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ORIGINAL ARTICLE

Thyroid Dysfunction and Autoantibody Positivity in Relation to Clinical Severity of Psoriasis

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ABSTRACT

Background*: Psoriasis is a chronic immune-mediated inflammatory disease, and other comorbidities that may be linked to psoriasis through the mechanisms of systemic autoimmune disorders. In patients with psoriasis, autoimmune thyroid disease has been observed more commonly, but the link between thyroid abnormalities and severity of psoriasis is not fully elucidated.* ***Methods & Materials:*** *A total of 63 patients with clinically and histopathologically diagnosed palmoplantar psoriasis (case) as well as apparently healthy age- and sex-matched controls were inducted into the study. Pasi and body surface area (BSA) were used to assess psoriasis severity. The laboratory examination consists of serum FT3, FT4, TSH, anti-TPO, anti-TG and TRAb.* ***Results:*** *The age of 35.8±16.7 years in DH and 35.4±16.9 in controls 78.0% of patients had chronic plaque psoriasis, and 73.0% had PASI >12, whereas 66.7% were reported with BSA involvement >10%. While most participants were euthyroid, thyroid function abnormalities were noted in 28 (44.4%) psoriasis patients. Patients of psoriasis with elevated anti-TPO antibodies (34.9%) and elevated anti-TG antibodies (46.0%). In patients with anti-TPO antibodies ≥5 IU/mL, 77.3% had PASI >12 and 81.8% had BSA >10%. Of these, 79.3% of those with anti-TG antibodies had PASI >12 and 75.9% had BSA >10%.* ***Conclusion****: In this study, the prevalence of thyroid dysfunction was high in patients with psoriasis and detection rates of thyroid autoantibodies were also elevated. Altered thyroid function was correlated with larger BSA involvement and relatively high serum levels of anti-TPO and anti-TG were mostly identified in patients with extensive and severe psoriasis.*

Keywords: *Psoriasis, thyroid dysfunction, thyroid autoimmunity, anti-TPO antibody, anti-thyroglobulin antibody*

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INTRODUCTION

Psoriasis is a chronic, immune-mediated inflammatory skin disease that is characterized by epidermal hyperproliferation, abnormal keratinocyte differentiation, and sustained inflammation. Psoriasis is known for its skin manifestations, but it attains recognition as a systemic inflammatory disease that may be accompanied by hypertension, obesity, type 2 diabetes, and other metabolic syndromes or cardiovascular comorbidities, especially in the psoriatic disease spectrum, which incites rheumatological and autoimmune comorbidities. The most common clinical type is chronic plaque psoriasis, for which severity differs dramatically between patients [1].

The pathogenesis of psoriasis is multifactorial, requiring a combination of genetic predisposition, environmental triggers, innate immunity and adaptive immune response. Dendritic cell and T-lymphocyte activation, mainly Th1 and Th17 cells, leads to increased pro-inflammatory cytokine production as well as skin keratinocyte proliferation. Psoriasis is one of the most important immunological typologies that operate through the IL-23/Th17 axis, while tumor necrosis factor-α and other inflammatory mediators are responsible for persisting disease activity [1].

Autoimmune thyroid diseases (AITD), which consist of Hashimoto thyroiditis and Graves' disease, are caused by an abnormal immune response directed against thyroid antigens. Anti-thyroid peroxidase (anti-TPO) and anti-thyroglobulin (anti-TG) antibodies are two serological markers of thyroid autoimmunity. Autoimmune thyroid diseases occur due to the interplay between genetic susceptibility, immune dysregulation, and environmental factors [2].

It has been suggested that a biological relationship may exist between psoriasis and thyroid autoimmunity because both entities share overlapping inflammatory and immunological mechanisms. Thyroid hormone receptors are expressed in skin and may affect keratinocyte proliferation, differentiation, and inflammation. Thus, thyroid dysfunction may have an indirect influence on epidermal homeostasis and skin inflammatory disorders [3].

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Despite several clinical studies having studied the association between psoriasis and thyroid abnormalities, their results were not completely consistent. Patients with psoriasis are associated with autoimmune thyroid disorders. Likewise, elevated titers of autoantibodies targeting the thyroid in psoriasis patients advocated a potential association between psoriasis and autoimmune thyroid disease [4]. On the other hand, there was no significant association between psoriasis and autoimmune thyroiditis, suggesting an association of uncertain magnitude dependent on population variables [5].

Thyroid dysfunction and psoriasis severity may be inversely related because thyroid abnormalities can contribute to the total burden of systemic inflammation among affected patients. A significant correlation of psoriasis severity with thyroid hormone abnormalities indicates that thyroid dysfunction may have clinical relevance in the management of patients with psoriasis [6]. Correspondingly, patients with thyroid dysfunction had a higher psoriasis severity assessed by clinical measures such as Psoriasis Area and Severity Index (PASI) or body surface area (BSA) [7].

Thyroid autoantibodies provide more information than routine thyroid function tests. Anti-TPO and anti-TG antibodies can be present in subjects prior to the onset of clinically overt thyroid disease, potentially providing a window into the early development of thyroid autoimmunity. To identify the association between psoriasis and thyroid autoimmunity. Higher anti-TPO and anti-TG antibody positivity among patients with psoriasis compared with controls [4].

Larger studies have provided additional evidence supporting the association between psoriasis and thyroid disease. In a meta-analysis, psoriasis patients had higher odds of all autoimmune thyroid diseases, and also reported increased positivity, especially for both anti-TPO and anti-TG antibodies, compared to healthy controls [8]. However, the relationship between thyroid autoantibody positivity and clinical severity of psoriasis remains less clear.

This potential link between thyroid dysfunctions and psoriasis is of noteworthy interest, especially in the context of South Asia, where both conditions pose significant clinical challenge. However, the evidence is rare from Bangladesh. Higher prevalence and significance of autoimmune mechanisms have been proposed in Tajik hypothyroidism patients, but limited local evidence suggests thyroid autoantibody status among psoriasis patients.

Hence, the current study was carried out to examine thyroid function and status of thyroid autoantibodies in patients with psoriasis and correlate their levels with clinical severity. Specifically, the study examined whether abnormal thyroid function, increased anti-TPO antibody, and increased anti-TG antibody contributed to higher PASI scores and more extensive BSA. This examination of severity adds a clinical dimension to the links between psoriasis and thyroid dysfunction beyond demonstrating autoimmune thyroiditis.

METHODS &MATERIAL

This was a hospital-based case-control study conducted in the Department of Dermatology and Venereology, Bangladesh Medical University, Dhaka. The study was conducted over 12 months, from November 2023 to October 2024. The control group consisted of age- and sex-matched apparently healthy individuals without psoriasis. A total of 63 psoriasis patients and 63 controls were included.

Inclusion Criteria

Patients who were clinically diagnosed with psoriasis and, if indicated based on clinical findings, histopathologically diagnosed with psoriasis. Patients of either sex. Individuals who are willing to participate in the study and provide written informed consent. Age- and sex-matched apparently healthy individuals with no history of psoriasis

Exclusion Criteria

Patients unwilling to participate or unable to consent. Patients with thyroid-damaging disorders or treatments that have the potential to alter thyroid function or levels of anti-thyroid autoantibodies significantly. Massive-scale chronic systemic disease or autoimmune condition that would affect the ability to assess Systemic Thyroid status in PA patients with Ps.

Clinical Assessment

Demographic and clinical data were obtained using a structured questionnaire. Information extracted from clinical data comprised the duration of psoriasis, history of treatments received, concomitant illnesses, habitual personal and family histories (History), and relevant systemic disorders. Diagnostic Methods: Patients received comprehensive dermatologic examination, and an expert dermatologist made all diagnoses. Skin biopsy was done for clinically indicated patients. The severity of disease was assessed using the Psoriasis Area and Severity Index (PASI). The PASI scores erythema, induration, scaling, as well as the area of involvement in the head, trunk and (upper and lower) limbs, with a range from 0 to 72. The present thesis dataset classified PASI >12 as higher-severity.

Data Collection

A structured questionnaire and clinical assessment form were used to collect data. Demographic and clinical details (age, sex, duration of the disease, treatment history details, comorbidities, personal habits and family history) were documented. Our patients were examined dermatologically in detail by a dermatologist, and the diagnosis of psoriasis was confirmed. The severity of disease was evaluated with Psoriasis Area and Severity Index (PASI) and body surface area (BSA). We collected venous blood samples from patients with psoriasis and healthy controls of comparable age and sex. Determination of serum levels of TSH, FT3, FT4, anti-TPO, anti-TG and TRAb and comparison between groups and with psoriasis severity.

Statistical Analysis

Continuous variables were described as mean±standard deviation for normally distributed variables and median with interquartile range for skewed variables. Categorical variables were expressed as frequencies and percentages. Continuous variables were analysed by Student's t-test or Mann–Whitney U test according to the data distribution. Categorical comparisons were made by using a chi-square or Fisher's exact test. Statistical analysis was performed by SPSS version 23.0, with $p<0.05$ signifying statistical significance.

Ethical Considerations

The study protocol was approved by the Institutional Review Board of Bangladesh University Medical before starting. Written informed consent from participants was required; confidentiality of data was maintained, and the right to deny informed participation or withdraw voluntarily at any time throughout the investigation was assured.

RESULTS

All 63 psoriasis patients had chronic plaque psoriasis. The mean disease duration was 3.56±1.63 years, and 77.8% had disease duration ≤5 years. The mean PASI score was 13.37±2.10, with 73.0% having PASI >12. Mean BSA involvement was 11.43±1.36%, and 66.7% had BSA involvement >10% (*Table I*).

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Table I: Clinical characteristics and severity profile of psoriasis patients (*n*=63)

Variable	n (%) / Mean±SD
Disease duration, years	3.56±1.63
≤5 years	49 (77.8)
>5 years	14 (22.2)
Type of psoriasis	
Chronic plaque psoriasis	63 (100.0)
PASI score	13.37±2.10
≤12	17 (27.0)
>12	46 (73.0)
BSA involvement	11.43±1.36%
≤10%	21 (33.3)
>10%	42 (66.7)

The majority of psoriasis patients (87.3%) were euthyroid. However, 4.8% were overt hypothyroid, 1.6% hyperthyroid, 4.8% subclinical hypothyroid and 1.6% subclinical hyperthyroid. Controls had a greater proportion of euthyroid participants, at 96.8%. The mean concentration of FT4 in psoriasis patients was significantly lower than that of controls (11.80±2.55 vs 12.62±1.69 pmol/L; p=0.035). Groups did not differ regarding FT3, TSH and TRAb (*Table II*).

Table II: Thyroid function and thyroid autoantibody profile among psoriasis patients and controls (*n*=126)

Parameter	Psoriasis (n=63)	Control (n=63)	p-value
TSH, median (IQR), mIU/L	1.74 (1.17–2.87)	2.11 (1.17–2.80)	0.684
Normal TSH	55 (87.3)	61 (96.8)	0.111
Elevated TSH	6 (9.5)	1 (1.6)	
FT3, mean±SD, pmol/L	4.52±1.03	4.78±0.55	0.088
Normal FT3	40 (63.5)	38 (60.3)	0.211
FT4, mean±SD, pmol/L	11.80±2.55	12.62±1.69	0.035
Normal FT4	58 (92.1)	63 (100.0)	0.058
Anti-TPO, median (IQR), IU/mL	1.21 (0.64–59.10)	0.71 (0.37–1.38)	0.002
Elevated anti-TPO	22 (34.9)	3 (4.8)	<0.001
Anti-TG, median (IQR), IU/mL	3.67 (0.54–21.84)	1.11 (0.94–1.59)	<0.001
Elevated anti-TG	29 (46.0)	5 (7.9)	<0.001
TRAb, mean±SD, IU/L	1.17±0.49	1.15±0.22	0.747
Elevated TRAb	0 (0.0)	0 (0.0)	—
Euthyroid status	55 (87.3)	61 (96.8)	1.000

Among psoriasis patients, 28 had abnormal thyroid function, and 35 had normal thyroid function. Patients with abnormal thyroid function were younger, with 78.6% aged ≤40 years compared with 54.3% in the normal-TFT group (p=0.045). The proportion with PASI >12 was higher among patients with abnormal TFTs (82.1%) than among those with normal TFTs (65.7%), although the difference was not statistically significant (p=0.144). A statistically significant difference was observed for BSA involvement: 82.1% of patients with abnormal TFTs had BSA >10%, compared with 54.3% among those with normal thyroid function (p=0.020) (*Table III*).

Table III: Clinical severity according to thyroid function status among psoriasis patients (*n*=63)

Clinical characteristic	Normal TFT (n=35)	Abnormal TFT (n=28)	p-value
Age ≤40 years	19 (54.3)	22 (78.6)	0.045
Age >40 years	16 (45.7)	6 (21.4)	
Male	22 (62.9)	18 (64.3)	0.907
Female	13 (37.1)	10 (35.7)	
Disease duration ≤5 years	29 (82.9)	20 (71.4)	0.278
Disease duration >5 years	6 (17.1)	8 (28.6)	
PASI ≤12	12 (34.3)	5 (17.9)	0.144
PASI >12	23 (65.7)	23 (82.1)	
BSA ≤10%	16 (45.7)	5 (17.9)	0.020
BSA >10%	19 (54.3)	23 (82.1)	

Anti-TPO antibodies were positive in 22 (34.9%) of patients with psoriasis among 63 patients. Younger Patients (>40 years old) were found to be at high risk of having abnormal anti-TPO antibodies. A borderline statistically significant association of anti-TPO positivity and age was also noted (p=0.017). As for the disease severity of psoriasis, 77.3% of patients with elevated anti-TPO antibodies had PASI >12 compared to 70.7% of patients with normal anti-TPO antibodies. This difference was not statistically significant(p=0.577). Nonetheless, BSA >10% was significantly more frequent in anti-TPO-positive patients (81.8%) when compared to anti-TPO-negative patients (58.5%, p=0.062), approaching significance (*Table IV*).

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Table IV: Association of anti-TPO antibody positivity with clinical characteristics and psoriasis severity (N=63)

Clinical characteristic	Normal anti-TPO (n=41)	Elevated anti-TPO (n=22)	p-value
Age ≤40 years	31 (75.6)	10 (45.5)	0.017
Age >40 years	10 (24.4)	12 (54.5)	
Male	24 (58.5)	16 (72.7)	0.265
Female	17 (41.5)	6 (27.3)	
Disease duration ≤5 years	31 (75.6)	16 (72.7)	0.753
Disease duration >5 years	10 (24.4)	6 (27.3)	
PASI ≤12	12 (29.3)	5 (22.7)	0.577
PASI >12	29 (70.7)	17 (77.3)	
BSA ≤10%	17 (41.5)	4 (18.2)	0.062
BSA >10%	24 (58.5)	18 (81.8)	

Elevated anti-TG antibodies were identified in 29 (46.0%) psoriasis patients. The duration of disease was significantly associated with anti-TG positivity. The percentage of anti-TG-positive patients among those with disease duration ≤5 years (89.7%) was higher than the percentage in subjects with normal anti-TG levels (67.6%), p=0.036. As for PASI, the proportion of patients with PASI >12 was higher among anti-TG-positive patients (79.3%) as compared to those with normal anti-TG levels (67.6%), though not statistically significant (p=0.299). Likewise, a BSA >10% was more common in anti-TG-positive patients (75.9%) than in the cohort with normal anti-TG levels (58.8%), and although this trend was observed, it did not achieve statistical significance (p=0.153) (*Table V*).

Table V: Association of anti-TG antibody positivity with clinical characteristics and psoriasis severity (*n*=63)

Clinical characteristic	Normal anti-TG (n=34)	Elevated anti-TG (n=29)	p-value
Age ≤40 years	25 (73.5)	16 (55.2)	0.128
Age >40 years	9 (26.5)	13 (44.8)	
Male	23 (67.6)	17 (58.6)	0.458
Female	11 (32.4)	12 (41.4)	
Disease duration ≤5 years	23 (67.6)	26 (89.7)	0.036
Disease duration >5 years	11 (32.4)	3 (10.3)	
PASI ≤12	11 (32.4)	6 (20.7)	0.299
PASI >12	23 (67.6)	23 (79.3)	
BSA ≤10%	14 (41.2)	7 (24.1)	0.153
BSA >10%	20 (58.8)	22 (75.9)	

DISCUSSION

In the present case-control study, we assessed the status of thyroid function and thyroid autoantibodies and their associations with psoriatic clinical severity in psoriasis patients. 63 patients with psoriasis were enrolled, along with 63 healthy controls matched by age and sex. Key messages: The presence of both anti-thyroid peroxidase (anti-TPO) and anti-thyroglobulin (anti-TG) antibodies was significantly higher among psoriasis patients compared with controls; Thyroid dysfunction and thyroid autoantibody positivity tended to coincide with more severe disease among the psoriasis patients.

The mean age was 35.8±16.7years and male sex accounted for 63.5% of the study group. Patients were mostly young (77.8% of subjects had duration of disease ≤5 years). Severe disease was prevalent, with 73.0% having a PASI score of >12 and BSA involvement of >10% in 66.7%. The domination of chronic plaque psoriasis was also consistent with that reported by Dogra and Mahajan [1], who noted that the most common morphological form of psoriasis is chronic plaque psoriatic skin lesions. As with males, male predominance was also reported by Alakbarov et al, Mahrous and Wang et al [9, 10, 11].

87.3% of psoriasis patients and 96.8% of controls had a normal TSH, compared to 63.5% and 60.3%, respectively, for the FT3. Psoriasis patients were found to have normal FT4 in 92.1%, and all controls had normal FT4. However, the mean FT4 concentration was significantly lower in psoriasis patients; nevertheless, most patients did not show overt thyroid dysfunction. These results are in general agreement with those reported by Lai and Yew [12], who found no significant differences in thyroid function between patients with psoriasis and control subjects.

Similar large differences between the two groups were observed for thyroid autoantibodies. Anti-TPO antibodies were increased in psoriasis patients (34.9%) but not controls (4.8%; p12 and BSA >10% were both significantly higher in that with abnormal thyroid function (82.1% vs 46.0%, P 10% revealed significantly more patients with abnormal thyroid function than those with normal thyroid function (82.1% vs. 54.3%, p=0.020). It indicates that it may be associated particularly with the extent of skin involvement for thyroid dysfunction [13,14]. Arican et al, measured disease activity using the PASI score, which was two-fold higher among those with faulty thyroid function compared to patients with no thyroid dysfunction [6].

Showed that 34.9% of patients with psoriasis had positive anti-TPO antibodies. Patients who had positive anti-TPO antibodies were significantly more likely to be over 40 years of age (54.5% vs 24.4%, p = 0.017). While PASI and BSA >10% remained not statistically significant, more than two-thirds of the anti-TPO-positive patients also had PASI>12.77.3% compared to 70.7%, and BSA >10% was higher in this group as well (81.8% vs 58.5%. This suggests that patients with positive anti-TPO have a propensity for more extensive disease. This finding is generally consistent with the association of thyroid autoimmunity and psoriasis reported by Alidrisi et al [4]. The patterns of severity, though somewhat different from those observed in anti-TPO-negative patients, were similar among patients with autoantibody-positive disease [15].

Also, anti-TG antibodies were increased in 46.0% of patients. Compared with patients without elevated anti-TG antibodies,

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the proportions of anti-TG-positive patients with PASI >12 and BSA >10% were significantly greater (79.3%, 75.9% vs 67.6% and 58.8%, respectively). While no statistical significance was reached in these differences in severity, the directionality of the changes suggests a connection between thyroid autoimmunity and greater psoriasis burden. This observation is consistent with increased anti-TG positivity reported by Alidrisi et al and Zhang et al [4,8].

Thyroid autoimmunity is significantly more prevalent in psoriasis patients than healthy controls, with the strongest associations for anti-TPO and anti-TG antibody positivity. Severity analyses also indicate that men with thyroid dysfunction and thyroid autoantibody positivity have more extensive disease, particularly BSA involvement.

CONCLUSION

This study demonstrated that thyroid autoimmunity, particularly anti-thyroid peroxidase and anti-thyroglobulin antibody positivity, was significantly more common among patients with psoriasis than healthy controls. Although most participants were euthyroid, psoriasis patients with abnormal thyroid function showed significantly greater body surface area involvement. Anti-TPO- and anti-TG-positive patients also demonstrated a higher proportion of severe psoriasis based on PASI and BSA, although some associations did not reach statistical significance. These findings suggest a possible relationship between thyroid autoimmunity and the clinical burden of psoriasis.

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CONFLICT OF INTEREST

None declared

ETHICAL CONSIDERATION

The study was approved by ethical review committee.

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