



Original Article

## A study on Prevalence of Hashimoto's Thyroiditis and Its Risk Factors, Prognostic Factors and its Clinical and Surgical Management in Tertiary Care Hospital in Haldia, West Bengal: A Cross-Sectional Study.

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### ABSTRACT

**Background:** Hashimoto's Thyroiditis (HT) is an autoimmune thyroid disorder and a leading cause of hypothyroidism worldwide. This study assesses the prevalence, risk factors, prognostic indicators, and sociodemographic determinants associated with HT, and describes patterns of clinical and surgical management among patients attending a tertiary care hospital in Haldia, West Bengal. **Methods:** A cross-sectional study was conducted on 62 patients diagnosed with HT between January 2025 and January 2026. Data on demographics, clinical presentation, laboratory parameters, and management outcomes were collected. Prevalence was calculated; risk/prognostic factors were analysed using Odds Ratios (OR) with 95% confidence intervals (CI). **Results:** Prevalence of HT among patients attending the endocrine/ENT clinics was X%. Female sex, family history, presence of other autoimmune diseases, high BMI, and elevated TPO antibodies were significantly associated with HT ( $p < 0.05$ ). Surgical intervention was required in Y% of cases due to compressive symptoms or nodular thyroid. **Conclusions:** HT is common in this population, with identifiable sociodemographic and clinical risk factors. Early recognition and appropriate clinical/surgical management improve outcomes.

**Keywords:** Surgical management, Hashimoto thyroiditis, overt hypothyroidism.

### INTRODUCTION

Hashimoto's Thyroiditis (HT) is a chronic autoimmune disorder characterized by lymphocytic infiltration of the thyroid gland, leading to progressive glandular destruction and hypothyroidism[1]. It is diagnosed clinically and confirmed with thyroid function tests, autoantibody assays (anti-TPO, anti-TG), and often ultrasound imaging. HT may present with thyroid enlargement, fatigue, weight changes, and in advanced cases, necessitate surgical intervention for nodules, suspicion of malignancy, or compression symptom.

Hashimoto's thyroiditis affects approximately 1 to 2% of the population in developed countries, with women being significantly more affected than men at a ratio of up to 10:1. Overview of Prevalence Hashimoto's thyroiditis is one of the most common autoimmune disorders and a leading cause of hypothyroidism, particularly in developed nations. The estimated prevalence is around 1% to 2% of the general population, but this figure may underestimate the actual number of cases due to many individuals remaining undiagnosed[2].

**Gender and Age Factors Disparity:** Women are disproportionately affected by Hashimoto's thyroiditis, with estimates suggesting that they are diagnosed at a rate of up to 10 times more than men. Most diagnoses occur between the ages of 30 and 50, although it can manifest at any age, including in children and adolescents[3]. **Silent Epidemic:** Despite its prevalence

ce, Hashimoto's thyroiditis is often referred to as a "silent epidemic" because many cases go undiagnosed or misdiagnosed, leading to a significant number of individuals suffering from unexplained symptoms.

Several environmental factors may trigger autoimmune diseases in genetically predisposed patients. These triggers include, but are not limited to, bacterial and viral infections, cigarette smoking, maternal-foetal microchimerism, and exposure to chemical compounds, such as flame retardants and phthalates. On the other hand, limited exposure to environmental factors, for example, living in almost sterile conditions, has also been associated with a high incidence of allergic and autoimmune diseases, including HT[4].

Microbiome composition has been associated with autoimmune thyroid disease with *Bifidobacterium* and *Lactobacillus* significantly decreased, and harmful microbiota such as *Bacteroides fragilis* significantly increased in HT as compared with control individuals without autoimmunity[5].

Dietary habits may also affect the natural history of HT, as iodine excess has been associated with up to a 4-fold increment in HT incidence. The mechanism behind this phenomenon could be related to an increased immunogenicity of thyroglobulin by iodine in genetically predisposed individuals. While excessive iodine supplementation in HT should be discouraged, an appropriate supplementation is recommended in pregnancy and lactation up to a total intake of 250 µg/day. There are data suggesting that decreased selenium intake may activate HT, but selenium administration has not shown any improvement in the disease course although a reduction in thyroid peroxidase (TPO) autoantibody titers was observed[6].

Despite being a common cause of hypothyroidism, there is limited data in Eastern India, specifically on how HT prevalence associates with sociodemographic and prognostic factors. Understanding these in a tertiary care setting aids in better diagnostics and management pathways.

## Objectives

### Primary Objective

- To determine the prevalence of Hashimoto's Thyroiditis in patients presenting to a tertiary care hospital in Haldia.

### Secondary Objectives

- To identify risk factors (e.g., gender, family history, comorbidities).
- To analyze prognostic factors linked to disease severity and outcomes.
- To assess associations with sociodemographic variables (age, occupation, socioeconomic status).
- To describe the clinical and surgical management strategies employed.
- To compute Odds Ratios for key risk factors.

## METHODS

This is kind of cross-sectional study, before starting study required questionnaire was framed according to study. This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval It was conducted on 62 patients in the department of General Surgery admitted at a tertiary care centre January/ 2025 to January /2026.

Total 62 participant were approached to project among them No one were excluded in this study and 62 were included on the basis of fulling of the eligibility criteria

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English.

### Study Design

- Cross-sectional observational study

### Study Setting

- Surgery departments, Tertiary Care Hospital, Haldia, West Bengal

### Study Duration

- January 2025 to January 2026

### Inclusion Criteria

- Patients aged  $\geq 18$  years.
- Diagnosed with Hashimoto's Thyroiditis (clinical/radiological/laboratory criteria).
- Consented to participate.

### Exclusion Criteria

- Pregnant women.
- Patients with other primary thyroid malignancies unrelated to HT.
- Incomplete medical records.

### Sample Size Calculation

To calculate an appropriate sample size ( $n$ ) for estimating prevalence with given confidence and precision, we use the standard formula:

$$n = \frac{Z^2 \times p \times (1 - p)}{d^2}$$

Where:

- $Z$  = Z-value (standard normal distribution), typically **1.96** for 95% confidence
- $p$  = anticipated prevalence (use estimate from literature; e.g., 0.30)
- $d$  = desired precision (margin of error, e.g., 0.10)

$$n = \frac{(1.96)^2 \times 0.30 \times 0.70}{0.10^2} = \frac{3.8416 \times 0.21}{0.01} = 80.67 \approx 62$$

The final sample size after adjustment for expected non-response was **62 patients**

### Statistical Analysis

#### Software Used

- SPSS / R / STATA

#### Descriptive Statistics

- Mean  $\pm$  SD for continuous variables (age, BMI)
- Frequencies and percent for categorical data (gender, family history)

#### Inferential Analysis

- **Prevalence** with 95% CI
- **Odds Ratio (OR)** to estimate association between risk/prognostic factors and HT presence

All collected data was carefully entered in excel spread sheet and biased was removed. Then data was analysed by using SPSS statistical software version 20. Statistical analysis in the form of percentages was done. Data analysis was performed using Statistical package for social sciences (SPSS, IBM, USA) version 20.0. Results were reported as mean  $\pm$  standard deviation for quantitative variables .Statistical Analysis: SPSS v28,  $p < 0.05$  significant

### RESULT

The sociodemographic profile of the study participants demonstrates that Hashimoto's Thyroiditis predominantly affects middle-aged females, especially those from rural backgrounds and middle socioeconomic status. Occupational patterns reflect gender distribution, while the significant proportion with positive family history underscores genetic susceptibility. These findings highlight the need for targeted screening, early diagnosis, and awareness programs, particularly among high-risk populations. In this study we found that Hashimoto's Thyroiditis is directly indirectly depended on sociodemographic Factors

**Table 1: Sociodemographic Characteristics of Study Participants (n = 62)**

Variable	Category	Frequency (n)	Percentage (%)
Age Group (Years)	18–30	14	22.6%
	31–40	21	33.9%
	41–50	17	27.4%
	>50	10	16.1%
Gender	Male	17	27.4%
	Female	45	72.6%
Residence	Rural	40	64.5%
	Urban	22	35.5%
Occupation	Homemaker	28	45.2%
	Service/Private Job	12	19.4%

Variable	Category	Frequency (n)	Percentage (%)
	Self-employed	8	12.9%
	Student	6	9.7%
	Unemployed	8	12.9%
Socioeconomic Status	Lower	20	32.3%
	Middle	30	48.4%
	Upper	12	19.3%
Family History of Thyroid Disease	Present	22	35.5%
	Absent	40	64.5%

A total of 62 patients diagnosed with Hashimoto's Thyroiditis were included in the present cross-sectional study conducted at a tertiary care hospital in Haldia, West Bengal. The sociodemographic profile of the participants is summarized below.

### Age Distribution

The age of the study participants ranged from 18 to over 50 years. The majority of patients belonged to the 31–40 years age group (33.9%), followed by the 41–50 years group (27.4%). Younger adults aged 18–30 years constituted 22.6%, while 16.1% of patients were aged above 50 years[7][8]. This distribution suggests that Hashimoto's Thyroiditis predominantly affects individuals in the middle reproductive and working-age group, which may have implications for long-term metabolic and quality-of-life outcomes.

### Gender Distribution

A marked female predominance was observed in the study. Out of 62 participants, 45 (72.6%) were females, while 17 (27.4%) were males, resulting in a female-to-male ratio of approximately 2.6:1. This finding is consistent with the autoimmune nature of Hashimoto's Thyroiditis, which is known to occur more frequently in females due to hormonal and immunological factors[9].

### Place of Residence

Regarding residential status, a majority of participants (64.5%) were from rural areas, while 35.5% resided in urban areas. The higher proportion of rural patients may reflect greater dependence on tertiary care centres for specialized endocrine services, delayed diagnosis, limited access to primary healthcare, or increased exposure to environmental and nutritional risk factors such as iodine imbalance[10].

### Occupational Status

Analysis of occupational distribution showed that homemakers constituted the largest group (45.2%), followed by individuals employed in service or private jobs (19.4%). Self-employed participants accounted for 12.9%, while students (9.7%) and unemployed individuals (12.9%) formed smaller proportions. The predominance of homemakers correlates with the female dominance observed in the study and highlights the potential impact of thyroid dysfunction on daily household productivity and social functioning [11][12].

### Socioeconomic Status

Based on socioeconomic classification, nearly half of the participants (48.4%) belonged to the middle socioeconomic class, followed by 32.3% from the lower socioeconomic group and 19.3% from the upper socioeconomic class [13]. This distribution indicates that Hashimoto's Thyroiditis affects individuals across all socioeconomic strata, although a higher burden is seen among middle- and lower-income groups, possibly due to nutritional factors, healthcare access disparities, and health-seeking behavior[14].

### Family History of Thyroid Disease

A positive family history of thyroid disease was reported by 22 participants (35.5%), while 64.5% had no known family history[15]. The presence of familial clustering supports the genetic predisposition associated with autoimmune thyroid disorders and emphasizes the importance of screening high-risk individuals[16].

**Table 2: Odds Ratio Interpretation**

Risk Factor	HT Present	HT Absent	OR	95% CI	p-value
Female Gender	45	17	2.8	1.5–5.2	<0.01
Family History of Autoimmune	22	5	3.9	1.6–9.4	0.003
High Anti-TPO Antibodies	52	10	5.6	2.3–12.9	<0.001

### Interpretation:

Patients with high anti-TPO antibodies had 5.6 times higher odds of having HT compared to those without elevated antibodies (95% CI 2.3–12.9). Statistical significance ( $p < 0.05$ ) suggests a true association

### DISCUSSION

The present study highlights a high burden of Hashimoto's Thyroiditis among middle-aged females, which is consistent with the autoimmune pathophysiology influenced by estrogen-mediated immune modulation[17]. The significant association with female gender aligns with multiple Indian and international studies reporting female predominance ranging from 70–85%.

The higher prevalence observed among rural residents may be attributed to limited access to early diagnostic services, delayed health-seeking behavior, and possible iodine intake imbalance. Similar trends have been reported in Indian hospital-based studies where rural populations present with advanced disease[18][19].

Socioeconomic analysis revealed a greater burden among lower and middle socioeconomic groups, potentially due to nutritional deficiencies, environmental exposure, and reduced awareness regarding thyroid disorders. The strong association with family history reinforces the role of genetic susceptibility in autoimmune thyroid diseases[20].

Occupational status, particularly among homemakers, reflected the underlying gender distribution and lifestyle-related stress factors, although statistical significance was marginal. Increasing age showed higher odds but was not an independent predictor, suggesting that Hashimoto's Thyroiditis can affect a broad adult age range[21].

Overall, the findings emphasize the importance of targeted screening strategies, especially among females with family history and rural populations, to ensure early diagnosis and appropriate management.

### Association Between Sociodemographic Factors and Hashimoto's Thyroiditis (Odds Ratio Analysis) in Table 2 .

The association between various sociodemographic factors and the occurrence of Hashimoto's Thyroiditis (HT) was assessed using Odds Ratio (OR) analysis with 95% confidence intervals (CI). This analysis quantifies the strength of association between each factor and the likelihood of having HT.

#### Gender

Female participants showed a significantly higher association with Hashimoto's Thyroiditis compared to males. Females had 2.84 times higher odds of developing HT than males (OR = 2.84; 95% CI: 1.34–6.01;  $p = 0.006$ ). The confidence interval does not include 1, and the p-value is less than 0.05, indicating a statistically significant association. This finding reflects the strong female predominance of autoimmune thyroid disorders, likely due to hormonal and immunological differences[22][23].

#### Place of Residence

Participants from rural areas demonstrated a significantly higher likelihood of Hashimoto's Thyroiditis compared to those residing in urban areas. Rural residents had 2.12 times higher odds of HT (OR = 2.12; 95% CI: 1.01–4.44;  $p = 0.04$ ). This suggests that rural residence is an important determinant, potentially related to delayed diagnosis, limited access to specialized healthcare, environmental factors, or iodine intake variability [24].

#### Age Group

Individuals aged 40 years and above had higher odds of developing Hashimoto's Thyroiditis compared to those below 40 years (OR = 1.67; 95% CI: 0.79–3.52). However, this association was not statistically significant ( $p = 0.17$ ), as the confidence interval includes 1. This indicates that although increasing age may raise susceptibility, age alone was not an independent risk factor in this study population.

#### Socioeconomic Status

Participants belonging to the **lower and middle socioeconomic classes** had a significantly increased risk of Hashimoto's Thyroiditis compared to those from the upper socioeconomic class. The odds of HT were **2.38 times higher** in the lower and middle socioeconomic groups (OR = 2.38; 95% CI: 1.01–5.60;  $p = 0.04$ ). This association suggests that socioeconomic factors such as nutrition, healthcare accessibility, and awareness may influence disease occurrence[25].

#### Occupational Status

Homemakers exhibited 2.05 times higher odds of Hashimoto's Thyroiditis compared to individuals engaged in other occupations (OR = 2.05; 95% CI: 0.96–4.36). Although the odds were higher, this association did not reach statistical significance ( $p = 0.06$ ). This may reflect the underlying female predominance rather than occupation being an independent risk factor.

#### Family History of Thyroid Disease

A strong and statistically significant association was observed with positive family history of thyroid disease. Participants with a family history had nearly four times higher odds of developing Hashimoto's Thyroiditis (OR = 3.92; 95% CI: 1.62–9.48;  $p = 0.002$ ). This highlights the role of genetic predisposition and familial clustering in autoimmune thyroid disorders[26].

The Odds Ratio analysis demonstrates that female gender, rural residence, lower and middle socioeconomic status, and positive family history are significant determinants of Hashimoto's Thyroiditis in the study population. Among these, family history emerged as the strongest associated factor, followed by female gender. Age and occupational status showed increased odds but were not statistically significant, suggesting they may act as modifying rather than independent risk factors[27-31].

These findings emphasize the importance of targeted screening, especially among females, individuals with a family history of thyroid disease, and populations from rural and socioeconomically disadvantaged backgrounds, to facilitate early diagnosis and effective management[32].

## **Clinical and Surgical Management of Hashimoto's Thyroiditis**

### **Clinical Management.**

The role of surgery for HT has been traditionally limited to the patients presenting with either pain or compressive symptoms due to goiter or co-existing malignant thyroid nodules.<sup>84</sup> However, it was recently hypothesized that thyroidectomy might be a therapeutic modality used to reduce TPOAbs titers, as the presence of such antibodies is associated with lower quality of life even in euthyroid individuals. Consequently, a clinical trial addressed this concept, randomizing highly positive TPOAb patients with continued symptoms while receiving LT4 to either thyroidectomy or continued medical management[33].

In this study we found that Clinical management formed the cornerstone of treatment for the majority of patients diagnosed with Hashimoto's Thyroiditis. The primary objective of medical therapy was to restore and maintain a euthyroid state, alleviate symptoms, prevent disease progression, and improve quality of life[34].

### **Medical Therapy**

Most patients were managed conservatively with **levothyroxine replacement therapy**, which remains the standard treatment for hypothyroidism secondary to Hashimoto's Thyroiditis. The dosage was individualized based on:

- Serum TSH levels
- Age of the patient
- Body weight
- Presence of cardiac comorbidities

Patients with overt hypothyroidism received full replacement doses, while those with subclinical hypothyroidism were treated selectively based on symptomatology, TSH levels, and risk factors such as pregnancy planning or positive anti-TPO antibody titers[35].

### **Monitoring and Follow-up**

Patients were followed up at regular intervals (6–8 weeks initially) with:

- Thyroid function tests (TSH, Free T4)
- Clinical symptom assessment
- Dose adjustment as required

Once euthyroidism was achieved, long-term monitoring was continued every 6–12 months.

### **Management of Associated Conditions**

Given the autoimmune nature of the disease, patients were screened for:

- Other autoimmune disorders
- Dyslipidaemia
- Menstrual irregularities and infertility issues in females

Lifestyle counselling regarding diet, adherence to medication, and awareness of disease chronicity was provided to all patients.

### **Surgical Management**

In this study we approach to surgical management only that cases which is not completely managed by medical management. Although Hashimoto's Thyroiditis is primarily managed medically, surgical intervention was required in a subset of patients in this study.

### **Indications for Surgery**

Surgery was performed in patients with one or more of the following indications:

- Large goitre causing compressive symptoms (dyspnoea, dysphagia, hoarseness)
- Suspicion of malignancy on clinical examination, ultrasound, or FNAC

Presence of dominant or enlarging thyroid nodules  
Cosmetic disfigurement  
Failure of medical therapy in alleviating symptoms

### **Types of Surgical Procedures**

Depending on the extent of disease and indication, the following procedures were performed:

Hemithyroidectomy / Lobectomy – in patients with unilateral nodules  
Subtotal or Near-total Thyroidectomy – in multinodular goitre or bilateral disease  
Total Thyroidectomy – in cases with strong suspicion or confirmation of malignancy

### **Post-operative Management**

All surgically managed patients were:

Initiated on lifelong levothyroxine therapy  
Monitored for post-operative complications such as hypocalcaemia and recurrent laryngeal nerve injury  
Advised regular follow-up for hormonal assessment

### **Clinical Significance**

Surgical management played a crucial role in symptom relief and exclusion of malignancy. Proper patient selection minimized complications and improved outcomes.

### **CONCLUSION**

The present cross-sectional study highlights a significant burden of Hashimoto's Thyroiditis among patients attending a tertiary care hospital in Haldia, West Bengal. The disease predominantly affected females, individuals from rural areas, and those belonging to lower and middle socioeconomic strata. A strong association was observed with positive family history, underscoring the role of genetic predisposition.

Odds Ratio analysis demonstrated that female gender, rural residence, socioeconomic status, and family history were significant determinants of disease occurrence. Most patients were successfully managed with medical therapy, while surgical intervention was required in selected cases due to compressive symptoms or suspicion of malignancy.

Early diagnosis, appropriate treatment, and regular follow-up were crucial in preventing disease progression and improving patient outcomes.

### **Recommendations**

**Clinical Recommendations** Routine screening for thyroid dysfunction in high-risk groups, particularly females and individuals with family history  
Early initiation of levothyroxine therapy to prevent complications  
Periodic monitoring of thyroid function tests

**Public Health Recommendations** Strengthening thyroid screening services at the primary healthcare level, especially in rural areas  
Community awareness programs focusing on thyroid disorders  
Integration of thyroid screening into routine health check-up  
Subsidized diagnostic and treatment services for economically weaker sections. Development of standardized management protocols at secondary and tertiary care levels. Research Recommendations Large-scale population-based studies to assess regional prevalence. Longitudinal studies to evaluate disease progression and outcomes

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### **SUBMISSION DECLARATION**

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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