



Prevalence of Hypothyroidism among the patients attended in the clinics of Tripura Medical College & Dr. B. R. A. M. Teaching Hospital, Agartala, Tripura

KEYWORDS

Hypothyroidism, Thyroxin, Thyroid Stimulating Hormone.

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ABSTRACT Hypothyroidism is a global health problem. Thyroid hormones control many metabolic pathways. Symptoms of hypothyroidism varies from man to man. Therefore, it is essential to know about the thyroid status. To assess that, estimation of serum Thyroid Stimulating Hormone (TSH) is the accepted parameter. Its value more than 4.5 μ IU/L is taken as the cutoff value. The present retrospective study was conducted on 2824 patients attended in the different out patient department of Tripura Medical College, Agartala, Tripura, to assess the prevalence of hypothyroidism in and around Agartala city. After the analysis of the data it is found that (16.60 %) of the patients were suffering from hypothyroidism. Females (18.15 %) are more prone to hypothyroidism as compared to males (12.45%). It is also noted that hypothyroidism among the persons above 50 years of age (20.55 %) are more than the persons below the age of 25 years (11.90 %). This is the only study in Tripura state. More studies are necessary to establish the prevalence. Due to the paucity of epidemiological study a national prevalence could not be established. But this study will reflect a picture in the North -East India.

Introduction-

The function of thyroid hormone is to "run the body's metabolism". Thyroid gland secretes Thyroxine (T4) hormone which is converted to triiodothyronine(T3) in other organs by the selenium dependant enzyme Iodothyronine deiodinase. T3 binds to the specific receptor in the nucleus of cells. There it stimulates the particular genes for the production of specific proteins. The hormone also binds to integrin α v β 3 on the cell membrane and stimulate Na/H antiporter. In the blood 99.97% of the thyroid hormones is bound to Thyroxine- binding globulin. Only the free unbound hormone is biologically active¹. The formation of thyroid hormone is controlled by a Pituitary hormone, Thyroid Stimulating hormone (TSH).

People with low thyroid hormone will have symptoms associated with a slow metabolic activity. Hypothyroidism is more common than we believe. Millions of people suffer from this disorder. Among them a good number of people suffer from subclinical hypothyroidism and do not know about their thyroid status. The common symptoms of hypothyroidism are weight gain, fatigue, dry and rough skin, hair loss, cold intolerance, constipation, depression, loss of memory, abnormal menstruation cycle etc². The symptoms vary for each individual and also length of sufferings.

The causes of hypothyroidism may grouped into- Primary, Central and Congenital³. Primary hypothyroidism is due to low synthesis of hormone by the gland like iodine deficiency, autoimmune thyroiditis, surgical removal of glandular part, radio-iodine therapy or other medication etc. The central hypothyroidism is due to any lesion of Pituitary gland which controls the thyroid gland like any compression on the Pituitary gland, surgery or radiation on the gland etc. The Congenital hypothyroidism is due to congenital thyroid dysfunction(75%), thyroid dishormonogenesis (20%) etc.

Estimation of TSH level in the blood is considered as the best initial test for the diagnosis of Hypothyroidism^{4,5}. An elevated TSH level indicates that the thyroid gland is not producing enough quantity of thyroid hormone. Free T4 is preferred than free T3. Serum TSH level between 0.5 – 4.5 μ IU/L is considered as normal^{4,5}. TSH level between 5 - 10mIU/L is considered as subclinical hypothyroidism⁴. There may be many undiagnosed subclinical cases of hypothyroidism because of the less or no symptoms. Incidence of hypothyroidism is much less in western countries (< 4%) due to health awareness and effective measures.^{6,7,8} In India there are very few studies on this and the available studies indicate the prevalence of hypothyroidism to be more than 10%.^{9,10,11}

Materials and Methods-

The study aims to evaluate the prevalence of hypothyroidism among the patients attended in different clinics of Tripura medical College, Tripura irrespective of specialties. The diagnosed hypothyroidism patients were also included in the study. The patients of impaired renal function, under radiotherapy and chemotherapy were excluded from this study. The morning samples were collected for the analysis of T3, T4 and TSH. The thyroid hormone assay were being performed in the department of Biochemistry of Tripura Medical College by ELISA technique. Kits for those tests were procured from Diagnostic Automation Co., USA. KFT and lipid profile were done by Semi auto-analyzer by end point method. The study period was from January 2014 to December 2015. This is a retrospective data analysis. The due permission from Institutional Ethics committee was obtained.

Result

This is a retrospective study of the patients attending different OPD of Tripura Medical College and Dr.B.R.A.M. Teaching Hospital, Tripura. The assay was done in the de-

partment of Biochemistry by ELISA method during the year 2015. The kit was procured from Diagnostic Automation Co. , USA. All the parameters of Thyroid profile (T3, T4 & TSH) were done. To assess the prevalence of hypothyroidism only serum level of TSH was considered. Minimum 4.5 μ IU/ L serum label of TSH was taken as the cut-off value for the diagnosis of hypothyroidism.

Total 2824 number of patients of different age groups were taken. Out of them 2061 were female and 763 were male. Again the patients were grouped into three groups according to age. The patients less than 25 years of age were 563 (M-159, F-404), 25 to 50 years were 1541 (M-363, F-1178) and above 50 years were 720 (M-241, F-479). After the analysis of data, we found that out of 2824 patients 469 (16.60%) were hypothyroid and among them 95 (12.45%) were male and 374(18.15%) were female. Table-1. Thus there was clear cut evidence of higher incidence of hypothyroidism in female (18.15%) against male (12.45%). If we consider the different age groups, the patients above the age of 50yrs. (20.55%) had higher incidence of hypothyroidism and the patients below the age of 25yrs. (11.90 %) had lowest incidence of hypothyroidism. Table-2. This also shows that incidence of hypothyroidism was increasing with the age of the patients. Table-3 shows that 18.15% of the female patients suffer from hypothyroidism and incidence was high among the patients above 50 yrs.(22.75%) and lowest among the patients below 25 yrs. (13.37%) of age.

Discussion -

The objective of this study was to assess the prevalence of hypothyroidism among the patients attended the OPD of different clinics of Tripura Medical and Dr.B.R.A.M. Teaching Hospital, Tripura. There are very few studies in India to assess an overall prevalence^{8,9,10}. In Tripura state this is the only study which may reflect the prevalence of hypothyroid. In one study conducted by Ambika Gopalakrishnan

Unnikrishnan et al. in eight cities of India and found that the prevalence of hypothyroidism was 10.95%. The present study reveals the information about the incidence in and around Agartala city. After the analysis of the data it is found that out of 2824 patients 469 are hypothyroid (16.60%) and among them 95 (12.45%) were male and 374 (18.15%) were female . Therefore, females are more prone to hypothyroidism than the males^{8,9}. Again the patients were grouped into three groups according to age. The patients less than 25 years of age were 563 (M-159, F-404), 25 to 50 years were 1541 (M-363, F-1178) and above 50 years were 720 (M-241, F-479). There was a clear cut evidence of higher incidence of hypothyroidism in females (18.15%) against the males (12.45%). The incidence of hypothyroidism was increasing with the age of the patients⁹. The patients above the age of 50yrs. (20.55%) had higher incidence of hypothyroidism than the patients below the age of 25yrs. (11.90 %). The same prevalence was observed in both the genders.

Conclusion

In this retrospective study in Tripura it was found that 16.60% of 2824 patients were suffering from hypothyroidism. Out of them 12.45% were male and 18.15% were female. Thus the females are more prone to hypothyroidism than the males. The incidence of hypothyroidism was increasing with the age of the patients. The patients above the age of 50yrs. (20.55%) had higher incidence of hypothyroidism than the patients below the age of 25yrs. (11.90 %). The same prevalence was observed in both the genders. The study was conducted only to know the prevalence of hypothyroidism not the cause. That is why only the serum level of TSH was considered to assess the thyroid status. The patients included were either self motivated or by the advice of the doctors. Mass epidemiological study may reduce the actual prevalence. For that more studies are required.

Table-1 . Gender wise prevalence

Total No. of Patients (n= 2824)	Euthyroid (TSH-0.5—4.5 μ IU/ L)	Hypothyroid	(%) of hypothyroid
Male - 763	668	95	12.45%
Female - 2061	1687	374	18.15%
Total = 2824	2355	469	16.60 %

Table-2 . Age wise prevalence in both the gender

Total No. of Patients (Age & Sex)	Euthyroid (TSH-0.5—4.5 μ IU/ L)	Hypothyroid		
		Male- (%)	Female- (%)	Total- (%)
< 25 yrs. - 563 (F-404, M -159)	496	13-8.18%	54-13.37%	67-11.90%
25—50 yrs. -1541 (F-1178, M-363)	1287	43-11.84%	211-17.91%	254-16.48%
>50 yrs. -720 (F-479, M-241)	572	39-16.18%	109-22.75%	148-20.55%
Total = 2824 (F-2061, M-763)	2355	95-12.45%	374-18.15%	469-16.60%

Table-3 Age wise prevalence among females.

Total No. of Patients (n= 2061)	Euthyroid (TSH-0.5—4.5 μ IU/ L)	Hypothyroid (%)
< 25 yrs. - 404	350	54—13.37%
25—50 yrs. - 1178	967	211- 17.91%
>50 yrs. - 479	370	109- 22.75%
Total = 2061	1687	374 -18.15%

Reference-

1. Longo, DL; Fauci, AS; Kasper, DL; Hauser, SL; Jameson, JL; Loscalzo, J (2011). "341: disorders of the thyroid gland". Harrison's principles of internal medicine. (18th ed.). New York: McGraw-Hill.
2. Stagnaro-Green A, Abalovich M, Alexander E, Azizi F, Mestman J, Negro R, et al. Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease During Pregnancy and Postpartum. *Thyroid*. 2011;21:1081-125.
3. Baloch Z, Carayon P, Conte-Devolx B, Demers LM, Feldt-Rasmussen U, Henry JF, et al. Laboratory medicine practice guidelines. Laboratory support for the diagnosis and monitoring of thyroid disease. *Thyroid*. 2003;13:3-126.
4. Surks MI, Ortiz E, Daniels GH, Sawin CT, Col NF, Cobin RH, et al. Subclinical thyroid disease: Scientific review and guidelines for diagnosis and management. *JAMA*. 2004;291:228-38.]
5. Reh A, Grifo J, Danoff A. What is a normal thyroid-stimulating hormone (TSH) level? Effects of stricter TSH thresholds on pregnancy outcomes after *in vitro* fertilization. *Fertil Steril*. 2010;94:2920-2.]
6. Garber, JR; Cobin, RH; Gharib, H; Hennessey, JV; Klein, I; Mechanick, JI; Pessah-Pollack, R; Singer, PA; et al. Thyroid 22 (12): 1200-1235.. Clinical Practice Guideline for Hypothyroidism in Adult. (December 2012). *Thyroid* 22 (12): 1200-1235.
7. LeFevre, ML "Screening for Thyroid Dysfunction: U.S. Preventive Services Task 8.
8. Force Recommendation Statement.". *Annals of internal medicine*. (24 March 2015. Dinesh K Dhanwal, Sudha Prasad, AK Agarwal, Vivek Dixit, AK Banerjee. . High prevalence of subclinical hypothyroidism during first trimester of pregnancy in North India. *Indian Journal of Endocrinology and Metabolism*, Year 2013, Volume 17, Issue 2 [p. 281-284]
9. Ambika Gopalakrishnan Unnikrishnan, Sanjoy Kalra, Rakesh Kumar Sahay, Ganapathi Bantwal, Methew John, Neeraj Tewari. Prevalence of hypothyroidism in adults: An epidemiological study in eight cities of India. *Indian J Endocrinol Metab*. 2013 July-Aug :17(4):647-652.
10. Nambiar V, Jagtap VS, Sarathi V, Lila AR, Kamalanathan S, Bandgar TR, et al. Prevalence and impact of thyroid disorders on maternal outcome in Asian-Indian pregnant women. *J Thyroid Res*. 2011;2011:429097
11. Sahu MT, Das V, Mittal S, Agarwal A, Sahu M. Overt and subclinical thyroid dysfunction among Indian pregnant women and its effect on maternal and fetal outcome. *Arch Gynecol Obstet*. 2010;281:215-20