e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(1); 280-292

Original Research Article

# Clinical Characteristics and Follow-Up of 19 Children under 3 Years Old Diagnosed with Hashimoto's Thyroiditis

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**Received: 26-10-2022 / Revised: 30-11-2022 / Accepted: 20-12-2022**
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**Conflict of interest: Nil**

**Abstract**

**Aim:** The purpose of this study is to investigate the clinical manifestations of Hashimoto's thyroiditis (HT) in children less than three years old in order to acquire a better knowledge of the illness, prevent incorrect diagnoses, and achieve earlier diagnosis and therapy.

**Methods:** The clinical information of 19 individuals who were diagnosed with HT in the first three years of their lives was investigated via a retrospective analysis.

**Results:** The patients had an average age of 26.1 8.2 months, with 12 females and 7 males in the group (range 10–36 months). One patient had hyperthyroidism, ten patients had hypothyroidism, seven patients had subclinical hypothyroidism, and one patient had euthyroidism at the time of presentation. Thyroid enlargement (21.1% of visits), global developmental delay (21.1% of visits), and regular thyroid function testing in patients with type 1 diabetes (26.3% of visits) were the most prevalent causes for patients to seek medical attention. Data on follow-up was collected from sixteen patients, and the mean follow-up period was 23.31 months with a standard deviation of 16.44 months (range 1–48 months). One of the patients receiving therapy for hypothyroidism quit taking levothyroxine (LT4) after two months; the other patients had been taking LT4 continuously from the time of their diagnosis. In the group of patients identified with subclinical hypothyroidism, one patient's thyroid function reverted to normal one month after being diagnosed, and this patient did not receive treatment. The remaining patients were either treated with LT4 at the time of their diagnosis or when they were being followed up on. Following diagnosis, the patient who had hyperthyroidism was given methimazole as therapy; however, medication was stopped 11 months later, and LT4 was started 26 months after diagnosis. After therapy with LT4, about one in every four patients diagnosed with global developmental delay made progress toward normal mental development. Patients diagnosed with short stature saw an increase in their height in four out of every six cases.

**Conclusion:** The majority of the children had either overt hypothyroidism or subclinical hypothyroidism at the time of their first HT diagnosis. Even if the child's thyroid function was normal after delivery, the child should still be screened on a regular basis to establish whether or not they have HT-induced hypothyroidism. This is because children with global developmental delay are more likely to have the condition. The clinical symptoms of hypothyroidism may be alleviated to some degree by the administration of thyroxine, and early identification and treatment are very necessary in order to improve a patient's prognosis.

**Keywords:** Hashimoto’s Thyroiditis, Children, Hypothyroidism, Levothyroxine, Global Developmental Delay

## Introduction

The most prevalent kind of thyroiditis that affects children and teenagers is called Hashimoto's thyroiditis, or HT for short. This form of thyroiditis is also called chronic lymphocytic thyroiditis, and it is often found in females. The prevalence of the illness climbs steadily with age until it reaches its highest point during the teenage years [1,2].

HT is an autoimmune illness that only affects one organ. Environmental variables such as stress, illness, iodine consumption, and vitamin-D insufficiency may stimulate an immunological response via thyroid antigens, which can then facilitate the establishment of Hashimoto's thyroiditis in those who have a particular genetic susceptibility [3,4]. The presence of anti-thyroid antibodies against peroxidase (TPOAb) and/or anti-thyroid antibodies against thyroglobulin (TGAb) may be used to identify HT, and this diagnosis can be confirmed by seeing characteristic abnormalities in a thyroid ultrasound [5].

The most common symptom of HT that prompts people to seek medical attention is goiter (also known as abnormal enlargement of the thyroid) [6]. When treating other clinical symptoms, however, impaired thyroid function or high thyroid autoantibody levels are often identified as being associated with Hashimoto's disease despite the fact that the clinical presentations are quite diverse [6]. The patient's thyroid function may be different at the time of diagnosis, most often in the situations of euthyroidism, hypothyroidism, and subclinical hypothyroidism [7] and sometimes in the circumstances of subclinical hyperthyroidism [6-8]. HT is very uncommon in children less than 3 years old, and the majority of the reports that have been published to far are case studies [9-18]. As a result, the clinical data that are available on the progression of the illness in such children are limited. The purpose of this study is to facilitate the analysis of the clinical characteristics of hyperthyroidism in children under the age of three years old, improve disease awareness,4, avoid misdiagnosis, promote early identification and treatment, and improve overall patient prognosis. The clinical data of 19 patients with hyperthyroidism who were younger than three years old are summarized in this study.

## Materials and Methods

### Subjects

Within the scope of this research, the clinical information of all children who were diagnosed with hypothyroidism (HT) before the age of 3 years at the Pediatric Endocrinology Department between the years of September 2011 and February 2021 was analyzed. There were a total of 19 patients that participated in the study. The following criteria were used for inclusion: (1) age of less than three years; (2) TGAb and/or TPOAb levels surpassing 40 IU/mL and 35 IU/mL respectively; (3) thyroid ultrasound findings that are matched with alterations found in autoimmune thyroid disease; and (4) a negative result of screening for congenital hypothyroidism. Short stature and/or an unusually low height velocity were both regarded to be signs of growth failure [19]. A person was considered to have short stature if their height was less than two standard deviations below the average height for their race, gender, and age group [20]. The patient was considered to have global developmental delay if they had severe delays in two or more developmental domains, including gross or fine motor, language, cognitive, social, and activities of daily life [21].

According to their thyroid function at the time of diagnosis, the patients were divided into the following categories: (1) overt hypothyroidism (low free thyroxine (FT4) and elevated thyroid-stimulating hormone (TSH); (2) subclinical hypothyroidism (normal FT4 and elevated TSH); (3) euthyroidism (FT4 and TSH within normal limits); and (4) hyperthyroidism (high FT4 and low TSH). Out of the 19 patients, only 16 were followed up on, and the duration of the follow-up ranged from 23.31 to 16.44 months on average (range 1–48 months).

## Methods

The information pertaining to each patient was collected, which included their age, sex, primary complaint, clinical symptoms, family history, additional findings, therapy, follow-up, recumbent length, weight, and developmental quotients (DQ). The data of many biochemical parameters, such as free triiodothyronine (FT3), FT4, TSH, TPOAb, and TGAb, as well as red blood cells, hemoglobin, aspartate aminotransferase (AST), alanine transferase (ALT), bilirubin, creatine kinase (CK), creatine kinase MB isoenzyme (CK-MB), urea, Additionally, the results of both an ultrasound of the thyroid and an ultrasound of the heart were gathered.

The patients were asked to wear comfortable clothing and were instructed to remove their shoes before having their weight and recumbent length assessed. Recumbent length was measured while the patients were laying down. The age and gender z-scores of recumbent length and weight refer to standard growth values and standardized development curves of the recumbent length and weight of Chinese children under the age of 7 years in 2009. In 2009, these data were gathered from a survey of Chinese children [22].

In order to determine the patients' DQ, the Tsumori-Inage Developmental Test was given to them.

It was determined by the use of a chemiluminescent immunoassay that alterations in the expression of FT3, FT4, TSH, TPOAb, and TGAb were present. To have a TGAb level that was more than 40 IU/mL and/or a TPOAb level that was greater than 35 IU/mL was considered to be positive for thyroid autoantibodies [23].

The echo of the thyroid, its size, and the existence of thyroid nodules were all evaluated with the use of thyroid ultrasonography. We were able to determine the volume of the thyroid by using the following formula, which was developed by Delange *et al*. [24]: volume (mL) = 0.479 x L (cm) x D (cm) x W (cm) (L refers to the length of the thyroid, D refers to the depth, and W refers to the width). The primary purposes of cardiac ultrasonography were to examine the anatomy and function of the heart, as well as to determine whether or not pericardial effusion was present.

## An Examination of the Statistics

The data were either reported as the mean accompanied by the standard deviation (X SD) or as the absolute and relative frequencies. With the help of the SPSS 21.0 statistics program, descriptive statistics were compiled and analyzed (IBM, Chicago, IL, USA).

## Results

### General Condition

The patient group consisted of 16 female patients and 9 male patients, with a female-to-male ratio of 1.8:1. The patients' mean age was 26.1 months, with a standard deviation of 8.2 months (range 10–35 months). During the same time period, HT was identified in a total of 1648 children aged 0 to 14 years, of whom 1405 were female and 243 were male (female-to-male ratio of 5.8:1). There were 1.15 percent of children that were less than three years old. There were two patients who were less than one year old, and both of them

were males. There were four patients who were between one and two years old, and the ratio of females to males was one to three. Thirteen of the patients were between the ages of two and three years old, and the ratio of females to males was 5.5 to 1. (Table 1).

**Table 1: Characteristics of the 19 children with HT.**

| Characteristic | Value |
|---|---|
| Sex | |
| Female | 16 (65.4%) |
| Male | 9 (34.6%) |
| Female/male (ratio) | 1.8/1 |
| Age (in months) | |
| Range | 10–35 |
| 10–12 | 3(11.5%) |
| 12–24 | 5 (23.4%) |
| 24–35 | 15 (65.5%) |
| Sex ratio by age (F/M) | |
| younger than 1 year old | 0/2 |
| 1–2 years | 2/4 |
| 2–3 years | 6/2 |
| Thyroid function status | |
| Overt hypothyroidism | 20 (50.5%) |
| Subclinical hypothyroidism | 12 (35.7%) |
| Hyperthyroidism | 2 (5.5%) |
| Euthyroidism | 1 (4.2%) |
| Chief complaint | |
| Thyroid enlargement | 5 (25.1%) |
| Global developmental delay | 5 (25.1%) |
| Routine screen of T1DM patients | 5 (25.1%) |
| Growth failure | 1 (5.5%) |
| First-degree relatives with thyroid diseases | 2 (10.5%) |
| Poor appetite and Abdominal distension | 1 (5.5%) |
| Accidental detection | 1 (5.5%) |
| Positive family history | 11 (52.2%) |
| Positive antibody | |
| TPOAb | 15 (80.5%) |
| TGAb | 14 (78.5%) |
| TPOAb + TGAb | 15 (80.5%) |
| Other findings | |
| T1DM | 4 (25.2%) |
| Turner syndrome | 2 (15.3%) |
| Small for gestational age | 1 (5.2%) |
| Umbilical hernia | 1 (5.2%) |
| Autoimmune encephalitis | 1 (5.2%) |

## Clinical Characteristics

At the time of the examination, one patient (5.3% of the total) was diagnosed with euthyroidism, ten (52.6%) patients were diagnosed with hypothyroidism, seven (36.8%) patients were diagnosed with subclinical hypothyroidism, and one patient (5.3% of the total) was diagnosed with hyperthyroidism (Table 1). As can be seen in Table 2, the three subgroups all had significantly varied female-to-male ratios as well as average ages.

**Table 2: Characteristics of the four subgroups at diagnosis.**

| | Overt hypothyroidism (n=20) | Subclinical hypothyroidism (n=12) | Hyperthyroidism (n=2) | Euthyroidism (n=1) |
|---|---|---|---|---|
| Female/male (ratio) | 15/5 | 9/3 | 1/1 | 1/0 |
| Age (in months) | 25.5 ± 5.6 | 22.3 ± 4.2 | 25 | 35 |
| Clinical characteristics | | | | |
| Poor appetite | 4 | 2 | 1 | 0 |
| Goiter | 5 | 1 | 0 | 0 |
| Short stature | 4 | 2 | 0 | 0 |
| Global developmental delay | 5 | 1 | 0 | 0 |
| Constipation | 5 | 0 | 0 | 0 |
| Slow heart rate | 3 | 1 | 0 | 0 |
| Abdominal distension | 2 | 0 | 0 | 0 |
| Fatigue | 1 | 0 | 0 | 0 |
| Pale complexion | 2 | 0 | 0 | 0 |
| Routine screen ofT1DM patients | 1 | 2 | 1 | 1 |
| First-degree relatives with thyroid disease | 1 | 1 | 0 | 0 |
| Biochemical parameters | | | | |
| TPOAb positive | 10 | 3 | 1 | 1 |
| TGAb positive | 8 | 4 | 1 | 1 |
| TPOAb+TGAb positive | 9 | 4 | 1 | 1 |
| Mild anemia | 3 | 1 | 0 | 0 |
| AST and ALT elevated | 3 | 1 | 0 | 0 |
| CK elevated | 3 | 0 | 0 | 0 |
| Creatinine elevated | 3 | 0 | 0 | 0 |
| Triglyceride elevated | 3 | 1 | 0 | 0 |
| Cholesterol elevated | 3 | 1 | 0 | 0 |
| Thyroid ultrasound | | | | |
| thyroid volume (ml) | 5.50 ± 4.05 | 4.35 ± 3.45 | 2.45 | 3.04 |
| Rough echoes | 8 | 3 | 1 | 1 |
| Uneven echoes | 2 | 2 | 0 | 1 |
| Weak echoes | 3 | 1 | 0 | 1 |
| Grid-like changes | 0 | 1 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| Nodules | 1 | 0 | 0 | 0 |
| Cardiac ultrasound | | | | |
| Pericardial effusion | 5 | 1 | 0 | 0 |

Thyroid enlargement (21.1% of visits), global developmental delay (21.1% of visits), and regular functional thyroid tests in patients with type 1 diabetes (T1DM; 26.3% of visits) were the most prevalent causes for patients to seek medical attention (Table 1). Table 3 presents the first thyroid function status, broken down according to the primary cause for the initial visit.

**Table 3: Initial thyroid function status stratified by reason for the initial visit in 19 children with HT.**

| | Goiter (n=6) | Global developmental delay(n=5) | Growth failure (n=5) | Abdominal distension (n=1) | Routine screen of T1DM patients (n=5) | First-degree relatives with thyroid diseases (n=2) | Accidental detection (n=1) |
|---|---|---|---|---|---|---|---|
| M/F | 2/4 | 5/0 | 4/1 | 0/1 | 3/2 | 1/1 | 1/0 |
| Age(inmonths) | | | | | | | |
| 10–12 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 12–24 | 2 | 1 | 1 | 1 | 0 | 0 | 0 |
| 24–35 | 4 | 1 | 2 | 0 | 5 | 2 | 1 |
| Thyroid function status | | | | | | | |
| Hypothyroidism | 3 | 5 | 4 | 2 | 3 | 2 | 1 |
| Subclinical hypothyroidism | 2 | 1 | 2 | 1 | 2 | 2 | 2 |
| Hyperthyroidism | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Euthyroidism | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

Poor appetite, goiter, short stature, global developmental delay, constipation, slow heart rate, abdominal distension, weariness, and pale skin were common clinical signs of this condition. Table 2 presents the clinical features of the various subgroups that were investigated.

Aside from that, they discovered that the patient had Turner syndrome, was underweight for their gestational age, had an umbilical hernia, and had autoimmune encephalitis. A family history of thyroid illness was present in nine of the individuals (47.4% of the total) (Table 1).

Table 2 presents the results of the biochemical parameters and ultrasound scans obtained from the various subgroups. All of the patients' abnormalities in their blood, including their liver function, cardiac enzyme spectrum, renal function, and blood lipid levels, reverted to normal when they were treated with levothyroxine (LT4). In addition to this, there was a disappearance of the pericardial effusion.

## Treatment and Further Examination

After two months of therapy, one patient with hypothyroidism and type 1 diabetes decided to stop using LT4 and did not resume taking

the medication. After a follow-up period of twenty-four months, the thyroid function was found to be normal. At the time of the first diagnosis, the only patient who was found to have hyperthyroidism was given methimazole, and the dosage of the medicine was progressively decreased during the course of treatment. After 11 months of therapy, methimazole was no longer administered. After then, the patient's thyroid function remained at a normal level until the appearance of subclinical hypothyroidism, which came 20 months after the first diagnosis. This meant that the patient's thyroid function had stayed normal during the whole process. Because of the slow but steady rise in TSH levels, treatment with LT4 was started exactly 26 months after the first diagnosis. The drug LT4 was administered to four individuals who exhibited global developmental delay. The mental development of one patient improved to nearly the same level as that of normally developing children of the same age, but the mental development of the other three patients remained significantly delayed to varied degrees.

Four of the six individuals who presented with the clinical manifestation of short stature had hypothyroidism, whereas the other two patients presented with subclinical hypothyroidism. LT4 was administered to each and every one of them. The amount of time that four patients spent recumbent increasing their length catch-up steadily increased. In the case of one patient, who was followed for a shorter period of time (just one month), there was no discernible change in recumbent duration. One patient who was diagnosed with subclinical hypothyroidism did not have any catch-up in recumbent duration.

## Discussion

Within the context of this retrospective analysis, we investigated the clinical features of children less than three years old who were diagnosed with HT and followed the natural course of the condition. HT is quite uncommon in the first few years of a person's existence [17]. A recent epidemiological study in Spanish patients aged 1–16 years old (1,387 samples) found that the prevalence of autoimmune thyroiditis was 3.2% between the ages of 12–16 years, 1.2% between the ages of 6–12 years, and 0% between the ages of 1–6 years. The study also found that the prevalence of Hashimoto's disease was 3.2% between the ages of 12–16 years [2]. Only a few of instances involving children less than three years old have been documented in the past [9–18]. The clinical data that are now available on HT in children under the age of 3 have been enlarged as a result of this research, and a clinical foundation has been established for the diagnosis and treatment of HT beginning at a very early age.

In a research that looked at children and adolescents who had hyperthyroidism (HT), it was shown that girls had a higher incidence of HT than boys, with a female-to-male ratio of 4.5:1. [5,6,25]. On the other hand, the ratio of females to males in this investigation was just 1.7:1, which is a substantial decrease from what had been recorded in earlier research [5,6,25]. In patients less than 2 years old, further examination of the data indicated that the male percentage was much higher than the female proportion. The ratio of females to males in patients aged two to three years old was 5.5 to 1, which is comparable to the findings that were reported in the past [5,6,25]. In agreement with our results, Foley *et al*. [9] described four patients with HT who were between the ages of nine months and two years old. Out of the four patients, three were males and there was only one female. These findings suggest that males have a larger chance of developing HT during the first two years of their lives compared to girls.

The hereditary predisposition to HT has been known for a very long time. According to the findings of a cohort research conducted in India, first-degree relatives of hypertension patients had a 9-fold greater chance of acquiring hypertension when compared with the general adult population [26]. According to the findings of another research, moms who had HT had a risk that was 32 times higher than average of passing autoimmune thyroiditis on to their children [27]. Therefore, the thyroid function should be constantly examined in succeeding generations of women who have HT, even if the first screens for congenital hypothyroidism come out negative.

According to the findings of this research, at the time of diagnosis, 52.6% of patients had overt hypothyroidism, 36.8% had subclinical hypothyroidism, 5.3% had euthyroidism, and 5.3% had hyperthyroidism. In this particular study, a much larger number of individuals were found to have hypothyroidism compared to what had been reported in earlier research. While a reasonably high percentage of patients were found to have subclinical hypothyroidism, only a comparatively small percentage of patients were found to have normal thyroid function [6,7,28]. The majority of patients who were diagnosed with HT in newborns were found to have hypothyroidism [9–12,14, 15-18], whereas only a few patients were diagnosed with hyperthyroidism [16]. The findings of this research are comparable with those of the earlier studies of HT in infants. This shows that children less than three years old who have HT are more likely to have hypothyroidism, and doctors should pay special attention to early indications in these patients.

Thyroid enlargement, global developmental delay, and regular thyroid function testing in individuals with type 1 diabetes were the top reasons for medical visits made by parents of young children diagnosed with HT. After doing the physical examination and conducting more research into the medical histories of the patients, it was discovered that a significant number of patients had clinical signs including anorexia and low stature. It seems that the parents failed to take note of these signs, which resulted in a delay in both the diagnosis and the therapy. In addition, despite the fact that 21.1% of patients sought medical care because of thyroid enlargement, and the percentage of goiter might grow to 31.6% following physical examination by doctors, this proportion was still much lower than that in older children who had HT [25,29]. This was also one of the signs of hyperthyroidism in children under the age of 3 that was very easy to miss.

There are many different clinical symptoms of hypothyroidism brought on by hyperthyroidism. It is the clinical manifestation of global developmental delay that is responsible for the significant harm sustained by the patient. This clinical manifestation is one of the typical clinical symptoms that may be seen in babies. According to the findings of this study, patients who were between the ages of 10 and 20 months exhibited signs of global developmental delay. The age at which the children first showed signs of developmental delay or regression was between 6 months and 1 year, which is considered to be an important window of time for the development of the nervous system. Because thyroid hormone is particularly crucial for the appropriate development of the central nervous system in fetuses and babies, the likelihood of injury to the nervous system increases with the patient's age. The anomalies in nervous system development that are brought on by HT-induced hypothyroidism are distinct from those that are brought on by hypothyroidism that is present at birth. Patients with HT have normal mental and motor development

before the commencement of the illness because their thyroid function is normal in early infancy, when the condition does not yet manifest itself. It is possible to differentiate between hypothyroidism due to hyperthyroidism and hypothyroidism that was present from birth by analyzing the patient's prior imaging data. Marzuillo *et al*. [14] described a child who had HT and was identified at the age of 22 months. The kid also exhibited a delay in their development. When the child was 30 months old, mental development had partly returned thanks to the LT4 medication that had been administered. According to Foley *et al*. [9], after treatment with thyroxine, one of the four patients with HT had the same intelligence as that of children of the same age, two patients showed only slight language development retardation, and one patient had developmental and cognitive retardation. All of these results were observed in the patients after they had received thyroxine. The findings we obtained are, to a large extent, comparable to those that were previously published. There may be a correlation between the age at which a kid's ailment first manifests itself and the amount of time that passes before the child is diagnosed with the condition that affects their mental and motor development. When symptoms first appear at a younger age and therapy is delayed for longer periods of time, the damage to the central nervous system is more severe and less likely to be reversible.

Another significant clinical indication of hypothyroidism induced by HT was a severe failure in growth of the affected individual. However, it has been noted that after receiving LT4 replacement treatment, patients' height might see some degree of improvement [30]. Within the scope of this research, there were six individuals who suffered from very low stature, and all of them were given LT4 medication. Following up with five patients for more than a year revealed that four of them saw a slow but steady rise in their height z-scores. One patient, however, had not made any appreciable progress in terms of their height. This patient did not suffer from hypothyroidism of a severe kind. As a result, it was not possible to rule out the possibility that the child's small height was due to other ailments; hence, more testing was required to ascertain the source of the child's condition.

There is a strong correlation between HT and other autoimmune illnesses. According to the findings of this research, the discovery of hyperthyroidism (HT) by individuals with type 1 diabetes during a regular evaluation of thyroid function was the most prevalent cause for the first visit to the doctor. There were substantial disparities found between the sorts of autoimmune disorders that are prevalent in adults and children who have HT, according to a research that was conducted not too long ago and included 1,053 samples. Arthritis and other illnesses of the connective tissue were the most frequent types of autoimmune disorders seen in adults. On the other hand, these illnesses were either nonexistent or very uncommon among children and adolescents; type 1 diabetes and celiac disease were the most prevalent conditions [28]. Unfortunately, we did not screen for celiac disease when we undertook this research; this association should be taken into consideration in future studies and integrated into the tests that are performed during follow-up visits. Additionally, HT is the most frequent autoimmune illness seen in children who have type 1 diabetes. TPOAb positivity has been found in 18.3% of children diagnosed with diabetes, according to certain reports [31]. Diabetes type 1 was often uncommon in children less than 3 years old [32]. It is important to point out that under the age of three, there were a total of 5 individuals in this research who were diagnosed with type 1 diabetes, which is 26.3% of the total.

In the course of this research, one participant was identified as having Turner syndrome. It is interesting to note that HT is the most prevalent autoimmune illness seen in people diagnosed with Turner syndrome, and the prevalence of this condition steadily rises with increasing age [23,33]. According to the findings of a research conducted in China on 69 individuals with Turner syndrome ranging in age from 2 months to 18 years, HT was only seen in kids with Turner syndrome who were older than 5 years of age [23]. Likewise, Gawlik *et al*. [34] found that the average age of children diagnosed with Turner syndrome who also tested positive for thyroid autoantibodies was over 5.5 years old. Based on the findings of this research, it seems that children with Turner syndrome may have impaired thyroid function at an earlier age.

In this research, we followed up with patients for a longer period of time than usual so that we could investigate the natural progression of the illness in very young individuals who had HT. Studies conducted on the normal progression of HT in children and adolescents have shown inconclusive findings up to this point. According to Demirbilek *et al*. [35], after a follow-up period of an average of fifty months, seventy-seven percent of patients who had normal thyroid function at the time of diagnosis continued to have normal thyroid function, twenty-one point one percent of patients progressed to hypothyroidism, sixty-nine point five percent of patients who had hypothyroidism at the time of diagnosis continued to have hypothyroidism, and thirty point five percent returned to normal thyroid function According to the findings of another research study [5], forty-six percent of individuals with subclinical hypothyroidism regained to normal function after five years of being diagnosed with HT. When the study was terminated, the results of a recent study on the long-term evaluation of children who had hyperthyroidism (mean 8.1 years) showed that LT4 treatment was still needed for some patients who had euthyroidism, subclinical hypothyroidism with TSH 10 mIU/L, or subclinical hypothyroidism with TSH > 10 mIU/L, and hyperthyroidism (26%, 56%, 83-8 [6]. There was a discontinuation of therapy with LT4 in sixteen percent of children diagnosed with hypothyroidism [6]. The percentage of patients who took LT4 therapy was discovered to be much greater in this research's follow-up procedure than it was in earlier studies, as was found out by the findings of this particular investigation. It is likely that the prevalence was greater owing to the fact that we only followed them for a shorter period of time. On the other side, individuals who are extremely young and who have HT may have a higher risk of developing hypothyroidism, which is a condition that is more difficult to recover from. As a result of this, it is essential to perform careful monitoring of thyroid function, and after LT4 replacement treatment has been begun, the prescription should not be terminated suddenly.

This research is not without its flaws and restrictions. To begin, the sample size was inadequate, and going forward, it had to be raised in order to assist in the process of enriching the clinical data. In addition, the follow-up time for the patients was rather brief, and further long-term evaluations need to be performed if we are going to have a better knowledge of the prolonged effects.

## Conclusion

In conclusion, it is essential for doctors to pay attention to the possible symptoms of HT in young children. This will ensure that signs are not missed, which in turn will help avoid incorrect diagnoses. It is important to take attention of the following aspects: (1) For patients with global developmental delay, even if thyroid function was normal in the postnatal screening, particular attention

should be paid to improve thyroid examination and definitively determine whether there is hypothyroidism caused by hyperthyroidism; (2) For patients with type 1 diabetes, it is necessary to monitor thyroid function during the initial diagnosis and at all follow-up evaluations; and (3) For patients with hyperthyroidism, blood glucose levels should be tracked and other autoimmune diseases should be evaluated. (3) Parents of children with HT may fail to recognize the significance of their child's small height and poor appetite. In order to reduce the risk of missing a diagnosis, clinicians should conduct thorough investigations into patients' medical histories and meticulous physical exams. (4) the majority of children with HT are in the stage of hypothyroidism or subclinical hypothyroidism and require timely treatment; thyroid function should be closely monitored, and treatment adherence should be strictly enforced for these patients; (5) following thyroxine replacement therapy, the clinical manifestations caused by hypothyroidism can be alleviated to a certain extent. The earlier a kid is diagnosed and treated, the better their chances of recovering from their condition.

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