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A Study on Thyroid Dysfunction in Patients with Psoriasis

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Abstract **Original Research Article**

***Background*:** Psoriasis is a common and chronic inflammatory skin disease which is characterize by clearly defined red and scaly plaques. The plaques of psoriasis can be disfiguring and severely pruritic and/or painful. Itching is often the most bothersome symptom of psoriasis. ***Methodology*:** In this hospital based cross-sectional study, a total of 180 people in the all age group were included. Individuals attending the Dermatology Out-patient Department of Bangabandhu Sheikh Mujib Medical University (BSMMU) were selected during the study period from July'2023 to Januray'2024. Total 90 patients with diagnosed cases of psoriasis were selected as study group and 90 age and sex matched healthy individuals were selected as controls. ***Results*:** No significant difference was noted in the values of FT3, FT4 and TSH hormones in the values among the control group and patient group. In males 10 (10.2%) were hypothyroid, 51 (86.4%) euthyroid and 2(3.4%) was hyperthyroid whereas, in females 5(16.13%) were hypothyroid, 25 (80.65%) euthyroid and 1 (3.2%) were hyperthyroid. ***Conclusion*:** No significant difference was noted in the values of FT3, FT4 and TSH hormones in the values among the control group.

Keyword: Thyroid dysfunction, psoriasis.

INTRODUCTION

Psoriasis is a common and chronic inflammatory skin disease which is characterize by an exceptionally increased rate of epidermal turnover, and an activated mononuclear infiltrate in the basic dermis. It has been thought of mainly as a genetic dermatosis [1]. Psoriasis is a familiar disease, particularly in Europe and North America with a prevalence of around 2% [2]. The incidence shows a linear increase over time, with a prevalence of around 1 % at the age of 18 years. Psoriasis has been related with insulin resistance, cardiovascular disease, thyroid dysfunction, atherosclerosis, Crohn's disease, depression, skin cancer and non-alcoholic fatty liver disease (NAFLD) [3-5]. Skin is the site of synthesis and metabolism of several neuropeptides including components of the Hypothalamic-Pituitary-Adrenal (HPA) and Hypothalamic-Pituitary-Thyroid (HPT) axis and also a source of vitamin D [6]. Psoriasis vulgaris is a chronic inflammatory skin disease with a negative impact on the patients' quality of life. The etiopathogenesis of this multifactorial disorder is not entirely elucidated, therefore a curative treatment is not available at the moment. To avoid relapsing episodes, a long term medication is necessary [7]. The aim of the study to see the association between thyroid hormone levels and incidence of psoriasis.

MATERIALS AND METHODS

In this hospital based cross-sectional study, a total of 180 people in the all age group were included. Individuals attending the Dermatology Out-patient Department of Bangabandhu Sheikh Mujib Medical University were selected during the study period from July'2023 to January'2024. Written informed consent was obtained from all participants of the study. Total 90 patients diagnosed cases of psoriasis were selected as study group and 90 age and sex matched healthy individuals were selected as controls. Exclusion criteria for participants of the study consisted of the following conditions: consumption of drugs that affected thyroid hormone levels (phenothiazines, H2 blockers, anti-depressants, butyrophenones, antipsychotics, oestrogens, reserpine, methyldopa, metoclopramide, verapamil, etc.,), pregnancy or lactation, menstrual abnormalities, any condition that could interfere with the evaluated hormone levels like pituitary, hypothalamic, adrenal or

renal diseases, head trauma, and any malignancy or psychiatric or physical condition that could hamper participation in the study. Five milliliters of fasting blood sample was collected under aseptic conditions from the individuals, centrifuged and instantly analyses or stored at -20ºC. All estimations were carried out on auto-analyser (Siemens dimension RxL Max). Thyroid profile consisting of free tri-iodothyronine (FT3), free thyroxine (FT4) and Thyroid-Stimulating Hormone (TSH) was estimated by chemiluminescence assay on Siemens Centaur CP. Because >99% of T4 and T3 in the blood are bound to serum proteins, but only the free thyroid hormones are biologically active, estimates of free thyroid hormone concentrations are theoretically preferable to total T3 and total T4 tests. According to the serum TSH levels, participants were classified as having hypothyroidism (>5.5 mIU/L), euthyroid status (0.4–5.5 mIU/L) and hyperthyroidism (<0.4 mIU/L).

RESULTS

Majority patients belonged to age 41-50 years in both groups, the mean age was found 47.5±15.2 years in case group and 46.7±14.5 years in control group. Males were predominant in both groups (65.6% vs 58.9%). Majority patients came from lower class family in both groups, 35(38.9%) in case group and 33(36.7%) in control group. The difference was not statistically significant (p>0.05) between two groups (Table 1). No significant difference was noted in the values of FT3, FT4 and TSH hormones in the values among the control group and patient group (Table 2). In males 10 (10.2%) were hypothyroid, 51 (86.4%) euthyroid and 2 (3.4%) was hyperthyroid whereas, in females 5(16.13%) were hypothyroid, 25 (80.65%) euthyroid and 1 (3.2%) were hyperthyroid (Table 3).

Table 1: Socio-demographic variables of the study population (n=180)

Socio-demographic variables	Case (n=90)		Control (n=90)		p value
Age (in years)	**n**	**%**	**n**	**%**	
<10	7	7.8	6	6.7	
10-20	8	8.9	9	10.0	
21-30	13	14.4	11	12.2	
31-40	17	18.9	15	16.7	
41-50	21	23.3	23	25.6	
50-60	11	12.2	10	11.1	
>60	13	14.4	16	17.8	
Mean±SD	47.5±15.2		46.7±14.5		0.718^{ns}
Sex					
Male	59	65.6	53	58.9	0.356^{ns}
Female	31	34.4	37	41.1	
Economic condition					
Lower class	35	38.9	33	36.7	
Lower middle class	28	31.1	25	27.8	0.884^{ns}
Upper middle class	16	17.8	19	21.1	
Upper class	11	12.2	13	14.4	
Duration of psoriasis (years)	12.3±2.3		-		

ns=not significant; p value reached from unpaired t-test

Table 2: Thyroid hormone levels of the study population (n=180)

Thyroid hormone levels	Case (n=90)	Control (n=90)	P value
	Mean±SD	**Mean±SD**	
FT3 (pg/ml)	3.13±0.96	2.95±0.68	0.148^{ns}
FT4 (ng/dl)	1.31±0.4	1.22±0.3	0.089^{ns}
TSH (µIU/ml)	2.97±1.1	3.28±1.2	0.072^{ns}

s=significant; ns=not significant; P value reached from unpaired t-test

Table 3: Prevalence of thyroid dysfunction in psoriasis patients

	Hypothyroid	Euthyroid	Hyperthyroid
Males (n=59)	6(10.2%)	51(86.4%)	2(3.4%)
Females (n=31)	5(16.13%)	25(80.65%)	1(3.23%)

DISCUSSION

In this study observed that majority patients belonged to age 41-50 years in both groups, the mean age was found 47.5±15.2 years in case group and 46.7±14.5 years in control group. Males were predominant in both groups (65.6% vs 58.9%). Majority patients came from lower class family in both groups, 35(38.9%) in case group and 33(36.7%) in control group. The difference was not statistically significant (p>0.05) between two groups. Vani *et al.,* [8] the mean age of control group was 47±2.0 years and the psoriatic group was 48±1.5 years. Incidence of the disease was higher in females compared to males. In study of Gul *et al.,* [1] observed that the mean age of patients with psoriasis was 40.54 ± 16.91 years. 56 patients were female, 49 were male.

In this study observed that that, in males 10 (10.2%) were hypothyroid, 51 (86.4%) euthyroid and 2 (3.4%) was hyperthyroid whereas, in females 5(16.13%) were hypothyroid, 25 (80.65%) euthyroid and 1 (3.2%) were hyperthyroid. Comparison the Vani *et al.,* [8] study found in males 6 (9.6%) were hypothyroid, 55 (88.7%) euthyroid and 1 (1.6%) was hyperthyroid whereas in females 7 (9.5%) were hypothyroid, 63 (86.75%) euthyroid and 3 (4.1%) were hyperthyroid.

In this study showed no significant difference was noted in the values of FT3, FT4 and TSH hormones in the values among the control group and patient group. In Roman *et al.,* [7] study, no significant differences were observed in the mean level of TSH and T3 in the two groups. The mean level of FT4 was significantly higher in patients with no systemic treatment (p<0.05). Previous studies have shown a higher frequency of autoimmune diseases in psoriatic population. Regarding the presence of thyroid disorders in psoriatic population versus healthy controls, the results are controversial. Robati *et al.,* [9] found no difference between the mean level of TSH, T3, T4 in psoriatic population compared to controls and no correlation between the level of hormones and psoriasis severity. No difference has been found between psoriatic patients and controls regarding TT3 (total triiodothyronine), FT4 and TSH, but the level of free T3 and total T4 was significantly higher in patients with psoriasis in the study conducted by Arican *et al.,* [10]. The level of FT4 was found significantly higher in patients with psoriasis, compared to controls in a study from 2009, conducted by Gul *et al.,* [1]. In their study, Lai *et al.,* [11] concluded that patients with active disease had a lower level of TSH than patients without active psoriasis. Vani *et al.,* [8] study showed No significant difference was noted in the values of FT3, FT4 and TSH hormones in the values among the control group and patient group. This could be attributed to the small sample size. These findings are similar to a study by Robati *et al.,* [9] who did not observe any statistically significant difference in the mean T3, T4 and TSH levels between psoriatic patients and controls. Arican *et al.,* [10] also observed no differences in serum levels of total T3, free T4 and TSH between cases and controls. Though, a few studies have shown high prevalence of thyroid autoimmunity in patients with psoriatic arthritis, Gul *et al.,* [1] did not find any statistically significant differences in the levels of anti-thyroglobulin and anti-thyroid peroxidase antibodies. T3 has a major role in the regulation of cell growth and differentiation [12]. T3 and T4 have hyperproliferative effect on the skin by Epidermal Growth Factor (EGF). Since, T3 receptors exist on the skin, it is postulated that T3 hormone may play a role in the synthesis of keratin. Propylthiouracil, an anti-thyroid drug, may interfere with keratin synthesis by binding to nuclear T3 receptors [13]. Gul *et al.,* [1] the levels of TSH, FT3 and FT4 findings of thyroid gland were compared statistically between psoriasis and control groups.

Prashant *et al.,* [14] reported that the prevalence of AITD in the control group, i.e., healthy subjects, is found to vary between 3% and 8% in the literature [15, 16]. The thyroid function and autoimmunity markers were assessed, and the prevalence of autoimmunity was calculated to be 1.9% by Alawneh *et al.,* [17].

CONCLUSION

Psoriasis is a chronic systemic inflammatory disorder related with different endocrine dysfunctions. In this study observed that the prevalence of thyroid disorders in psoriatic patients is high although no statistically significant difference was noted in the levels of thyroid hormones between healthy individuals and patients with psoriasis.

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