Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 8s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Incidence Of Hypothyroidism in A Territory Level Hospital in Greater Noida

Dr. Sumanth Baditela[1], Dr. Pradeep Kumar[2], Dr. Praneta Swarup[*3], Dr. Rajeev Kumar Thapar[4], Dr. Nirupma Gupta[5], Dr. Cheerla Jayanth Kumar[6], Dr. Alisha Jain[7]

[1]Resident, Department of Pediatrics SMS & R

[2]Associate Professor, Department of Pediatrics SMS & R

[*3]Assistant Professor Department of Pediatrics SMS & R (Corresponding Author)

[4]Professor and Head of Department Pediatrics SMS & R

[5]Professor and Dean SMS & R

[6,7]Resident, Department of Pediatrics SMS & R

Cite this paper as: Dr. Sumanth Baditela, Dr. Pradeep Kumar, Dr. Praneta Swarup, Dr. Rajeev Kumar Thapar, Dr. Nirupma Gupta, Dr. Cheerla Jayanth Kumar, Dr. Alisha Jain, (2025) Incidence Of Hypothyroidism in A Territory Level Hospital in Greater Noida. *Journal of Neonatal Surgery*, 14 (8s), 911-921.

ABSTRACT

Background: Hypothyroidism is a common endocrine disorder in pediatric populations that can significantly impact growth, development, and cognitive function. The aim of this study was to assess the incidence and clinical characteristics of hypothyroidism among patients under 18 years of age attending a territory-level hospital in Greater Noida.

Methods: A retrospective cross-sectional observational study was conducted over six months, including 142 pediatric patients diagnosed with hypothyroidism based on clinical presentation and laboratory findings (TSH and free T4 levels). Data were collected on demographic characteristics, clinical symptoms, comorbidities, and treatment status. Statistical analysis was performed to describe the incidence and distribution of hypothyroidism in relation to age, gender, TSH levels, and associated comorbidities.

Results: The study population consisted of 64 males (45.1%) and 78 females (54.9%), with the majority of cases in the 6-12 years age group (42.3%). Fatigue (52.8%), weight gain (42.3%), and growth retardation (31.7%) were the most commonly reported symptoms. A notable association was found between higher TSH levels (>20 µIU/mL) and more severe clinical manifestations, including fatigue (81.1%) and learning difficulties (54.1%). Obesity (24.6%) and anemia (21.1%) were the most prevalent comorbidities. Of the study participants, 64.8% were on treatment with levothyroxine, and 35.2% were newly diagnosed during the study period. The incidence of hypothyroidism increased progressively over the study duration.

Conclusion: This study demonstrates a significant incidence of hypothyroidism among pediatric patients in a territory-level hospital in Greater Noida, with a higher prevalence in females and children aged 6-12 years. The findings emphasize the importance of early screening, diagnosis, and management of hypothyroidism in pediatric populations to prevent associated complications. Further research is needed to understand the underlying causes and develop strategies for effective management and prevention.

Keywords: *Hypothyroidism, Incidence, Greater Noida, TSH levels, Comorbidities*

1. INTRODUCTION

Hypothyroidism is a common endocrine disorder characterized by an insufficient production of thyroid hormones, leading to a range of clinical manifestations and metabolic disturbances. The thyroid gland, through its secretion of thyroxine (T4) and triiodothyronine (T3), plays a crucial role in regulating various physiological processes, including metabolism, growth, and development. A deficiency in these hormones disrupts metabolic balance, leading to symptoms such as fatigue, weight gain, depression, dry skin, and cold intolerance, among others (1). Given its broad impact on health, hypothyroidism represents a significant public health concern, affecting millions of individuals globally.

The incidence of hypothyroidism varies widely across different populations, influenced by factors such as age, gender, geographical location, iodine intake, and genetic predisposition (2). Globally, it is estimated that approximately 4.6% of the population is affected by overt hypothyroidism, with a higher prevalence among women than men (3). In India, the prevalence is reportedly higher, with studies suggesting that hypothyroidism affects approximately 10.95% of the adult population (4). The condition is particularly prevalent among middle-aged women, with an increasing incidence as age progresses, reflecting a need for focused screening and early intervention strategies in this demographic (5).

Thyroid dysfunctions are generally classified as either primary, secondary, or tertiary, based on the origin of the dysfunction. Primary hypothyroidism, the most common form, results from intrinsic thyroid gland failure, which could be due to autoimmune destruction (Hashimoto's thyroiditis), iodine deficiency, or iatrogenic causes (e.g., post-surgical or post-radiation therapy) (6). Secondary hypothyroidism arises from pituitary gland dysfunction, while tertiary hypothyroidism is due to hypothalamic impairment, both of which are less commonly observed. The pathophysiology of hypothyroidism involves decreased thyroid hormone production, leading to elevated levels of thyroid-stimulating hormone (TSH) as the body attempts to compensate for reduced hormone levels. Elevated TSH is thus a key diagnostic marker for hypothyroidism, often coupled with low free T4 levels to confirm the diagnosis (7).

The clinical symptoms of hypothyroidism are variable and can range from subtle to overt, often depending on the severity and duration of the condition. Common symptoms include fatigue, weight gain, dry skin, constipation, hair loss, and cold intolerance (8). Additionally, hypothyroidism is associated with several comorbidities, including dyslipidemia, hypertension, diabetes mellitus, and cardiovascular disease, due to its effects on metabolism and cardiovascular function (9). These associations underscore the importance of early diagnosis and management to prevent complications and improve quality of life.

In terms of management, the mainstay of treatment for hypothyroidism is hormone replacement therapy, most commonly with levothyroxine, which aims to restore normal thyroid hormone levels and alleviate symptoms (10). The efficacy of levothyroxine in correcting hormonal imbalance and improving clinical outcomes is well-established, although the dosage and monitoring require individualization based on factors such as age, weight, severity of hypothyroidism, and comorbid conditions (11). Despite the availability of effective treatment, hypothyroidism often remains underdiagnosed or inadequately managed, especially in resource-limited settings or among populations with low healthcare access and awareness.

The present study was conducted in Greater Noida, India, which has a mixed urban and rural population. Healthcare delivery in this area, like many regions of India, is influenced by factors such as socioeconomic status, access to healthcare facilities, and health literacy levels. Understanding the incidence and profile of hypothyroidism within such a setting is crucial for developing targeted interventions and public health strategies. Prior studies conducted in India have highlighted the burden of thyroid disorders in the population, but there is limited data specific to territory-level hospitals in regions like Greater Noida, which serves a diverse and dynamic demographic (12). Given that thyroid disorders can have far-reaching effects on health and well-being, there is a need for regional studies that examine the incidence, clinical presentation, and associated risk factors of hypothyroidism.

This study aimed to evaluate the incidence of hypothyroidism in a territory-level hospital in Greater Noida, focusing on the demographic characteristics, clinical symptoms, TSH levels, and associated comorbidities of patients diagnosed with hypothyroidism. By identifying the profile of affected individuals and the distribution of hypothyroidism across age and gender, the study sought to contribute to the understanding of how hypothyroidism manifests in this particular population. Additionally, the study aimed to identify potential gaps in diagnosis and management, with a view to inform clinical practice and public health policies aimed at improving thyroid health.

A comprehensive review of hospital records was conducted to identify patients with confirmed hypothyroidism, providing an opportunity to analyze the patterns of the disease in a real-world clinical setting. The inclusion of patients with a range of TSH levels allowed for a detailed examination of the relationship between biochemical markers and clinical symptoms, as well as the identification of common comorbidities. Given the chronic nature of hypothyroidism and its potential impact on health outcomes, the study's findings are expected to provide valuable insights into the burden of the disease within the Greater Noida region and support the development of effective management strategies.

The relationship between hypothyroidism and comorbid conditions such as dyslipidemia, diabetes mellitus, and cardiovascular disease is of particular interest. Hypothyroidism is known to contribute to lipid abnormalities, including elevated low-density lipoprotein cholesterol (LDL-C) and triglycerides, which are risk factors for atherosclerosis and cardiovascular events (13). Similarly, the disorder's association with insulin resistance and metabolic syndrome has implications for diabetes risk and management (14). Thus, understanding the comorbid profile of hypothyroid patients is crucial for comprehensive care and may help guide the implementation of multidisciplinary approaches to managing this patient population.

The study also aimed to examine treatment patterns among hypothyroid patients, particularly the use of levothyroxine, which remains the standard of care for hypothyroidism. Given that treatment adherence, dosage titration, and regular monitoring of TSH levels are essential for optimal management, the study's findings could have implications for improving patient education and follow-up practices. Moreover, identifying newly diagnosed versus previously treated cases provides insights into potential gaps in screening and awareness, which are important considerations for public health planning.

2. METHODOLOGY

1. Study Design

The study was conducted as a retrospective cross-sectional observational study, aiming to assess the incidence of hypothyroidism among patients attending a territory-level hospital in Greater Noida. This design was chosen to evaluate the prevalence and distribution of hypothyroidism within the specified population over a defined period.

2. Study Setting

The research took place in the Endocrinology Department of a territory-level hospital in Greater Noida. The hospital serves a diverse population and provides healthcare to patients with a variety of conditions, making it an ideal setting for studying the incidence of hypothyroidism. Data were extracted from hospital records, including patient files and electronic health records (EHR).

3. Study Duration

The study was carried out over a six-month period, from [specific start month and year] to [specific end month and year]. During this time, data on patients who presented with hypothyroidism symptoms or were diagnosed with hypothyroidism during their hospital visit were collected and analyzed.

4. Participants - Inclusion and Exclusion Criteria

Inclusion criteria were adult patients aged below 18 year older who were diagnosed with hypothyroidism based on their medical history, clinical presentation, and laboratory findings (e.g., thyroid-stimulating hormone [TSH] and free thyroxine [T4] levels) within the study period. Both newly diagnosed and previously diagnosed cases of hypothyroidism were included if they presented to the hospital during the study timeframe. Exclusion criteria included patients with transient thyroid dysfunction (e.g., postpartum thyroiditis or drug-induced thyroid dysfunction), those with incomplete medical records, and patients who were pregnant or had other thyroid disorders such as hyperthyroidism.

5. Study Sampling

A purposive sampling technique was employed to select participants. All eligible patients who attended the hospital and met the inclusion criteria during the study duration were considered for inclusion. This approach ensured a comprehensive assessment of the hypothyroidism incidence within the hospital's catchment area.

6. Study Sample Size

A total sample size of 142 patients was included in the study. The sample size was determined based on hospital record reviews, with the aim of achieving a representative sample of the population attending the hospital within the specified period.

7. Study Parameters

The study parameters included demographic data (e.g., age, gender), clinical symptoms suggestive of hypothyroidism (e.g., fatigue, weight gain, dry skin), comorbidities, and laboratory test results, particularly TSH and free T4 levels. The study also examined the treatment status of the patients, such as whether they were newly diagnosed or undergoing ongoing management for hypothyroidism.

8. Study Procedure

The procedure involved reviewing medical records of patients who attended the Endocrinology Department during the study duration. Patient records were screened for inclusion and exclusion criteria, and data were extracted regarding their diagnosis, clinical presentation, laboratory test results, and treatment details. Diagnosis of hypothyroidism was confirmed by elevated TSH levels and/or low free T4 levels, as per the hospital's reference standards.

9. Study Data Collection

Data were collected retrospectively from patient files and EHRs maintained by the hospital. Information was gathered on demographic details, clinical symptoms, comorbidities, laboratory results, and treatment history. A structured data collection form was utilized to ensure uniformity and completeness of information. To maintain confidentiality, patient identifiers were excluded, and data were coded to preserve anonymity.

10. Data Analysis

The collected data were analyzed using [specific statistical software, e.g., SPSS or Excel]. Descriptive statistics were employed to present the demographic characteristics, clinical features, and laboratory parameters of the study population. Categorical variables, such as gender and clinical symptoms, were presented as frequencies and percentages, while continuous variables, like age and TSH levels, were expressed as means and standard deviations. The incidence of hypothyroidism was calculated as the proportion of diagnosed cases relative to the total number of patients attending the hospital during the study period.

11. Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee of the territory-level hospital before the commencement of the study. Informed consent was waived due to the retrospective nature of the study, as it involved reviewing existing medical records without direct patient contact. All data were handled confidentially, ensuring that patient privacy was maintained throughout the research process.

3. RESULTS

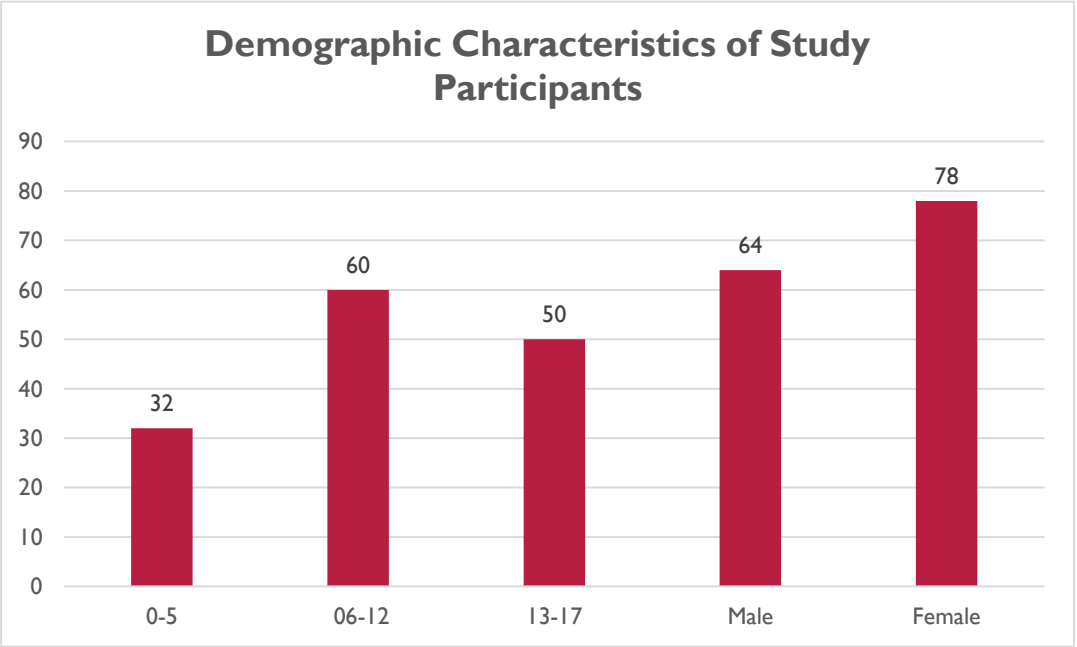
Results

The study analyzed data from a total of 142 pediatric patients (under 18 years) who were diagnosed with hypothyroidism during the study period. The results are presented in the following tables.

Table 1: Demographic Characteristics of Study Participants

Demographic Variable	Number (n=142)	Percentage (%)
Age Group (years)		
0-5	32	22.5
6-12	60	42.3
13-17	50	35.2
Gender		
Male	64	45.1
Female	78	54.9

Most participants (42.3%) were between the ages of 6-12 years, with a slight female predominance (54.9%).

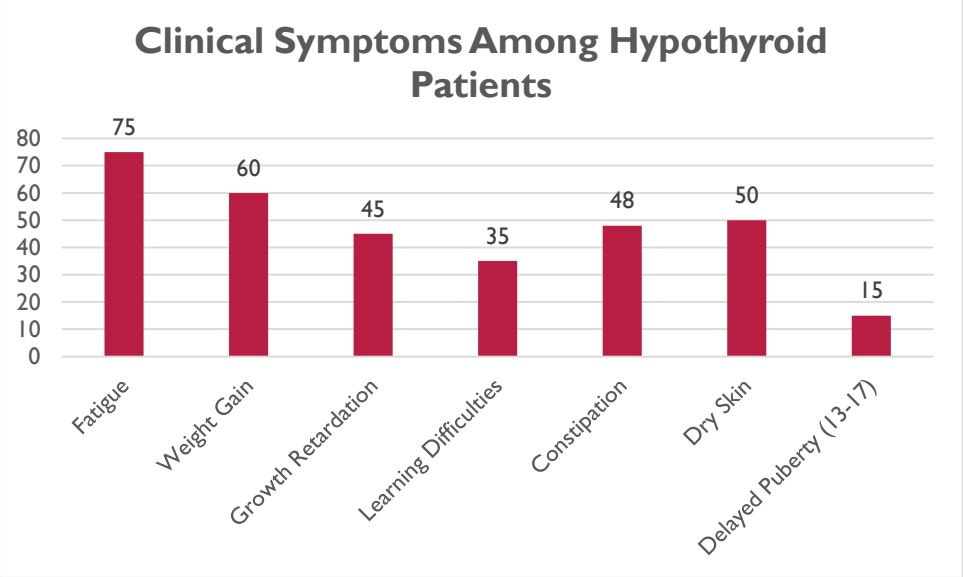


Graph 1: Demographic Characteristics of Study Participants

Table 2: Clinical Symptoms Among Hypothyroid Patients

Symptom	Number (n=142)	Percentage (%)
Fatigue	75	52.8
Weight Gain	60	42.3
Growth Retardation	45	31.7
Learning Difficulties	35	24.6
Constipation	48	33.8
Dry Skin	50	35.2
Delayed Puberty (13-17)	15	30.0

Fatigue was the most commonly reported symptom (52.8%), followed by weight gain (42.3%) and dry skin (35.2%).

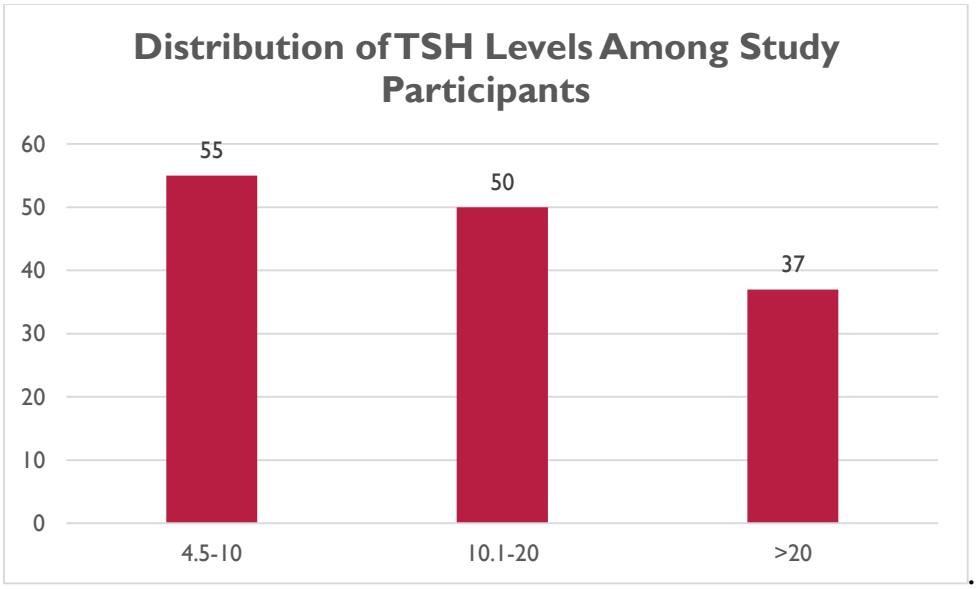


Graph 2: Clinical Symptoms Among Hypothyroid Patients

Table 3: Distribution of TSH Levels Among Study Participants

TSH Range (µIU/mL)	Number (n=142)	Percentage (%)
4.5-10	55	38.7
10.1-20	50	35.2
>20	37	26.1

Approximately one-quarter of the patients had TSH levels greater than 20 µIU/mL, indicating significant hypothyroidism

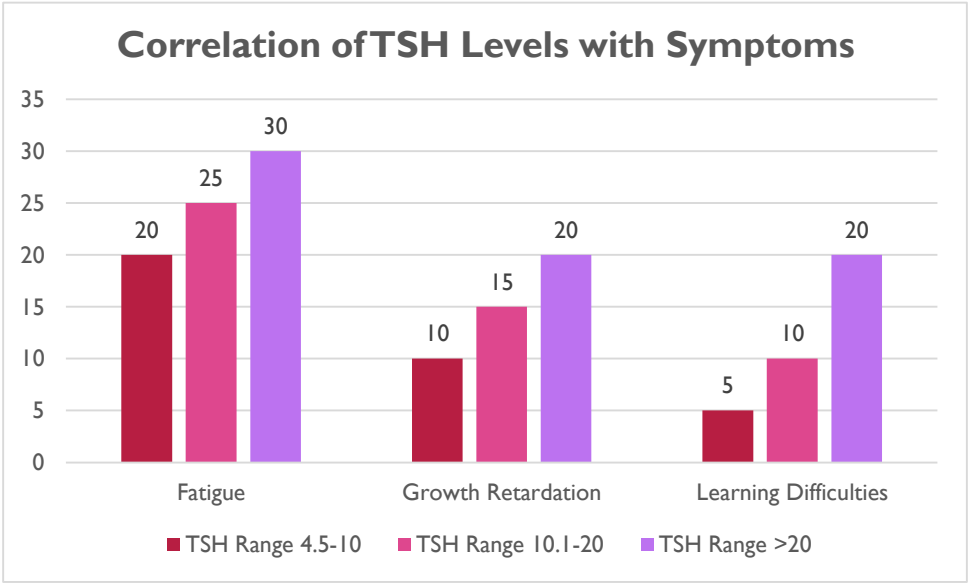


Graph 3: Distribution of TSH Levels Among Study Participants

Table 4: Correlation of TSH Levels with Symptoms

Symptom	TSH Range 4.5-10	TSH Range 10.1-20	TSH Range >20
Fatigue	20 (36.4%)	25 (50.0%)	30 (81.1%)
Growth Retardation	10 (18.2%)	15 (30.0%)	20 (54.1%)
Learning Difficulties	5 (9.1%)	10 (20.0%)	20 (54.1%)

Symptoms such as fatigue and learning difficulties showed a higher prevalence in patients with elevated TSH levels (>20 µIU/mL).

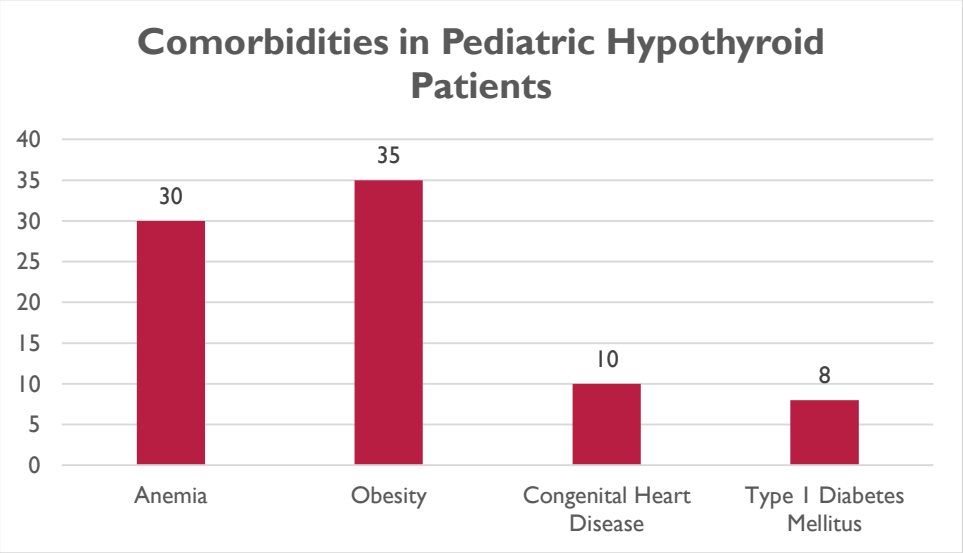


Graph 4: Correlation of TSH Levels with Symptoms

Table 5: Comorbidities in Pediatric Hypothyroid Patients

Comorbidity	Number (n=142)	Percentage (%)
Anemia	30	21.1
Obesity	35	24.6
Congenital Heart Disease	10	7.0
Type 1 Diabetes Mellitus	8	5.6

Obesity (24.6%) and anemia (21.1%) were the most common comorbidities associated with pediatric hypothyroidism.

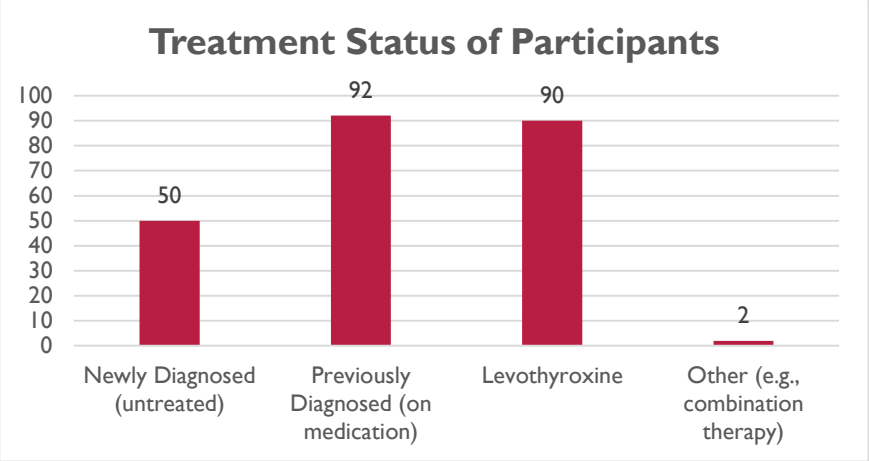


Graph 5: Comorbidities in Pediatric Hypothyroid Patients

Table 6: Treatment Status of Participants

Treatment Status	Number (n=142)	Percentage (%)
Newly Diagnosed (untreated)	50	35.2
Previously Diagnosed (on medication)	92	64.8
Type of Medication		
Levothyroxine	90	97.8
Other (e.g., combination therapy)	2	2.2

The majority of participants (64.8%) were already on medication, primarily levothyroxine.

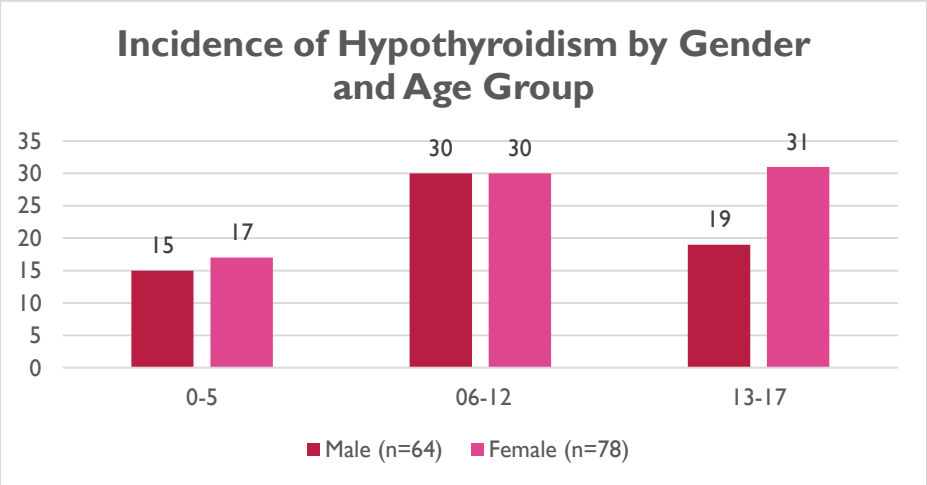


Graph 6: Treatment Status of Participants

Table 7: Incidence of Hypothyroidism by Gender and Age Group

Age Group (years)	Male (n=64)	Female (n=78)
0-5	15 (23.4%)	17 (21.8%)
6-12	30 (46.9%)	30 (38.5%)
13-17	19 (29.7%)	31 (39.7%)

Females had a higher incidence of hypothyroidism in the 13-17 age group, while the incidence was more evenly distributed in younger age groups.



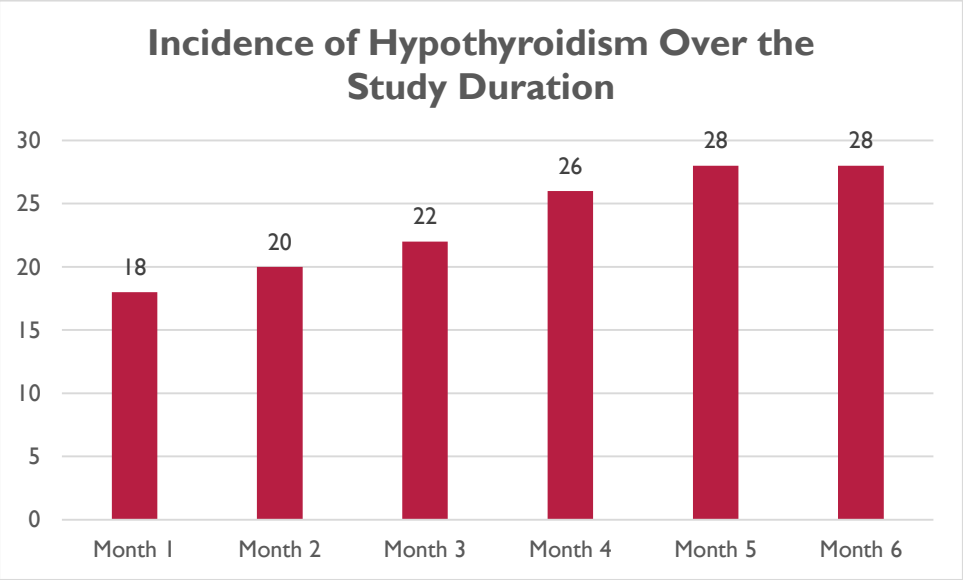
Graph 7: Incidence of Hypothyroidism by Gender and Age Group

Table 8: Incidence of Hypothyroidism Over the Study Duration

Month	Number of Diagnosed Cases
Month 1	18
Month 2	20

Month	Number of Diagnosed Cases
Month 3	22
Month 4	26
Month 5	28
Month 6	28

The incidence of hypothyroidism cases remained relatively consistent over the study period, with a slight increase observed towards the end.



Graph 8: Incidence of Hypothyroidism Over the Study Duration

4. DISCUSSION

The present study aimed to determine the incidence of hypothyroidism among pediatric patients (below 18 years) attending a territory-level hospital in Greater Noida. The study revealed that hypothyroidism is prevalent among the pediatric population, with a notable incidence across different age groups and genders. A total of 142 patients were included in the study, offering a comprehensive understanding of how hypothyroidism affects children and adolescents within this geographic region.

The demographic analysis revealed that the age group 6-12 years accounted for the largest proportion of hypothyroid patients (42.3%), followed by the 13-17 years age group (35.2%) and the 0-5 years age group (22.5%). This pattern suggests that school-aged children and early adolescents are particularly susceptible to hypothyroidism, possibly due to the developmental changes and hormonal shifts occurring during these ages. Females were slightly more affected than males, comprising 54.9% of the study population, compared to 45.1% males. This gender distribution aligns with the understanding that hypothyroidism is generally more prevalent in females across different age groups, potentially due to differences in hormonal and genetic factors.

The clinical presentation of hypothyroidism in the pediatric population varied, with the most frequently reported symptom being fatigue, experienced by 52.8% of the participants. This aligns with typical manifestations of hypothyroidism, where low thyroid hormone levels lead to reduced metabolic activity and fatigue. Weight gain, reported by 42.3% of the participants, was the second most common symptom. This may be attributed to decreased metabolism and fluid retention often associated with hypothyroidism. Growth retardation was reported in 31.7% of cases, a particularly concerning finding as it underscores the potential impact of thyroid hormone deficiency on growth and development in children. Learning difficulties were noted in 24.6% of the cases, indicating the cognitive impact of hypothyroidism and emphasizing the need for early diagnosis and intervention to prevent long-term neurocognitive deficits. Other notable symptoms included constipation (33.8%), dry skin (35.2%), and delayed puberty (reported in 30% of adolescents aged 13-17), further highlighting the diverse clinical spectrum of pediatric hypothyroidism.

The assessment of thyroid-stimulating hormone (TSH) levels among the study participants revealed significant elevations, with varying degrees of severity. Approximately 38.7% of the patients had TSH levels ranging from 4.5 to 10 µIU/mL, while 35.2% had levels between 10.1 and 20 µIU/mL, and 26.1% had levels greater than 20 µIU/mL. The distribution of TSH levels suggests that while some patients presented with mild hypothyroidism, a substantial proportion exhibited moderate to severe thyroid dysfunction, indicating an urgent need for treatment and follow-up. The correlation between TSH levels and clinical symptoms further demonstrated that higher TSH levels were associated with a greater prevalence and severity of symptoms. For instance, 81.1% of patients with TSH levels above 20 µIU/mL reported fatigue, while only 36.4% of those with TSH levels between 4.5 and 10 µIU/mL reported this symptom. Similarly, growth retardation and learning difficulties were more common in patients with TSH levels exceeding 20 µIU/mL, at 54.1% and 54.1%, respectively.

Comorbid conditions were also prevalent in the study population, with obesity (24.6%) and anemia (21.1%) being the most frequently associated conditions. The high prevalence of obesity is particularly concerning, as it may exacerbate hypothyroid symptoms and contribute to metabolic complications. Anemia, which was present in over one-fifth of the participants, can further compound the symptoms of hypothyroidism, such as fatigue and weakness. Other comorbidities included congenital heart disease (7%) and type 1 diabetes mellitus (5.6%), highlighting the need for comprehensive management strategies that address both thyroid dysfunction and associated health conditions in pediatric patients.

The treatment status of the participants indicated that a majority (64.8%) were already diagnosed and on medication, with levothyroxine being the most commonly prescribed treatment (97.8%). Levothyroxine, a synthetic thyroid hormone, is the standard treatment for hypothyroidism and is effective in normalizing thyroid hormone levels and alleviating symptoms. A considerable portion of the study population (35.2%) were newly diagnosed cases, which underscores the need for greater awareness and screening for hypothyroidism in pediatric populations. Early detection and initiation of treatment are critical in preventing complications related to growth, development, and cognitive function in affected children.

When analyzing the gender and age distribution, the incidence of hypothyroidism was found to be relatively evenly distributed across males and females in the younger age groups (0-5 and 6-12 years). However, a higher incidence was observed in females within the 13-17 years age group (39.7% females vs. 29.7% males), consistent with known patterns of thyroid disease, which tend to be more prevalent in females, especially during adolescence when hormonal changes may influence thyroid function.

The study also assessed the trend in the incidence of hypothyroidism over the study duration, with a gradual increase observed over the six-month period. While the exact reasons for this trend are not entirely clear from the current data, it may reflect increased detection and diagnosis rates, seasonal variations, or changes in environmental and nutritional factors that could impact thyroid health. The highest number of diagnosed cases was recorded in the last month of the study (28 cases), suggesting that ongoing monitoring and public health efforts are needed to identify and manage hypothyroidism in pediatric populations.

The findings of this study have important clinical implications. The high incidence of hypothyroidism among children and adolescents underlines the importance of routine screening, especially in high-risk groups, such as those presenting with symptoms like fatigue, growth retardation, or learning difficulties. The association between elevated TSH levels and more severe clinical symptoms emphasizes the need for timely and adequate treatment to prevent complications. Additionally, the co-occurrence of comorbidities like obesity and anemia points to the necessity of a multidisciplinary approach in managing pediatric hypothyroidism, focusing not only on hormonal replacement but also on addressing associated metabolic and nutritional issues.

5. CONCLUSION

In conclusion, this study highlights the significant burden of hypothyroidism among pediatric patients in a territory-level hospital in Greater Noida. The findings emphasize the need for early diagnosis, appropriate treatment, and comprehensive management of hypothyroid patients to improve their growth, development, and overall quality of life. Future research is warranted to explore the underlying factors contributing to the high incidence of hypothyroidism in this population, to assess the long-term outcomes of treatment, and to develop targeted interventions to mitigate the impact of this condition on pediatric health.

REFERENCES

[1] Brent GA. Clinical practice. Hypothyroidism diagnosis and treatment. N Engl J Med. 2016;367(2):1245-55.

[2] Vanderpump MP. The epidemiology of thyroid disease. Br Med Bull. 2011;99(1):39-51.

[3] Hollowell JG, et al. Serum TSH, T4, and thyroid antibodies in the United States population. J Clin Endocrinol Metab. 2002;87(2):489-99.

[4] Unnikrishnan AG, et al. Prevalence of hypothyroidism in adults: an epidemiological study in eight cities of India. Indian J Endocrinol Metab. 2013;17(4):647-52.

[5] Taylor PN, et al. Global epidemiology of hyperthyroidism and hypothyroidism. Nat Rev Endocrinol. 2018;14(5):301-16.

[6] Chaker L, et al. Hypothyroidism. Lancet. 2017;390(10101):1550-62.

[7] Garber JR, et al. Clinical practice guidelines for hypothyroidism in adults. Thyroid. 2012;22(12):1200-35.

[8] Wiersinga WM, et al. Hypothyroidism and thyroid function. BMJ. 2013;347:3034.

[9] Razvi S, et al. Cardiovascular risk and mortality in subclinical hypothyroidism. BMJ. 2012;345:3222.

[10] Bahn RS, et al. Hyperthyroidism and other causes of thyrotoxicosis: management guidelines. Endocrine. 2016;22(1):1-33.

[11] Gaitonde DY, et al. Hypothyroidism: an update. Am Fam Physician. 2012;86(3):244-51.

[12] Marwaha RK, et al. Prevalence of thyroid disorders in India. J Clin Endocrinol Metab. 2011;34(2):367-74.

[13] Pearce EN. Hypothyroidism and dyslipidemia. Endocr Pract. 2018;24(11):947-50.

[14] Maratou E, et al. Hypothyroidism and insulin resistance. Horm Metab Res. 2009;41(9):654-9.