ISSN : (Online): 1898-7249
Abbreviation: J Derm Cse Rep



Journal of Dermatological Case Reports

# Association of metabolic syndrome with psoriasis and its relationship to clinical severity

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## Abstract:

**Background:** Psoriasis is a chronic inflammatory skin condition that has increasingly been coupled with metabolic syndrome (MetS). The purpose of the study is to assess the connection between MetS and psoriasis severity. **Methods:** The Cross-sectional research was conducted on 100 psoriasis subjects. In addition to recording metabolic parameters like fasting plasma glucose (FPG), blood pressure (B.P.), lipid profile, and obesity, the Psoriasis Area and Severity Index (PASI) was used to evaluate clinical severity. The relationships between MetS components and PASI scores were investigated using correlation analysis. **Results:** Of the 100 patients, 41% were men and 59% were women. The prevalence of MetS components was demonstrated by the following: 78% had central obesity, 89% had elevated triglycerides (T.G.), 66% had low HDL, 81% had hypertension, and 45% had impaired fasting glucose. Alcohol use and smoking were reported in 18% and 35% of cases, respectively. Nine percent suffered from severe psoriasis, sixty-nine percent from moderate psoriasis, and twenty-two percent from mild psoriasis. More metabolic abnormalities were found in moderate to severe cases. There was a negative correlation among HDL and PASI ($r = -0.243$, $p = 0.015$), while there was a high correlation between fasting glucose and PASI ($r = 0.438$, $p < 0.001$). There was a correlation between Waist circumference (W.C.) and fasting glucose, Blood pressure (B.P.), and T.G., but not with PASI. **Conclusion:** This study shows a robust alliance among severity of psoriasis and metabolic syndrome, with fasting glucose and HDL levels playing a major role. In order to prevent systemic complications and slow the progression of the illness, these results the consequence of early metabolic screening plus a multidisciplinary approach to psoriasis management.

## Keywords:

Psoriasis, Metabolic syndrome, Psoriasis Area and Severity Index (PASI).

## Introduction

Globally, two to three percent of people suffer from psoriasis, a inflammatory responses skin condition mediated by the immune system. [1]. Systemic immune activation, epidermal inflammation, and keratinocyte hyperproliferation all contribute to the formation of erythematous, scaly plaques on the skin. There is escalating data that psoriasis is allied

with several systemic co-morbidities, including metabolic syndrome (MetS), despite the fact that it primarily affects the skin [2, 3]. A collection of linked metabolic diseases known as the MetS raises the threat of heart disease and type 2 diabetes. Among these abnormalities are adiposity, insulin resistance, hypertension and dyslipidemia. [4].

According to recent research, persistently low status systemic inflammation is the primary pathophysiological means that unites psoriasis and MetS. Insulin resistance, endothelial dysfunction, and abnormalities in lipid metabolism are all caused by pro-inflammatory cytokines like adipokines, tumor necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6). These two disorders are further linked by immunological dysregulation as well as oxidative stress. In addition to raising chance of cardiovascular problems, MetS in psoriasis patients may also affect the severity and course of the condition [5-7].

Compared to the general population, psoriasis patients are more likely to have MetS, according to numerous clinical studies. Additionally, the severity of psoriasis, which is commonly measured using the PASI, appears to be associated with the extent and existence of MetS constituents. Insulin resistance, dyslipidemia, and obesity are more common in patients with severe psoriasis, suggesting a reciprocal relationship whereby metabolic dysfunction exacerbates psoriasis and vice versa [8-9].

Effective disease management requires an understanding of the relationship between psoriasis and metabolic syndrome. Identifying MetS in psoriasis patients can help guide treatment plans that address dermatological and systemic health issues and assist in risk assessment. This research aims to ascertain the metabolic syndrome prevalence in psoriasis patients and analyze its relationship to clinical severity in order to support a more thorough approach to patient care.

## Materials and Procedures:

The study design was cross-sectional. Written informed consent was provided by each participant.

**Study Population**

This research included patients who had been diagnosed with psoriasis according to the American Academy of Dermatology's or the International Psoriasis Council's criteria. The inclusion and exclusion criteria were as follows: Patients with a verified clinical and/or histopathological diagnosis of psoriasis and are at least 18 years old are eligible to participate. Patients who are willing to participate and give their informed consent, as well as cases that have been diagnosed recently and in the past.Patients with additional autoimmune skin conditions are excluded. Individuals who had received immunosuppressive or systemic corticosteroid treatment within the previous three months were not included. people with known endocrine or metabolic conditions that are not associated with metabolic syndrome. Women who were nursing or pregnant were also not included.

**Sample Size:** 100 participants were incorporated in this research.

**Clinical Assessment**

I. Psoriasis Severity: The Psoriasis Area and Severity Index (PASI) were used to measure the severity of psoriasis. Patients were categorized as having mild (PASI <10), moderate (PASI 10–20), or severe (PASI >20) psoriasis.

II. Metabolic syndrome was diagnosed using the International Diabetes Federation (IDF) criteria or the National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III) criteria. A person is said to have metabolic syndrome if they have at least three of the following symptoms: The following parameters were evaluated:

- W.C. (at least 88 cm for women and 102 cm for men)
- FPG (defined as ≥100 mg/dl or diabetes)
- B.P. ≥130/85 mmHg or while taking antihypertensive medication
- T.G. (≥150 mg/dl or while receiving lipid-lowering medication)
- HDL cholesterol (less than 40 mg/dl for men and less than 50 mg/dl for women)

Data Collection and Lab Analysis: Comprehensive demographic information, medical history, and lifestyle factors (diet, alcohol use, and smoking) were documented. Following an 8-12 hours fast, Blood samples were obtained to measure fasting glucose, lipid profile, and HbA1c, B.P. and

anthropometric (weight, height, and waist circumference) measurements were obtained.

**Statistical Evaluation**: To inspect the data, SPSS version 26 was utilized. Continuous variables were shown as mean ± standard deviation (SD), while categorical variables were shown as percentages. The association between the severity of psoriasis and elements of the metabolic syndrome was evaluated using Pearson's correlation. A p-value of less than 0.05 was considered to be statistically significant.

## Result

Among 100 individuals with psoriasis, 41% were men and 59% were women. Components of the metabolic syndrome were very common: 78% had central obesity, 89% had elevated triglycerides, 66% had low HDL, 81% had hypertension, and 45% had impaired fasting glucose. Of the patients, 35% reported smoking, and 18% reported drinking alcohol. 22% of people had mild psoriasis (PASI <10), 69% had moderate psoriasis (PASI 10–20), and 9% had severe psoriasis (PASI >20), according to severity assessment. There were more metabolic abnormalities, especially obesity, dyslipidemia, and hypertension, in individuals suffering from moderate to severe psoriasis. Cardiovascular disease (1%), thyroid disease (4%), and no lung or kidney disease were reported as co-morbidities (Table No. 1). Correlation analysis revealed significant associations between metabolic parameters and psoriasis severity. (W.C.)had a negative relationship with HDL ($r = -0.305$, $p = 0.002$) and a positive association with B.P., triglycerides, and fasting glucose ($r = 0.336$, $p = 0.001$), but not with PASI. Fasting glucose and PASI showed a strong positive correlation ($r = 0.438$, $p < 0.001$), indicating that it affects how severe psoriasis is. There was a negative association between HDL and PASI ($r = -0.243$, $p = 0.015$), suggesting that more severe disease is associated with lower HDL levels. (Table No. 2).

**Table No. 1:** ***Showing the clinical characteristics of psoriasis patients***

| **Characteristics** | | **Patients No. (%)** |
|---|---|---|
| Gender | Male | 41 (41%) |
| | Female | 59 (59%) |
| W.C. (cm) | ≥102 cm in men, ≥88 cm in women | 78 (78%) |
| | ≤102 cm in men, ≤88 cm in women | 22 (22%) |
| Alcohol consumption | | 18 (18%) |
| Smoking habit | | 35 (35%) |
| T.G. (mg/dl) | ≥150 mg/dl or on lipid-lowering therapy | 89 (89%) |
| | ≤150 mg/dl | 21 (21%) |
| HDL (mg/dl) | <40 mg/dl in men, <50 mg/dl in women | 66 (66%) |
| | >40 mg/dl in men, >50 mg/dl in women | 34 (34%) |
| B.P.(mm Hg) | ≥130/85 mmHg or on antihypertensive treatment | 81(81%) |
| | ≤130/85 mmHg | 19 (19%) |
| FPG (mg/dl) | ≥100 mg/dl or diagnosed diabetes | 45 (45%) |
| | ≤100 mg/dl | 55 (55%) |
| PASI | Mild (PASI <10) | 22 (22%) |
| | Moderate (PASI 10–20) | 69 (69%) |
| | Severe (PASI >20) | 9 (9%) |
| **Co-morbidities** | | |
| Cardiovascular disease | | 1 (1%) |
| Lung disease | | 0 (0%) |
| Kidney disease | | 0 (0%) |
| Thyroid disease | | 4(4%) |

**Table No. 2:** ***Showing the correlation (r and p-value) between diagnosis of metabolic syndrome and clinical characteristics of psoriasis patients***

| Characteristics | W.C. | FPG | Systolic B.P. | Diastolic B.P. | T.G. | HDL | PASI |
|---|---|---|---|---|---|---|---|
| **W.C.** | 1 | 0.336** | 0.606** | 0.293** | 0.341** | -0.305** | 0.160 |
| | | 0.001 | 0.000 | 0.003 | 0.001 | 0.002 | 0.112 |
| **FPG** | | 1 | 0.385** | 0.247* | 0.187 | -.512** | 0.438** |
| | | | 0.000 | 0.013 | 0.062 | 0.000 | 0.000 |
| **Systolic B.P.** | | | 1 | 0.447** | 0.589** | -0.428** | 0.174 |
| | | | | 0.000 | 0.000 | 0.000 | 0.083 |
| **Diastolic B.P.** | | | | 1 | 0.528** | -0.300** | 0.135 |
| | | | | | 0.000 | 0.002 | 0.180 |
| **T.G.** | | | | | 1 | -0.100 | 0.021 |
| | | | | | | 0.320 | 0.832 |
| **HDL** | | | | | | 1 | -0.243* |
| | | | | | | | 0.015 |
| **PASI** | | | | | | | 1 |
| **. At the 0.01 level, correlation is significant. | | | | | | | |
| *. At the 0.05 level, correlation is significant. | | | | | | | |

## Discussion

Findings of present study illustrate a strong association among psoriasis and metabolic syndrome (MetS), confirming the growing body of evidence that There is more to psoriasis than just skin ailment; It is an inflammatory systemic disease condition with significant metabolic implications. The high incidence of MetS components amongst psoriasis patients in this study, including central obesity (78%), elevated triglycerides (89%), low HDL (66%), hypertension (81%), and impaired fasting glucose (45%), suggests a significant metabolic burden in this population [10, 11].

There may be a reciprocal connection among the severity of psoriasis and metabolic disturbance, as prevalence of metabolic abnormalities, particularly obesity, dyslipidemia, and hypertension, was higher in patients with moderate to severe psoriasis. One pathological mechanism that connects these conditions is chronic systemic inflammation, which is driven by pro-inflammatory cytokines like TNF-α, IL-6, and adipokines. Obesity specifically exacerbates metabolic disorders by contributing to insulin resistance and the pathophysiology of psoriasis [12, 13].

The correlation analysis further strengthens this association. B.P., triglycerides, HDL, and fasting glucose were all found to be significantly correlated

with waist circumference, suggesting that central adiposity acting a significant part in metabolic dysregulation. The severity of psoriasis was significantly associated with FPG (PASI, $r = 0.438$, $p < 0.001$), indicating that insulin resistance and hyperglycemia may contribute to more severe psoriasis symptoms. Furthermore, the negative association between HDL and PASI ($r = -0.243$, $p = 0.015$) suggests that lesser HDL levels are associated with more severe psoriasis because HDL has anti-inflammatory and endothelial-protective qualities [14].

The presence of cardiovascular disease (1%) and thyroid disease (4%) as co-morbidities highlights the need for comprehensive systemic evaluation in psoriasis patients [15]. The absence of lung and kidney disease in this research may be because of the relatively tiny sample range or specific exclusion criteria.

## Conclusion

By demonstrating a strong association between the severity of psoriasis and metabolic syndrome, this study emphasizes the significance of early identification and treatment of metabolic risk factors in psoriasis patients. Fasting glucose, HDL levels, and PASI are correlated, which implies that metabolic abnormalities could be a factor in the development of the disease. A multidisciplinary approach linking cardiologists, endocrinologists, and dermatologists is crucial for improving patient outcomes because of the shared inflammatory pathways. To investigate the underlying mechanisms and possible treatment approaches that target both metabolic syndrome and psoriasis, more extensive research is required.

**Conflict of Interest:** None

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