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Review RRJoMST

Metabolic Syndrome in Psoriatic Patients: A Cross-Sectional Study

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Abstract

Background: *Psoriasis is a chronic immuno-inflammatory disease affecting the skin and joints. Studies have demonstrated an increased prevalence of conventional cardiovascular risk factors such as diabetes mellitus, hypertension, and metabolic syndrome in these patients. The aim of this study was to determine the association between psoriasis and metabolic syndrome.* ***Material and Method:*** *An observational cross-sectional study was carried out between November 2023 and October 2024, including participants with and without psoriasis. Blood samples were analysed for serum lipid profile and fasting blood sugar to assess biochemical variations. Clinical Examination done to evaluate blood pressure and waist circumference (for central obesity).* ***Result:*** *100 participants, 50 with psoriasis and 50 healthy controls were recruited. The prevalence of metabolic syndrome in psoriatic patient was observed 24% in comparison to control 16% ($p < 0.05$).* ***Conclusion:*** *Patients with psoriasis have a higher prevalence of metabolic syndrome compared to the general population. Therefore, identification of metabolic syndrome can be done routinely for better management of psoriasis.*

Keywords: Cardiovascular risk factors, dyslipidemia, inflammatory mediators, insulin resistance, metabolic syndrome, psoriasis

INTRODUCTION

Psoriasis is a chronic immune-mediated inflammatory skin disorder characterized by well-demarcated, erythematous, scaly plaques. It affects about 2–3% of the world population and markedly impairs the quality of life of affected individuals [1]. Psoriasis is more common in men and peaks in the third and fourth decades of life, with a prevalence of 0.44 to 2.8% among adult dermatological patients in India [2–4].

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In India, the burden of psoriasis is considerable, significantly affecting health-related quality of life and leading to substantial associated costs. A study assessing the quality of life in Indian patients with psoriasis found that the disease had a significant impact on various aspects of life, including physical, psychological, social, and sexual functioning [3, 4].

Psoriasis has also been associated with various other comorbidities, including metabolic syndrome, cardiovascular disease risk factors, and ischemic heart disease. A study conducted in South India reported that the prevalence of metabolic syndrome was significantly higher among patients with psoriasis compared to controls (44.1% vs. 30%) [5].

A group of illnesses known as metabolic syndrome raise the chance of acquiring diabetes, cardiovascular disease, and other long-term health

issues. It is defined by the presence of at least three features: increased waist circumference, elevated triglycerides, low HDL cholesterol, high blood pressure, and raised fasting blood glucose [6]. According to studies, between 11% and 56% of Indians living in cities suffer from metabolic syndrome [8, 9].

India has a significant metabolic syndrome burden. Metabolic syndrome poses a significant risk for both diabetes and cardiovascular disease. When these disorders coexist, there may be an increase in health risks and a decrease in the affected people's quality of life [6, 8].

The inflammatory skin disorder psoriasis is a chronic immune-mediated condition that has been strongly associated with metabolic syndrome. Comprehending the intricate connections among these ailments is imperative for the all-encompassing treatment of psoriasis patients.

METABOLIC SYNDROME IN PSORIASIS

It is commonly known that psoriasis and metabolic syndrome are related. Abdominal obesity, hypertension, hyperglycaemia, and dyslipidaemia are among the diseases that make up metabolic syndrome, which increases the risk of both type 2 diabetes and cardiovascular disease [9].

It is believed that a combination of lifestyle variables, insulin resistance, and common inflammatory pathways contribute to the elevated risk of metabolic syndrome in psoriasis patients. Metabolic abnormalities may arise because of chronic inflammation linked to psoriasis, and inflammatory states may worsen psoriasis as a result of metabolic irregularities [10].

As previously indicated, research has shown that Indian psoriasis patients have a metabolic syndrome prevalence that ranges from 28% to 44.1%, which is much higher than the overall population [5, 7].

Mechanisms Underlying the Link Between Metabolic Abnormalities and Psoriasis Pathogenesis

There are several processes that connect metabolic syndrome and psoriasis. Metabolic disorders, such as dyslipidaemia and insulin resistance, can be brought on by some inflammatory condition. The inflammatory cascade in psoriasis can be amplified by the increased production of pro-inflammatory cytokines linked to metabolic syndrome, such as tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), and interleukin-1β (IL-1β), which can result in more severe skin lesions and increased disease activity [11–14].

An additional aspect is genetic predisposition, with shared genetic loci and pathways associated with metabolic syndrome and psoriasis. These conditions are also thought to be affected by oxidative stress and endothelial dysfunction. Lifestyle factors, such as diet and physical activity, can influence the development of these disorders. Regular physical activity may lower the risk of cardiovascular disease in psoriasis patients, potentially enhancing overall health and well-being.

To precisely understand the mechanisms behind the linkages between these disorders and to create focused treatments for the management and prevention of their cohabitation in the Indian setting, more research is required.

MATERIALS AND METHODS

The present study was an observational cross-sectional study conducted in government medical college, Kota and attached group of hospitals, department of biochemistry for 10 months. The research study made up of 100 study subjects, diagnosed with psoriasis and non-psoriatic patients. The serum levels of fasting blood sugar and lipid profile were all estimated. Blood Pressure and waist circumference also recorded.

OBSERVATION

100 subjects,50 with psoriasis {Cases} and 50 non-psoriatic patients {Control} were observed.

In this study 50 psoriatic patients (case) were enrolled over a 10-month period, 50 non-psoriatic patients, other skin disorders (controls). Most of the patients were males (70%) and the mean age was (41.53 years) (Tables 1–5 and Figures 1 and 2).

Table 1. Age distribution of the study population (n = 100) mean age: 41.53 years.

Age group	Cases N (%)	Controls N (%)	Total N (%)
21–30 years	7 (14)	6 (12)	13 (13)
31–40 years	17 (34)	18 (36)	35 (35)
41–50 years	17(34)	15 (30)	32 (32)
51–60 years	7 (14)	9 (8)	16 (16)
>60 years	2 (4)	2 (4)	4 (4)
Total	50 (100)	50 (100)	100

Note: Standard deviation: 9.68 years, Minimum: 22 years, Maximum: 65 years.

Table 2. Comparison of age among cases and controls (n = 100) "T" test.

Study group	Mean age	SD	Mean difference	P-value
Case	41.30	9.79	0.46	0.40
Control	41.76	9.67		

Note: There was a very minimal age mean difference between the cases and the controls and this difference was not statistically significant. Hence both cases and controls were comparable.

Chi Square Value: 0.040 p Value: 0.840

Table 3 depicts the equal gender distribution 56 % male and 44 % female between both cases and controls groups.

Table 3. Gender distribution of the study population (n = 100).

Gender	Cases N (%)	Controls N (%)	Total N (%)
Male	28 (56)	28 (56)	56 (56)
Female	22 (44)	22 (44)	44 (44)
Total	50 (100)	50 (100)	100 (100)

Table 4. The metabolic syndrome prevalence among psoriatic patients and controls.

Parameter	Psoriatic patients (n = 50)			Control group (n = 50)		Total (n = 100)	
	Group	*Frequency*	*%*	*Frequency*	*%*	*Frequency*	%
Waist Circumference (cm)	Normal	41	82%	35	70%	76	76%
	Elevated	9	18%	15	30%	24	24%
	(>90 for males, >80 for females)	Male – 4 Female – 5		Male – 6 Female – 9			
FBG (mg/dl)	Normal (<100)	33	66%	46	92%	79	79%
	Elevated (>100)	17	34%	4	8%	21	21%
Serum Triglycerides (mg/dl)	Normal (<150)	14	28%	31	62%	45	45%
	Elevated (>150)	36	72%	19	38%	55	55%
HDL-c (mg/dl)	Normal	18	36%	27	54%	45	45%
	Reduced	32	64%	23	46%	55	55%
	(<40 for males, <50 for females)	Male – 12 Female – 20		Male – 4 Female – 19			
Blood pressure (mmHg)	Normal	31	62%	33	66%	64	64%
	Elevated (SBP>+130 and/or DBP>=85)	21	42%	17	34%	38	38%

Note: n = 100.

Table 5. Distribution of metabolic syndrome components among psoriatic and non-psoriatic subjects.

Components		Group		P-value
		Cases N (%)	Controls N (%)	
Waist Circumference (cm)	Normal Elevated	41 (82%) 9 (18%)	35 (70%) 15 (24%)	0.383
FBG (mg/dl)	Normal Elevated	33 (66%) 17 (34%)	46 (92%) 15 (30%)	0.0427
Serum Triglycerides (mg/dl)	Normal Elevated	14 (28%) 36 (72%)	31(62%) 19 (38%)	<.001
HDL-c (mg/dl)	Normal Reduced	18 (36%) 32 (64%)	27(54%) 23(46%)	<.001
Blood pressure (mmHg)	Normal Elevated	31 (62%) 19 (38%)	33 (66%) 17 (34%)	.0027

Note: n = 100.

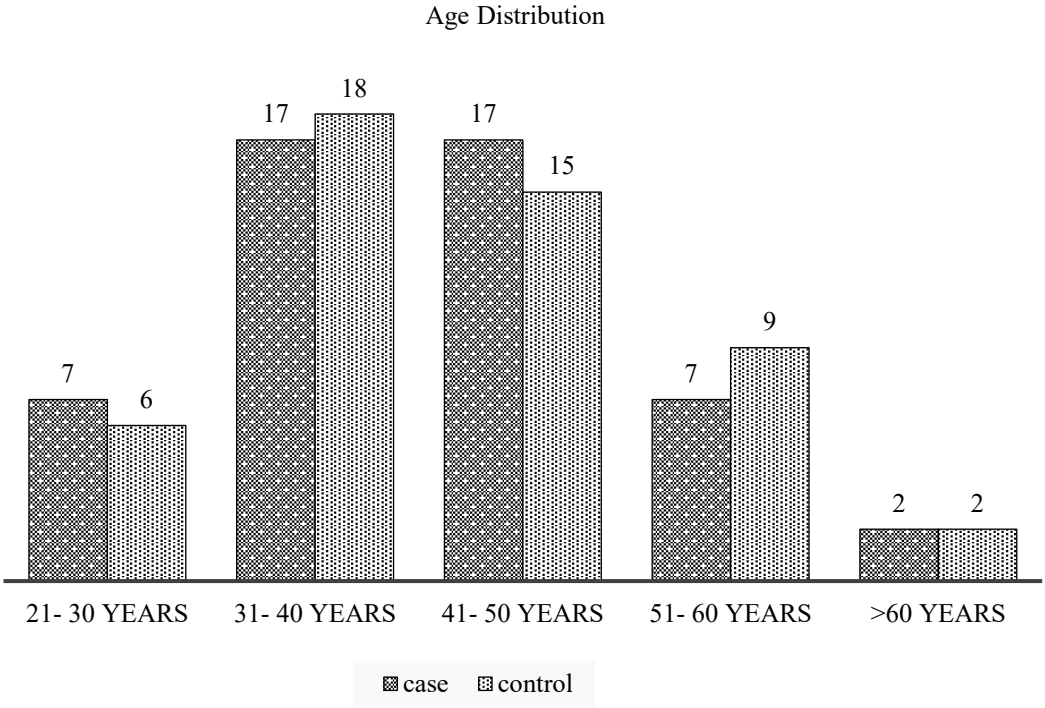

Figure 1. Bar chart showing age distribution of the study population (n = 100).

Comments

- Central obesity was observed more in control groups (30%) as compared to Study group 18% and result was nonsignificant ($p > 0.05$).
- Elevated Fasting Blood glucose was almost equal in both cases and controls (34% versus 30%), and result was significant ($p < 0.05$).
- Elevated serum triglyceride level was more in cases (72%) than controls (38%) and these differences were statistically significant ($p < 0.05$).
- Elevated blood pressure was almost equal in both cases (38%) and controls (34%) and these differences were statistically significant ($p < 0.05$).
- In Cases, the components in descending order of prevalence are Raised level of Triglycerides > Reduced HDL > Raised level of blood pressure > increased level of fasting glucose > Central obesity.
- In controls, the components in descending order of prevalence are Reduced HDL > Elevated level of Triglycerides > Elevated blood pressure > Elevated fasting glucose> central obesity.

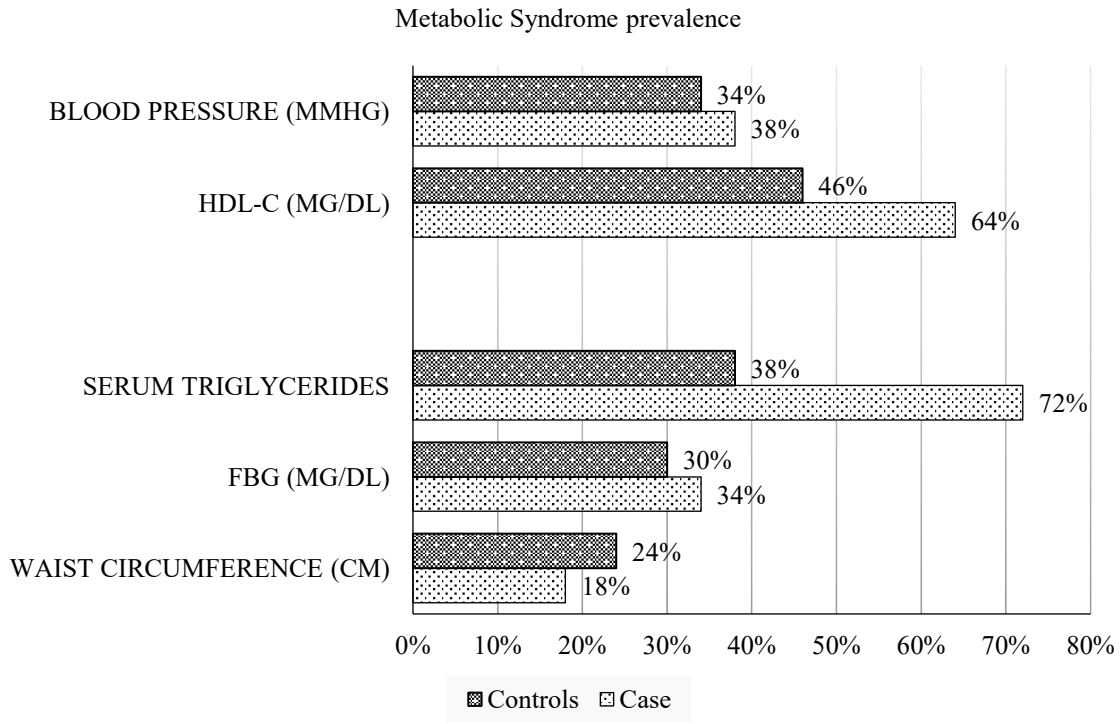

Figure 2. Bar chart showing the Metabolic Syndrome prevalence among study population and control group (n = 100).

RESULT

It was an Observational Cross-sectional, Hospital based study of 100 participants (50 healthy controls and 50 cases with psoriasis) between age group 20–80 years.

It was found that the prevalence of metabolic syndrome is higher in psoriatic patient (24%) than non-psoriatic study population (16%) and the result was statistically significant ($p < 0.05$).

DISCUSSION

Psoriasis plaques harbour proinflammatory cytokines associated with insulin resistance, dyslipidemia, and hypertension. Leptin, a hormone secreted by adipocytes, modulates the expression of cytokines influencing type 1 and type 2 T-helper cells, contributing to both acute and chronic inflammatory states. Elevated leptin levels have been correlated with the onset of multiple sclerosis and are also observed in psoriasis, though the precise role in psoriasis remains unexplored [9].

A lot of studies have shown that psoriasis and metabolic syndrome (MS) are linked. Zindanci et al. [10] compared 140 healthy controls with 115 psoriatic patients and found a higher prevalence of insulin resistance syndromes in cases (53%) compared to controls (39%), with a statistically significant p-value of less than 0.001. In a study involving 338 plaque psoriasis patients and controls, Gelfand et al. [11] reported a strong link between MS and those with psoriasis (30.1%) compared to people without psoriasis (20.6%), based on the NCEP ATP III criteria ($p = 0.005$).

Our analysis revealed that MS prevalence was 24% in cases compared to 16% in controls, though this difference was not statistically significant. However, case patients exhibited a 1.65 times greater likelihood of developing MS.

Misra and Khurana noted that South Asians are more susceptible than Caucasians to MS and associated cardiovascular risks [12].

In our study, no association was found between MS and patient age. The average age of subjects with MS was 41.30 years, compared to 41.76 years for those without MS, with standard deviations of 9.79 for cases and 9.67 for controls. The mean age difference of 0.46 was statistically significant ($p < 0.01$), indicating that age is a critical factor in MS development, as the risk increases with advancing age.

Gelfand et al. [11] observed a higher MS prevalence in individuals over 40, while Zindanci et al. [10] identified the 40–50 age range as particularly affected.

Our findings indicated that MS prevalence was consistent across psoriasis patients regardless of disease severity, as measured by the BSA score. This suggests that MS occurrence is an "all or none" phenomenon, independent of psoriasis severity due to underlying pathophysiology. Zindanci et al. [10] similarly found no correlation between psoriasis severity and MS, whereas Kim et al. [13] reported an association between severe psoriasis and MS ($p = 0.048$).

When evaluating MS components in psoriatic patients, central obesity was more prevalent in controls (30%) than in cases (18%), though this was not statistically significant ($p > 0.05$). Fasting blood glucose levels were comparable between cases (34%) and controls (30%), with a significant result ($p < 0.05$). Elevated serum triglycerides were more common in cases (72%) than controls (38%), with significant differences ($p < 0.05$). Cases had lower serum HDL levels (46%) than controls (64%), and the difference was statistically significant ($p < 0.05$). Elevated blood pressure was also more frequent in cases (38%) than controls (34%), with statistical significance ($p < 0.05$).

In Cases, the components in descending order of prevalence are Raised level of Triglycerides > Reduced HDL > Raised level of blood pressure > increased level of fasting glucose > Central obesity. In controls, the components in descending order of prevalence are Reduced HDL > Elevated level of Triglycerides > Elevated blood pressure > Elevated fasting glucose> central obesity.

Elevated blood glucose emerged as a key contributor to the higher MS incidence in psoriatic patients. One possible explanation is that psoriasis and diabetes share some genetic loci, such as the CDKLI gene, which is connected to both type 2 diabetes and psoriasis.

Per the NCEP ATP III criteria, approximately 14% of the study population exhibited no MS components, while 86% had at least one component, and 1.5% met all five criteria.

A South Indian study by Sristi Lakshmi et al. [14] found significantly elevated fasting blood glucose in MS patients ($p < 0.001$), but no notable differences in other MS components such as obesity, hypertension, or dyslipidemia in psoriatic MS patients.

Psoriasis and high lipid levels have been related in a number of research. Shapiro and associates [15] identified an association between psoriasis and hyperlipidemia. Research has also demonstrated correlations between psoriasis and increased levels of IL-2, IL-8, and Tumour Necrosis Factor-Alpha, which contribute to psoriasis development and may explain triglyceridemia in these patients. The development of psoriasis [16] is also influenced by these cytokines. Triglyceridemia in psoriasis may be explained by an elevated amount of these cytokines. We found a significant difference in the mean duration of psoriasis between patients with and without multiple sclerosis.

The average duration of psoriasis was 11.42 years, with a standard deviation of 5.89 years, and 52% of cases had psoriasis for over a decade. Thus, longer psoriasis duration significantly increases the likelihood of developing MS.

CONCLUSION

In India, psoriasis ranks among the most frequently occurring skin disorders, with its frequency and epidemiological traits mirroring those seen in Western nations. Studies indicate a link between psoriasis and metabolic syndrome. Numerous investigations suggest that psoriasis might serve as a risk indicator

for ailments such as ischemic heart disease. Consequently, it is vital to screen for metabolic syndrome to avert potential future health issue.

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