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Original Article

Prevalence and Clinical Correlates of Metabolic Syndrome in Psoriasis Patients at a Tertiary Care Hospital in Pakistan

Bilal Khan[1], Naheed Asghar[1], Muhammad Asghar[2], Muhammad Haroon[2], Awais Naeem[2] & Noor Rehman[2]

[1]Hayatabad Medical Complex, Peshawar, Pakistan
[2]Khyber Teaching Hospital, Peshawar, Pakistan

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Abstract

Background: Psoriasis is a chronic, immune-mediated inflammatory skin disease affecting approximately 2–3% of the global population. Metabolic syndrome (MetS) is a cluster of metabolic abnormalities—central obesity, insulin resistance, dyslipidemia, and hypertension—that heightens the risk of cardiovascular disease and type 2 diabetes.

Objective: To determine the frequency of metabolic syndrome in psoriasis patients presenting to the dermatology unit at a tertiary care hospital in, Pakistan.

Methodology: This cross-sectional study was conducted from June 27, 2021, to December 26, 2021, in the dermatology unit. A total of 143 clinically diagnosed psoriasis patients aged 20–60 years of both sexes were enrolled. Key components of metabolic syndrome—including blood pressure, waist circumference, triglyceride levels, high-density lipoprotein (HDL) cholesterol, and random blood glucose—were measured in accordance with NCEP ATP III criteria.

Results: Among the 143 patients, the mean age was 35.3 ± 9.2 years; 44% were male and 56% were female. The mean Body Mass Index (BMI) was 26.3 ± 3.4 kg/m². The prevalence of metabolic syndrome was 45.4%. Statistically significant associations were found between metabolic syndrome and smoking status, diabetes mellitus, elevated blood glucose levels, and increased BMI ($p < 0.05$).

Conclusion: The frequency of metabolic syndrome among psoriasis patients in this cohort was notably high. These findings underscore the need for early screening and comprehensive management of metabolic risk factors in psoriasis patients, particularly in the local Pakistani population.

Keywords: Body Mass Index, Cardiovascular Risk, Dermatology, Metabolic Syndrome, Psoriasis.

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Corresponding Author:
Dr. Naheed Asghar
Associate Professor,
Department of Dermatology,
Hayatabad Medical Complex,
Peshawar, Pakistan.
drnaheedhmc@gmail.com

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Introduction

Psoriasis is a chronic, immune-mediated inflammatory skin disorder affecting approximately 2–3% of the global population [1]. Traditionally viewed as a dermatological condition, psoriasis is now increasingly recognized for its systemic involvement, especially its association with multiple comorbidities. Among these, metabolic syndrome (MetS) has gained particular attention due to its potential to exacerbate cardiovascular and metabolic risks in affected individuals [2].

Metabolic syndrome is defined as a constellation of interrelated risk factors—including central obesity, insulin resistance, dyslipidemia, and hypertension—that collectively increase the risk of cardiovascular disease and type 2 diabetes mellitus [3][4]. The global burden of MetS is growing, and individuals with chronic inflammatory conditions such as psoriasis appear to be at heightened risk. Evidence suggests that the systemic inflammation characterizing psoriasis may promote metabolic disturbances through shared inflammatory pathways, thereby increasing susceptibility to MetS [5].

In South Asia, and specifically in Pakistan, the prevalence of psoriasis appears to be increasing. However, few studies have systematically explored its association with metabolic syndrome in the local population [6,7]. The unique genetic makeup and lifestyle practices—including dietary patterns, physical inactivity, and high rates of smoking—make South Asian populations more susceptible to both psoriasis and metabolic disturbances [8]. Yet, there remains a paucity of comprehensive data examining this relationship within the Pakistani context.

Psoriasis, far beyond its cutaneous manifestations, involves immune dysregulation and chronic systemic inflammation. These pathophysiological mechanisms are believed to not only drive the characteristic skin lesions but also alter metabolic processes, contributing to the development of MetS [7]. Epidemiological studies from other regions have shown a significantly higher prevalence of MetS among psoriasis patients compared to the general population, highlighting the need for a similar focus in low- and middle-income countries [2][9].

Peshawar, a major urban center in Pakistan, represents a socioeconomically and ethnically diverse population, making it an ideal setting for investigating this association. This study aims to determine the prevalence of metabolic syndrome among psoriasis patients in a tertiary care dermatology unit and to explore clinical correlates such as age, sex, BMI, blood glucose levels, lipid profile, and smoking history.

By identifying key components of MetS and their association with psoriasis in a local context, this study seeks to inform clinical practice and public health strategies. The findings may support early screening initiatives and integrated care approaches that address both dermatological and systemic health in psoriasis patients. Additionally, this research may pave the way for future investigations into the pathophysiological links between inflammatory skin diseases and systemic metabolic disorders in South Asian populations.

Methodology

Study Design

This was a cross-sectional study conducted to determine the frequency of metabolic syndrome among patients with clinically diagnosed psoriasis. The study was designed to explore potential associations between psoriasis and metabolic risk factors using standardized diagnostic criteria.

Ethics

Prior to the commencement of the study, ethical approval was obtained from the Institutional Review Board (Document Ref No. 628/HEC/B&PSC/2022 dated 13/05/2022). All participants provided written informed consent after being informed of the study's objectives, procedures, risks, and benefits. Confidentiality and anonymity were ensured throughout the research process.

Setting

The study was carried out at the Division of Dermatology, [Insert Institution Name], over a six-month period from June 27, 2021, to December 26, 2021. The dermatology unit primarily caters to patients from urban and peri-urban areas, providing a diverse patient pool for investigation.

Participants

The study enrolled 143 adult patients between 20 and 60 years of age who had a clinical diagnosis of psoriasis. A consecutive (non-probability) sampling technique was employed. Inclusion criteria comprised individuals with psoriasis confirmed by a dermatologist through characteristic erythematous and scaly plaques, diagnosed according to standard clinical diagnostic criteria. Patients were excluded if they had psoriasis of less than one-year duration, drug-induced maculopapular eruptions, recent use (within the last three months) of cyclosporine or systemic retinoid therapy, coexisting skin diseases such as eczema, lipid-lowering medication use, thyroid disorders, or a history of skin cancer.

Variables

The primary outcome variable was the presence of metabolic syndrome, defined by the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) criteria. Predictor variables included age, gender, duration of psoriasis, and clinical characteristics. The operational definition of metabolic syndrome required the presence of three or more of the following: (1) waist circumference > 40 inches in men or > 35 inches in women, (2) serum triglycerides ≥ 150 mg/dL, (3) HDL cholesterol < 40 mg/dL in men or < 50 mg/dL in women, (4) blood pressure ≥ 130/85 mmHg, and (5) random blood glucose ≥ 140 mg/dL (adapted to study protocol).

Data Sources/Measurement

Data were collected through patient interviews, clinical examination, and laboratory analysis. A standardized questionnaire was used to record demographic data and medical history. Waist circumference and blood pressure were measured using calibrated tools following standardized procedures. Blood samples were obtained to assess serum triglycerides, HDL cholesterol, and random blood glucose levels, analyzed in the hospital's central laboratory using validated methods.

Bias

To reduce selection bias, all eligible psoriasis patients attending the dermatology clinic during the study period were approached consecutively. Information bias was minimized by using standard definitions and measurement protocols for metabolic syndrome components. All laboratory analyses were conducted by trained personnel blinded to the psoriasis severity or clinical profile.

Study Size

The sample size was calculated using the WHO sample size calculator, assuming a prevalence of metabolic syndrome in psoriasis patients of 40%, with a 95% confidence level and an 8% margin of error, yielding a required sample of 143 participants. This estimation was based on data from prior literature.

Quantitative Variables

The primary quantitative variables included age, waist circumference, serum triglycerides, HDL cholesterol, blood pressure, and random blood glucose. These variables were measured on a continuous scale and were later categorized according to the NCEP ATP III criteria for the diagnosis of metabolic syndrome.

Statistical Methods

Data were entered and analyzed using SPSS version 23. Descriptive statistics were computed for all variables. Mean and standard deviation were calculated for continuous variables, whereas categorical variables were presented as frequencies and percentages. The chi-square test was used to examine the association between metabolic syndrome and various categorical factors (such as gender, age group, duration of psoriasis). A p-value of < 0.05 was considered statistically significant. Results were displayed through tables and graphs to enhance interpretability and facilitate comparative analysis.

Table 1: Age, gender and clinical parameters in patients with psoriasis (n =143)

Age groups	Frequency	Percentage	Mean ± SD
20-40 years	101	70.6	
> 40-60 years	42	29.4	35.3 ± 9.2 years
Gender			
Male	63	44	
Female	80	56	
BMI			
<25	53	37	
≥25	90	63	26.3 ± 3.4 kg/m^2
Total	143	100.0	
Diabetes			
Yes	61	42.6	
No	82	57.4	
Total	143	100.0	
Random Blood Sugar			
<140mg/dl	92	64.3	135±12mg/dl
≥140mg/dl	51	35.7	
SystolicBlood Pressure			
<140mmHg	103	72	130 ±12 mmHg
≥140mmHg	40	28%	
Triglyceride level			
≤150mg/dl	84	58.7	
>150mg/dl	59	41.3	

Results

Participants

A total of 143 patients with clinically diagnosed psoriasis were included in this cross-sectional study. The participants ranged in age from 20 to 60 years, with a mean age of 35.3 ± 9.2 years. The majority of patients (70.6%) were in the 20–40 years age group, while the remaining 29.4% were between 41 and 60 years. Gender distribution showed a slightly higher proportion of females (56%) compared to males (44%).

Descriptive Data

The clinical and anthropometric profile of the study population revealed a mean Body Mass Index (BMI) of 26.3 ± 3.4 kg/m², with 63% of participants having a BMI greater than 25 kg/m², indicating a higher prevalence of overweight individuals among psoriasis patients. Systolic blood pressure averaged 130 ± 12 mmHg, and the mean random blood sugar level was 135 ± 12 mg/dL. A significant portion of the cohort (42.6%) had a known diagnosis of diabetes mellitus. Waist circumference measurements indicated that 51.8% of the participants had central obesity (waist > 40 inches), while 48.2% were below this threshold. Additionally, 22.4% of patients reported a positive history of smoking. Regarding lipid profiles, 41.3% of the participants had elevated triglyceride levels (≥150 mg/dL), whereas 58.7% had levels below the cutoff.

Outcome Data

Using the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) criteria, the presence of metabolic syndrome was assessed among the psoriasis patients. Out of 143 individuals, 65 (45.4%) met the diagnostic criteria for metabolic syndrome, while 78 (54.6%) did not. This finding underscores a considerable burden of metabolic syndrome within the psoriatic population.

Table 2: Epidemiological parameters in patients with psoriasis (n=143)

Waist circumference	Frequency	Percentage
≤40inch	69	48.2
>40inch	74	51.8
Smoking History		
Yes	32	22.4
No	111	77.6

Table 3: Frequency distribution of different parameters in metabolic syndrome of psoriasis patients (n=143)

		MetabolicSyndrome		P-value
		Yes	No	
Metabolic Syndrome in psoriasis		65	78	
Percentage		45.4	54.6	
Age Group	20-40 years	41	60	0.07
		40.5%	59.5%	
	>40-60 years	24	18	
		57.1%	42.9%	
Gender	Male	23	40	0.0565
		36.5%	57.8%	
	Female	42	38	
		52.5%	47.5%	
BMI kg/m^2	<25 kg/m^2	17	36	0.013
		32%	68%	
	≥25 kg/m^2	48	42	
		53.3%	46.7%	
Diabetes	Yes	15	46	0.003
		24.5%	75.5%	
	No	40	42	
		48.7%	51.3%	
RandomBlood Sugar	< 140mg/dl	26	66	<0.00001
		39.3%	60.7%	
	≥140mg/dl	39	12	
		76.4%	23.6%	
Systolic Blood Pressure	< 140 mmHg	45	58	0.49
		43.6%	56.4%	
	≥140 mmHg	20	20	
		50%	50%	
SmokingHistory	Yes	26	6	0.00001
		81.2%	18.8%	
	No	39	72	
		35.1%	64.9%	

Main Results

Stratified analysis revealed several significant associations. The prevalence of metabolic syndrome was higher in the 41–60 years age group (57.1%) compared to the 20–40 years group (40.5%), though the difference was not statistically significant ($p = 0.07$). A gender-based analysis showed that 52.5% of females with psoriasis had metabolic syndrome, compared to 36.5% of males ($p = 0.0565$), approaching statistical significance. A statistically significant association was observed between higher BMI and metabolic syndrome ($p = 0.013$); 53.3% of individuals with BMI >25 kg/m² had metabolic syndrome compared to 32% with BMI <25 kg/m².

Discussion

Psoriasis is one of the most frequently encountered chronic inflammatory skin disorders in dermatology outpatient departments. It is a prevalent condition, particularly affecting young adults in Western societies, and is widely recognized as an autoimmune disease with a notable familial tendency. Although the exact pathophysiological mechanisms remain unclear, various risk factors and triggers have been identified through global clinical studies. These include psychological stress, such as anxiety and depression, recent surgeries, hospital admissions, and the use of certain medications including anti-malarials, antihypertensives, and non-steroidal anti-inflammatory drugs [12]. Avoidance of these triggering factors may reduce flare-ups and improve patient outcomes.

Given the chronic nature of psoriasis, long-term pharmacological management is often required. Common therapeutic agents include topical corticosteroids and systemic immunosuppressants, which, while effective, are associated with adverse effects such as osteoporosis and cardiovascular complications [13]. Cardiovascular issues are particularly prevalent in patients with concurrent metabolic syndrome, which has emerged as a common comorbidity among individuals with psoriasis.

Diabetes status was also significantly associated with metabolic syndrome ($p = 0.003$), with only 24.5% of diabetic patients free from metabolic syndrome compared to 48.7% of non-diabetics. Notably, elevated random blood sugar (>140 mg/dL) showed a strong association with metabolic syndrome (76.4% vs. 39.3%, $p < 0.00001$). Smoking history was significantly correlated with the presence of metabolic syndrome; 81.2% of smokers had metabolic syndrome compared to 35.1% of non-smokers ($p < 0.00001$). However, no significant association was found between systolic blood pressure and metabolic syndrome status ($p = 0.49$).

Metabolic syndrome significantly worsens the overall prognosis in patients with psoriasis by accelerating atherosclerosis and contributing to reno-vascular hypertension [14]. Clinically, this manifests as cardiac dysfunction and progressive vascular intimal thickening, increasing the risk for myocardial infarction, chronic kidney disease, and cerebrovascular accidents. In the current study, 45.4% of the psoriasis patients met the criteria for metabolic syndrome, a prevalence substantially higher than that observed in the general population.

Among the 143 study participants, more than half had triglyceride levels below 150 mg/dL. Triglycerides are a key component of metabolic syndrome and lipid biochemistry. Elevated triglyceride levels are associated with an increased risk of adverse cardiovascular events such as myocardial infarction and stroke. Obesity, another crucial component of metabolic syndrome, was also examined in our cohort. Waist circumference, a simple and reliable marker of central obesity, showed an almost equal distribution above and below the 40-inch threshold.

Interestingly, our findings indicated that the presence of metabolic syndrome in psoriasis patients was not significantly associated with age ($p > 0.05$) or gender ($p = 0.05$). This contrasts with other studies, which have reported a higher prevalence of metabolic syndrome in older individuals and a female predominance [15]. These

discrepancies may be attributable to variations in the demographic and geographic characteristics of the study populations. Additional research is warranted to clarify the relationship between age, gender, and metabolic syndrome in our local context.

A statistically significant association was found between elevated Body Mass Index (BMI) and metabolic syndrome ($p < 0.05$), suggesting that increased weight may be a shared risk factor for both conditions. Obesity is known to exacerbate systemic inflammation and insulin resistance, thereby increasing the likelihood of developing diabetes mellitus. This is consistent with findings from other international studies [16].

Moreover, diabetes and elevated blood glucose levels were also positively correlated with metabolic syndrome in our psoriasis patients ($p < 0.05$). This reinforces the role of insulin resistance in the pathogenesis of both conditions, as previously reported [17]. In contrast, no significant association was found between systolic blood pressure and metabolic syndrome ($p > 0.05$). However, a strong positive association was observed between smoking and the presence of metabolic syndrome in psoriasis patients ($p < 0.05$), aligning with prior research that implicates smoking as a modifiable risk factor for metabolic and cardiovascular disorders [18].

The present study identifies diabetes, elevated glucose levels, high BMI, and smoking as significant risk factors for the development of metabolic syndrome in patients with psoriasis. These findings underscore the importance of integrated management strategies focusing on metabolic health in this patient population. Further large-scale, multi-center studies are needed to validate these associations and explore potential interventions.

Conclusion

This study concludes that the frequency of metabolic syndrome among patients with psoriasis in our local population is considerably high. These individuals are at an increased risk of cardiovascular morbidity and mortality. The study identifies diabetes, elevated glucose levels, high BMI, and smoking as key factors associated with the development of metabolic syndrome in psoriasis patients. These associations, although compelling, require further validation through studies involving larger and more diverse populations. Given the modifiable nature of these risk factors, we recommend early intervention focusing on glycemic control and weight management to reduce the burden of metabolic syndrome and improve long-term outcomes in psoriasis patients.

Authors' Contributions

All authors meet the ICMJE criteria for authorship. They have reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Author 1: Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 2: Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 3: Analysis and interpretation of data, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 4: Analysis and interpretation of data, critical revision, final approval, agreed to be accountable for all the work.
Author 5: Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Author 6: Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.

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