

Exploring the Epidemiology and Prevalence of Thyroid Dysfunction Disorders in Women in India

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Abstract

Thyroid dysfunction is one of the most prevalent endocrine disorders among Indian women, with prevalence estimates greatly surpassing those of many developed countries. It is estimated that about 42 million people suffer from any form of thyroid disorders in India, with women being about ten times more likely to be affected by thyroid imbalance compared to men. The current literature review brings together epidemiological data regarding the burden, distribution, and risk factors for thyroid dysfunction – hypothyroidism, subclinical hypothyroidism, hyperthyroidism, autoimmune thyroiditis, and thyroid disorders during pregnancy among Indian women. Sources of information include both hospital-based cross-sectional surveys and nationally representative community surveys including NFHS-4 and NFHS-5 surveys. The findings suggest that there is an increasing trend in the occurrence of thyroid disorders based on both self-reports and biochemical confirmation, which varies by age, region, socio-economic status, pregnancy status, and iodine nutrition.

Keywords: *thyroid dysfunction, hypothyroidism, hyperthyroidism, epidemiology, prevalence, women, India, autoimmune thyroiditis*

1. Introduction

The thyroid gland regulates the metabolic rate and growth of an individual by secreting T3 and T4 hormones, which is regulated by TSH. An abnormality in this mechanism, also known as thyroid dysfunction, includes a wide range of conditions such as subclinical hypothyroidism, overt hypothyroidism, hyperthyroidism, goiter, and autoimmune thyroid disease like Hashimoto's disease and Graves' disease. Thyroid disorders are one of the most common endocrinopathies, and the prevalence of such disorders is higher in women compared to men irrespective of their age group (Unnikrishnan & Menon, 2011). The case of India is different. In the past, cases of iodine deficiency disorders and goiter were common in the sub-Himalayan region and other iodine deficient regions of the country. Since the implementation of the National Iodine Deficiency Disorders Control Programme, the prevalence of thyroid disorders has changed to autoimmune and lifestyle-related dysfunction of thyroid. It has been estimated that roughly 42 million Indians have some form of thyroid disorder, with hypothyroidism alone

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affecting almost one out of every ten adults. Since there are repercussions of thyroid dysfunction on fertility, pregnancy, and maternal and fetal well-being, the study of the epidemiology of thyroid dysfunction among Indian women becomes an important public health issue. The objective of this review is to (a) provide a brief overview of the prevalence of various types of thyroid dysfunction among women in India, (b) highlight important epidemiological aspects and risk factors, and (c) discuss important implications thereof.

2. Methodology

The current literature review is based on cross-sectional studies conducted at hospitals and in communities, meta-analysis of the existing literature, and data from national surveys (NFHS-4, 2015-16, and NFHS-5, 2019-21) available in the Indian and international literature. The literature was identified through searches of PubMed and the Indian Journal of Endocrinology and Metabolism, emphasizing the prevalence and characteristics of thyroid dysfunction in women of India, including the adult population, women of reproductive age, and pregnant women.

3. Burden of Thyroid Dysfunction in India

Thyroid disorders have been projected to affect around 42 million people in India through studies done on the subject matter. Hypothyroidism is the most prevalent form of thyroid disorder in India, where one out of every ten people suffers from the disease, with the female gender being about ten times more vulnerable to thyroid dysfunction than the male gender. According to hospital- and community-based studies, there is a prevalence of about 10–11% of hypothyroidism among the women in India, whereby hypothyroidism is estimated to be as high as 10.95% in urban India, where the age group of women suffering from the disease is between 46–54 years. In keeping with this estimate, it has been estimated that 10–12% of women in India suffer from hypothyroidism, especially women who are above 35 years of age (Unnikrishnan et al., 2013). National representative self-reported statistics paint a different picture. An analysis of NFHS data indicates that the prevalence of self-reported thyroid disorders among women has increased from 2.2% in NFHS-4 (2015–16) to 2.9% in NFHS-5 (2019–21), due to an increase in awareness and screening as well as increase in disease burden. Studies done at the community level using surveys reveal the magnitude of the prevalence of subclinical disease. A study involving screening discovered that subclinical hypothyroidism was the most common form of thyroid dysfunction, occurring in 19.3% of participants in general – 15.9% of males and 21.4% of females.

4. Prevalence Among Specific Population Groups

4.1 Young and Reproductive-Age Women

The community screening study carried out in college-going girls in south India showed a high prevalence of un-diagnosed diseases; out of 1,292 young females screened from seven colleges located in Madurai district of Tamil Nadu, India, 12.5 percent had abnormal TSH levels with a prevalence of 11 percent with elevated TSH levels, 9.7 percent being mildly elevated TSH levels and 1.3 percent having low TSH levels. The researchers opined that one in every eight young girls in south India had thyroid dysfunction.

4.2 Pregnant Women

Thyroid dysfunction is particularly consequential during pregnancy given its associations with miscarriage, preterm birth, and impaired neurodevelopment. A prospective study of 865 pregnant women attending a tertiary hospital in Indore, Madhya Pradesh, found an overall thyroid dysfunction prevalence of 10.4%. A separate observational study of pregnant women reported thyroid dysfunction prevalence of 12%, with disease most frequently diagnosed in the first trimester (61.1% of cases) and rates rising with increasing body mass index. Larger multicity data align with these findings: hospital-based screening across 11 cities in 9 states of India revealed a high overall prevalence of hypothyroidism in pregnancy of 13.13%.

4.3 Autoimmune Thyroid Disease

The importance of autoimmune thyroiditis, especially Hashimoto's thyroiditis, in causing hypothyroidism among the iodine-sufficient individuals in India has now been established. A tertiary care center based study from New Delhi revealed that out of the hypothyroid cases, high levels of anti-thyroid peroxidase (anti-TPO) antibodies were found in 78.8% of the cases, thus demonstrating the presence of autoimmune disease as the most common cause of the disease, along with 15.4% of the patients having high levels of anti-tissue transglutaminase antibody, which are associated with celiac disease and are all in addition to high anti-TPO antibodies (Marwaha et al., 2000). Worldwide, Hashimoto's thyroiditis occurs four times more commonly in adult females than in males, its prevalence being around 2% a decade ago and increasing to 5-10% in recent years. In India, a nation-wide screening of goitrous adolescent girls has shown a prevalence of juvenile autoimmune thyroiditis of 7.5%.

4.4 Iodine Nutrition and Goiter

There have been notable decreases in the incidence of goiter due to Universal Salt Iodization (USI) in India. Analysis of NFHS-4 for about 700,000 women showed that more than 93% of the homes use USI salt, representing an appreciable increase since 74% a decade back, while the biochemical studies for the regions have shown normal iodine output in urine and low incidence of goiter, indicating success of the USI programme despite the prevalence of subclinical hypothyroidism which is not linked to either iodine intake or thyroid autoimmunity.

Table 1. Reported Prevalence of Thyroid Dysfunction Among Women in India, by Population Group and Study

Population Group	Study Setting / Sample	Prevalence Reported	Key Findings	Source
General adult population (mixed sex, community screening)	Community-based screening study	19.3% subclinical hypothyroidism overall (15.9% men; 21.4% women)	Prevalence rises with age in both sexes; low goiter prevalence indicates iodization success	Menon (2020)

Urban adult women	Urban India, epidemiological review	10.95% hypothyroidism	Predominantly affects women aged 46–54 years	Unnikrishnan & Menon (2011)
Young women (college students)	7 colleges, Madurai district, Tamil Nadu (n = 1,292)	12.5% abnormal TSH; 11% elevated TSH; 1.3% low TSH	1 in 8 young women affected; mild TSH elevation most common	Shivaprasad & Aiswarya (2015)
Pregnant women (single-center)	Tertiary hospital, Indore, MP (n = 865)	10.4% thyroid dysfunction	Cross-sectional prospective design, FOGSI-ICOG criteria used	Prospective study (2021)
Pregnant women (single-center)	Tertiary hospital, antenatal clinic (n = 300)	12% thyroid dysfunction	61.1% diagnosed in first trimester; rises with BMI	Observational study (2025)
Pregnant women (multicity)	11 cities, 9 states of India	13.13% hypothyroidism	High prevalence across diverse regions	Dhanwal et al. (2016)
Hypothyroid patients (autoimmune etiology)	Tertiary hospital, New Delhi	78.8% anti-TPO positive among hypothyroid patients	Confirms autoimmune thyroid disease as leading cause; 15.4% also anti-TTG positive	Cross-sectional study (2025)
Adolescent / goitrous girls (nationwide)	Countrywide screening	7.5% juvenile autoimmune thyroiditis	Screening of goitrous young girls	Marwaha et al., cited in Shivaprasad & Aiswarya (2015)
Women of reproductive age (national)	NFHS-4 (2015–16), n ≈ 699,686 women	2.2% self-reported thyroid disorder	Rose to 2.9% in NFHS-5 (2019–21)	IIPS/NFHS-4 & NFHS-5

5. Sociodemographic and Regional Determinants

A spatial analysis of data for women of reproductive age (15–49 years) from all 36 states and union territories and 640 districts based on NFHS-4 has shown strong clustering of the thyroid disorder, where prevalence and determinants extend far beyond the consumption of iodized salt and include lifestyle, dietary factors, and socioeconomic and geographic considerations (Singh, et al., 2022). In particular, the prevalence of thyroid disorder was observed to be higher among women belonging to wealthier families, a trend that could be related to their higher probability of seeking care, getting screened, and being aware of reporting the illness, apart from possible lifestyle risk factors. More extensive analysis from NFHS-5 has revealed that women in India have more morbidity than men, with women in urban areas having more morbidity than women in rural areas.

6. Risk Factors and Contributing Mechanisms

There are several interrelated risk factors behind the female preponderance and increasing incidence of thyroid disorders in India:

- **Autoimmunity:** Thyroid autoimmunity, as seen with positive anti-TPO and anti-thyroglobulin antibodies, has now been identified as the most common identifiable cause of hypothyroidism in India among iodine-replete populations, especially among women.
- **Age:** Increased prevalence is seen with advancing age, reaching a peak in perimenopausal and menopausal years (ages 40 to 50).
- **Obesity/BMI:** Elevated BMI has been linked with an increased prevalence of thyroid dysfunction, especially among pregnant women.
- **Pregnancy/postpartum condition:** Immune and hormone changes associated with pregnancy and postpartum condition lead to increased susceptibility to both hypothyroidism and postpartum thyroiditis.
- **Iodine nutrition status:** Though traditionally responsible for goiter development, iodine excess or variability in consumption including iodine-deficient salt preparations could be contributing factors to thyroid autoimmune processes.
- **Genetic/family history:** Some HLA gene variations and family history can make one susceptible to thyroid autoimmune disease.
- **Economic/urban lifestyle:** Urban dwellers and wealthier households have shown an increased prevalence of the disease; this may be related to true risk factors or increased diagnostic access.

Table 2. Key Risk Factors and Determinants of Thyroid Dysfunction Among Indian Women

Risk Factor	Association with Thyroid Dysfunction	Notes / Mechanism
Female sex	4–10× higher risk than men across most disorder categories	Hormonal and immune-mediated sex differences; estrogen implicated in autoimmunity
Advancing age (>35–45 years)	Prevalence rises consistently with age, peaking in perimenopause	Cumulative autoimmune damage and glandular changes over time
Thyroid autoimmunity (anti-TPO/anti-TGAb positivity)	Leading identifiable cause of hypothyroidism in iodine-sufficient settings	~79% of hypothyroid patients anti-TPO positive in Delhi cohort

Pregnancy / postpartum period	10–13% prevalence in pregnant Indian women; risk of postpartum thyroiditis	Immune and hormonal shifts of gestation; highest diagnosis in first trimester
Elevated BMI / obesity	Significant upward trend in thyroid dysfunction with increasing BMI	Metabolic-endocrine interplay; more pronounced in urban populations
Urban residence	Higher reported prevalence in urban vs. rural populations	Greater diagnostic access; possible lifestyle/dietary exposures
Household wealth / socioeconomic status	Higher self-reported prevalence among wealthier households	Reflects both screening access and reporting bias
Iodine nutrition status	Historically dominant cause of goiter; less linked to current subclinical hypothyroidism	~93% household iodized salt coverage nationally (NFHS-4)
Family history / genetic susceptibility (HLA variants)	Increases individual risk of autoimmune thyroid disease	Certain HLA variants more prevalent in Indian population
Comorbid autoimmune conditions (e.g., celiac disease)	Significant co-occurrence with autoimmune thyroiditis	15.4% anti-TTG positivity among anti-TPO-positive patients

7. Public Health Implications

It becomes apparent that in view of the persistent high prevalence of thyroid disorders among women in India, even during reproductive age or during pregnancy, there is a need to perform universal or targeted TSH screening within antenatal care, because of the well-established association between untreated hypothyroidism in mothers and poor pregnancy and neurodevelopmental outcomes. Poor-quality water that has excess fluoride, nitrates, metals, or any other contaminants can affect the functioning of the thyroid gland, whereas lack of iodine can cause hypothyroidism (Tigga & Pandey 2023). The discrepancy between the self-report prevalence of the problem from national surveys (2-3%) and the biochemically verified prevalence from screening studies (10-20%) indicates that there is a lot of undiagnosed cases of the condition at population level, especially with asymptomatic and subclinical thyroid dysfunction.

8. Conclusion

Thyroid disorders constitute an important but perhaps even an underrecognized problem among Indian women. Although there has been a considerable reduction in iodine deficiency disorders because of salt iodization, autoimmune and lifestyle-related hypothyroidism have become common, with a prevalence of about 10% among general adult population-based studies and up to 20% for subclinical hypothyroidism in certain cohorts and 10-13% among pregnant women. Large differences have been noted geographically and demographically in prevalence of thyroid disorders, making region-specific screening methods essential. Reducing the gap in

the prevalence rate among self-reported cases and confirmed cases through screening especially among pregnant women and perimenopausal women would be highly desirable.

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