

Clinical Profile of Thyroid Disorders – A retrospective study at BPKIHS

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Abstract

Background: The thyroid gland produces two key metabolic hormones which regulate metabolic rate, growth and development. They play vital roles in digestion, heart and muscle function, brain development and maintenance of bones. People suffering from thyroid disorders may have autoimmune disease, ranging from primary hypothyroidism, Hashimoto's thyroiditis, to hyperthyroidism caused by Graves' disease.

Objectives: To study clinical profile of thyroid disorders in endocrinology clinic of BPKIHS, Nepal.

Methods: This is a hospital based retrospective study of past five years (2012 – 2017) done in department of internal medicine at B.P. Koirala Institute of Health Sciences, in which thyroid disorder patient records from the endocrinology clinic will be compiled together will be analyzed after classifying them according to the guidelines of the American Thyroid Association (ATA). **Results:** Among 584 thyroid disorder cases that were sampled, higher prevalence of thyroid disorders was seen in females, and the Male: Female ratio was 1:4.13. Most common type of thyroid disorder was Hypothyroidism (29.6%) followed by Subclinical hypothyroidism (28.3%).

Conclusions: Thyroid disorders are more common in females than males and hypothyroidism being commonest thyroid disorder in our setup. Subclinical hypothyroidism is second commonest followed by hyperthyroidism. In Subclinical hypothyroidism Anti TPO antibody is most commonly found to be positive.

Key Words: Hypothyroidism, Hyperthyroidism, Thyroid disorder

Introduction

The thyroid gland produces two key metabolic hormones viz. thyroxine (T₄) and tri-iodothyronine (T₃).¹ These hormones regulate metabolic rate, growth and development. The thyroid disorders include hypothyroidism, subclinical hypothyroidism, hyperthyroidism, subclinical hyperthyroidism and Secondary hypothyroidism.² Their clinical manifestations vary considerably from area to area and are determined principally by availability of iodine in the diet.³

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According to WHO, about 31% (1 900.9 million) of the world's population is estimated to have insufficient iodine intakes, with the most affected WHO regions being South-East Asia and Europe.^{4,5} Within South-East Asia, Nepal is a mountainous landlocked country, which due to its geographical placement and high annual rainfall, has very low soil iodine content. This leads to an ever increasing number of iodine deficiency disorders and thyroid dysfunction in the general population.^{6,7}

Though the clinical profile of thyroid dysfunction has previously been studied in other parts of Nepal, to the best of our knowledge, this is the first study to be reported from the eastern part of Nepal. The

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objective of this study is to assess the clinical profile of thyroid disorder in the eastern region of Nepal.

Methodology

This is a Hospital based retrospective cross sectional study done in Endocrinology clinic, Department of Internal Medicine, BPKIHS. Since this is a hospital based retrospective study of the medical records of thyroid disorders patients, presenting to the endocrinology clinic of BPKIHS in the past five years (2012-2017), so all the diagnosed cases of thyroid disorders of that duration will be taken as the sample size.

The Inclusion Criteria were all diagnosed case of thyroid disorders as per ATA guidelines visiting endocrinology clinic at BPKIHS were selected irrespective of age and sex.

The thyroid disorder patient records from the endocrinology clinic will be compiled together after permission from the institutional ethical committee. The records collected will be analyzed after classifying them according to the guidelines of the American Thyroid Association (ATA).

ATA/AACE guidelines 2011 (Bahn et al, 2011)

- a. Primary Hyperthyroidism: There is constitutive activation of thyroid hormone synthesis & secretion leading to autonomous release of excess thyroid hormone. Raised FT3, FT4 and decreased TSH levels.
- b. Secondary Hyperthyroidism: Occurs if thyroid is inappropriately stimulated by tropic factors. Decreased FT3, FT4 and raised TSH levels.
- c. Subclinical Hyperthyroidism: Low or undetectable TSH with values within the normal reference range for both T3 and T4 estimates.
- d. Graves' disease: Graves' disease is an autoimmune disorder. Thyrotropin receptor antibodies stimulate the TSH receptor, increasing thyroid hormone production.
- e. Sub-acute Thyroiditis: Sub-acute thyroiditis is thought to be caused by viral infection and is characterized by fever and thyroid pain.
- f. Euthyroid: Normal FT3, FT4 & TSH levels.

g. Hypothyroidism: Decreased FT3 and FT4 level and increased TSH level.

h. Had no change: FT3, FT4 and TSH value before and after the treatment has no significant change.

i. Graves Ophthalmopathy: Graves Ophthalmopathy is an inflammatory eye disease that develops in the orbit in association with autoimmune thyroid disorders.

TFT via immunofluorescence method (CLIA) was :

FT3: 1.21 to 4.18 picogm/ml

FT4: 8.9 to 17.2 picogm/ml

TSH: 0.3 to 4.5 micro IU/ml

Results

Table 1: Age distribution of the sampled thyroid patients (n=584)

Age Group (in years)	Frequency	Percentage
15-30	175	30.0
31-45	237	40.6
46-60	148	25.3
60-75	19	3.3
>75	5	0.9
Total	584	100.0

Table 1 above shows that out of the total 584 thyroid disorder cases that were sampled, higher prevalence of thyroid disorders was seen in the age group 31-45.

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Table 2: Sex distribution of the sampled thyroid patients (n=584)

Sex	Frequency	Percentage
Female	470	80.5
Male	114	19.5
Total	584	100.0

Table 2 above shows that out of the total 584 thyroid disorder cases that were sampled, higher prevalence of thyroid disorders was seen in females, and the Male: Female ratio was 1:4.13.

Table 3: Thyroid Disorder distribution of sampled thyroid patients (n=584)

Thyroid disorder	Frequency	Percentage
Hypothyroidism	173	29.6
Hypothyroidism Subclinical	165	28.3
Euthyroidism	28	4.8
Hyperthyroidism	80	13.7
Subclinical Hyperthyroidism	19	3.3
Secondary Hypothyroidism	53	9.1
Others (Thyroiditis, Goitre)	20	3.4
Sick Euthyroid Syndrome	46	7.9
Total	584	100.0

Table 3 above shows that out of the total 584 thyroid disorder cases that were sampled, most common type of thyroid disorder was Hypothyroidism (29.6%) followed by Subclinical hypothyroidism (28.3%).

Table 4: Distribution of Anti TPO Antibody test results of sampled thyroid patients (n=584)

Anti TPO Antibody	Frequency	Percentage
Not Tested	293	50.2
Negative (<30)	99	17.0
Positive (>30)	192	32.9
Total	584	100.0

Table 4 above shows that out of the total 584 thyroid disorder cases that were sampled, 293 patients were not tested for Anti TPO Antibody. Among the 291 tested patients, 99 tested negative, i.e. <30 and 192 tested positive, i.e. >30.

Table 5: Thyroid disorder distribution in Anti TPO Antibody positive patients (n = 192)

Thyroid disorder	Frequency	Percentage
Hypothyroidism	53	27.6
Subclinical Hypothyroidism	55	28.6
Euthyroidism	6	3.1
Hyperthyroidism	15	7.8
Subclinical Hyperthyroidism	3	1.6
Secondary Hypothyroidism	28	14.6
Others (Thyroiditis, Goitre)	7	3.6
Sick Euthyroid Syndrome	25	13.0
Total	192	100.0

Table 5 above shows that out of the total 192 thyroid disorder cases that tested positive for Anti TPO Antibody test, most common type of thyroid disorder was Subclinical Hypothyroidism (28.6%) followed by Hypothyroidism (27.6%).

Table 6: Differences in the characteristics of all thyroid disorder patients who underwent testing for Anti TPO Antibody (n = 291)

	Negative	Positive	Total	Value
Age				
15 – 30	35 (35.4%)	55 (28.6%)	90	0.250
31 – 45	41 (41.4%)	79 (41.1%)	120	
46 – 60	20 (20.2%)	54 (28.1%)	74	
60 – 75	2 (2.0%)	4 (2.1%)	6	
>75	1 (1.0%)	0 (0.0%)	1	
Sex				
Female	78 (78.8%)	155 (80.7%)	233	0.695
Male	21 (21.2%)	37 (19.3%)	58	
Type of Thyroid				
Hypothyroidism	24 (24.2%)	53 (27.6%)	77	0.791
Subclinical Hypothyroidism	26 (26.3%)	55 (28.6%)	81	
Euthyroidism	12 (12.1%)	6 (3.1%)	18	
Hyperthyroidism	6 (6.1%)	15 (7.8%)	21	
Subclinical Hyperthyroidism	6 (6.1%)	3 (1.6%)	9	
Secondary Hypothyroidism	12 (12.1%)	28 (14.6%)	40	
Others (Thyroiditis, Goitre)	3 (3.0%)	7 (3.6%)	10	
Sick Euthyroid Syndrome	10 (10.1%)	25 (13.0%)	35	
Total	99	192	291	

Table 6 above shows that out of 291 Thyroid disorder patients who were tested for Anti TPO Antibody, differences were seen in the characteristics for those who tested positive and negative. Among the most common age group, i.e. 31 – 45, almost equal distribution (41.4% for negative and 41.1% for positive) can be seen. Between sex distribution, the male: female ratio for negative and positive tested were approximately 3:11 and 4:17 respectively. For people tested for the antibody, the most common type of thyroid was Subclinical Hypothyroidism, whose distribution slightly varies with 26.3% for negative and 28.6% for positive tested.

Table 7: Association between Type of Thyroid Disorders and Age group of sample size (n = 584)

Type of Thyroid	Age					Total	P value
	15–30	31–45	46–60	60–75	>75		
Hypothyroidism	51 (29.5%)	69 (39.9%)	46 (26.6%)	6 (3.5%)	1 (0.6%)	173	0.535
Subclinical Hypothyroidism	55 (33.3%)	61 (37.0%)	41 (24.8%)	6 (3.6%)	2 (1.2%)	165	
Euthyroidism	9 (32.1%)	10 (35.7%)	8 (28.6%)	0 (0.0%)	1 (3.6%)	28	
Hyperthyroidism	24 (30.0%)	27 (33.8%)	25 (31.3%)	3 (3.8%)	1 (1.3%)	80	
Subclinical Hyperthyroidism	4 (21.1%)	8 (42.1%)	6 (31.6%)	1 (5.3%)	0 (0.0%)	19	
Secondary Hypothyroidism	11 (20.8%)	30 (56.6%)	12 (22.6%)	0 (0.0%)	0 (0.0%)	53	
Others (Thyroiditis, Goitre)	6 (30.0%)	11 (55.0%)	2 (10.0%)	1 (5.0%)	0 (0.0%)	20	
Sick Euthyroid Syndrome	15 (32.6%)	21 (45.7%)	8 (17.4%)	2 (4.3%)	0 (0.0%)	46	
Total	175 (30.0%)	237 (40.6%)	148 (25.3%)	19 (3.3%)	5 (0.9%)	584	

Table 7 above shows the association between type of thyroid disorders and age group, which has turned to be not significant ($P > 0.05$).

Table 8: Association between Type of Thyroid Disorders and Sex of sample size (n = 584)

Type of Thyroid	Age		Total	P Value
	Male	Female		
Hypothyroidism	143 (82.7%)	30 (17.3%)	173	0.162
Subclinical Hypothyroidism	139 (84.2%)	26 (15.8%)	165	
Euthyroidism	22 (78.6%)	6 (21.4%)	28	
Hyperthyroidism	57 (71.3%)	23 (28.8%)	80	
Subclinical Hyperthyroidism	14 (73.7%)	5 (26.3%)	19	
Secondary Hypothyroidism	43 (81.1%)	10 (18.9%)	53	
Others (Thyroiditis, Goitre)	18 (90.0%)	2 (10.0%)	20	
Sick Euthyroid Syndrome	34 (73.9%)	12 (26.1%)	46	
Total	470 (80.5%)	114 (19.5%)	584	

Table 8 above shows the association between type of thyroid disorders and sex distribution, which has turned to be not significant ($P > 0.05$).

Discussion

The study was done in B. P. Koirala Institute of Health Sciences of Dharan in the Eastern region of Nepal. All diagnosed cases of thyroid disorders as per ATA guidelines visiting endocrinology clinic at BPKIHS were selected irrespective of age and sex. From our study, we found that maximum (80%) of the patients suffering from thyroid disorders are females. Our result was similar to all other surveys done in different parts of the country as well as outside the country.^{8,9,10,11,12}

From our study, we found that the most common age group for thyroid disorders is 31 – 45 (40.6%), which was similar to the data obtained in Lumbini

Medical College Teaching Hospital (LMCTH), where the mean age for males was 39.28 years (SD = 19.01) and that of female was 39.60 years (SD = 14.63).¹¹ The results from other studies varied slightly. In Charak Hospital, Pokhara higher prevalence was observed in the subjects whose ages were above 41-50 years.⁸ In Shree Puspanjali Hospital Pvt. Ltd, Bharatpur-10, mean age was 45.9±1.3 years.⁹ In Malankara Orthodox Syrian Church Medical College, in Kerala State, the highest proportion of cases was reported in 40-60 years.¹⁰ In Benazer Bhutto Hospital, Islamabad, the study showed that young adult in the range of 16-40 years are more likely to suffer from thyroid illness.¹²

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From our study, we found that the most common type of thyroid disorder is Hypothyroidism (29.6%) followed by Subclinical hypothyroidism (28.3%), which was similar but less than that found in Shree Puspanjali Hospital Pvt. Ltd, Bharatpur-10, which was 87%⁹ and in Benazer Bhutto Hospital, Islamabad, which was 63%.¹² Whereas in Charak Hospital, Pokhara, Subclinical hypothyroidism (10.50%) had higher prevalence,⁸ in Lumbini Medical College Teaching Hospital (LMCTH), Euthyroid cases were 76.7%¹¹ and in Malankara Orthodox Syrian Church Medical College, in Kerala State, most commonly observed type of thyroid disorder was Non-toxic multinodular goiter (48.5%).¹⁰

Conclusion

Thyroid disorders are more common in females than males and hypothyroidism being commonest thyroid disorder in our setup. Subclinical hypothyroidism is second commonest followed by hyperthyroidism. In Subclinical hypothyroidism Anti TPO antibody is most commonly found to be positive.

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