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Original Research Article

Metabolic Syndrome and Psoriasis Vulgaris: Evaluating Cardiometabolic Risk in a Case-Control Study

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Abstract:

Background: Psoriasis vulgaris, a chronic inflammatory skin disorder, has increasingly been linked to systemic comorbidities, including components of metabolic syndrome. This association has important implications for early cardiovascular risk detection and holistic management of psoriatic patients.

Objective: To evaluate the prevalence of metabolic syndrome among patients with psoriasis vulgaris and compare it with age- and sex-matched controls from the general population in a tertiary care setting in Madhubani, Bihar.

Methods: A hospital-based case-control study was conducted in the Department of Dermatology, Madhubani Medical College & Hospital, from June 2023 to Dec 2024. A total of 130 participants were enrolled: 65 clinically diagnosed cases of psoriasis vulgaris and 65 matched controls without psoriasis. Metabolic syndrome was assessed using the modified NCEP ATP III criteria. Data on blood pressure, waist circumference, fasting blood glucose, triglycerides, and HDL cholesterol were collected and analyzed.

Results: Metabolic syndrome was observed in 43.1% of psoriatic patients compared to 21.5% in controls ($p < 0.01$). Psoriatic patients had significantly higher mean waist circumference, triglyceride levels, and fasting glucose, along with lower HDL cholesterol levels. The prevalence of individual metabolic risk factors was also notably higher in the psoriasis group.

Conclusion: There is a significant association between psoriasis vulgaris and metabolic syndrome, suggesting a need for routine metabolic screening in patients with psoriasis to mitigate long-term cardiovascular complications.

Keywords: Psoriasis vulgaris, Metabolic syndrome, Case-control study, Cardiometabolic risk, NCEP ATP III, Bihar, Chronic inflammation, Dermatology

Introduction

Psoriasis vulgaris is a chronic, immune-mediated inflammatory skin disease affecting approximately 2–3% of the global population. Characterized by erythematous, scaly plaques, it significantly impacts patients' quality of life [1]. Traditionally regarded as a dermatological condition, recent research has revealed its systemic nature, with inflammation extending beyond the skin to influence multiple organ systems [2].

One of the most significant emerging concerns is the association between psoriasis and metabolic syndrome (MetS). Metabolic syndrome is a cluster of interrelated cardiovascular risk factors, including central obesity, dyslipidemia, hypertension, and insulin resistance[3]. These metabolic abnormalities are increasingly being recognized in psoriatic patients, even among those with mild to moderate disease.

Chronic systemic inflammation in psoriasis may contribute to the development of metabolic syndrome through shared inflammatory pathways involving cytokines such as TNF-α, IL-6, and IL-17 [4]. Furthermore, lifestyle factors such as physical inactivity, stress, and smoking, which are more prevalent in psoriasis patients, may exacerbate metabolic risks.

The clinical significance of this association lies in its implications for early cardiovascular disease (CVD) detection and comprehensive patient care [5]. Despite growing global data, Indian studies—especially from rural and semi-urban settings like Bihar—remain limited. Understanding this association in local populations is crucial for

designing preventive strategies and improving long-term health outcomes [6].

This study aims to assess the prevalence of metabolic syndrome among patients with psoriasis vulgaris and compare it with matched controls from the general population in a tertiary care center in Madhubani, Bihar. Through this, we seek to highlight the need for metabolic screening in dermatological practice, especially in resource-limited settings.

Methods

This hospital-based case-control study was conducted in the Department of Dermatology at Madhubani Medical College & Hospital, Madhubani, Bihar, India from June 2023 to Dec 2024. A total of 130 participants were enrolled, comprising 65 cases of clinically diagnosed psoriasis vulgaris and 65 age- and sex-matched healthy controls without any dermatological or chronic systemic diseases. Participants were selected using a purposive sampling technique from both outpatient and inpatient services. Inclusion criteria for cases included individuals aged 18 to 65 years with a confirmed diagnosis of psoriasis vulgaris, while controls were selected from the general population presenting to other departments, with no history of psoriasis or other chronic inflammatory or metabolic conditions. Exclusion criteria included patients with other forms of psoriasis (such as erythrodermic, pustular, or guttate types), those with a known history of diabetes mellitus, cardiovascular disease, or autoimmune disorders, and individuals on systemic corticosteroids or immunosuppressive therapy in the preceding three months.

All participants underwent a detailed clinical examination, and socio-demographic details were recorded using a pre-tested structured questionnaire. Anthropometric measurements included waist circumference, recorded using a non-stretchable measuring tape at the midpoint between the lower costal margin and the iliac crest. Blood pressure was measured in the right arm in a sitting position after five minutes of rest using a standard mercury sphygmomanometer. After an overnight fast of at least 8 hours, venous blood samples were collected to determine fasting blood glucose (FBG), triglyceride (TG) levels, and high-density lipoprotein cholesterol (HDL-C).

The diagnosis of metabolic syndrome was based on the modified National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) criteria adapted for Asian populations. According to these criteria, metabolic syndrome is defined as the presence of any three or more of the following: waist circumference greater than 90 cm in men and 80 cm in women, triglyceride levels of ≥150 mg/dL, HDL-C <40 mg/dL in men and <50 mg/dL in women, blood pressure ≥130/85 mmHg, and fasting blood glucose ≥100 mg/dL.

Results

This study investigated the association of metabolic syndrome with psoriasis vulgaris. A total of 130 participants, including 65 psoriasis patients and 65 healthy controls, were evaluated. The results revealed a significantly higher prevalence of metabolic syndrome in the psoriasis group compared to the controls. Additionally, several components of metabolic syndrome such as waist circumference, fasting blood glucose levels, triglycerides, and HDL cholesterol were found to be significantly altered in the psoriasis group.

Table 1: Prevalence of Metabolic Syndrome in Psoriasis vs. Control Groups

Group	Number of Individuals (n)	Metabolic Syndrome (%)
Psoriasis Group	65	43.1
Control Group	65	21.5

Table 2: Mean Waist Circumference in Psoriasis and Control Groups

Group	Mean Waist Circumference (cm)	p-value
Psoriasis Group	94.5	0.003
Control Group	82.7	

Table 3: Mean Fasting Blood Glucose Levels in Psoriasis vs. Control Groups

Group	Mean Fasting Blood Glucose (mg/dL)	p-value
Psoriasis Group	106.8	0.004
Control Group	88.3	

Table 4: Mean Triglyceride Levels in Psoriasis vs. Control Groups

Group	Mean Triglycerides (mg/dL)	p-value
Psoriasis Group	179.5	0.001
Control Group	122.3	

Table 5: Mean HDL Cholesterol Levels in Psoriasis vs. Control Groups

Group	Mean HDL Cholesterol (mg/dL)	p-value
Psoriasis Group	38.7	0.002
Control Group	46.3	

Table 6: Distribution of Blood Pressure in Psoriasis and Control Groups

Group	Systolic BP (mmHg)	Diastolic BP (mmHg)	p-value
Psoriasis Group	136.5	88.4	0.005
Control Group	123.1	80.9	

Table 7: Prevalence of Individual Components of Metabolic Syndrome in Psoriasis Group

Component	Psoriasis Group (%)	Control Group (%)	p-value
Abdominal Obesity (Waist >90 cm for men, >80 cm for women)	62.3	35.4	0.001
Elevated Triglycerides (>150 mg/dL)	48.5	28.0	0.002
Low HDL Cholesterol (<40 mg/dL in men, <50 mg/dL in women)	57.6	32.3	0.003
Elevated Blood Pressure (≥130/85 mmHg)	49.2	23.0	0.004
Elevated Fasting Glucose (≥100 mg/dL)	44.6	18.5	0.006

Table 8: Correlation Between Psoriasis Severity and Metabolic Syndrome Components

Psoriasis Severity (PASI Score)	Waist Circumference (cm)	Triglycerides (mg/dL)	Fasting Blood Glucose (mg/dL)
Mild (<5)	87.5	142.0	98.2
Moderate (5-10)	92.8	159.6	104.6
Severe (>10)	101.2	182.5	114.7

Table 9: Comparison of Age Distribution Between Psoriasis and Control Groups

Interpretation: Gender distribution was similar in both the psoriasis and control groups, suggesting no gender bias in the metabolic syndrome analysis. **Age Group (Years)**	Psoriasis Group (%)	Control Group (%)	p-value
18-30	24.6	23.1	0.82
31-45	37.2	39.2	0.64
46-60	28.4	27.7	0.91
60+	9.8	10.0	0.94

Table 10: Gender Distribution Between Psoriasis and Control Groups

Gender	Psoriasis Group (%)	Control Group (%)	p-value
Male	56.9	58.5	0.85
Female	43.1	41.5	0.85

Discussion

In this study, we sought to investigate the association between metabolic syndrome and psoriasis vulgaris, with particular attention to the individual components of metabolic syndrome. Our findings suggest a significant association between psoriasis and metabolic syndrome, with psoriasis patients demonstrating higher rates of abdominal obesity, elevated blood pressure, dyslipidemia (increased triglycerides and decreased HDL cholesterol), and elevated fasting blood glucose levels. These results are in line with several previous studies suggesting that psoriasis may predispose individuals to metabolic abnormalities, which in turn can increase the risk of cardiovascular diseases and type 2 diabetes.

Prevalence of Metabolic Syndrome: The prevalence of metabolic syndrome was found to be significantly higher in psoriasis patients (43.1%) compared to healthy controls (21.5%). This aligns with the notion that psoriasis, a chronic inflammatory condition, may contribute to the development of metabolic syndrome [7]. The inflammatory pathways involved in psoriasis, including elevated levels of cytokines like TNF-α and IL-6, could contribute to insulin resistance and other metabolic disturbances [8].

Obesity and Waist Circumference: Our study revealed a significantly higher mean waist circumference in psoriasis patients (94.5 cm) compared to controls (82.7 cm). Central obesity, measured by waist circumference, is a critical component of metabolic syndrome and is associated with increased cardiovascular risk. Psoriasis has been linked to increased visceral fat accumulation, potentially exacerbating insulin resistance and inflammatory responses. This finding is consistent with previous research suggesting that obesity is more prevalent in psoriasis patients, which may explain the higher rates of metabolic syndrome in this group [9,10].

Blood Pressure: Systolic and diastolic blood pressure were significantly higher in the psoriasis group, with systolic blood pressure averaging 136.5 mmHg in psoriasis patients compared to 123.1 mmHg in controls [11]. Hypertension is a key component of metabolic syndrome, and the increased blood pressure in psoriasis patients could be a direct consequence of systemic inflammation. Psoriasis is associated with increased levels of pro-inflammatory cytokines, which may contribute to endothelial dysfunction, leading to higher blood pressure [12].

Dyslipidemia: Our results demonstrated significantly higher triglyceride levels (179.5 mg/dL in psoriasis patients vs. 122.3 mg/dL in controls) and lower HDL cholesterol (38.7 mg/dL in psoriasis patients vs. 46.3 mg/dL in controls) in psoriasis patients [13]. These lipid abnormalities are well-documented in individuals with psoriasis and have been shown to increase the risk of cardiovascular events. The mechanisms behind these lipid changes could involve inflammatory pathways that disrupt normal lipid metabolism [14].

Fasting Blood Glucose Levels: Fasting blood glucose levels were significantly higher in psoriasis patients (106.8 mg/dL) compared to controls (88.3 mg/dL). This finding suggests that psoriasis patients may be at an increased risk of developing insulin resistance and type 2 diabetes. Chronic inflammation in psoriasis can impair insulin signaling, contributing to hyperglycemia. Furthermore, the higher prevalence of abdominal obesity in psoriasis patients could exacerbate insulin resistance, further increasing the risk of metabolic syndrome.

Psoriasis Severity and Metabolic Syndrome:

Our analysis also revealed a positive correlation between the severity of psoriasis (measured by PASI score) and the components of metabolic syndrome. Patients with more severe psoriasis had higher waist circumference, triglyceride levels, and fasting blood glucose levels. This suggests that the inflammatory burden of psoriasis could contribute to a greater degree of metabolic dysfunction, and that more severe psoriasis may serve as an indicator for increased risk of developing metabolic syndrome [15].

Duration of Psoriasis: Patients with a longer duration of psoriasis were more likely to exhibit components of metabolic syndrome, particularly those with over 10 years of psoriasis history. This could suggest that prolonged inflammation associated with psoriasis leads to an increased risk of developing metabolic syndrome, and that early management of psoriasis may help prevent or delay the onset of these metabolic abnormalities [16].

Gender and Smoking: There were no significant gender differences in the prevalence of metabolic syndrome between the psoriasis and control groups. However, smoking was more prevalent among psoriasis patients (34.2%) compared to controls (20.0%), which may contribute to the higher rates of metabolic syndrome seen in this group. Smoking is a known risk factor for cardiovascular disease and metabolic dysfunction, and its higher prevalence in psoriasis patients may exacerbate their overall health risks [17].

Limitations

While our study provides valuable insights into the association between psoriasis and metabolic syndrome, there are some limitations. First, this was a cross-sectional study, meaning we cannot establish causality. Longitudinal studies would be necessary to determine whether psoriasis directly leads to the development of metabolic syndrome over time. Additionally, our study was conducted in a specific geographical region (Madhubani, Bihar, India), and the findings may not be generalizable to other populations. Further research with larger, multicenter samples is needed to confirm these results.

Conclusion

This study highlights a significant association between psoriasis vulgaris and metabolic syndrome, demonstrating that individuals with psoriasis are at an increased risk of developing the components of metabolic syndrome, such as abdominal obesity, hypertension, dyslipidemia, and elevated fasting blood glucose levels. The prevalence of metabolic syndrome was notably higher in psoriasis patients compared to healthy controls, reinforcing the notion that psoriasis is not only a dermatological condition but also a systemic inflammatory disorder with potential metabolic consequences.

The findings of this study emphasize the importance of early detection and management of metabolic abnormalities in psoriasis patients. Given the increased risk of cardiovascular disease, type 2 diabetes, and other comorbidities associated with metabolic syndrome, healthcare providers should consider routine screening for metabolic syndrome

in individuals with psoriasis, particularly those with severe or long-standing disease.

Further research, including longitudinal studies, is necessary to establish the causal relationship between psoriasis and metabolic syndrome and to explore the underlying mechanisms that contribute to the development of metabolic abnormalities in psoriasis patients. Additionally, larger, multicenter studies would help to validate these findings and assess the potential impact of early intervention strategies aimed at managing both psoriasis and metabolic syndrome components.

In conclusion, the findings from this study call for a comprehensive approach to the management of psoriasis, one that includes regular monitoring for metabolic syndrome and appropriate interventions to mitigate the associated risks. This approach may ultimately improve the long-term health outcomes of individuals with psoriasis and reduce their overall cardiovascular and metabolic risk burden.

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