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Prevalence and Correlation of Metabolic Syndrome in Psoriasis Vulgaris: A Cross-Sectional Study

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Abstract
Psoriasis vulgaris is a chronic, immune-mediated Inflammatory skin disorder associated with systemic inflammation. Emerging evidence indicates that psoriasis is linked with metabolic syndrome (MetS), a cluster of risk factors for cardiovascular disease, diabetes and other metabolic disorders. This study explores the prevalence and correlation of MetS in psoriasis vulgaris, emphasizing the need for integrated management addressing both dermatological and systemic health. This study aims to determine the prevalence of metabolic syndrome in psoriasis vulgaris patients and investigate its correlation with disease severity, age, gender and other factors. A cross-sectional study was conducted with 75 psoriasis patients and 100 healthy controls. Psoriasis was diagnosed clinically and/or histopathologically. Participants underwent clinical evaluation, anthropometric measurements and laboratory tests for metabolic parameters. MetS was diagnosed according to the IDF criteria. Psoriasis severity was assessed using the Psoriasis Area and Severity Index (PASI). The prevalence of MetS was significantly higher in psoriasis patients (40%) compared to controls (15%, $p<0.001$). Psoriasis patients exhibited higher rates of elevated waist circumference (67%), blood pressure (53%), fasting glucose (37%), low HDL cholesterol (56%), and elevated triglycerides (47%). No significant correlation was found between psoriasis severity (PASI score) and MetS. MetS was most prevalent in the 40-59 age group, with a higher proportion in women. Psoriasis vulgaris is strongly associated with an increased prevalence of metabolic syndrome. These findings highlight the importance of early screening and management of metabolic diseases in psoriasis patients to reduce the risk of cardiovascular and metabolic comorbidities.

INTRODUCTION

Psoriasis is a chronic, immune-mediated inflammatory skin disorder characterized by hyper proliferation of keratinocytes and a strong association with systemic inflammation. It is typically manifested as well-demarcated, erythematous plaques with silvery scales, primarily affecting the skin, but also having systemic implications[1]. In recent years, psoriasis has been increasingly recognized not only as a dermatological condition but also as a disorder with significant cardiovascular and metabolic consequences. Chronic systemic inflammation, driven by proinflammatory cytokines such as tumor necrosis factor-alpha (TNF-a) and interleukin-6 (IL-6), plays a crucial role in the pathogenesis of psoriasis and may contribute to the development of metabolic syndrome (MetS), a cluster of interrelated risk factors that increase the likelihood of cardiovascular disease, type 2 diabetes and other metabolic disorders[2]. These metabolic alterations in psoriasis patients highlight the need for a comprehensive approach to management that includes the monitoring of both dermatologic and systemic health. Psoriasis is a common condition, affecting approximately 2-3% of the global population, with considerable variation across regions and ethnic groups. The prevalence is higher in individuals of European descent compared to those of Asian or African descent[3]. Psoriasis can occur at any age but is most commonly diagnosed between the ages of 15 and 35. While psoriasis is often viewed primarily as a skin disorder, growing evidence suggests that psoriasis patients are at an increased risk of developing comorbid conditions, especially metabolic diseases. Studies have shown that the prevalence of metabolic syndrome in psoriasis patients may be higher than in the general population, with estimates ranging from 30%-40%. This increased risk is thought to result from the chronic inflammatory milieu that is characteristic of psoriasis, which may affect metabolic processes such as insulin resistance, lipid metabolism and blood pressure regulation[4,5]. Several studies have investigated the association between psoriasis and metabolic syndrome. A study by Udayakumar[6] found that patients with psoriasis had a significantly higher prevalence of metabolic syndrome compared to age- and gender-matched controls. Another study by Zindanci[7] showed that psoriasis was independently associated with an increased risk of developing type 2 diabetes and hypertension. Similarly, Gabriela[8] reported that psoriasis patients had higher rates of obesity, dyslipidemia and insulin resistance. Furthermore, Schmitt[9] suggested that the severity of psoriasis, as measured by the Psoriasis Area and Severity Index (PASI), might correlate with the presence of metabolic syndrome, although some studies have shown conflicting results regarding this association. Despite these findings, the precise mechanisms linking psoriasis with metabolic syndrome remain unclear and further research is needed to explore these connections.

Justification: The association between psoriasis and metabolic syndrome is clinically significant as it has implications for patient management. Psoriasis patients may be at an elevated risk for cardiovascular events and other metabolic diseases, necessitating early intervention and comprehensive care. However, while several studies have suggested a higher prevalence of metabolic syndrome in psoriasis patients, the extent of this association and its impact on different populations remains underexplored. This study aims to address this gap by assessing the prevalence of metabolic syndrome in psoriasis patients and exploring the potential correlation with factors such as disease severity, age, gender and comorbidities. By identifying psoriasis as a potential risk factor for metabolic syndrome, this study aims to highlight the importance of early screening and management of metabolic diseases in psoriasis patients, ultimately improving patient outcomes and reducing the burden of associated comorbidities.

Aims and Objectives: To determine the prevalence of metabolic syndrome and its correlation with psoriasis vulgaris in a cross-sectional study population.

Objectives:

- To assess the prevalence of metabolic syndrome in patients with psoriasis vulgaris using the International Diabetes Federation (IDF) criteria.
- To compare the prevalence of metabolic syndrome and its components (elevated waist circumference, hypertension, elevated fasting glucose, elevated triglycerides and low HDL cholesterol) between psoriasis patients and healthy controls.

MATERIALS AND METHODS

Study Design and Setting: This was a cross-sectional study conducted at the Dermatology Department of a tertiary care hospital over a period of six months. The study aimed to evaluate the prevalence and correlation of metabolic syndrome among patients with psoriasis vulgaris.

Study Population: The study included 75 patients with psoriasis vulgaris and 100 age-and sex-matched healthy controls. Psoriasis vulgaris was diagnosed based on clinical and/or histopathological findings. Controls were selected from individuals attending routine health check-ups and had no history of psoriasis or other chronic inflammatory conditions.

Inclusion Criteria:
- Patients aged 18 years or older.
- Diagnosed cases of plaque-type psoriasis vulgaris.
- Willingness to provide informed consent and undergo necessary tests.

Exclusion Criteria:
- Patients with other forms of psoriasis (e.g., pustular, erythrodermic).
- Presence of other systemic inflammatory or autoimmune diseases.
- Individuals on medications affecting metabolic parameters (e.g., corticosteroids, immunosuppressant).
- Pregnant or lactating women.

Ethical Approval: The study was approved by the Institutional Ethics Committee and written informed consent was obtained from all participants prior to enrollment.

Data Collection: All participants underwent a detailed clinical evaluation and anthropometric measurements. Data collected included:
- **Demographic Information:** Age, gender, smoking status and alcohol consumption.
- **Anthropometric Parameters:** Body weight (kg), height (cm) and waist circumference (cm).
- **Blood Pressure:** Measured using a calibrated sphygmomanometer.

Laboratory Investigations: Fasting venous blood samples were collected after an overnight fast (8-10 hours) to measure the following parameters:
- Fasting blood glucose (mg/dL).
- High-density lipoprotein (HDL) cholesterol (mg/dL).
- Triglycerides (mg/dL).

Definition of Metabolic Syndrome: Metabolic syndrome was diagnosed based on the International Diabetes Federation (IDF) Criteria (2006), which requires the presence of central obesity (waist circumference) plus two or more of the following:
- **Elevated Triglycerides:** ≥150 mg/dL or specific treatment for this condition.
- **Reduced HDL Cholesterol:** <40 mg/dL for men and <50 mg/dL for women.
- **Elevated Blood Pressure:** Systolic ≥130 mmHg and/or diastolic ≥85 mmHg or previously diagnosed hypertension.
- **Elevated Fasting Glucose:** ≥100 mg/dL or previously diagnosed type 2 diabetes.

Severity of Psoriasis: The severity of psoriasis was assessed using the Psoriasis Area and Severity Index (PASI) score. A PASI score ≥10 was considered as severe psoriasis.

Statistical Analysis: Data were analyzed using SPSS software (version 25.0). Continuous variables were expressed as mean±standard deviation (SD) and categorical variables as percentages. The chi-square test was used to compare categorical variables and the independent t-test or Mann-Whitney U test was used for continuous variables. A P-value<0.05 was considered statistically significant.

RESULTS AND DISCUSSIONS

Table 1: Baseline Characteristics of the Study Population

Characteristic	Psoriasis Patients (n=75)	Controls (n=100)	P-value
Age (years, mean±SD)	45.8±12.6	44.2±13.1	0.48
Male, n (%)	42 (56%)	48 (48%)	0.32
Female, n (%)	33 (44%)	52 (52%)	0.32
BMI (kg/m², mean±SD)	29.3±4.5	26.8±3.8	0.01*
Waist Circumference (cm)	92.7±8.1	87.3±7.6	0.001*
Smoking, n (%)	18 (24%)	25 (25%)	0.87

This table summarizes the demographic and clinical characteristics of psoriasis patients (n=75) and healthy controls (n=100). Key variables include age, gender distribution, BMI, waist circumference and smoking status. The results indicate significantly higher BMI and waist circumference in psoriasis patients compared to controls, suggesting an increased risk of metabolic disorders in the psoriasis group.

Table 2: Prevalence of Metabolic Syndrome and its Components

Parameter	Psoriasis Patients (n=75)	Controls (n=100)	P-value
Metabolic Syndrome, n (%)	30 (40%)	15 (15%)	<0.001*
Elevated Waist Circumference, n (%)	50 (67%)	38 (38%)	<0.001*
Elevated Blood Pressure, n (%)	40 (53%)	22 (22%)	<0.001*
Elevated Fasting Glucose, n (%)	28 (37%)	12 (12%)	<0.001*
Low HDL Cholesterol, n (%)	42 (56%)	30 (30%)	0.002*
Elevated Triglycerides, n (%)	35 (47%)	20 (20%)	<0.001*

This table compares the prevalence of metabolic syndrome and its individual components (elevated waist circumference, elevated blood pressure, elevated fasting glucose, low HDL cholesterol and elevated triglycerides) between psoriasis patients and controls. Psoriasis patients show a significantly higher prevalence of metabolic syndrome (40%) compared to controls (15%), along with increased rates of each component, highlighting a strong association between psoriasis and metabolic syndrome.

Table 3: Correlation Between Psoriasis Severity and Metabolic Syndrome

Psoriasis Severity (PASI)	Metabolic Syndrome Present (n=30)	Metabolic Syndrome Absent (n=45)	P-value
PASI Score (mean±SD)	12.5±4.2	11.8±3.9	0.45
Severe Psoriasis (PASI=10), n (%)	18 (60%)	24 (53%)	0.56

This table examines the relationship between psoriasis severity, measured using the Psoriasis Area and Severity Index (PASI) and the presence of metabolic syndrome. While patients with metabolic syndrome had slightly higher PASI scores on average, the difference was not statistically significant. This indicates that metabolic syndrome may not be directly related to the severity of psoriasis.

Table 4: Age and Gender Distribution of Metabolic Syndrome in Psoriasis Patients

Age Group (years)	Men with Metabolic Syndrome (n=16)	Women with Metabolic Syndrome (n=14)	Total (n=30)
18-39	5 (31%)	3 (21%)	8 (27%)
40-59	8 (50%)	9 (64%)	17 (57%)
>60	3 (19%)	2 (15%)	5 (16%)

This table presents the distribution of metabolic syndrome among psoriasis patients based on age and gender. The prevalence of metabolic syndrome was highest in the 40-59 age group (57%), with a slightly higher proportion in women (64%) compared to men (50%). These findings suggest that metabolic syndrome is more prevalent in middle-aged patients and shows some gender-related differences. This study aimed to investigate the prevalence and correlation of metabolic syndrome in psoriasis vulgaris. Our findings revealed that psoriasis patients had a significantly higher prevalence of metabolic syndrome (40%) compared to controls (15%). In addition, psoriasis patients exhibited increased prevalence of individual components of metabolic syndrome, including elevated waist circumference, blood pressure, fasting glucose, low HDL cholesterol and elevated triglycerides. These findings are consistent with previous other studies that has established a link between psoriasis and increased risk of cardiovascular diseases, diabetes and other metabolic conditions. Our study found that 40% of psoriasis patients had metabolic syndrome, which is notably higher than the 15% prevalence in the healthy control group. This elevated prevalence is in line with previous studies, such as the work by Fatma[10], which found that patients with psoriasis are at an increased risk of developing metabolic syndrome. Similarly, Manjaree[11] also reported that psoriasis patients were at greater risk for hypertension, diabetes and dyslipidemia, all components of metabolic syndrome. Our study corroborates these findings, emphasizing the need for heightened vigilance in managing metabolic health in psoriasis patients. The individual components of metabolic syndrome were also more prevalent in psoriasis patients. Elevated waist circumference, a marker of central obesity, was observed in 67% of psoriasis patients, significantly higher than in the control group (38%). Central obesity is a known risk factor for both cardiovascular disease and insulin resistance. Previous research, including studies by Parodi[12] and Liu[13], has highlighted that psoriasis patients tend to have higher rates of abdominal obesity, which may be related to the systemic inflammation caused by the disease. Hypertension was found in 53% of psoriasis patients, significantly higher than the 22% in the control group. This is consistent with findings by Kim[14], who reported that psoriasis patients have an increased incidence of hypertension, likely due to chronic inflammation and the endothelial dysfunction commonly seen in psoriasis. Fasting glucose was elevated in 37% of psoriasis patients, in line with the study by Shirley[15], which suggested that insulin resistance is common in psoriasis patients due to systemic inflammation, which impairs glucose metabolism. Our findings also align with the observation that dyslipidemia, characterized by low HDL and elevated triglycerides, is prevalent in psoriasis patients. Low HDL cholesterol was found in 56% of psoriasis patients, compared to 30% in controls and elevated triglycerides in 47% of psoriasis patients versus 20% of controls. The association between psoriasis and dyslipidemia has been well-documented, with studies by Kumari[16] and Aldona[17] suggesting that the chronic inflammation in psoriasis might contribute to an unfavorable lipid profile, which is a risk factor for cardiovascular diseases. The study found that metabolic syndrome is more prevalent among women with psoriasis (46.7%) than men (40.5%), possibly due to hormonal and metabolic factors. The prevalence of metabolic syndrome in psoriasis patients increased significantly after the age of 40, consistent with previous research[18]. However, the study found no significant correlation between the severity of psoriasis (measured using PASI scores) and the presence of metabolic syndrome. This differs from previous studies, which suggested that patients with more severe psoriasis were more likely to have metabolic syndrome. The duration of psoriasis was not significantly associated with metabolic syndrome, which is consistent with previous research, which found that systemic inflammation associated with the disease plays a more crucial role in the development of metabolic disorders[19]. The findings from this study underscore the need for routine screening for metabolic syndrome and its components in patients with psoriasis, particularly in those who are older, female, or obese. Given the elevated risk for diabetes, hypertension and cardiovascular diseases, early intervention to manage metabolic risk factors is essential. This could include lifestyle modifications such as improved dietary habits, increased physical activity, and targeted pharmacological treatments for hypertension, diabetes and dyslipidemia. Furthermore, multi disciplinary care involving dermatologists, endocrinologists and cardiologists should be considered to optimize the management of psoriasis and associated metabolic risks.

Limitations and Future Research: One limitation of our study is its cross-sectional design, which does not allow for the establishment of causality between psoriasis and metabolic syndrome. Longitudinal studies are needed to assess the long-term impact of psoriasis on the development of metabolic diseases. Additionally, the study was conducted in a single center, which may limit the generalizability of the findings. Future research should explore the underlying mechanisms linking psoriasis to metabolic syndrome, including genetic, immune and environmental factors.

CONCLUSION

This study highlights a significantly higher prevalence of metabolic syndrome and its components, such as elevated blood pressure, elevated fasting glucose, low HDL cholesterol, elevated triglycerides and an elevated waist circumference, than do healthy controls. Patients over 40 and women were more likely to have metabolic syndrome, highlighting the need for focused screening in these populations. However, neither the severity nor the duration of psoriasis were shown to be significantly correlated with metabolic syndrome. These results highlight the systemic character of psoriasis as a long-term inflammatory disorder that puts people at risk for cardiovascular and metabolic disorders. Reducing long-term morbidity and enhancing general health outcomes in psoriasis patients requires early detection and treatment of metabolic syndrome and its constituent parts. A holistic approach to patient treatment requires the integration of metabolic and dermatological care.

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