Journal of Pathology of Nepal (2025) Vol. **15**, 2320 -2323

Journal of
PATHOLOGY
of Nepal
www.acpnepal.com

Original Article

Thyroid dysfunction among individuals visiting a diagnostic center in Lalitpur, Nepal: A descriptive cross-sectional study

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Keywords:

hyperthyroidism; hypothyroidism; thyroid gland.

ABSTRACT

Background: Thyroid dysfunction is a common endocrine abnormality globally. In Nepal, socio-environmental factors like iodine deficiency, dietary habits, and limited access to healthcare have exacerbated its prevalence. It is the altered serum thyroid stimulating hormone level with normal or altered thyroid hormones (free tri-iodothyronine and free thyroxine). The present study aimed to find the prevalence of thyroid dysfunction among individuals visiting a diagnostic center in Lalitpur, Nepal.

Materials and Methods: This was a descriptive cross-sectional study conducted at the Genesis Diagnostic and Clinic in Lalitpur, Nepal, between July 1, 2022, to December 30, 2024. Ethical clearance was granted by the Ethical Review Board (Reference number: 1384). Patients who had undergone thyroid function tests, like assessments of free tri-iodothyronine, free thyroxine and thyroid-stimulating hormone, were enrolled. Enumeration sampling was done. SPSS version 22 was used for data analysis.

Results: Out of 520 patients who underwent thyroid function test, thyroid dysfunction was seen in 118 (22.69%) patients. Among them, 93 (17.88%) had subclinical hypothyroidism, 13 (2.50%) had subclinical hyperthyroidism, six (1.20%) had hypothyroidism, and six (1.20%) had hyperthyroidism. There were 47 (39.84%) males and 71 (60.16%) females with thyroid dysfunction. The male-to-female ratio was 1:1.51. The age range was 20 to 90 years with a mean age of 44.53 ± 14.61 years. The maximum number of thyroid dysfunction cases occurred in the 30-39 years age group.

Conclusion: The prevalence of thyroid dysfunction is still higher in our study population and is similar to studies done in similar settings. Subclinical hypothyroidism was the most common thyroid dysfunction with female predominance.

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Received : 17th July 2025; **Accepted :** 20th August 2025

Citation: Maharjan R, Shrestha MR, Khadka R. Thyroid Dysfunction Among Individuals Visiting a Diagnostic Center in Lalitpur, Nepal: A Descriptive Cross-Sectional Study. J Pathol Nep. 2025;15(1):2320-3. DOI: 10.3126/jpn.v15i1.81988

INTRODUCTION

Globally, thyroid dysfunction is a common endocrine disorder that affects about 300 million people.[1] In Nepal, there are an estimated 0.20% of the deaths resulting from endocrine disorders, among which the major cause is Iodine deficiency.[2] There are various causes of thyroid dysfunctions, which are congenital, genetic predisposition, viral infections, radiotherapy, pregnancy, surgery, infiltrative disorders, deficiency of Iodine intake, and autoimmunity.[3] Worldwide, the most common cause of thyroid disorder has

been the micronutrient Iodine deficiency.[4] Globally, several studies on thyroid dysfunction epidemiology have been done and have shown various results depending on different geographical regions. Prevalence of thyroid dysfunction in south western Nepal was 40.37%,[5] in eastern Nepal 30.87%,[6] and in central Nepal 29%.[7]

Thyroid disorders are classified on the basis of thyroid hormone levels in the blood. The major disorders of the thyroid glands are undersecretion (hypothyroidism) and oversecretion (hyperthyroidism). Patients with hypothyroidism present with non-specific symptoms like weight gain and fatigue, whereas patients with hyperthyroidism present with palpitation and weight loss.[8] There is an increased risk of osteoporosis, hyperlipidemia, neuropsychiatric, and cardiovascular disorders in patients with thyroid dysfunction.[9] In the Nepalese community, it is among the major public health problems. In this post-iodization era, thyroid dysfunction still remains common due to multiple risk factors. For early recognition, proper management, and prevention of the consequences of thyroid dysfunction, regular screening is required.[10]

This study aimed to assess the prevalence of thyroid dysfunction among individuals attending a diagnostic center in Lalitpur, Nepal.

MATERIALS AND METHODS

This was a retrospective cross-sectional study conducted at Genesis Diagnostic and Clinic, Dhapakhel, Lalitpur, Nepal, between July 1, 2022 to December 30, 2024. Ethical approval was granted by the Ethical Review Board (Reference number:1384). The study population included individuals aged 18 years or older and patients who had undergone thyroid function tests (TFT), including assessments of free tri-iodothyronine (fT3), free thyroxine (fT4), and thyroid stimulating hormone (TSH) during their visit at the Diagnostic center. A brief clinical history, medication history, and history of surgery were noted from the database. Patients with incomplete records (e.g., TSH only without fT3 and fT4), history of thyroid surgery, prior history of hypothyroidism or hyperthyroidism, or those already on thyroid medication were excluded to avoid bias from altered thyroid function tests. An enumeration sampling method was employed.

2.0 ml of venous blood was collected following standard phlebotomy procedures attending the diagnostic center. Blood was collected in a plain vial and allowed to clot. The blood was centrifuged at 3000 rpm for 15 minutes within two hours of collection to separate the serum. The separated serum was used to measure serum fT3, fT4, and TSH levels were measured using chemiluminescent immunoassay (CLIA) method.

Thyroid dysfunction was categorized based on TSH and fT3 or fT4 reference range. Hypothyroidism was indicated by elevated TSH levels alongside low fT3 or fT4 levels, while hyperthyroidism presented with low TSH with accompanying elevated fT3 or fT4 levels. Subclinical hypothyroidism and subclinical hyperthyroidism were characterized by elevated and lowered TSH, respectively, with normal fT3 and fT4 levels. Euthyroid was when patients had normal TSH, fT3 and fT4 levels. Reference ranges for TSH, free T3 and free T4 in the CLIA method were 0.3-4.5 µIU/ml, 2.0-4.2 pg/ml and 8.9-17.2 pg/ml, respectively, as provided by the manufacturer. Data analysis was performed using Statistical Package for the Social Sciences version 22.0 and Microsoft Excel version 10.0.

RESULTS

Out of 520 patients who had undergone TFT, thyroid dysfunction was seen in 118 (22.69%) subjects. (fig.1) Among them, the most common was subclinical hypothyroidism, 93 (17.88%), followed by subclinical hyperthyroidism, 13 (2.50%). Six (1.20%) subjects had hypothyroidism, and six (1.20%) had hyperthyroidism (Table 1). The euthyroid state was seen in 402 (77.30%) cases. There were 47 (39.84%) males and 71 (60.16%) females with thyroid dysfunction. The male-to-female ratio was 1:1.51. The age range was 20 to 90 years, and the mean age was 44.53 ± 14.61 years. The maximum number of thyroid dysfunctions was seen in the age group 30-39 years, with 35 (29.66%) cases (Table 2).

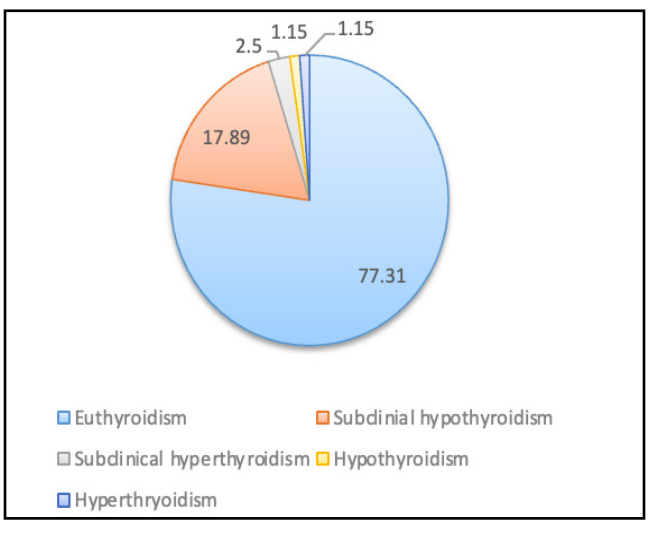

Figure 1: *Prevalence of thyroid dysfunction*

Table1: Distribution of thyroid dysfunction with respect to gender (n = 118)

Thyroid Dysfunction	Gender n (%)		Total n (%)
	Male	Female	
Subclinical hypothyroidism	38 (32.20)	55 (46.61)	93 (78.81)
Subclinical hyperthyroidism	6 (5.08)	7 (5.93)	13 (11.01)
Hypothyroidism	0 (0)	6 (5.08)	6 (5.08)
Hyperthryoidism	3 (2.54)	3 (2.54)	6 (5.08)
Total	**47 (39.82)**	**71 (60.16)**	**118**

DOI: 10.3126/jpn.v15i1.81988

Table 2: Thyroid dysfunction according to age group (n = 118)

Age group (years)	Subclinical hypothyroidism (n = 93)	Subclinical hyperthyroidism (n = 13)	Hypothyroidism (n = 6)	Hyperthyroidism (n = 6)
20 - 29	7	0	0	1
30 - 39	26	3	2	4
40 - 49	26	3	2	1
50 - 59	15	4	1	0
60 - 69	12	1	1	0
70 - 79	6	1	0	0
80 - 89	1	1	0	0
Total	**93**	**13**	**6**	**6**

DISCUSSION

In Nepal, thyroid dysfunction is a major public health issue. In this study, thyroid dysfunction was found to be more common in 30-39 years age group, which is comparable to other studies.[11,12] In contrast, few studies show thyroid dysfunction to be more common in the fourth decade.[10, 13] There was a female preponderance in our study, which is similar to findings

In this study, thyroid dysfunction was observed in 118 (22.69%) patients. The finding is similar to several other studies.[10-14] reported by several other studies.[11,13-17] The laboratory in which this study was carried out caters predominantly to the population of Lalitpur, the central part of Nepal, and data presented are most representative of this population. Studies done in various other geographical regions, like the south-western, eastern, and also central region of Nepal, encompassing different ethnicities, have shown a higher prevalence of thyroid dysfunction. Thyroid dysfunction prevalence in central Nepal was 29%, in eastern Nepal it was 30.87%, and in south western Nepal it was 40.37% as per other studies.[5-7] The prevalence and pattern of thyroid dysfunction depend upon geographic, ethnic, and environmental factors such as iodine intake status. Among patients with thyroid dysfunction in present study, subclinical hypothyroidism (17.88%) was the most common, which is similar to other studies.[7,10,13-14] In contrast, Hossen MS et al. and Khan A et al. have found hyperthyroidism to be the most common type of thyroid dysfunction.[15,16] This could be due to different geographical and environmental factors.

Also, in our study, the second most common type of thyroid dysfunction was found to be subclinical hyperthyroidism (2.50%), which was similar to study done by Yadav RK et al.[13] In contrast, other studies have found hypothyroidism to be the second most common form of thyroid dysfunction.[7,10] In present study, hypothyroidism and hyperthyroidism were found at 1.20% each. This is in concordance with a study done by Yadav RK et al.[13] In contrast, other studies have found a significant number of patients with hypothyroidism.[10, 11]

This study has some limitations in that this study did not include thyroid autoantibody tests such as anti-thyroid peroxidase antibodies, anti-thyroglobulin antibodies, and thyroid-stimulating immunoglobulin. Incorporating thyroid autoantibody screening would have aided in the identification of the cause of thyroid dysfunction. Furthermore, as this is a single-center study, its findings may not be generalizable to a wide population. We therefore recommend a larger, multicenter studies to be carried out.

CONCLUSIONS

The prevalence of thyroid dysfunction remains high in our study population and is similar to other studies done in Nepalese settings. Subclinical hypothyroidism is the most common form of thyroid dysfunction with a female preponderance in our study.

Acknowledgement: None

Conflict of interest: None

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