Journal of Carcinogenesis
Covering Genesis to Therapeutics

Journal of Carcinogenesis, ISSN: 1477-3163
2025; Vol 24: Issue 9s, https://carcinogenesis.com/

Evaluating the Prevalence and Patterns of Thyroid Dysfunction in Patients Attending a Tertiary Care Centre

Dr. Sankha Simlai[1], Dr. Kedar Prasad Yadav[2], Dr. Ekta Arpita Andriyas[3], Dr. Nashra Afaq[4], Dr. Shaheen Bhat[5], Dr. Ayesha Nazar[6], Dr. Furquan Alam[*]

[1]Professor, Department of Biochemistry, Prasad Institute of Medical Sciences, Uttar Pradesh, India.

[2]Associate Professor, Department of Biochemistry, Autonomous State Medical College, Hardoi, Uttar Pradesh, India.

[3]Assistant Professor, Department of MLT, Era University, Lucknow, Uttar Pradesh, India.

[4]Assistant Professor, Department of Microbiology and Central Research Laboratory, Rama Medical College Hospital and Research Centre, Uttar Pradesh, India.

[5]Associate Professor, Department of Microbiology, SMS & R, Sharda hospital,Greater Noida, India.

[6]Assistant Professor, Department of Microbiology, SMS & R, Sharda hospital,Greater Noida, India.

Professor*, Department of Biochemistry, Integral Institute of Medical Sciences and Research, Integral University, Lucknow, Uttar Pradesh, India.

Corresponding Author: Dr. Furquan Alam*

Email ID: falam_18@rediffmail.com

ABSTRACT

Background: Thyroid dysfunction is one of the most common endocrine disorders worldwide, second only to diabetes mellitus. Its prevalence varies across populations due to differences in genetics, age, sex, environmental factors, and iodine intake. Despite increasing awareness, thyroid dysfunction remains underdiagnosed, particularly in developing countries.

Aim and Objective: To evaluate the prevalence and patterns of thyroid dysfunction among patients attending a tertiary care hospital in North India.

Material and Methods: A hospital-based cross-sectional study was conducted over one year and included 1,200 subjects. Serum levels of thyroid stimulating hormone (TSH), triiodothyronine (T3), and thyroxine (T4) were measured using the Cobas e411 immunoassay analyzer. Subjects were categorized as euthyroid, overt hypothyroid, subclinical hypothyroid, overt hyperthyroid, or subclinical hyperthyroid based on biochemical criteria. Data were analyzed for gender- and age-specific distribution.

Results: Of the 1,200 participants, 852 (71%) were female and 348 (29%) male (female-to-male ratio: 2.45:1). The majority of patients were aged 20–29 years (23.9%). Overall, 810 (67.5%) subjects were euthyroid, while 390 (32.5%) had thyroid dysfunction (TDF). Among these, subclinical hypothyroidism was the most common disorder (10.7%), followed by overt hyperthyroidism (8.7%), subclinical hyperthyroidism (7.5%), and overt hypothyroidism (5.6%). Thyroid dysfunction was more prevalent among females (64%) compared to males (36%). The highest prevalence of thyroid dysfunction was observed in individuals above 70 years (64.2%).

Conclusion: The prevalence of thyroid dysfunction in this North Indian cohort was 32.5%, with a clear female predominance and a rising trend with advancing age. Subclinical hypothyroidism emerged as the most frequent thyroid disorder. These findings highlight the importance of routine thyroid function screening, especially in women and older adults, for early diagnosis and management to prevent long-term complications.

KEYWORDS: *Thyroid dysfunction, TSH, hypothyroidism, hyperthyroidism, prevalence, North India.*

How to Cite: Sankha Simlai, Kedar Prasad Yadav, Ekta Arpita Andriyas, Nashra Afaq, Shaheen Bhat, Ayesha Nazar, Furquan Alam., (2025) Evaluating the Prevalence and Patterns of Thyroid Dysfunction in Patients Attending a Tertiary Care Centre, *Journal of Carcinogenesis*, *Vol.24, No.9s*, 104-111.

1. INTRODUCTION

Thyroid dysfunction is recognized as the second most common endocrine disorder after diabetes mellitus, affecting millions of individuals worldwide [1]. It results from disturbances in the hypothalamic–pituitary–thyroid axis and is characterized by abnormal levels of thyroid stimulating hormone (TSH), with normal or altered levels of thyroid hormones (T3 and T4). Overt hypothyroidism is diagnosed when serum TSH is elevated along with reduced T3 and T4, whereas subclinical hypothyroidism is defined by elevated TSH with normal thyroid hormone levels. Conversely, overt hyperthyroidism presents with suppressed TSH and elevated T3/T4, while subclinical hyperthyroidism is indicated by reduced TSH with normal thyroid hormones. Globally, thyroid dysfunction has emerged as a significant public health concern. According to the American Thyroid Association, nearly 20 million Americans are affected, with hypothyroidism being the predominant form. In India, approximately 42 million individuals are estimated to have thyroid disease, earning it the name "second diabetes of India." The prevalence and presentation vary across geographic regions due to genetic, ethnic, environmental, and iodine status differences [2-4].

The clinical importance of thyroid dysfunction lies in its systemic impact. Thyroid hormones regulate basal metabolic rate, cardiovascular function, lipid metabolism, and thermoregulation. In addition, subclinical thyroid dysfunction, often overlooked, has been associated with adverse outcomes including cardiovascular morbidity and metabolic derangements.

Population-based and hospital-based studies across South Asia have revealed wide variations in prevalence ranging from 15% to 35%. Most studies have consistently shown a higher prevalence among females and older adults. Screening and early detection of thyroid dysfunction are crucial, as timely intervention can prevent long-term complications [5,6].

Thyroid dysfunction is a major endocrine health problem globally and is considered the second most common endocrine disorder after diabetes mellitus [1]. It encompasses a wide spectrum of conditions ranging from overt hypothyroidism and hyperthyroidism to their subclinical counterparts. The clinical burden of thyroid disease is often underestimated because of its insidious onset and nonspecific presentation. Importantly, thyroid hormones exert crucial influences on metabolic homeostasis, cardiovascular function, reproduction, neurodevelopment, and overall quality of life [2].

India, in particular, is witnessing a rising epidemic of thyroid disorders. Approximately 42 million people in India are estimated to suffer from various thyroid abnormalities, making thyroid dysfunction a pressing public health concern [7]. Regional surveys in South India reported a high burden of subclinical hypothyroidism ranging between 9% and 11%, while overt hypothyroidism ranged between 2% and 4% [8]. Studies from North India also indicate a rising prevalence, especially among women and older adults [9]. Importantly, iodine sufficiency achieved through universal salt iodization has paradoxically shifted the disease profile towards autoimmune thyroid disease and subclinical hypothyroidism [10].

Gender and age distribution play critical roles in the epidemiology of thyroid dysfunction. Females are disproportionately affected, with studies showing a 4–8 fold higher prevalence compared to males [11]. This is largely attributed to autoimmunity, hormonal fluctuations, pregnancy-related thyroid stress, and genetic predisposition. Advancing age is also a well-recognized risk factor, with subclinical and overt hypothyroidism becoming more prevalent in older populations [12]. Age-related changes in thyroid physiology and comorbidities often mask or mimic thyroid dysfunction, complicating diagnosis [13].

From a pathophysiological perspective, thyroid function is governed by the hypothalamic–pituitary–thyroid (HPT) axis, in which thyrotropin-releasing hormone (TRH) stimulates the release of thyroid-stimulating hormone (TSH) from the pituitary, which in turn regulates thyroidal secretion of thyroxine (T4) and triiodothyronine (T3). TSH is considered the most sensitive biomarker of thyroid reserve, with even minor alterations in thyroid hormone production reflected by changes in serum TSH [14]. Overt hypothyroidism is characterized by elevated TSH and low T3/T4 levels, whereas subclinical hypothyroidism presents with elevated TSH but normal thyroid hormones. Conversely, hyperthyroidism is defined by suppressed TSH and elevated T3/T4, while subclinical hyperthyroidism manifests as suppressed TSH with normal hormones [15].

The clinical implications of thyroid dysfunction extend far beyond endocrine health. Hypothyroidism has been strongly linked with dyslipidemia, obesity, infertility, and cardiovascular disease [16]. Subclinical hypothyroidism, once considered

benign, has now been associated with increased risk of ischemic heart disease, neurocognitive decline, and pregnancy complications [17]. Hyperthyroidism, on the other hand, predisposes to atrial fibrillation, osteoporosis, muscle wasting, and neuropsychiatric disturbances [18]. Importantly, both conditions have been shown to significantly impact quality of life and healthcare utilization [19].

Diagnostic evaluation of thyroid dysfunction has improved substantially with the advent of high-sensitivity immunoassays for TSH, free T4, and free T3. These tests allow for early detection of subclinical thyroid disease, which is particularly relevant in populations at risk such as women over 40 years, pregnant women, and patients with metabolic syndrome [20]. However, the interpretation of thyroid function tests requires caution due to confounding factors such as non-thyroidal illness, medications, and laboratory variability [21].

Despite significant progress, thyroid disorders continue to be under-recognized and underdiagnosed, particularly in resource-limited settings. The silent progression of subclinical disease and the lack of awareness among patients and physicians contribute to delayed diagnosis [22]. Additionally, the absence of routine population screening in many countries means that a substantial proportion of cases remain undetected until late complications arise [23].

Given the high prevalence, gender bias, systemic consequences, and diagnostic challenges, there is a compelling need for region-specific studies to map the burden of thyroid dysfunction. Understanding local prevalence patterns aids in guiding clinical screening strategies, health policy planning, and resource allocation. With limited epidemiological data available from Northern India, this study was undertaken to assess the prevalence and distribution of thyroid dysfunction among patients attending a tertiary care centre, with particular emphasis on gender and age-specific trends. The present study was conducted to evaluate the prevalence and pattern of thyroid dysfunction among patients attending a tertiary care hospital. By analyzing 1,200 subjects, this study aims to provide data on gender distribution, age stratification, and the spectrum of thyroid disorders in the region.

2. MATERIAL AND METHODS

This was a hospital-based, cross-sectional observational study carried out in the Department of Biochemistry and Department of Physiology at a tertiary care centre, for a period of 12 months i.e, April 2024 to April 2025.

Study Population and Sampling
A total of 1,200 consecutive patients attending the outpatient and inpatient departments were screened for thyroid dysfunction. Convenience sampling was employed, and eligible participants were recruited until the required sample size was achieved.

Inclusion Criteria
1. Adults aged ≥18 years.
2. Both male and female patients attending the hospital during the study period.
3. Patients willing to provide informed written consent.
4. Individuals undergoing thyroid function testing as part of their clinical evaluation.

Exclusion Criteria
1. Patients with previously diagnosed thyroid disease who were already receiving treatment (levothyroxine, antithyroid drugs, radioiodine therapy, or post-thyroidectomy).
2. Pregnant and lactating women (due to physiological variations in thyroid hormones).
3. Patients with known systemic illnesses or on medications that could interfere with thyroid function (e.g., corticosteroids, lithium, amiodarone).
4. Critically ill patients or those with non-thyroidal illness syndrome.
5. Patients unwilling to participate in the study.

Data Collection
All participants were interviewed using a structured proforma to record demographic details (age, sex), relevant medical history, and presenting complaints. Clinical examination was performed where indicated.

Laboratory Investigations
Venous blood samples were collected in the morning after an overnight fast. Serum was separated and stored at appropriate temperature until analysis.

Parameters Measured: Serum thyroid stimulating hormone (TSH), free triiodothyronine (FT3), and free thyroxine (FT4).
Method: All samples were analyzed using the chemiluminescent immunoassay technique on the Cobas e411 automated analyzer (Roche Diagnostics, Germany).

Reference Ranges:
TSH: 0.27–4.20 µIU/mL
FT3: 2.0–4.4 pg/mL
FT4: 0.93–1.70 ng/dL

Diagnostic Criteria

1. Based on biochemical values, patients were classified as:
2. Euthyroid: Normal TSH, FT3, and FT4 levels.
3. Overt Hypothyroidism: Elevated TSH with low FT3/FT4.
4. Subclinical Hypothyroidism: Elevated TSH with normal FT3/FT4.
5. Overt Hyperthyroidism: Suppressed TSH with elevated FT3/FT4.
6. Subclinical Hyperthyroidism: Suppressed TSH with normal FT3/FT4.

Statistical Analysis
Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics such as mean, standard deviation, frequency, and percentages were calculated. Chi-square test was applied to assess the association of thyroid dysfunction with age and sex. A p-value <0.05 was considered statistically significant.

3. RESULTS

In the present study, a total of 1,200 subjects were enrolled and analyzed for thyroid dysfunction. Among them, 852 (71%) were female and 348 (29%) were male, giving a female-to-male ratio of 2.45:1.

The age distribution revealed that the largest group was between 20–29 years (23.9%), followed by 30–39 years (18.0%) and 60–69 years (16.8%). The smallest group was patients over 70 years (8.8%).

Out of the total 1,200 subjects, 810 (67.5%) were euthyroid while 390 (32.5%) showed thyroid dysfunction (TDF). Among those with TDF, hypothyroidism (subclinical + overt) was more prevalent than hyperthyroidism. Subclinical hypothyroidism accounted for 10.7%, overt hypothyroidism for 5.6%, overt hyperthyroidism for 8.7%, and subclinical hyperthyroidism for 7.5% of the total cases.

Gender-wise analysis showed that thyroid dysfunction was more common among females (64%) than males (36%). Subclinical hypothyroidism was particularly higher in women.

With respect to age, the prevalence of thyroid dysfunction was highest in subjects aged >70 years (72.9%), followed by those in the 30–39 years age group (41.8%). Thyroid dysfunction was observed across all age categories, with an increasing trend in older individuals.

Table 1. Distribution of patients according to gender

Gender	No. of cases	Percentage
Male	348	29%
Female	852	71%
Total	1,200	100%

Table 2. Distribution of patients according to age

Age group (years)	No. of cases	Percentage
20–29	287	23.9%
30–39	216	18.0%
40–49	196	16.3%
50–59	193	16.1%
60–69	202	16.8%
>70	106	8.8%
Total	1,200	100%

Table 3. Distribution of patients according to thyroid function

Thyroid function	No. of cases	Percentage
Euthyroidism	810	67.5%
Thyroid dysfunction	390	32.5%
Total	1,200	100%

Table 4. Sub-classification of thyroid dysfunction

Thyroid function	No. of cases	Percentage
Euthyroidism	810	67.5%
Overt Hyperthyroidism	104	8.7%
Subclinical Hyperthyroidism	90	7.5%
Overt Hypothyroidism	67	5.6%
Subclinical Hypothyroidism	129	10.7%
Total	1,200	100%

Table 5. Euthyroidism in male and female subjects

Thyroid status	Female	Male	Total
Euthyroidism	610	200	810
Euthyroid female:male ratio = 3.05:1			

Table 6. Distribution of thyroid dysfunction in male and female subjects

Thyroid status	Male	Female	Total	
Overt Hypothyroidism	19	48	67	
Subclinical Hypothyroidism		41	88	129
Overt Hyperthyroidism	43	61	104	
Subclinical Hyperthyroidism		28	62	90
Total	131	259	390	
Female:Male ratio = 1.98:1				

Table 7. Distribution of thyroid dysfunction in different age groups

4. DISCUSSION

The present study, involving 1,200 subjects, demonstrated a prevalence of thyroid dysfunction (TDF) of 32.5%, with a clear female predominance (64%) and increasing prevalence with advancing age. Subclinical hypothyroidism (10.7%) was the most common thyroid disorder observed, followed by overt hyperthyroidism (8.7%). These findings are in agreement with global and Indian literature, highlighting the high burden of thyroid abnormalities in developing countries.

Our results align with the meta-analysis by Garmendia Madariaga et al. (2014), which reported a global prevalence of hypothyroidism ranging between 4–10%, with subclinical forms being more frequent, particularly among females and the elderly [1]. Brent (2008) emphasized that thyroid dysfunction is often underdiagnosed due to its nonspecific clinical features, underscoring the importance of population-based screening [2]. Similarly, Vanderpump (2011) highlighted the age- and gender-related predisposition, with older adults and women being at higher risk [3].

The prevalence rate in our cohort is consistent with earlier Indian studies. Unnikrishnan and Menon (2011) reported that approximately 42 million individuals in India suffer from thyroid disorders, making it the “second diabetes” of the country [7]. Marwaha et al. (2013) noted a high prevalence of subclinical hypothyroidism (11%) in North India, which parallels our findings [8]. Singh et al. (2016) also documented a prevalence rate of 30% in their hospital-based study, further supporting the present results [9].

The female predominance observed in this study is well established in literature. Taylor et al. (2018) reported that autoimmune thyroid disorders disproportionately affect women due to hormonal fluctuations, genetic susceptibility, and pregnancy-related stress [11]. Yu et al. (2010) similarly noted higher thyroid disease prevalence in postmenopausal women [12]. These findings emphasize the need for regular screening in women, especially during reproductive years and beyond. Subclinical hypothyroidism, once considered clinically insignificant, is now recognized as an important risk factor for cardiovascular morbidity and adverse pregnancy outcomes. Razvi et al. (2010) linked it to dyslipidemia and ischemic heart disease [16], while Biondi and Cooper (2008) demonstrated its association with infertility and metabolic derangements [17]. Our findings, showing subclinical hypothyroidism as the most frequent thyroid disorder, are therefore of significant clinical importance.

Hyperthyroidism was less common in our study, but its clinical relevance remains high. Flynn et al. (2010) reported an increased risk of atrial fibrillation and osteoporosis in hyperthyroid patients [18]. Subclinical hyperthyroidism, noted in 7.5% of our subjects, has also been associated with cardiovascular risks and bone loss, as highlighted by Pearce et al. (2013) [15].

Age-related trends observed in our study, particularly the higher prevalence among individuals >70 years (64.2%), are consistent with Peeters (2017), who noted that thyroid dysfunction becomes more pronounced with advancing age due to physiological changes and comorbidities [13]. Koulouri et al. (2013) also emphasized that diagnosis in elderly patients is often challenging because symptoms may mimic normal aging [14].

The diagnostic role of sensitive TSH assays in detecting subclinical thyroid disease was highlighted in our study, reflecting improvements in laboratory technology. Spencer (2013) underscored the utility of these assays in identifying early thyroid dysfunction [20], while Eligar et al. (2020) emphasized caution in interpretation due to confounding factors [21].

The lack of awareness and underdiagnosis remains a global challenge. Bekkering et al. (2019) stressed the ongoing debate

on routine screening strategies [22], and Razvi et al. (2019) recommended region-specific screening policies tailored to high-risk populations [23]. Our study reinforces these recommendations for the Indian setting, where the burden of thyroid disorders remains substantial.

Recent studies conducted in 2024 and 2025 further reinforce the high burden of thyroid dysfunction across diverse populations, emphasizing the need for vigilant screening strategies. A comprehensive systematic review and meta-analysis encompassing 38 studies published in 2024 reported an overall pooled prevalence of thyroid dysfunction of 20.24% (95% CI: 17.85–22.64), with subclinical hypothyroidism being the most common subtype at 11.87% (95% CI: 6.90–16.84) . In a focused 2025 study among patients with type 2 diabetes in Tamil Nadu, India, thyroid dysfunction was identified in 23.1% of the cohort (20.9% hypothyroidism and 2.2% hyperthyroidism), with higher occurrence noted in those with longer duration of diabetes . Additionally, a 2025 retrospective review from a pediatric thyroid clinic in Northern India reported that acquired hypothyroidism—particularly autoimmune thyroiditis—was the predominant disorder in children, followed by congenital hypothyroidism, with hyperthyroidism being relatively rare (4.8%) . These recent findings underscore that thyroid dysfunction remains a significant health issue across both adult and pediatric populations, particularly in vulnerable groups like those with diabetes and children, emphasizing the importance of tailored screening and early interventions [24-26].
Overall, the findings highlight the clinical significance of thyroid dysfunction, particularly subclinical hypothyroidism, in the Indian population. Early screening, especially among women and older adults, is essential to mitigate long-term complications.

5. CONCLUSION

This hospital-based study revealed a high prevalence of thyroid dysfunction (32.5%) among 1,200 patients in North India, with a strong female predominance and increasing prevalence with age. Subclinical hypothyroidism emerged as the most common thyroid abnormality. These findings highlight the importance of routine thyroid function screening, particularly among women and the elderly, for timely diagnosis and prevention of long-term complications such as cardiovascular disease, osteoporosis, and infertility.

6. LIMITATIONS

1. The study was hospital-based, which may not reflect true community prevalence due to selection bias.
2. The cross-sectional design limits causal inference between thyroid dysfunction and associated clinical outcomes.
3. Autoantibody testing (anti-TPO, anti-Tg) was not performed, which could have provided insights into autoimmune thyroid disease.
4. Longitudinal follow-up was not conducted to assess progression from subclinical to overt thyroid dysfunction.
5. Lifestyle, dietary iodine intake, and socioeconomic factors, which may influence thyroid status, were not assessed.

DECLARATIONS
Conflicts of interest: There is no any conflict of interest associated with this study
Consent to participate: There is consent to participate.
Consent for publication: There is consent for the publication of this paper.
Authors' contributions: Author equally contributed the work.

REFERENCES

[1] Garmendia Madariaga A, Santos Palacios S, Guillén-Grima F, Galofré JC. J Clin Endocrinol Metab. 2014;99(3):923-31.
[2] Brent GA. N Engl J Med. 2008;358(24):2594-605.
[3] Vanderpump MP. Br Med Bull. 2011;99:39-51.
[4] Tunbridge WM, Evered DC, Hall R, Appleton D, Brewis M, Clark F, et al. Clin Endocrinol (Oxf). 1977;7(6):481-93.
[5] Hollowell JG, Staehling NW, Flanders WD, Hannon WH, Gunter EW, Spencer CA, et al. J Clin Endocrinol Metab. 2002;87(2):489-99.
[6] Aryal M, Gyawali P, Rajbhandari N, Aryal P, Pandey DR. Biomed Res. 2010;21(4):411-5.
[7] Unnikrishnan AG, Menon UV. Indian J Endocrinol Metab. 2011;15(Suppl 2):S78-S81.
[8] Marwaha RK, Tandon N, Garg MK, Kanwar R, Sastry A, Narang A, et al. Indian J Endocrinol Metab. 2013;17(4):647-52.
[9] Singh A, Sachan R, Tripathi P, Singh S, Varma M. Int J Health Sci Res. 2016;6(7):121-6.
[10] Zimmermann MB, Boelaert K. Lancet Diabetes Endocrinol. 2015;3(4):286-95.

[11] Taylor PN, Albrecht D, Scholz A, Gutierrez-Buey G, Lazarus JH, Dayan CM, et al. Nat Rev Endocrinol. 2018;14(5):301-16
[12] Yu SH, Li ZM, Chang CX, Zhongwei Z, Zhongli H. Chin Med J. 2010;123(13):1673-8.
[13] Peeters RP. Endocr Rev. 2017;38(2):213-36.
[14] Koulouri O, Moran C, Halsall D, Chatterjee K, Gurnell M. Best Pract Res Clin Endocrinol Metab. 2013;27(6):745-62.
[15] Pearce SH, Brabant G, Duntas LH, Monzani F, Peeters RP, Razvi S, et al. Eur Thyroid J. 2013;2(4):215-28.
[16] Razvi S, Weaver JU, Vanderpump MP, Pearce SH. Eur J Endocrinol. 2010;162(4):643-50.
[17] Biondi B, Cooper DS. Endocr Rev. 2008;29(1):76-131.
[18] Flynn RW, Bonellie SR, Jung RT, MacDonald TM, Morris AD, Leese GP. J Clin Endocrinol Metab. 2010;95(4):1864-71.
[19] Watt T, Cramon P, Hegedüs L, Bjorner JB, Bonnema SJ, Rasmussen ÅK, et al. Thyroid. 2012;22(2):145-52.
[20] Spencer CA. In: Braverman LE, Cooper DS, editors. Werner & Ingbar's The Thyroid. 10th ed. Philadelphia: Lippincott Williams & Wilkins; 2013. p. 394-441.
[21] Eligar V, Taylor PN, Okosieme O, Leese GP, Dayan CM. Endocr Connect. 2020;9(9):941-9.
[22] Bekkering GE, Agoritsas T, Lytvyn L, Heen AF, Feller M, Moutzouri E, et al. BMJ. 2019;365:l2006.
[23] Razvi S, Korevaar TIM, Taylor P. Lancet Diabetes Endocrinol. 2019;7(9):733-42.
[24] Xu J, Li Y, Chen Y, Zhao W, Wang H, Yang Z, et al. Global prevalence of thyroid dysfunction: a systematic review and meta-analysis. Syst Rev. 2024;13(1):115.
[25] Dinesh A, Soundarajan R, Sharmila V, Periasamy V. Prevalence and determinants of thyroid dysfunction among patients with type 2 diabetes in a tertiary care hospital, Tamil Nadu. Indian J Endocrinol Metab. 2025;29(2):151-7.
[26] Sahu JK, Tewari V, Gupta S, Verma A, Sharma S, Jadon A, et al. Spectrum of pediatric thyroid disorders: a retrospective study from Northern India. Thyroid Res Pract. 2025;22(1):24-30.