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Comorbidities in Psoriasis, Cross-sectional Study in Western Nepal

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Abstract

Introduction: Psoriasis is an immune mediated chronic inflammatory disorder with a worldwide prevalence of 0.5 to 11%. Prevalence of psoriasis in Nepal is around 3%. Psoriasis has many associated systemic diseases and conditions such as diabetes, hypertension, metabolic syndrome, etc. of which the commonly associated condition is metabolic syndrome. The objective of this study is to find the degree of association between psoriasis and other diseases such as hypothyroidism, metabolic syndrome etc.

Materials and Methods: For this study, total number of fifty-two patients with equal number of age and sex matched controls were recruited with a total duration of study being six months. This was an observational cross sectional prospective study. For the qualitative data, Chi-square test was used and for quantitative data analysis, Student's t test was used.

Results: Out of the eight parameters Body mass index (BMI), smoking, alcohol use, hypothyroidism, hypertension, fasting blood sugar (FBS), fasting triglyceride (TG), fasting high density lipoprotein, considering the p value of <0.05 to be significant, FBS & fasting TG were found to be significant. When the means of FBS and fasting TG were compared between the cases and controls, there was notable relationship between the difference of means and the standard errors of means (p value=0.01 for FBS and p value=0.017 for fasting TG) as calculated by Student's t Test.

Conclusion: In this study, there was a statistical significance between the fasting blood sugar (FBS) levels of the cases and controls (p value=0.01) and also between the fasting triglyceride levels of cases and controls (p value=0.017).

Key words: Adipokines; Comorbidities; Diabetes; Dyslipidemia; Hypertension; Hypothyroidism; Metabolic syndrome; Psoriasis.

Introduction

Psoriasis is a common inflammatory and immune mediated chronic disorder which commonly involves the skin and the joints. Worldwide prevalence of psoriasis in adults ranges from 0.51% to 11.43%, and in children from 0% to 1.37%.^{1,2} The prevalence of the disease in Nepal ranges from 2.9% to 3.6%.^{3,4} The disease has a bimodal distribution of onset, early peak occurring during early 20s and late peak occurring in the 60s. It is commonly related with physical

disability, psychological distress and decreased self-confidence. Mild to moderate disease is usually controlled with topical steroids, calcipotriol, dithranol, tacrolimus and retinoids. Severe disease requires systemic immunosuppressants such as methotrexate, cyclosporine and mycophenolate mofetil.

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The primary objective of this study is to find the relationship between psoriasis and other diseases specially diabetes, hypertension and thyroid disorders. The secondary objective is to see any correlation between disease and patients' habits such as cigarette smoking & alcoholism.

Materials and Methods

The study was carried out in Manipal Teaching Hospital, Pokhara. Patient recruitment was done in Dermatology Outpatient Department. Consent form was signed by every patient before enrollment into the study. Patients with chronic plaque psoriasis of both sex with age more than 18 years were included in the study. The diagnosis of psoriasis was mostly clinical and in some cases prior diagnosis and treatment such as methotrexate were relied on. Patients with other papulosquamous disorders such as lichen planus, pityriasis rosea, seborrheic dermatitis were ruled out because of close proximity with clinical presentation of psoriasis. Patients of cutaneous infection such as impetigo, tinea and herpes were also excluded. The patients, after being enrolled and vitals being noted down, were called the next day for blood samples including FBS, Fasting lipid profile and TFT (T3, T4, TSH).

Approval for research was obtained on 25th November 2020 from Institutional Review Committee (IRC). The recruitment began from December 2020 and ended

in May 2021. This was a cross sectional prospective study. The total number of cases were 52 and the same number of patients were taken for the age and sex matched comparison group (control). The data was analyzed using SPSS version 21.

Results

The total number of cases of chronic plaque psoriasis was 52 (24 males and 28 females). The age of the subjects ranged from 20 to 82 years, of which almost 38% cases ranged between 34 to 46 years, mean year being 47 years (Figure 1). The total duration of disease ranged from 6 months to 40 years.

The analysis of the relevant data was done using Statistical Package for Social Sciences (SPSS) version 21. For nonparametric data, chi-square test was used to find the correlation and for parametric values, Student's -t test was used wherever necessary. P-value of <0.05 was considered statistically significant within the confidence interval of 95%.

In our study, there was a significant correlation in regards to diabetes (p-value=0.01) and dyslipidemia (specifically triglyceride levels) (p-value=0.017), whereas comorbidities such as hypertension, thyroid abnormalities, body mass index had no significant association (Table 1). There was also no direct correlation between psoriasis in terms of smoking and alcohol consumption when compared distinctively.

Table 1: Descriptive characteristics of cases and control along with lab values and p-values

Characteristics	Cases (Total n =52)	Controls (Total n= 52)	p- value
Age range in yrs (mean)	20-82 (46.92)	19-88 (44.30)	NA
Male/Female, n (ratio)	24/28 (0.8)	22/30 (0.73)	NA
BMI >30	19 (36%)	13 (25%)	0.2
Smokers, n (%)	30 (57%)	16 (30%)	0.32
Alcoholics, n (%)	20 (38%)	15 (28%)	0.56
Hypothyroidism, n (%)	18 (34%)	14 (27%)	0.22
Hypertension	25 (48%)	20 (38%)	0.26
Diabetes FBS>100mg/dl, (mean±SD)	22 (106.86±39.85)	12 (88.76±18.35)	0.01 [∞]
Fasting TG>150mg/dl, (mean±SD)	21 (144.1±63.07)	10 (118.07±35.18)	0.017 [∞]
Fasting HDL<40mg/dl, (mean±SD)	28 (37.80±4.81)	24 (40.46±5.67)	0.42

[∞]-significant p-value (<0.05), NA-Not applicable

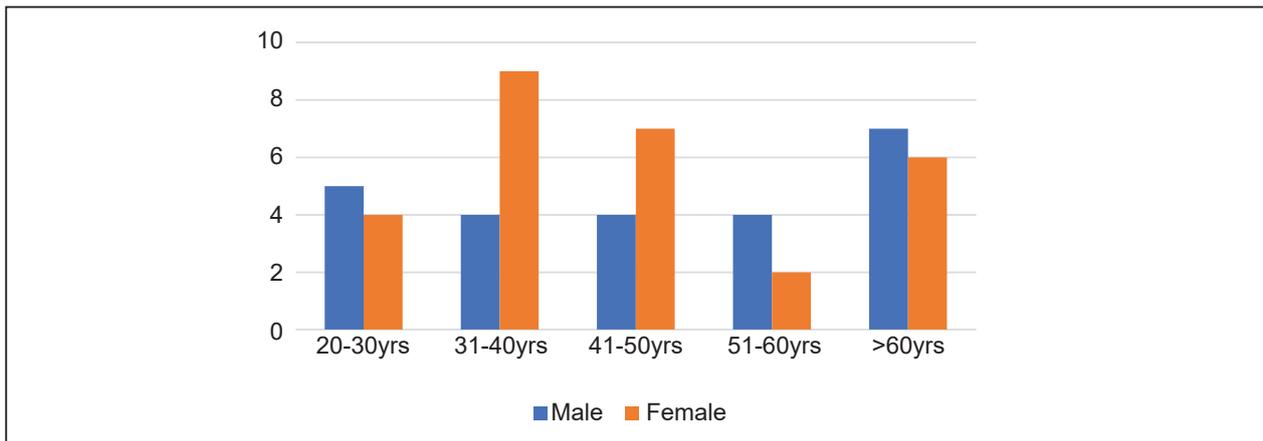


Figure 1: Age and sex distribution of cases

Discussion

The rationale for our study is that, other coexisting systemic diseases are found more in psoriatic patients than in other chronic skin conditions. Psoriasis has a very close association with metabolic syndrome.⁵ It is associated with an increased risk of other autoimmune disorders like ulcerative colitis, Crohn’s disease, and celiac disease.⁶ It has also been found to be associated with alopecia areata, thyroid dysfunction and metabolic syndrome.⁷

Rather than individually diagnosing metabolic syndrome according to the standard guidelines and criteria, the metabolic parameters such as triglyceride levels, HDL cholesterol levels, fasting blood sugar levels, blood pressure and BMI were taken into consideration and compared among the patients and controls. There has been a direct association between psoriasis and metabolic syndrome as indicated by the levels of adipokines such as tumor necrosis factor, vascular endothelial growth factor, adiponectin and leptin. Adipokines are responsible for causing insulin resistance whereas tumor necrosis factor and leptin are liable for increased proliferation of keratinocytes and inducing T cells, leading to psoriasis.⁸

According to a Thai study conducted by Kokpol et al, there was a notable association between metabolic syndrome and psoriatic patients as compared to controls.⁹ Tumor necrosis factor (TNF- α) correlate well as an indicator for increased waist circumference and body mass index.¹⁰ Chronic inflammation leads to oxidative stress and endothelial damage, thus greater prevalence of hypertension in psoriasis patients.¹¹

In two multicentric meta-analytic studies done over 2 million participants with more than 200 thousand

psoriatic patients reviewed by the same authors, found out that the odds of developing hypertension and obesity was greater with severe psoriasis as compared to mild psoriasis.^{11,12} However in our study there was no significant association between psoriasis versus hypertension and obesity. Another study done from Italy showed that the psoriatic patients with BMI ≥ 30 mg/m² had notably less chance of improving in PASI score than with normal weight patients after conventional therapy.¹⁰

In our study, the association between psoriasis and hypertension was not significant. However some earlier studies have shown positive correlation between psoriasis and severity of hypertension.^{13,14} With severity of psoriasis being more, there is more chances of poorly controlled hypertension in the patient, independent of BMI and other metabolic parameters.¹⁴ In both children and adults of psoriasis, there was an inverse relationship of severity of disease with the levels of HDL and CEC (cholesterol efflux capacity).^{15,16}

In a meta-analysis conducted by Amstrong AW and colleagues, a pooled relative risk (RR) of 1.27 (95% CI, 1.16-1.40) was calculated for diabetes among patients with psoriasis.¹⁷ Azfar RS et al found a significant risk of diabetes and its complication in patients of severe psoriasis.¹⁸ In our current research we too found a positive correlation among psoriatic patients and diabetes (p-value=0.01)

Along with obesity and hypertension, chronic smoking habits and alcohol consumption have also been found to be associated with psoriasis.¹⁹ Psoriasis was found to be severe in patients with diabetes, obesity and history of smoking than those without these conditions (p<0.05).²⁰

Kiguradze T et al. conducted a retrospective study of over 3 years duration with a total number of psoriasis patient being 9,654 out of which 1,745 patients had Hashimoto's thyroiditis. This study had a positive correlation between psoriasis and Hashimoto's thyroiditis (OR=2.49; 95%CI 1.79–3.48; $p < 0.0001$).²¹ However Vassilatou E et al. found no proper correlation between psoriasis and hypothyroidism.²² In our study also we found no significant relationship between psoriasis and hypothyroidism.

In an Indian study a notable correlation between psoriasis and metabolic syndrome was found out. Metabolic syndrome was diagnosed by the presence of three or more of the five criteria of the National Cholesterol Education Programme's Adult Panel III (ATP III): waist circumference > 102 cm in men or > 88 cm in women; hypertriglyceridaemia > 150 mg/dl; high density lipoprotein (HDL) cholesterol < 40 mg/dl in men or < 50 mg/dl in women; blood pressure $> 130/85$ mmHg and fasting plasma glucose of > 100 mg/dl.²³

Poikolainen K et al in their case control study conducted on 144 patients and 285 unmatched controls found a very positive relationship between chronic alcohol intake and psoriasis. In these patients the serum levels of gamma glutamyl transferase were also higher than that of controls.²⁴ Our study also supported this study (p -value=0.021) but we didn't take into consideration the gamma glutamyl transferase level. According to Kafle M et al more than 95% of psoriasis had dyslipidemia($p < 0.001$), specifically triglyceride levels

and HDL levels but in our study less than 50 % patients had dyslipidemia and also there was no significant association with HDL levels.²⁵ Also in this study smoking and alcohol had no association with psoriasis similar to our study

Conclusion

As supported by many prior studies on a large number of patients; diabetes, obesity and dyslipidemia play an important role in the aetiopathogenesis and aggravation of psoriasis through the roles of adipokines, leptin and tumor necrosis factor inducing proliferation of keratinocytes and T cells. Although our study has a limited number of patients as compared to some large sample size studies, the sample size of 52 was more than sufficient to carry out the study. Out of eight parameters considered, there was a statistical significance between the FBS levels of the cases and controls (p value=0.01) and also between the fasting triglyceride levels of cases and controls (p value=0.02). As compared to other studies of similar nature, sample size of the current study is less. We need to include multicentric hospital and community based data for broader inclusion of the research. In future, we will certainly need to increase the number of patients and also the duration of study.

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