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Research Article

Incidence and etiology of thyroid disorders in children

Sailendra Kumar Yelluri*

Department of Pediatrics, Mallareddy Institute of Medical sciences, Suraram, Hyderabad India

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***Correspondence:**
Dr. Sailendra Kumar Yeluri,
E-mail: yeluri_sailu@yahoo.com

ABSTRACT

Background: The prevalence of thyroid disorders is known to be influenced by environmental factors especially iodine deficiency. The most common cause of hypothyroidism in children is autoimmune thyroiditis, which leads to Hashimoto thyroiditis and lymphocyte thyroiditis. Hyperthyroidism is comparatively rare now due to increase in iodine content, but if present it causes rapid linear growth and skeletal growth due to increase in metabolic activity. This study was hence conducted to identify the types of thyroid diseases in our area as well as try to identify the etiology.
Methods: 63 children who were suspected of thyroid disorders. Thorough demographic details, physical and clinical examination was done for all the patients. Blood samples were taken from all the patients for T3, T4 and TSH estimation.
Results: A female predominance of 2:1 was observed over males. Euthyroid was observed in 58.3% of the cases, followed by 30.6% of hypothyroid and 11.1% hyperthyroid. The most common cause was found to be acquired hypothyroidism (47.2%), followed by congenital hypothyroidism (22.2%) and goiter (22.2%). Autoimmunie thyroid disorders accounted for 8.3% of the cases.
Conclusions: Autoimmune disorders, congenital hypothyroidism and acquired hypothyroidism being the common causes of thyroid disorders with females more prone to than males. Since in the long run, hypothyroidism can lead to cardiovascular diseases, it is advisable to identify this disorder as soon as possible so that effective treatment can be started immediately.

Keywords: Hypothyroidism, Hyperthyroidism, Paediatric age, Congenital hypothyroidism, Acquired hypothyroidism

INTRODUCTION

The prevalence of thyroid disorders is known to be influenced by environmental factors especially iodine deficiency.[1-3] In the children, thyroid hormones are principally concerned with the growth and metabolism of the child along with the mental development. Deficiency of these hormones leads to irreparable damage to the growth and development, both physical as well as mental, of the child.[4,5] One of the main causes is congenital hypothyroidism, which is preventable. It is estimated to occur in 1 in 3000-4000 children in the world. In India, this ratio is 1:2500.[4,5]

Hypothyroidism ranges from an overt state of myxedema, end organ effects and multisystem failure to asymptomatic or subclinical condition with normal levels of thyroxine and triiodothyronine but mildly elevated levels of thyrotropin.[6-9]

The prevalence of hypothyroid in the developed world is estimated to be about 4-5% while subclinical hypothyroidism is estimated to be about 4-15%.[10-12] In India, for a long time it was Iodine deficiency disorders which was more prevalent as the consumption of iodine was very less.[13-15] Since 1983, when India adopted the universal salt iodization programme, there has been a decline in the salt deficiency and an increase in salt

sufficiency was observed.[16-18] Goitre and urinary iodine concentrations were the signs of iodine deficiency, which have been on decline since 1983. Today, majority of the households have optimum iodine nutrition with consumption of iodized salt.

Subclinical hypothyroidism by some clinicians is considered as a benign normal variation and the thyroid hormone can be supplemented to lower the TSH and the actual cause of increased TSH level is unknown. But recent studies show higher mortality rates among young adukts due to coronary heart disease due to hypothyroidism and high TSH levels, thereby proving that subclinical hypothyroidism isn't harmless but may result in grave outcomes.[19,20]

The most common cause in children is autoimmune thyroiditis, which is diagnosed by an increased concentration of anti-thyroid peroxidase in the serum.[21,22] This is the most common cause for acquired hypothyroidism, including Hashimoto thyroiditis and lymphocyte thyroiditis. Their clinical manifestations include euthyroid goiter to hypo and hyperthyroiditis.[23,24]

Hyperthyroidism is comparatively rare now due to increase in iodine content, but if present it causes rapid linear growth and skeletal growth due to increase in metabolic activity.[22,24]

This study was hence conducted to identify the types of thyroid diseases in our area as well as try to identify the etiology.

METHODS

This study was performed by the department of Pediatrics at Mallareddy Institute of Medical Sciences. 63 children who were suspected of thyroid disorders were included in the study during the period of last two years.

The patients included into the study had either of the following symptoms:

1. New-borns with clinical symptoms pertaining to thyroid diseases.
2. Children having enlargement of the thyroid gland but no visible clinical symptoms.
3. Children with clinical features such as obesity, physical and mental retardation, constipation.
4. Children who were on treatment for hypothyroidism.

All those neonates who were falsely positive for hypothyroid screening were excluded from the study. Children with thyroid related diseases and other chronic diseases were also excluded from the study.

Thorough demographic details, physical and clinical examination was done for all the patients. Blood samples were taken from all the patients for T3, T4 and TSH estimation, by chemilumeniscence method.

RESULTS

Out of the 63 patients, 21 (33.3%) were males and 42 (66.7%) were females (Figure 1).

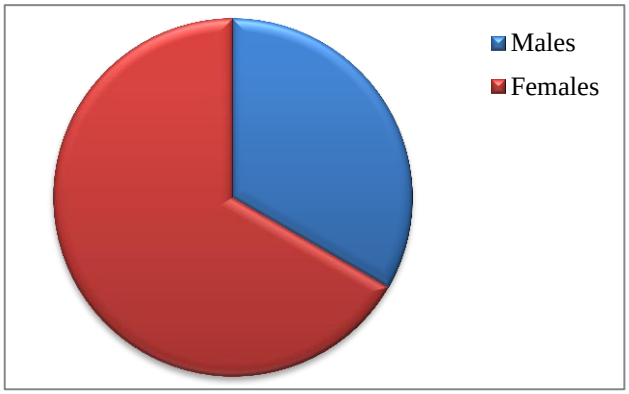

Figure 1: Gender wise distribution of patients suspected with thyroid disorders.

The most common age group was found to be 1-3 years with 33.3% of the cases followed by 9-12 years with 20.6% of the cases (Table 1).

Table 1: Age wise distribution of the patients.

Age of patient	Number	Percentage
Newborn - < 1mnth	2	3.2%
1-12 months	4	6.3%
1-3 years	21	33.3%
3-6 years	10	15.9%
6-9 years	12	19.0%
9-12years	13	20.6%
12-15 years	1	1.6%

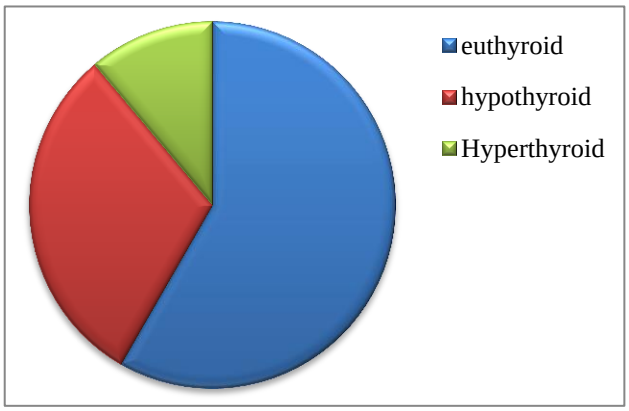

Figure 2: Distribution of thyroid diseases among patients.

Out of these 63 patients, 36 were found to be having abnormal thyroid values. Of them, 9 were males and 27 were females. Euthyroid was observed in most of the cases, followed by hypothyroid and hyperthyroid (Figure 2).

Of the most common cause for thyroid disorders was acquired hypothyroidism seen in 17 patients of which 11 of them had euthyroid while 6 were hypothyroid. Goitre was seen in 8 cases with 4 of them having hyperthyroidism (Table 2).

Table 2: Causes for thyroid disorders.

Disorder	Euthyroid	Hypothyroid	Hyperthyroid	Total
Acquired hypothyroidism	11 (30.6%)	6 (16.7%)	0	17 (47.2%)
Goitre	2 (5.6%)	2 (5.6%)	4 (11.1%)	8 (22.2%)
Congenital Hypothyroidism	6 (16.7%)	2 (5.6%)	0	8 (22.2%)
Autoimmune thyroid disorders	2 (5.6%)	1 (2.8%)	0	3 (8.3%)
Total	21 (58.3%)	11 (30.6%)	4 (11.1%)	36 (100%)

DISCUSSION

63 children below the age of 15 years had come to our department with sign and symptoms of thyroid disorders. Out of these, females were observed to be highly predominant over the males with 66.7% incidence (1:2 ratio). This predominance of females was observed in other studies. Hunter et al observed a male : female ratio to be 1:2.8, while Kapil et al observed a ratio of 1:2.9, Desai, et al, 1:3.4 and Shah, et al observed a ratio of 1:3.[14,24-26]

This female dominance was seen not only in children but also in adults. Unnikishnan et al reported 54.7% of the cases to be females.[23]

The prevalence of hypothyroidism among our study population was 30.6%, while hyperthyroidism was 11.1%. Congenital hypothyroidism was 22.2% while acquired hypothyroidism was observed in 47.2%. In a study by Desai et al, Congenital hypothyroidism was observed to be 46% while in another study by Shah et al, it was 25%, which was very similar to our study.[5,26] This was in contrast to a large prospective study from Arizona and Utah where a prevalence of hypothyroidism was found to be 0.06% and from Croatia it was 0.09%.[27,28]

Autoimmune disorders were found in 8.3% of the children in our study but in the study by Shah et al it was 18.7%[26] and by Desai et al it was 40.25%.[24]

Our study showed a prevalence of euthyroid to be 58.3% which was in accordance to Shah, et al (56.25%).[26] In a cohort study by Hunter et al, it was observed that 66% of the cases who had acquired hypothyroidism had an autoimmune basis for their disease, as was the case in another study from Scotland.[29]

In our study we had no cases of Down's syndrome. It has been reported that children with Down's syndrome are at increased risk of upto 28 times the normal population to hypothyroidism. Autoimmune disposition is probably a reason for this in these children.

Our study has a few limitations. The sample size was very small; therefore the exact prevalence of the different aspects of the thyroid disease could not be ascertained. Most of the patients had taken iodized salt, so they could be considered iodine sufficient. Therefore the data on iodine insufficient patients remains unknown.

CONCLUSION

Hypothyroidism is a commonly prevailing disorder in our country in adults, with more and more children also being affected. Autoimmune disorders, congenital hypothyroidism and acquired hypothyroidism being the common causes. Females seem to be more prone to this disorder than males probably of their tendency to put on weight faster. Since in the long run, hypothyroidism can lead to cardiovascular diseases, it is advisable to identify this disorder as soon as possible so that effective treatment can be started immediately.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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