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Clinical and demographic profile of patients with thyroid eye disease in a tertiary eye care centre

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Abstract

Introduction: Thyroid eye disease (TED) is an autoimmune inflammatory disorder of the orbit commonly associated with thyroid dysfunction. Understanding its clinical spectrum, thyroid status, and disease activity is crucial for appropriate management.

Method: A cross-sectional study was conducted among adults diagnosed with TED at the Department of Ophthalmology, Dhulikhel Hospital, Nepal, from 7 Apr 2024 to 10 Sep 2024 after ethical approval. Patients with unrelated orbital diseases, trauma, or incomplete records were excluded. Demographics, clinical features, thyroid function, ocular findings, disease activity (Clinical Activity Score, CAS), disease severity (EUGOGO classification), and management were recorded. Data were analysed descriptively with mean±SD or median (IQR) for continuous variables, and n(%) for categorical variables using STATA version 14.0.

Result: Among 73 TED patients, the mean age was 42.5±13.2 years; 46(63.0%) were female. Most were from Province 3, 55(75.3%). Thyroid function status was hyperthyroidism in 28(38.4%), hypothyroidism in 27(37.0%), and euthyroidism in 18(24.7%). Ocular findings included lid retraction in 29(39.7%), proptosis in 26(35.6%), and diplopia in 9(12.3%). Active disease (CAS≥3) was present in 23(31.5%). Most had mild disease (68.5%). All cases were managed conservatively with lubricants 73(100%).

Conclusion: This study revealed that TED predominantly affects middle-aged females, with hyperthyroidism being the most common. Most patients had mild disease and responded well to conservative management.

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Introduction

Thyroid eye disease (TED), also termed Graves' orbitopathy, is an autoimmune inflammatory disorder.[1–3] It results from immune-mediated activation of orbital fibroblasts, leading to extraocular muscle enlargement, adipogenesis, and glycosaminoglycan deposition. This manifests clinically as eyelid retraction, proptosis, diplopia, ocular surface disease, and, rarely, dysthyroid optic neuropathy.[1,4]

Globally, TED affects approximately 30–40% of patients with Graves' disease, with an annual incidence of 3–20 per 100,000 population and a clear female predominance, typically presenting in middle age.[4,5] Recent data from Europe and North America suggest a shift toward earlier diagnosis and predominantly mild disease, attributed to improved thyroid control and declining smoking prevalence.[1,3,6] Despite these advances, TED shows marked heterogeneity in clinical activity, severity, and thyroid status.[3,7]

While hyperthyroidism predominates, euthyroid and hypothyroid TED are increasingly recognized, particularly in Asian populations, and may present with milder or asymmetric disease. Smoking remains the strongest modifiable risk factor, yet its prevalence and impact vary regionally.[3] Furthermore, most evidence guiding assessment and management—such as the use of the Clinical Activity Score (CAS) and EUGOGO severity classification—derives from Western cohorts, with limited data from South Asia.[1,8,9]

In Nepal, published data on the demographic profile, thyroid status, and clinical spectrum of TED are scarce, limiting context-specific risk stratification and management planning. Therefore, this study aimed to describe the demographic characteristics, thyroid functional status, clinical features, disease activity, and severity of TED in patients presenting to a tertiary eye care center in Nepal, and to contextualize these findings within current global and regional literature.

Method

A hospital-based cross-sectional observational study was conducted at the Department of Ophthalmology, Dhulikhel Hospital, Nepal from 7 Apr 2024 to 10 Sep 2024. Adults aged ≥18 years with a clinical diagnosis of TED were included. Patients with orbital diseases unrelated to thyroid dysfunction, previous orbital trauma, or incomplete clinical records were excluded. The sample size was calculated using the formula $n=Z^2pq/e^2$ for a single population proportion, where prevalence of TED at 25% (p=0.25), with a 95% confidence level (Z=1.96) and 5% margin of error (e=0.05), the required sample size was 103. Using consecutive sampling, 73 participants were enrolled.

Data were collected via a standardized proforma capturing demographics, medical and thyroid history, smoking status, and family history. Ophthalmic examination included best-corrected visual acuity, slit-lamp evaluation, eyelid and motility assessment, Hertel exophthalmometry, intraocular pressure, and anterior and posterior segment evaluation. Tear film was assessed with tear breakup time and Schirmer I test. Disease activity was graded using the Clinical Activity Score (CAS) and severity with EUGOGO criteria. Thyroid function tests (TSH, FT3, FT4), thyroid autoantibodies (anti-TPO, TSHR antibodies), and orbital CT were performed as indicated.

Ethical approval was obtained from the Institutional Review Committee of Kathmandu University School of Medical Sciences (IRC-KUSMS 120/24). Written informed consent was obtained from all participants. Data were analyzed using STATA version 14.0 with descriptive statistics; continuous variables were expressed as mean±SD or median (IQR), and categorical variables as frequencies and percentages.

Result

A total of 73 patients with TED were included. The mean age was 42.5±13.2 years with female predominance 46(63.0%). The most common age groups were 50–59 years 18(24.7%) and ⩾ 60 years 16(21.9%). Most patients were from

Province 3, 55(75.3%), and homemakers constituted the largest occupational group, 27(37.0%), Table 1.

Foreign body sensation was the most frequent presenting complaint 33(45.2%), followed by eyelid swelling 16(21.9%) and redness 16(21.9%). Protrusion of the eyeball was reported by 14(19.2%), while diplopia was present in 7(9.6%). A family history of thyroid disorder was noted in 20(27.4%), and a family history of TED in 7(9.6%), Table 2. Smoking history was present in 27(37.0%) patients. Hypertension was observed in 15(20.5%) and diabetes mellitus in 6(8.2%); 29(39.7%) had no systemic comorbidity, Table 2.

Hyperthyroidism was observed in 28(38.4%), hypothyroidism in 27(37.0%), and euthyroidism in 18(24.7%). TSH was elevated in 24(32.9%), suppressed in 20(27.4%), and normal in 29(39.7%). TSHR antibodies were positive in 21(28.8%) and negative in 30(41.1%); anti-TPO antibodies were positive in 16(21.9%), Table 5.

Best-corrected visual acuity was 6/6–6/9 in 44(60.3%) patients and ≤6/24 in 8(11.0%). Hertel exophthalmometry readings were >20 mm in 39(53.4%). Relative afferent pupillary defect was absent in all patients, and extraocular movements were full in 72(98.6%). Fundus examination was normal in 52(71.2%), with pale optic disc in 14(19.2%) and optic disc edema in 6(8.2%). Intraocular pressure was ⩽ 21 mmHg in 69(94.5%), and cup–disc ratio was ≤0.6 in 57(78.1%), Table 3.

Proptosis was present in 26(35.6%) patients, of whom 18(69.2%) had non-painful and 8(30.8%) had painful proptosis. Lid retraction 29(39.7%) and lid lag 20(27.4%) were the most common eyelid signs. Active disease defined by CAS≥3 at presentation was observed in 23(31.5%). According to the EUGOGO classification, mild disease was present in 50(68.5%), while 23(31.5%) had moderate–severe disease, Table 4.

Tear film instability was common, with tear breakup time <5 seconds in 28(38.4%). Schirmer I test values were >10 mm in most patients 52(71.2%). Orbital CT findings included fat-predominant disease in 7(9.6%), muscle-predominant disease in 6(8.2%), and apical crowding in 6(8.2%), Table 5.

All patients received topical lubricating therapy 73(100%). Systemic therapy was not required in 39(53.4%) patients. Corticosteroids were administered in 14(19.2%) and anti-thyroid drugs in 18(24.7%). Orbital radiotherapy and surgical intervention were required in one patient each 1(1.4%), Table 6.

Table 1. Socio-demographic characteristics of patients with thyroid eye disease (TED), n=73

Variable	Category	n(%)
Age group (years)	<30	11(15.1)
	30–39	15(20.5)
	40–49	13(17.8)
	50–59	18(24.7)
	≥60	16(21.9)
Sex	Female	46(63.0)
	Male	27(37.0)
Province	Province 3	55(75.3)
	Province 1	9(12.3)
	Province 2	5(6.8)
	Province 4	3(4.1)
	Province 6	1(1.4)
Occupation	Homemaker	27(37.0)
	Farmer	13(17.8)
	Government employee	9(12.3)
	Others	24(32.9)

Table 2. Presenting complaints, family history and risk factors in TED, n=73

Variable	Category	n(%)
Presenting complaints	Foreign body sensation	33(45.2)
	Eyelid swelling	16(21.9)
	Redness	16(21.9)
	Protrusion of eyeball	14(19.2)
	Diplopia	7(9.6)
Family history	Thyroid disorder	20(27.4)
	TED	7(9.6)
	None	43(58.9)
Smoking	Yes	27(37.0)
Comorbidity	Hypertension	15(20.5)
	Diabetes mellitus	6(8.2)
	None	29(39.7)

Table 3. Thyroid status and basic ocular examination findings, n=73

Variable	Category	n(%)
Thyroid status	Hyperthyroidism	28(38.4)
	Hypothyroidism	27(37.0)
	Euthyroidism	18(24.7)
TSHR Ab	Positive	21(28.8)
	Negative	30(41.1)
	Not done	22(30.1)
Anti-TPO Ab	Positive	16(21.9)
	Negative	35(47.9)
	Not done	22(30.1)
Best-corrected visual acuity	6/6–6/9	44(60.3)
	6/12–6/18	21(28.8)
	≤6/24	8(11.0)
Hertel exophthalmometry	≤20 mm	34(46.6)
	>20 mm	39(53.4)
Extraocular muscle movement	Full	72(98.6)
	Restricted	1(1.4)
Fundus findings	Normal	52(71.2)
	Pale optic disc	14(19.2)
	Optic disc edema	6(8.2)
Intraocular pressure	≤21 mmHg	69(94.5)
	>21 mmHg	4(5.5)
Cup–disc ratio	≤0.6	57(78.1)
	>0.6	16(21.9)

Table 4. Ocular signs, disease activity and severity of TED, n=73

Variable	Category	n(%)
Proptosis	**Present**	**26(35.6)**
	Absent	47(64.4)
Type of proptosis	Non-painful	18(69.2)
	Painful	8(30.8)
Eyelid signs	Lid retraction	29(39.7)
	Lid lag	20(27.4)
CAS (CAS)	≥3	23(31.5)
	<3	50(68.5)
EUGOGO severity classification	Mild	50(68.5)
	Moderate–severe	23(31.5)

Table 5. Investigation findings and tear film evaluation in TED, n=73

Variable	Category	n(%)
Tear breakup time (TBUT)	<5 seconds	28(38.4)
	5–10 seconds	25(34.2)
	>10 seconds	20(27.4)
Schirmer I test	<5 mm	6(8.2)
	5–10 mm	15(20.5)
	>10 mm	52(71.2)
Orbital CT findings	Fat-predominant	7(9.6)
	Muscle-predominant	6(8.2)
	Apical crowding	6(8.2)

Table 6. Management modalities used in patients with TED, n=73

Treatment	Category	n(%)
Topical therapy	Lubricants	73(100)
Systemic therapy	None	39(53.4)
	Corticosteroids	14(19.2)
	Anti-thyroid drugs	18(24.7)
Other interventions	Orbital radiotherapy	1(1.4)
	Surgical intervention	1(1.4)

Discussion

Our descriptive study of TED found the presence of mild and largely inactive disease, with EUGOGO-mild disease in 50(68.5%) and CAS<3 in 50(68.5%) patients, and a substantial proportion of hypothyroid and euthyroid TED 50(61.7%). This supports the study objective of defining the clinical spectrum of TED rather than assessing therapeutic outcomes. Large epidemiologic reviews and international guidelines consistently report that approximately 70–80% of TED cases are mild, 20–25% are moderate–severe, and only a small minority progress to sight-threatening disease, reflecting a global presence of milder disease.[1,10] The rarity of optic neuropathy, restrictive myopathy, and severe activity in this cohort aligns with these observations and suggests that most patients were evaluated

before irreversible fibrotic changes occurred.[7,10,11]

Clinically, eyelid signs and proptosis were the dominant manifestations, while motility restriction and optic nerve involvement were uncommon. Lid retraction 29(39.7%) and proptosis 26(35.6%) were the most frequent objective findings, whereas diplopia was present in only 9(12.3%) in the present study. This pattern suggests predominance of soft-tissue inflammatory changes rather than muscle-predominant disease. In contrast, cohorts from East Asia report higher rates of diplopia and extraocular muscle enlargement.[12] The lower burden of restrictive disease in the present series may reflect earlier ophthalmic referral, milder disease biology, or referral bias whereby patients with severe disease are referred for general medical management and less likely to access eye care services.

The demographic profile demonstrated female predominance and clustering in middle-to-older age groups, consistent with autoimmune susceptibility patterns. Although male sex has been associated with more severe disease in several studies, the descriptive nature of the present cohort limits inference regarding sex-severity relationships.[7,10,12] The concentration of patients from Province 3, 55(75.3%), most likely reflects hospital catchment and referral pathways rather than true geographic distribution in the country.

A notable finding of the present study was the near-equal distribution of hyperthyroid 28(38.4%) and hypothyroid 27(37.0%) TED. This contrasts with systematic reviews reporting a predominance of hyperthyroid TED (86%).[3] This could be due to prior treatment of Graves' disease before ophthalmic referral, a higher prevalence of autoimmune thyroiditis, and incomplete TRAb testing, which may underestimate autoimmune activity.[3,13] Such heterogeneity has been increasingly recognized in Asian cohorts and challenges the traditional hyperthyroid-centric view of TED.

Ocular surface disease was a major contributor to morbidity, with reduced tear breakup time (TBUT) observed in 53(72.6%) patients in the present study. This finding reinforces evidence that even mild, inactive TED can significantly affect quality of life through exposure-related symptoms rather than vision-threatening pathology.[4,7,11] Management patterns reflected this clinical profile, with over half of patients, 39(53.4%) requiring no systemic therapy and only use of topical lubricants. Limited use of systemic immunosuppression, radiotherapy, or surgery is consistent with guideline-based care for mild, inactive disease and also reflects local resource availability.[8,14,15] Regional registries and collaborative studies could address these gaps and better define TED phenotypes locally and in the Asia region.[3,16]

The limitation of this study include our cross-sectional, single-center design precluding assessment of temporal changes in disease activity or progression. Further subgroup analyses by thyroid status or disease activity with larger sample size may be required. Resource-related limitations affecting immunologic and radiologic evaluation reflect real-world practice but may underestimate disease activity and structural severity. A prospective, multicenter design with standardized antibody testing, orbital imaging, and longitudinal follow-up would allow more refined phenotyping and improve generalizability.

Conclusion

Thyroid eye disease in this Nepalese tertiary eye care cohort was predominantly mild, inactive, and non-sight-threatening, with eyelid signs, proptosis, and ocular surface symptoms being the most common manifestations. A substantial proportion of patients were hypothyroid or euthyroid, emphasizing the heterogeneous thyroid status associated with TED beyond the classic hyperthyroid phenotype.

Author contribution

Concept design: TS, AT; Literature search: TS, AT; Data collection: TS, PJ, AT; Data analysis: TS, RKC, PJ, NS, AT; Draft manuscript: TS, PJ, NS, RKC, AT; Final manuscript and accountability: All

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Conflict of Interest

None

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Supplementary material

The data and supplementary material that support the findings of this study are available from the corresponding author upon reasonable request.

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