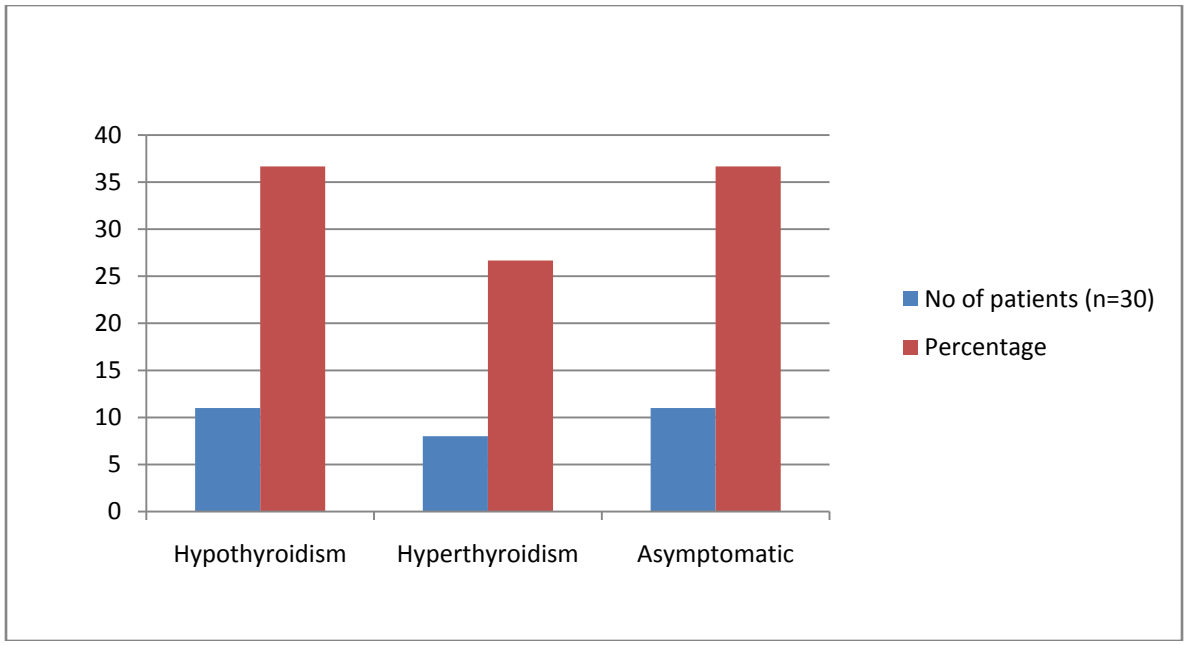

Figure 2: Symptoms

Table 4: Thyroid Hormone Status

STATUS	TOTAL		MALES		FEMALES	
	No. of. patients	Percentage	No. of. patients	Percentage	No of patients	Percentage
Euthyroid	12	40	2	6.67	10	33.33
Hypothyroid	8	26.67	1	3.33	7	23.33
Hyperthyroid	7	23.33	4	13.33	3	10
Subclinical hypothyroid	3	10	0	0	**3**	10
Subclinical hyperthyroid	0	0	0	0	0	0

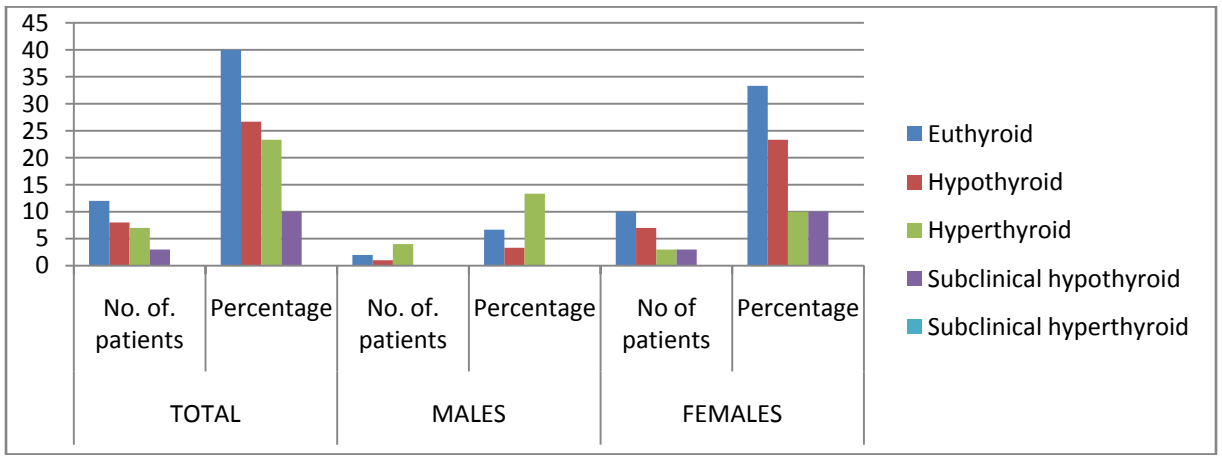

Figure 3: TFT

Table -5:Anti TPO Titer

Titre (0-5.61 IU/ml)	TOTAL		MALES		FEMALES	
	No. of. patients	Percentage	No. of. patients	Percentage	No of patients	Percentage
Normal	14	46.67	2	6.67	12	40
Elevated	16	53.33	5	16.67	11	36.67

Table 6:FNAC

FNAC	TOTAL		MALES		FEMALES	
	No. of. patients	Percentage	No. of. patients	Percentage	No of patients	Percentage
Colloid goitre	9	30	1	3.33	8	26.67
Nodular goitre	6	20	1	3.33	5	16.67
Multinodular goitre	3	10	1	3.33	2	6.67
Hashimotos thyroiditis	8	26.67	2	6.67	6	20
Graves disease	2	6.67	2	6.67	0	0
Follicular neoplasm	1	3.33	0	0	1	3.33
Papillary carcinoma	1	3.33	0	0	1	3.33

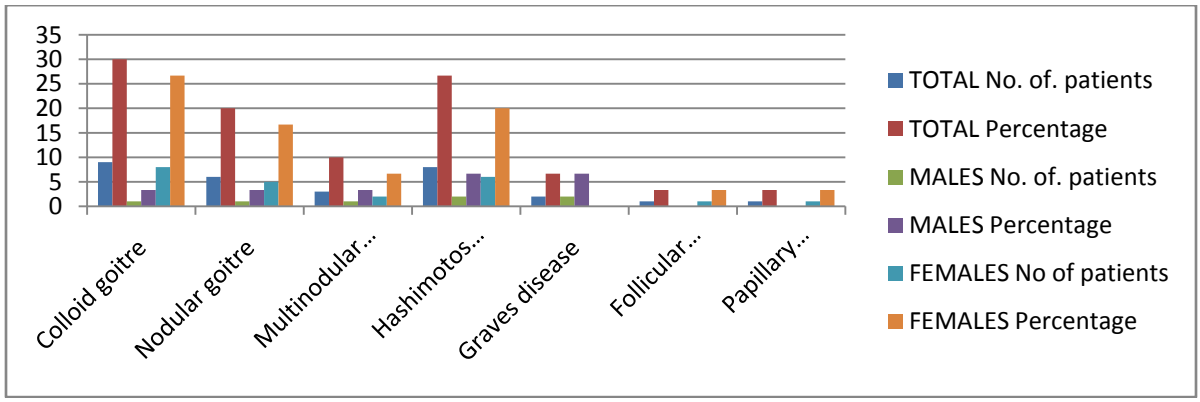

Figure 4: FNAC

Table 7:USG Neck

USG	No of patients	Percentage
Colloid goiter	17	56.67
Thyroiditis	6	20
Nodular goiter	1	3.33
Multinodular goiter	4	13.33
Malignancy	2	6.67

Table 8:

Diagnosis	No.of.patients	Percentage
Colloid goiter in euthyroid state	5	16.67
Colloid goiter in hypothyroid state	4	13.33
Colloid goiter in hyperthyroid state	3	10
Colloid goiter in subclinical hypothyroid state	1	3.33
Hashimoto's thyroiditis in euthyroid state	2	6.67
Hashimoto's thyroiditis in hypothyroid state	4	13.33
Hashimoto's thyroiditis in hyperthyroid state	1	3.33
Hashimoto's thyroiditis in subclinical hypothyroid state	1	3.33
Solitary nodule in euthyroid state	1	3.33
Multi nodular goiter in euthyroid state	2	6.67
Multi nodular goiter in hyperthyroid state	1	3.33
Grave's disease	2	6.67
Papillary carcinoma in subclinical hypothyroidism	1	3.33
Follicular neoplasm in euthyroid state	2	6.67

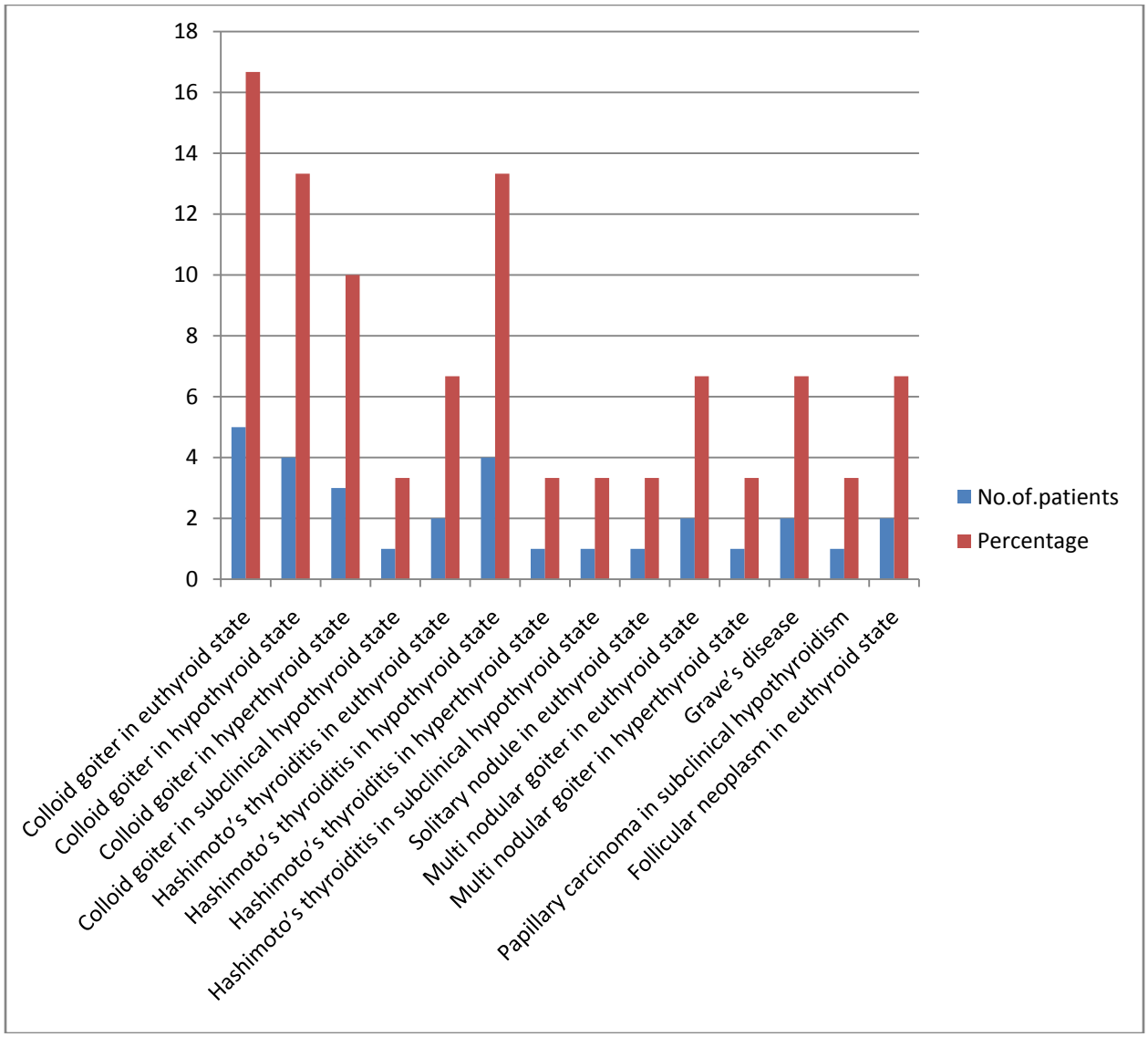

Figure 5: Diagnosis

Table 9: Results of Corelation Between The Variables

	FT3	**FT4**	**TSH**	**ANTI TPO**
FT3	1	0.951 (0.00)	-0.270 (0.150)	0.344 (0.062)
FT4	0.951 (0.00)	1	-0.376 (0.040)	0.312 (0.094)
TSH	-0.270 (0.150)	-0.376 (0.040)	1	0.091 (0.631)
ANTI TPO	0.344 (0.062)	0.312 (0.094)	0.091 (0.631)	1

IV. DISCUSSION

A. Thyroid Swelling

Thyroid swelling may occur secondarily due to different etiologies as discussed earlier. Clinical features and its laboratory findings depends on the underlying etiology and its thyroid hormone status. In our study thyroid swelling were more prevalent among females 77% as consistent with other studies like Vanderpump MPJ et al[11]; Unnikrishnan et al; Menon U V[12];

B. Clinical Features

In addition to thyroid swelling most common symptom is fatigue, followed by patients having neither symptoms of hypothyroidism nor hyperthyroidism.

C. Thyroid Function Status

In our study, 40% of the study populations were in euthyroid state, followed by hypo and hyperthyroidism respectively. Males are mostly in hyperthyroid state where as females are mostly in euthyroid. 10% of cases showed subclinical hypothyroidism and all of them were females. TSH was found to be elevated in a case of papillary carcinoma as reported in other studies as well.

D. Anti TPO Antibodies

Anti TPO antibody titer[8] was found to be elevated in 53.33% of cases. Interestingly it was proportionately higher in males as compared to females. Most patients with Hashimoto's thyroiditis showed titers >1000 IU/L [10]. Patients with Grave's disease also showed raise in anti TPO titer with lower values. 15% of Non auto immune thyroid swelling showed raise in anti TPO titer which is far higher than reported in studies by M. Knobel et al; M.F. Baua et al;

In order to know the relationship between thyroid function test and anti TPO titre Pearson correlation was applied. The correlation coefficient between FT3 and anti TPO was found to be -0.270 which indicates 27% of negative relationship risks and insignificant since the p value was 0.150. Similarly the relationship of FT4 and TSH with anti TPO was found to be insignificant since their p value between FT4 and anti TPO was 0.094 and their p value between TSH and anti TPO was 0.631. This was comparable to the study by Salman Aziz Al-Juburi et al.

E. Fine Needle Aspiration Cytology of Thyroid

FNAC showed predominantly of colloid goiter in our study population which contributed 30%. 26.67% showed Hashimoto's thyroiditis and 6.67% showed Graves disease. Malignancy was found in 6.66% study population.

F. USG Thyroid

Diffuse thyromegaly is the common radiological finding in USG. Multinodular goiter is the second common findings. Features of malignancy were seen in 6.67% of cases which was comparable to the study by Ankush Dhanadia et al;

G. Clinical Diagnosis

Colloid goiter is the first clinical diagnosis in most number of cases followed by thyroiditis. In our study the findings on clinical examination, thyroid function test, Anti TPO titer, USG thyroid and FNAC are comparable and all are correlating with each other. All patients diagnosed to have thyroiditis were having elevated Anti TPO titer. USG showing features suggestive of malignancy was confirmed by FNAC.
Further large scale study is necessary to find the relation between autoimmunity and goiter since anti TPO is found to be raised in most number of cases. Iodine deficiency was considered as a major cause for goiter, autoimmunity may play a major role in pathogenesis of thyroid swelling rather than iodine deficiency at present.

V. CONCLUSION

Most of the patients were females. 31-50 yrs are the most commonly affected age groups. Females developed the swelling a decade earlier than male. Most of the patients are within normal BMI. Hypothyroid symptoms are commonly documented among the study population, where fatigue is the commonest symptom.

Thyroid function test showed most patients are in euthyroid state followed by hypothyroid and hyperthyroid state respectively. Hyperthyroidism is more prevalent among males followed by euthyroid and hypothyroid state respectively as compared to females. Euthyroidism is common among females followed by hypothyroid and hyperthyroid state respectively as compared to males. Subclinical hypothyroidism was found in 3 (10%) cases, were all of them were females. In cases of Hashimoto's thyroiditis most of them are in hypothyroid state. Multi nodular goiter was seen commonly in females in our study. Of which most of them were in euthyroid state and hyperthyroid state. TSH was found to be elevated in a case of papillary carcinoma.

Interestingly Anti TPO titers were elevated in more than half of our study population irrespective of underlying etiology. All patients with Hashimoto's thyroiditis had higher titer of Anti TPO antibodies (>100 IU/ml). Patients with Hashimoto's thyroiditis had higher titer of Anti TPO antibodies when compared to Grave's disease. Anti TPO can be considered as a

highly sensitive test for auto immune thyroid disease and it correlated well with findings.

Colloid goiter was the most common findings in FNAC as a whole in our study population. FNAC of thyroid in males showed predominantly thyroiditis with equal incidence of Hashimoto's thyroiditis and Grave's disease, and colloid goiter was the common findings in females. In our study FNAC showed confirmed evidence of neoplasm in 2 cases (6.67%) and suspicion of neoplasm in one case (3.33%). All these were found in females.

USG showed features suggestive of malignancy in 6.67% of our cases. Diffuse thyromegaly was the commonly reported finding in USG thyroid of which colloid goiter accounting more than half of our study population followed by thyroiditis.

On correlating clinical features, TSH, FNAC and USG thyroid: colloid goiter is the common cause of thyroid swelling of which most of them were in euthyroid state. Malignancy was diagnosed in 10% of cases, papillary carcinoma contributing 3.33% and follicular carcinoma 6.67%. Since Anti TPO titer was found to be raised in more number of cases, auto immunity has to be suspected than iodine deficiency as a cause of thyroid swelling and it also necessitates further large scale evaluation. The correlation co-efficient between TSH and anti TPO was found to be insignificant.

REFERENCE

[1] Shlomo Melmed (2011)."Williams Text Book Of Endocrinology" 13th Edition. Philadelphia, Elsevier.

[2] Kenneth MF, Strieder T, Wiersinga WM (2004). The environment and autoimmune thyroid diseases. Eur J Endocrinol; 150(5):605-18.

[3] Ghaib H, Goeliner JR. Fine neelde aspiration biopsy of the thyroid: An appraisal. Ann Intern Med 1993; 118: 282-9. PMid:8420446.

[4] Nelson JC, Wilcox RB. Analytical performance of free and total thyroxine assay, Clin Chem 1996; 42: 146-154. PMid:8565218.

[5] Bravemann LE. Evaluation of thyroid status in patients with thyrotoxocosis, Clin Chem 1996; 42: 174-181. PMid:8565222.

[6] Beever K, Bradbury J, Philips D, et al. Highly sensitive assays of auto antibodies to thyroglobulin and to thyroid peroxidase. Clin Chem 1989; 35: 1949-54. PMid:2776323.

[7] Kabelitz M, Liesenkotter KP, Stach B, et al. The prevalence of anti-thyroid peroxidase antibodies and autoimmune thyroiditis in children and adolescents in an iodine replete area, European Journal of Endocrinology (2003); 148 301-307. www.eje-online.org/content/148/3/301.full.pdf

[8] Tamai H, Uno H, Hirota Y. (2005). Immunogenetics of Hashimoto's and Grave's diseases. J. Clin. Endocrinology. Metab. 60: 62-65.

[9] 9. Chandrakant S. Pandav, Kapil Yadav, et al (2013). Iodine deficiency disorders (IDD) control in India. Indian J Med Res 138, September 2013, pp 418-433. http://icmr.nic.in/ijmr/2013/september/0922.pdf

[10] Sivaranjani H, Anna C. Das, Govindaiah H. K. Correlation between anti tpo antibodies and fnac in the diagnosis of hypothyroidism: an observational study. Journal of Evolution of Medical and Dental Sciences. 2015;4(65)11362-11366. http://www.jemds.com/data_pdf/1_sivaranjini%20%20%20kumGU.pdf

[11] Vanderpump MPJ, Tunbridge WMG, French JM, et al. The incidence of thyroid disorders in the community: a twenty-year follow-up of the Whickham survey.Clin Endocrinol (Oxf) 1995; 43: 55-69.

[12] Unnikrishnan AG, Menon UV. Thyroid disorders in India: An epidemiological perspective. Indian J Endo Meta 2015: 15; 78-81.