

A Study of Clinical Profile of Thyroid Disorders in Children in A Tertiary Care Hospital, Kurnool

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ABSTRACT

Background: Thyroid hormone abnormalities are the commonest endocrine disorder in India and also the commonest preventable cause of mental retardation, so we want to determine the prevalence of thyroid dysfunction in children at kurnool district.

Materials and Methods: A hospital based prospective observational study performed in new born and children below 18 years fulfilling the inclusion criteria visiting the pediatric OPD and IPD in Viswabharathi medical college, Kurnool if they had clinical suspicion of thyroid dysfunction. If suspicion of hypothyroidism, Free T₄, Total T₄, TSH levels and if suspicion of hyperthyroidism Free T₃ and TSH were done.

Results: Out of 70 case 3 cases (4.3%) are hyperthyroidism and 67 cases (95.7%) are hypothyroidism in these 3 (4.3%) cases had family history of thyroid disorders, male to female ratio was 1.3:6 and prevalence rate was high in the age group of 10 - 12 years 32.9% (23 cases). 13 (18.6%) cases had thyroid enlargement and 48 (68.57%) cases had anaemia. Treatment was started according to standard guidelines.

Conclusion: The higher prevalence rate of thyroid disorders in childhood that to in female children and age group of 10 - 12 years in and around kurnool. Hence, screening of all new-borns and children should be mandatory as early diagnosis and treatment helps in prevention of complications of thyroid disorders.

KEY WORDS: Free T₃, Free T₄, Goiter, Hyperthyroidism, Hypothyroidism, and Thyroid stimulating hormone.

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INTRODUCTION

The thyroid function disorders are very common in the world [1] and also in INDIA [2], however, there is limited data regarding them in infants and children. Thyroid function disorders in infancy and childhood lead to unique effect on growth and maturation of many target tissues, including the brain and skeleton. Congenital hypothyroidism commonly has hyperbilirubinemia, and delayed skeletal maturation, reflecting immaturity of liver and bone, respectively, and they are at risk of permanent mental retardation if

thyroid hormone therapy is delayed or inadequate; their size at birth, however, is normal. In contrast, hypothyroidism that develops after the age of three years (when most thyroid hormone-dependent brain development is complete) is characterized predominantly by a deceleration in linear growth and skeletal maturation but there is no permanent effect on cognitive development [3].

Autoimmune thyroid diseases are now major leading cause of thyroid disorders in childhood and now considered the most common cause

of acquired hypothyroidism. They include Hashimoto thyroiditis and lymphocytic thyroiditis. Their clinical manifestations range from euthyroid goiter to hypo or hyperthyroid state [4, 5]. Hyperthyroidism is rare in children and if present it causes rapid linear growth and skeletal maturation due to increase metabolic activity [4,6].

Congenital hypothyroidism is the most common preventable cause with worldwide incidence of 1:3000-4000, in India this ratio is 1:2500 - 2800 [7, 8]. The Prevalence of thyroid disorders in children (1-13 years) 7.82% was found in Kerala, South India [1], subclinical hypothyroidism (SCH) in an Indian study was found in <2% of study population [9].

The evolution rate of SCH to overt hypothyroidism (OH) on follow-up ranges from 0-28.8 % in another study [10]. Most cases of childhood hypothyroidism are sporadic and 10-15% disorders are caused by inherited defects [11-13]. There is limited data regarding prevalence of thyroid disorders in Infants and children from India. In one of the study prevalence rates of SCH and OH was 6.1% and 0.4 % respectively among study population of ~39,000 children [14].

There is limited data regarding the prevalence rates of thyroid disorders in infants and children from Andhra Pradesh. Hence, the present study attempts to evaluate the prevalence of thyroid disorders in Kurnool district, Andhra Pradesh, South Indian children and infant's population those who are attending the tertiary care hospital.

MATERIALS AND METHODS

A hospital based 2years prospective observational study performed in new born and children below 18 years fulfilling the inclusion criteria visiting the pediatric OPD and IPD in Viswabharathi medical college, Kurnool, Kurnool district, Andhra Pradesh, South Indian if they had clinical suspicion of thyroid dysfunction. Patients having clinical features suggestive of thyroid disorders like constipation, short stature, lethargy, goiter, mental retardation, obesity, prolonged neonatal jaundice, palpitations etc were enrolled in the study. Thyroid profile consisting of TSH, free

T4 and Total T4 is done if there is suspicion of hypothyroidism and in suspicion of hyperthyroidism thyroid profile consisting of TSH and free T3 is done. As per the standard cut off of free T3, totalT4 , freeT4 and TSH according to different age groups [15] are evaluated further in the study and taken as a positive case and detailed demographic data including family history of thyroid disorders, use of iodised salt, vital parameters, anthropometry, systemic examination, examination of the thyroid gland was performed and Complete blood count was done in all cases and as per the WHO guidelines [16] anaemia was defined and graded as mild, moderate and severe depending upon the age and sex wise cut offs. All the diagnosed patients are treated as per guidelines [17]. Data was entered into Microsoft Excel (Windows 7; Version 2007) and Descriptive statistics analysis were done using the Statistical Package for Social Sciences (SPSS) for windows software (version 22.0; SPSS inc, Chicago).

RESULTS

Out of 503 patients screened, 433 (86.1%) patients had normal TSH levels and 70 (13.92%) had abnormal TSH levels. Patients with abnormal TSH are evaluated further in the study.

Table 1: Distribution of patients according to their age Group.

Age in Years	Number of cases	Percentage of case
	(Total cases (N)=70)	(out of 70 cases)
≤1	4	5.7
01-03	1	1.4
04-06	6	8.6
07-09	11	15.7
10-12	23	32.9
13-15	16	22.9
16-18	9	12.9
Mean ± SD	10.67 ± 4.23	
Range	0.2 – 18.0	

Table 1 showing out of 70 cases, maximum number of cases belonged to age group of 10 out of 70 cases, maximum number of cases belonged to age group of 10 - 12 years (32.9%), followed by 16 cases belonged to 13 – 15 years (22.9%), 11 cases were between to 7 - 9 years (15.7%), 9 cases between 16 – 18 years (12.9%), 6 cases between 4-6 years (8.6%), 4 cases were between < 1year (5.7%), and 1 case between 1-3 years (1.4%).

Table 2: Case distribution according to the gender, Hypo/Hyperthyroidism, Family History, Thyroid Gland and HB (in g%).

Distribution		Number of cases	Percentage of case
		(Total cases (N)=70)	(out of 70cases)
Gender	Female	55	78.6
	Male	15	21.4
Hypo/Hyperthyroidism	Hypothyroidism	67	95.7
	Hyperthyroidism	3	4.3
Family History	Positive	3	4.3
	Negative	67	95.7
Thyroid Gland	Enlargement	13	18.6
	No Enlargement	57	81.4
HB (in g%)	Normal	22	31.4
	Mild	16	22.9
	Moderate	25	35.7
	Severe	7	10

Table 2 showing that Out of 70 cases 15 were male (21.4%), and 55 were female with (78.6%) with over all Male: Female ratio of 1:3.6. Out of 70 cases, 67 cases (95.7%) are hypothyroidism and 3 cases (4.3%) are hyperthyroidism. 3 out of 70 cases had family history of thyroid disorders (4.3%) and 67 cases had no family history of thyroid diseases (95.7%). All the 3 were hypothyroid cases. Out of 70 cases 13 cases had thyroid enlargement on examination (18.6%), 57 cases had no thyroid enlargement (81.4%). Out of 70 cases, 48 cases had anaemia, 16 cases with mild anaemia (22.9%), 25 cases with moderate anaemia (35.7%), 7 cases with severe 7 cases with severe anaemia (10%), 22 cases were having normal haemoglobin levels (31.4%).

DISCUSSION

In the present study out of 503 patients tested having suspicion of thyroid dysfunction, 70 children had abnormal thyroid dysfunction, 67 were hypothyroid and 3 were hyper thyroid. Estimated Prevalence in our study is 13.9% which is similar to in Western India study showed 65 were found to have thyroid dysfunction, 61 with hypothyroidism (93.8%) and 4 had hyperthyroidism (6.1%) [18]. Male: Female Ratio Thyroid disorders are well known to be more in female than male of all age groups. In our study, out of 70 cases, 15 are Male (21.4%) and 55 are Female (79.6%). Overall Male: Female ratio was 1:3.6 which is

similar to Previously reported studies in Indian children have demonstrated a male: female ratio ranging from 1:2.9 to 1:3.4 (19-21), in Kerala, Prevalence of female: male ratios in subclinical hypothyroidism, overt Hypothyroidism and hyperthyroidism 2.5:1, 2.43:1 and 7:1 respectively [1], and in delhi it was 2.86 (females-5541 vs. males - 1933) [22], in Western India 1:1.2 [18] and in eastern India study showed 66% of female participants were having thyroid disorders [23].

In the present study, the most common age group presenting with thyroid dysfunction is between 10 -12 (32.9%) years of age. In eastern Indian study the mean age at detection was 8.95 ± 3.96 years in the SCH group and 8.38 ± 3.29 years in the OH group [23], and in kerala, it was 7.82% in 1-13 of years children [1] and in western India noted that out of 65 cases having thyroid dysfunction, most of the patient belonged to age of 0-1 years and 9-12 years of age [18]. In a study done by Desai MP et al (19) on Autoimmune thyroid disease in childhood noted that maximum cases where in age group 9-12 years (44%) and (61%) in 6-12 years of age.

out of 70 cases, 3 cases (4.4%) had family history of thyroid disorders which is similar to western India study in children noted that 4 cases (6.5%) had family history of thyroid disorders [18]. In the present study 14 (20%) children with thyroid dysfunction had thyroid gland enlargement which was confirmed by ultrasound thyroid showing goiter. In India

reported prevalence of goiter in 38% children with thyroid hormone abnormalities [19]. Similarly, in a study done by Shah NA et al (24) on Evaluation of thyroid diseases by hormonal analysis in Paediatric age group noted that out of 16 cases, 3 cases had prevalence of goiter (5%).

Anaemia is known to be associated with hypothyroidism. The common type of anaemia found in hypothyroidism is anaemia of chronic disease [25]. In our study out of 70 cases, prevalence of anaemia was found to be (69.6%). In western India which was 31.1% [18]. While the available literature suggests the prevalence to be higher which was 20-60% [26].

In present study out of 70 cases with thyroid dysfunction, 67 cases (97.7%) were hypothyroidism and 3 cases (4.3%) were hyperthyroidism. In Indian study out of 800 cases 79% were having hypothyroidism and 2% were having hyperthyroidism [19]. In western India study it was Out of the 498 children tested, 65 were found to have thyroid dysfunction, 61 with hypothyroidism (93.8%) and 4 had hyperthyroidism (6.1%) [18], in eastern India out of the 100 participants, 74% had overt hypothyroidism, while 26% had subclinical hypothyroidism [23]. In a study done by Shah NA et al [24] on Evaluation of thyroid diseases by hormonal analysis in paediatric age group noted that out of 16 cases 6 cases were having hypothyroidism (37.5%) and 1 case had hyperthyroidism (6.25%). All the cases of hypothyroidism were treated with tablet levothyroxine and hyperthyroidism cases with Carbimazole according to standard guidelines. Iron, calcium and vitamin D₃ supplementation was given to the patients.

We have strived to provide baseline orientation regarding the prevalence of thyroid disorders in the representative kurnool population. To the best of our knowledge, this is the first study that has attempted to evaluate the epidemiology of this disease in the kurnool, Andhra Pradesh, Indian population. Similar studies have been carried out in different places of India by different researchers. However, true picture can be ascertained only after population-based studies which can

predict the true incidence and prevalence rates.

CONCLUSION

Thyroid hormones estimation is very useful in diagnosis of various thyroid disorders in children with clinical suspicion of thyroid dysfunction. Thyroid hormones are unique in view of their role in fetal development and early neonatal brain development and also having actions on growth and developmental during the first two decades of life. Hence screening of all new-borns and children should be mandatory as early diagnosis and treatment helps in prevention of complications of thyroid disorders.

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