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Prevalence of Cardiovascular Risk Factors in Patients with Psoriasis in A Tertiary Care Hospital: A Cross Sectional Study

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Conflict of interest: Nil

Abstract

Background: Psoriasis is a chronic immune-mediated inflammatory skin disorder associated with a heightened risk of systemic comorbidities, particularly cardiovascular disease and metabolic syndrome. Shared inflammatory pathways between psoriasis and atherosclerosis, involving cytokines such as TNF-α, IL-17, and IL-6, contribute to endothelial dysfunction and systemic vascular inflammation.

Aim and Objectives: To determine the prevalence of cardiovascular risk factors in patients with psoriasis and to assess the correlation between these risk factors and the severity of psoriasis.

Material and Method: A hospital-based cross-sectional study was conducted at the DVL outpatient department of Santhiram Medical College and General Hospital, Nandyal, from September 2024 to November 2024. Thirty clinically diagnosed psoriasis patients of all ages who provided informed consent and were not on lipid-lowering or systemic psoriasis medications were included. Severity of psoriasis was assessed using the Psoriasis Area and Severity Index (PASI). Cardiovascular risk factors such as Body Mass Index (BMI), waist circumference, blood pressure, fasting blood sugar, and lipid profile were measured. Metabolic syndrome was diagnosed using the modified NCEP ATP III criteria. Statistical analysis was performed using SPSS version 23, with significance set at $p<0.05$.

Result: Among the 30 patients (73.3% male,26.7% female, mean age 43.9±11.46 years), 16 (53.3%) had mild psoriasis and 14 (46.7%) had moderate to severe disease. The most prevalent risk factors were metabolic syndrome (53.3%) and elevated fasting blood sugar (53.3%), followed by obesity, low High Density

Lipoprotein (HDL), high triglycerides, smoking, and alcohol use (each 46.7%). High blood pressure was present in 20%, elevated total cholesterol in 40%, and high Low Density Lipoprotein (LDL) in 33.3%. No statistically significant association was found between PASI score and any individual cardiovascular risk factor, although low HDL, high blood pressure and high LDL were more frequent in moderate to severe psoriasis.

Conclusion: This study demonstrates a high prevalence of cardiovascular risk factors and metabolic syndrome among psoriasis patients, irrespective of disease severity. Despite the lack of statistically significant associations with PASI scores, the observed trends suggest that comprehensive cardiovascular risk assessment is essential for all psoriasis patients to mitigate long-term cardiovascular morbidity and mortality.

Keywords: Psoriasis, Cardiovascular risk factors, Metabolic syndrome, PASI, Dyslipidemia, Obesity

Introduction

Psoriasis is a chronic, immune-mediated skin disorder with a genetic basis involving multiple genes. Various environmental factors such as skin injury, infections, and certain medications can trigger the condition in individuals who are genetically predisposed.[1] The disease typically presents with well-defined, erythematous plaques covered by silvery-white scales, which can appear in localized areas or be more widespread. Psoriasis is more than just a skin condition; it is systemic in nature. Up to 20–30% of affected individuals either have or will develop psoriatic arthritis. Furthermore, those with moderate to severe psoriasis are at a higher risk of developing metabolic syndrome and cardiovascular disease. The condition significantly affects quality of life,[2] and many patients report that, despite their effectiveness, current treatment options often fall short of delivering long-term relief.

Psoriasis and atherosclerosis are linked through common inflammatory mechanisms. In psoriatic lesions, activated T cells and myeloid cells produce various inflammatory cytokines such as TNF-α, interferons, IL-17, IL-23, and IL-22. These act alongside IL-1, IL-6, and IL-8—cytokines involved in innate immunity and the pathogenesis of atherosclerosis—leading to increased inflammation and keratinocyte proliferation. Additionally, blood vessels in psoriatic skin become dilated and permeable, allowing these cytokines to enter the circulation and trigger systemic inflammation.[3] Endothelial cell dysfunction is a critical process in atherosclerosis.[4] Studies show that psoriatic skin and atherosclerotic plaques share similar inflammatory pathways, especially those driven by IFN-γ and TNF-α. In psoriasis patients, endothelial cells express inflammatory and chemotactic molecules—VCAM-1, IL-1β, CXCL10, and COX-2—at levels 2 to 8 times higher than normal.[5] These patterns mirror the responses of lab-stimulated endothelial cells exposed to TNF-α, IL-17A, and IFN-γ, emphasizing the diseases' shared immunological features.[5]

Beyond local skin effects, psoriasis involves systemic inflammasome activation, particularly through IL-1 and IL-6, which also play a role in atherosclerosis.[5,6] Th1 cells, abundant in both psoriatic tissue and blood, are likewise found in atherosclerotic plaques, where they recruit additional immune cells and promote plaque instability.[7]

Traditional cardiovascular risk factors such as high blood pressure, diabetes, high cholesterol, obesity, smoking, and metabolic syndrome are highly common in individuals with psoriasis, affecting over 50%

collectively. However, these risk factors are often overlooked and inadequately managed in this population.[8]

The development of atherosclerosis in psoriasis results from a combination of immune system activation and widespread arterial inflammation caused by the disease itself, along with the added impact of these accompanying cardiometabolic conditions.[9]

This hospital-based cross-sectional study was conducted to determine the prevalence of cardiovascular risk factors in psoriasis patients and their correlation with disease severity.

Material and Method

This was a hospital based cross sectional study performed on 30 patients of psoriasis of any age group in outpatient department of DVL from September 2024 to November 2024 who were willing to give written informed consent and not taking lipid lowering drugs, methotrexate, acitretin. The study was approved by Institutional Ethics Committee and written informed consent was taken from all patients. A detailed history was taken regarding the age, sex, duration of disease, personal habits like smoking, alcohol consumption. Severity of psoriasis was assessed according to the Psoriasis Area and Severity Index (PASI). PASI was graded as mild (≤10), moderate to severe (>10). Blood pressure, Body mass index, waist circumference were measured in all patients. Fasting blood sugar, Fasting lipid profile, ECG, Echocardiography were done. The diagnosis of metabolic syndrome was made based on the presence of ≥3 criteria of the modified National Cholesterol Education Program's Adult Treatment Panel III[10]:-

Waist circumference: >102 cm in men or >88 cm in women,

Hypertriglyceridemia: ≥150 mg/dL,

HDL cholesterol: <40 mg/dL in men or <50 mg/dL in women,

Blood pressure: ≥130/ 85 mmHg,

Fasting plasma glucose: ≥100 mg/dL.

All results were carefully recorded. All the findings were tabulated and analysed.

Statistical analysis

The data obtained were analysed statistically using SPSS software version 23. Correlation between variables was calculated using Chi-square test. P-value < 0.05 was considered statistically significant.

Results

This hospital-based cross-sectional study included 30 patients with clinically diagnosed psoriasis who attended the DVL outpatient department at Santhiram Medical College and General Hospital, Nandyal. Of the study population, 22 patients (73.3%) were male and 8 (26.7%) were female. The mean age of the participants was 43.9 ± 11.46 years, and the mean duration of the disease was 38.1 ± 26.7 months. Based on the Psoriasis Area and Severity Index (PASI), 16 patients (53.3%) had mild psoriasis (PASI ≤10), while 14 patients (46.7%) had moderate to severe psoriasis (PASI >10). Personal habits revealed that 14 patients (46.7%) were smokers and 14 (46.7%) consumed alcohol.

Regarding anthropometric and metabolic parameters, obesity (BMI >30) was observed in 14 patients (46.7%), and increased waist circumference was noted in 18 patients (60%), comprising 14 males (46.7%) and 4 females (13.3%). Elevated blood pressure (≥130/85 mmHg) was detected in 6 patients (20%). Laboratory investigations showed that 16 patients (53.3%) had elevated fasting blood sugar levels, 12 (40%) had increased total cholesterol, 14 (46.7%) had low HDL cholesterol, 10 (33.3%) had elevated LDL cholesterol,

and 14 (46.7%) had raised triglyceride levels. Metabolic syndrome, as defined by the modified NCEP ATP III criteria, was present in 16 patients (53.3%). ECG of two patients showed sinus arrhythmia. Echocardiography revealed dilated cardiomyopathy in two patients and left ventricular hypertrophy in four patients.

On comparing cardiovascular risk factors with psoriasis severity, no statistically significant association was found between PASI score and BMI (p=0.063), waist circumference (p=0.765), blood pressure (p=0.272), fasting blood sugar (p=0.282), total cholesterol (p=0.232), HDL cholesterol (p=0.282), LDL cholesterol (p=0.796), triglycerides (p=0.696), or metabolic syndrome (p=0.282). Notably, low HDL cholesterol and elevated blood pressure were more frequently observed in patients with moderate to severe psoriasis, although these differences did not reach statistical significance. Overall, the findings indicate a high prevalence of cardiovascular risk factors and metabolic syndrome among patients with psoriasis, regardless of disease severity.

Table 1: Distribution of clinical characteristics and laboratory findings in the study group of patients with psoriasis (N=30)

Characteristics		n	%
Sex	Female	8	26.7%
	Male	22	73.3%
PASI (Psoriasis Area and Severity Index)	≤10(Mild)	16	53.3%
	>10(Moderate to severe)	14	46.7%
Smoking	Present	14	46.7%
	Absent	16	53.3%
Alcohol	Present	14	46.7%
	Absent	16	53.3%
BMI	>30	14	46.7%
	<30	16	53.3%
Waist circumference (WC)	Male		
	Increased	14	46.7%
	Normal	8	26.7%
	Female		
	Increased	4	13.3%
	Normal	4	13.3%
Blood pressure (BP)	High	6	20%
	Normal	24	80%
Fasting blood sugar (FBS)	High	16	53.3%
	Normal	14	46.7%
Total cholesterol (TC)	High	12	40%
	Normal	18	60%
High density lipoprotein (HDL)	Low	14	46.7%
	Normal	16	53.3%
Low density lipoprotein (LDL)	High	10	33.3%
	Normal	20	66.7%
Triglycerides (TG)	High	14	46.7%
	Normal	16	53.3%
Metabolic syndrome (MS)	Present	16	53.3%
	Absent	14	46.7%

Graph 1: Bar diagram showing prevalence of cardiovascular risk factors in the study population

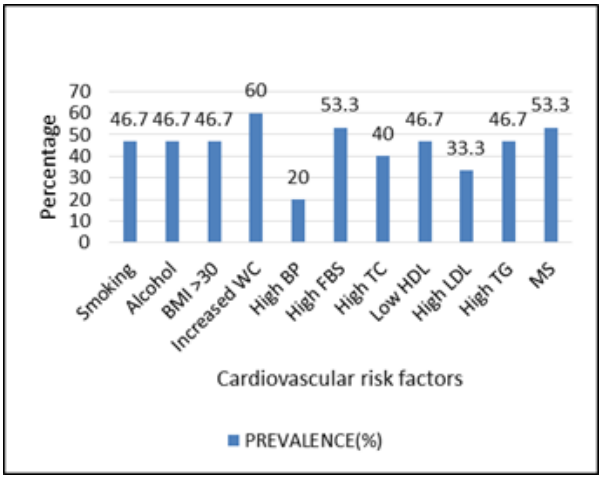
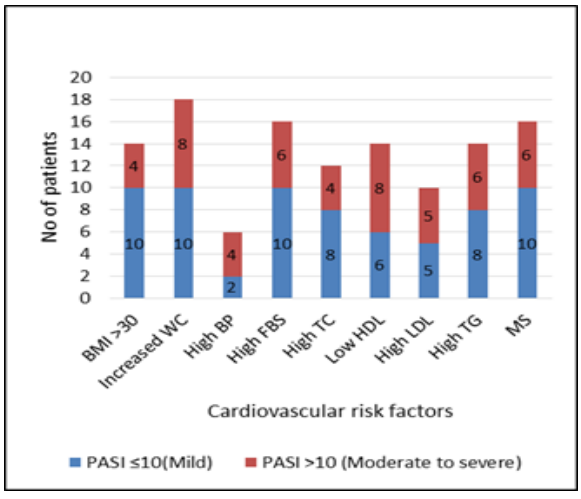


Table 2: Association of cardiovascular risk factors with Severity of Psoriasis

Characteristics		PASI ≤10(Mild) n=16	PASI >10(Moderate to severe) n=14	Total	P value
BMI	>30	10	4	14	0.063
	<30	6	10	16	
Waist circumference (WC)	Increased	10	8	18	0.765
	normal	6	6	12	
Blood pressure (BP)	High	2	4	6	0.272
	Normal	14	10	24	
Fasting blood sugar (FBS)	High	10	6	16	0.282
	Normal	6	8	14	
Total cholesterol (TC)	High	8	4	12	0.232
	Normal	8	10	18	
High density lipoprotein (HDL)	Low	6	8	14	0.282
	Normal	10	6	16	
Low density lipoprotein (LDL)	High	5	5	10	0.796
	Normal	11	9	20	
Triglycerides (TG)	High	8	6	14	0.696
	Normal	8	8	16	
Metabolic syndrome (MS)	Present	10	6	16	0.282
	Absent	6	8	14	

Graph 2: Distribution of cardiovascular risk factors with severity of psoriasis in the study population



Clinical Pictures of Psoriasis

Figure 1a:

Figure 1b:

Figure 1c:

Figure 2a:

Figure 2b:

Figure 2c:

Discussion

This cross-sectional study evaluated 30 clinically diagnosed psoriasis patients and found that the most prevalent cardiovascular risk factors were metabolic syndrome and elevated fasting blood sugar, each present in 53.3% of participants. Other commonly observed risk factors included smoking, alcohol consumption, obesity, low HDL cholesterol, and elevated triglyceride levels, each reported in 46.7% of cases. The majority of the study participants were male (73.3%). The distribution of disease severity was fairly even, with 53.3% having mild psoriasis and 46.7% classified as moderate to severe based on the PASI score. In contrast, Kampe et al. reported that among 190 psoriasis patients, 48.9% were male and only 10.5% had moderate to severe psoriasis, with the majority (89.5%) having mild disease severity based on PASI scores.[11]

Modifiable lifestyle factors such as smoking and alcohol consumption were reported in nearly half of the patients (46.7%).These findings highlight the importance of lifestyle counselling as part of comprehensive care. Similarly, Agarwal K et al. observed higher rates of smoking and alcohol use in psoriasis cases compared to controls.[12]

Obesity was also common, with 46.7% of the participants having a body mass index (BMI) of 30 or higher.

Increased waist circumference, a marker of central obesity and a key component of metabolic syndrome, was noted in a substantial proportion of both male and female patients (46.7% and 13.3%, respectively). These findings are consistent with Kimball et al., who noted an increased frequency of obesity among psoriasis patients when compared to the general population.[13] The link between obesity and psoriasis may reflect overlapping inflammatory mechanisms as well as shared behavioural risk factors.

Hypertension was present in 20% of the study population. Ghiasi et al. reported that individuals with psoriasis are 2.2 times more likely to develop hypertension than those without the disease.[14] Elevated fasting blood glucose, another key component of metabolic syndrome, was noted in more than half of the patients. This aligns with findings from Nisa and Qazi, who also reported increased fasting plasma glucose levels in psoriasis patients compared to controls.[15] However, Bhat B et al. found a higher prevalence of diabetes and hypertension among psoriasis patients but without significant associations.[16]

Dyslipidemia was also widespread: 40% had elevated total cholesterol, 46.7% had low HDL, 33.3% had high LDL, and 46.7% had elevated triglycerides. These lipid abnormalities support the concept of psoriasis as a systemic inflammatory disorder that contributes to metabolic and cardiovascular dysfunction. Similar findings have been reported by Kothiwala et al. and Bhat B et al., who observed abnormal lipid profiles in a significant proportion of psoriatic patients.[16,17]

Metabolic syndrome, a constellation of risk factors including central obesity, dyslipidemia, hypertension, and insulin resistance, was present in over half of the patients (53.3%). This is comparable to the 39.3% prevalence reported by Kothiwala et al. in patients with chronic plaque psoriasis, which was significantly higher than in control groups.[17]

Although no statistically significant correlations were found between the severity of psoriasis and individual cardiovascular risk factors (such as BMI, waist circumference, blood pressure, blood sugar, lipid profile, or metabolic syndrome), certain patterns were observed. Patients with moderate to severe psoriasis showed a higher frequency of low HDL, high blood pressure, and elevated LDL levels compared to those with mild disease. These trends suggest a possible link between greater skin involvement and increased cardiovascular risk, although the small sample size may have limited the ability to detect statistically significant differences. Similar results were reported in other studies, including those by Agarwal K et al., Nisa et al., Zindanci et al., and Lakshmi et al., where no significant association was observed between the presence of metabolic syndrome and psoriasis severity.[12,15,18,19]

Overall, this study supports the need for cardiovascular risk screening in all psoriasis patients, regardless of disease severity, to reduce long-term health complications.

Conclusions

This hospital-based cross-sectional study highlights a high prevalence of cardiovascular risk factors and metabolic syndrome among patients with psoriasis, regardless of disease severity. More than half of the patients exhibited metabolic syndrome (53.3%) and elevated fasting blood sugar (53.3%), while nearly half had obesity, dyslipidemia, and personal habits such as smoking and alcohol consumption. Although the association between the severity of psoriasis (as measured by PASI score) and individual cardiovascular risk factors was not statistically significant, there was a trend toward

higher prevalence of hypertension, low HDL, and elevated LDL in patients with moderate to severe disease. These findings underscore the systemic nature of psoriasis and the need for comprehensive cardiovascular risk assessment and management in all patients with psoriasis, irrespective of skin disease severity. Early identification and intervention may reduce long-term cardiovascular morbidity and mortality in this population.

Limitations

Small Sample Size**:** The study included only 30 participants, which limits the statistical power to detect significant associations between psoriasis severity and cardiovascular risk factors. A larger sample size may yield more conclusive results.

Cross-Sectional Nature: The study design does not allow for assessment of causality or temporal relationships between psoriasis and cardiovascular risk factors.

Lack of Control Group: The absence of a matched control group limits the ability to compare the prevalence of cardiovascular risk factors in psoriasis patients versus the general population.

List of abbreviations

TNF-Tumor necrosis factor

IL-Interleukin

PASI-Psoriasis area and severity index

BMI-Body mass index

NCEP ATP III- National Cholesterol Education Program's Adult Treatment Panel III

VCAM-Vascular cell adhesion molecule

COX-Cyclooxygenase

IFN-Interferon

ECG-Electrocardiography

WC-Waist circumference

BP-Blood pressure

FBS-Fasting blood sugar

TC-Total cholesterol

MS-Metabolic syndrome

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