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Review Article

Prevalence of Hyperthyroidism in India: Epidemiology, Determinants, and Public Health Implications

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Abstract

Hyperthyroidism is a significant endocrine disorder characterized by excess synthesis and secretion of thyroid hormones. Although hypothyroidism has drawn more attention in India, hyperthyroidism represents a growing public health concern, particularly in iodine-replete regions where autoimmune etiologies increasingly predominate. This paper reviews recent epidemiological data, risk determinants, and the national context of thyroid function disorders, focusing on the prevalence and distribution of hyperthyroidism across India. Analysis draws on large-scale epidemiological studies, regional hospital-based surveys, and meta-analytic reviews. Overall, the prevalence of overt and subclinical hyperthyroidism in India ranges between 1–3%, with notable gender, age, and geographic variation. Determinants include autoimmune susceptibility, iodine intake patterns, environmental goitrogens, stress, and genetic predisposition. The findings underscore the need for continuous surveillance, targeted screening in vulnerable populations, and integration of thyroid health into national non-communicable disease programs.

Keywords: Hyperthyroidism, India, Graves' disease, thyroid epidemiology, autoimmune thyroiditis, iodine nutrition, public health, thyroid screening.

1. INTRODUCTION

Thyroid disorders are among the most prevalent endocrine diseases worldwide, second only to diabetes. In India, approximately 42 million individuals suffer from thyroid dysfunction, with hypothyroidism, hyperthyroidism, and autoimmune thyroiditis being the dominant forms [1]. Hyperthyroidism, characterized by elevated serum triiodothyronine (T_3) and thyroxine (T_4) with suppressed thyroid-stimulating hormone (TSH), manifests clinically as weight loss, palpitations, heat intolerance, tremor, anxiety, and ophthalmopathy in certain cases.

Despite the recognized burden, the epidemiology of hyperthyroidism in India remains less thoroughly explored than hypothyroidism. This paper seeks to consolidate evidence on the prevalence, determinants, and public health implications of hyperthyroidism across India.

2. EPIDEMIOLOGY

2.1 National Overview

A landmark population-based survey conducted in Cochin reported an overall hyperthyroidism prevalence of 2.9% (1.3% overt, 1.6% subclinical), among a representative sample of 971 adults aged ≥20 years [1]. Similar analyses in Pondicherry women found subclinical and overt hyperthyroidism in 0.6% and 1.2%, respectively.

More recent analyses from North India (2018–2023) covering a 12,775-patient dataset found 26% of thyroid dysfunction cases attributable to hyperthyroidism, showing a higher prevalence among women (75%), especially aged 18–35 years [2].

2.2 Meta-analytical Evidence

A meta-analysis of 28 studies, including data across all Indian zones, estimated the overall prevalence of thyroid disorders at 18.75%, of which hyperthyroidism accounted for approximately 2–3% [3,5].

2.3 Regional Variations

- **Southern India (Kerala, Tamil Nadu):** Reports estimate 1.3–2.7% prevalence [4].
- **North India (Uttar Pradesh, Uttarakhand):** Frequency higher, up to 4–5%, possibly due to residual iodine imbalance.

- **Northeast and Himalayan belts:** Historically endemic for iodine deficiency, now showing a shift toward autoimmune hyperthyroidism post-iodization.

3. DETERMINANTS OF HYPERTHYROIDISM

3.1 Iodine Nutrition

Universal salt iodization dramatically reduced goiter and hypothyroidism but coincided with increased autoimmune thyroid disease prevalence. In iodine-sufficient populations, Graves' disease and toxic multinodular goiter are leading causes.

3.2 Autoimmune Predisposition

Anti–thyroid peroxidase (anti-TPO) and anti–TSH receptor antibodies are detected in up to 34% of individuals with thyroid dysfunction, predominantly in females [2].

3.3 Demographic and Genetic Factors

- **Gender:** Females are disproportionately affected (female-to-male ratio ≈ 6–8:1).
- **Age:** Incidence peaks in the third to fifth decades.
- Family history and HLA polymorphisms (e.g., HLA-B8, DR3) show associations with Graves' disease.

3.4 Environmental and Lifestyle Factors

- Excessive psychological stress and infections can exacerbate autoimmune processes.
- Exposure to goitrogens such as thiocyanate from cruciferous vegetables and smoking contributes to risk in susceptible individuals.
- Postpartum women are particularly prone due to immune rebound phenomena.

4. CLINICAL AND PUBLIC HEALTH BURDEN

Hyperthyroidism contributes to cardiovascular morbidity (atrial fibrillation, hypertension), metabolic disturbances, and bone loss. Subclinical hyperthyroidism, often asymptomatic, has been linked to increased risk of atrial arrhythmias and fractures in elderly women.

From a public health standpoint, the condition affects work productivity, reproductive health, and poses risks during pregnancy and lactation due to adverse fetal effects.

Given India's demographic profile with nearly half the population under 35 years, the disease's socio-economic implications are considerable.

5. DIAGNOSTIC AND PROGRAMMATIC CHALLENGES

5.1 Laboratory Diagnostics

While thyroid function testing (TSH, FT_3, FT_4) is widely available in urban centers, rural access is limited. Subtle biochemical variations, assay discrepancies, and lack of pregnancy-specific reference ranges complicate interpretation.

5.2 Surveillance Limitations

India lacks a nationwide thyroid registry. Most prevalence estimates derive from hospital based or regional studies with heterogeneous methodology, leading to underestimation.

6. PREVENTION AND CONTROL STRATEGIES

1. **Strengthen National Iodine Deficiency Disorder Control Program (NIDDCP):** Continuous monitoring of iodization levels to prevent iodine excess.
2. **Integrate Screening:** Incorporate thyroid function testing in maternal and reproductive health clinics.
3. **Health Education:** Awareness on early symptoms and diet–thyroid interactions.
4. **Research Network:** Establish population-based registries for thyroid disorders through collaboration with the Indian Council of Medical Research (ICMR).

7. DISCUSSION

Thyroid problems are still poorly diagnosed and treated in India. Thyroid disorder registries may help estimate the severity of thyroid issues' effects because this knowledge can affect the laws governing how these disorders are treated. India demonstrates a dual burden continuing iodine deficiency in isolated regions and rising autoimmune thyroid disease in urban, iodine-sufficient populations. The steady prevalence of hyperthyroidism reflects improved detection and possible autoimmune surge following universal iodization.

Notably, hyperthyroidism is more frequently observed among women of reproductive age, underscoring the necessity for targeted interventions. Socioeconomic factors, environmental exposures, and genetic susceptibility interplay in disease expression, warranting multidisciplinary public health approaches [5]. All women of reproductive age should have enough iodine [6]. Most individuals with juvenile autoimmune thyroiditis should have their near relatives screened. The recommendations above would be based on research from Indian and Western research and treatment practices from various organizations [7]. The study advises thyroid screening programs regularly and addresses issues of restricted availability to prophylactic and treatment facilities. Thyroid management standards must be considered by our assets, even if the backdrop set up is weak, and education initiatives must be concerned with preventing thyroid disorders [8].

According to a professional survey, over a third of the Indian population suffers from thyroid disorders,

implying that approximately 32% million Indians suffer from gland abnormalities in some way [9]. Men and women experience weakness, weariness, weight gain, depression, and elevated cholesterol levels due to hypothyroidism (hypothyroidism). Thyroid issues is a disorder wherein the thyroid generates too much of the hormone thyroxin, which causes fast or irregular pulse, perspiration, and agitation or irritation [10]. People residing in the North areas of India had reported the most cases of hypothyroidism compared to most of the country. The thyroid could be effectively treated with earlier detection and medication. Hormone replacement is a simple and effective way to control discomfort and avoid problems [11].

The most prevalent endocrine illness impacting the general population, thyroid dysfunction, considerably raises the morbidity rate. The thyroid in pregnancy and childhood has been the subject of exciting research in India during the last two years [12]. One in ten persons in the research sample had hypothyroidism, making it a common condition. Hypothyroidism was found to be strongly correlated with older age and female gender [13]. Females who are older and overweight appear to be more susceptible. In a sizeable portion of patients, autoimmune mechanisms are the root cause of the disease. Intake of iodine is no longer the only etiological factor for thyroid diseases in metropolitan environments. But after universal salt iodization, we wanted to understand the extent of the iodine deficiency and how it affected the incidence of thyroid dysfunction and autoimmune disease in this poor society [14].

8. CONCLUSION

Hyperthyroidism, though less prevalent than hypothyroidism, affects 2–4% of India's population and disproportionately impacts women and iodine-sufficient regions. It remains a significant yet underappreciated endocrine challenge, requiring enhanced surveillance, standardized diagnostic criteria, and public health integration. Policymakers should prioritize thyroid health as part of India's broader non-communicable disease framework.

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