

Frequency of metabolic syndrome in patients of chronic plaque psoriasis

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Abstract

Background Psoriasis is a common, chronic, inflammatory condition of the skin. The incidence of metabolic syndrome is three times higher in psoriasis which has significant and serious implications on the health of patient overall health and life span.

Objective To determine the frequency of metabolic syndrome in patients of chronic plaque psoriasis.

Methods It was a Cross sectional study conducted in department of Dermatology, Services Hospital, Lahore on 150 patients were enrolled. All enrolled patients were tested for their fasting blood sugar, fasting lipid levels, postprandial blood sugar, serum cholesterol, and triglycerides levels. Plasma glucose was measured using glucose oxidase method and serum lipids with enzymatic assays. Waist circumference was measured. Blood pressure was recorded. Outcome variable i.e. metabolic syndrome was recorded.

Results The mean age of the patients was 49.23 ± 17.59 years, 114 (76%) patients were male and 117 (78%) patients were married. The familial dyslipidemia was detected in 15 (10%) patients and the metabolic syndrome was found in 49 (32.67%) patients.

Conclusion This study concluded that in patients of chronic plaque psoriasis approximately one third of the patients are with metabolic syndrome.

Key words

Metabolic Syndrome; Chronic Plaque Psoriasis.

Introduction

Psoriasis is a common, chronic, inflammatory condition of the skin, characterized by red, scaly, sharply demarcated, indurated plaques, present particularly over the extensor surfaces of the skin and scalp. It is a multifactorial disease in which environmental triggers like trauma, infections and medication play an important

role. Extent and severity of the disease varies enormously over time and between individuals.¹

Psoriasis is a systemic disease with autoimmune pathogenesis. Metabolic syndrome is thrice more common in psoriasis than general population. Metabolic syndrome is a group of diseases which includes cardiovascular disease, obesity, hypertension, dyslipidemia and insulin resistance. Psoriasis and metabolic syndrome are the two conditions which share common genetic tendency and underlying inflammatory mechanisms. In psoriasis there is chronic inflammation that involves mainly Th-1 and Th-

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17 subset of T lymphocytes. Elevated cytokines tumor necrosis factor- α and interleukin-6 cause epidermal hyperplasia on one hand while on other hand they also antagonize insulin signaling, alter adipokine expression, causes endoplasmic reticulum stress, generate reactive oxygen species, mediate insulin resistance and induces obesity.² Additionally, diabetes mellitus which is a part of metabolic syndrome is pathologically linked to psoriasis by increased levels of TNF α which downplays insulin receptors by reducing tyrosine kinase activity. Furthermore an upregulated expression of IL-23/ TH-17 contributes to associated cardiometabolic complications.³

According to one cross-sectional study done on United Kingdom population, psoriasis was directly associated with diabetes mellitus, independent of its risk factors such as obesity. Severe the disease, the more chances of developing diabetes.⁴ New emerging data suggest that metabolic syndrome incidence is 15% higher in pediatric psoriasis population of age above 12 years as compared to those less than 12 years of age.⁵

Psoriasis and obesity both conditions involve chronic inflammation in which IL-17A plays a crucial role of maintaining continuous cycle of inflammation. Many cytokines including IL-6 and TNF- α induce insulin resistance and promote obesity through various mechanisms. IL-17 inhibitors are more effective in normal weight psoriatic patients.^{6,7} According to one study metabolic syndrome was present in 32.5% cases of Indian patients of psoriasis.⁸ Milčić D *et al.* found incidence of metabolic syndrome in 45.1% cases of psoriasis.⁹ Praveenkumar had noted that metabolic syndrome was present in 60% cases of psoriasis.¹⁰ In 2018, Ghias A *et al.* in Pakistan recorded the prevalence of metabolic syndrome in patients of psoriasis at 41%.¹¹

We have felt that still there is still a need to conduct further local research to further establish the frequency of metabolic syndrome in patients of chronic plaque psoriasis in Pakistani population. This will help to prevent serious complications like diabetes, hypertension, dyslipidemia, obesity and cardiovascular diseases in patients of psoriasis.

Methods

This Cross-sectional research was carried out Department of dermatology, Services Hospital, Lahore on a total 150 patients enrolled through Non-probability consecutive sampling after written informed consent and approval from internal review board, suffering from **chronic plaque psoriasis**: which is defined as red, scaly, sharply demarcated papules and plaque present particularly over extensor surfaces and scalp (assessed on clinical examination). Patients of psoriasis with age ranging from 18-60 years of either genders, suffering from duration greater than or equal to 6 months were included. Patients on cyclosporine and/or systemic retinoids, systemic steroids or immunosuppressants, pregnant, diabetics, hypertensive, suffering familial dyslipidemia and obesity (medical history and investigations) were excluded. A 5ml venous blood sample of all enrolled patients after 12 hours of overnight fasting was collected. The fasting blood sugar, fasting lipid (HDL cholesterol and triglycerides) levels, postprandial blood sugar was measured. Serum cholesterol and triglycerides were measured with enzymatic procedures. HDL cholesterol by spectro enzymatic assay with cholesterol esterase and oxidase; triglycerides by molecular absorption spectroscopy. Plasma glucose was measured using glucose oxidase method. Waist circumference was measured as the midpoint between lowest rib and iliac crest in standing position. Blood pressure was recorded as the average of two measurements

after subject has been sitting for five minutes. Outcome variable i.e. metabolic syndrome was recorded as per operational definition. **Metabolic Syndrome:** It was diagnosed using the SAM-NCEP ATP III criteria. If ≥ 3 of the mentioned below are present, the patient will be diagnosed as having Metabolic syndrome. 1:Abdominal obesity (waist circumference ≥ 90 cm males and ≥ 80 cm females), 2:Blood pressure $>130/85$ mmHg, 3:Fasting blood glucose ≥ 100 mg/dl, 4:Hypertriglyceridemia >150 mg/dl; or Low HDL cholesterol (<40 mg/dl for males and <50 mg/dl for females). All this information was recorded in a predesigned proforma. The data collected was entered and analyzed using SPSS 22. Mean and standard deviation was calculated for quantitative variables like age, blood glucose, blood pressure and cholesterol levels. Qualitative variables like gender and metabolic syndrome was presented as frequency and percentages. Data was stratified for age, gender, duration of psoriasis and severity of psoriasis. Post-stratification, chi-square test was applied to compare metabolic syndrome in stratified groups. p-value ≤ 0.05 was taken as significant.

Results

In this study total 150 patients were enrolled. Among 150 patients 114(76%) patients were male and 36 (24%) patients were females (**Figure 1**). The mean age of the patients was 49.23 ± 17.59 years ranging between 21 and 80 years (**Table 1**). The mean duration of disease of the patients was 53.03 ± 35.44 months ranging between 7 and 120 months (**Table 1**). Dyslipidemia was noted in 15 (10%) patients. The mean systolic blood pressure of the patients was 122.87 ± 16.03 mmHg and the mean diastolic blood pressure of the patients was 79.07 ± 10.32 mmHg (**Table 2**). The mean fasting blood sugar level of the patients was 103.64 ± 17.46 mg/dl and the mean post prandial blood sugar of the patients was 132.78 ± 47.83 mmHg (**Table 2**).

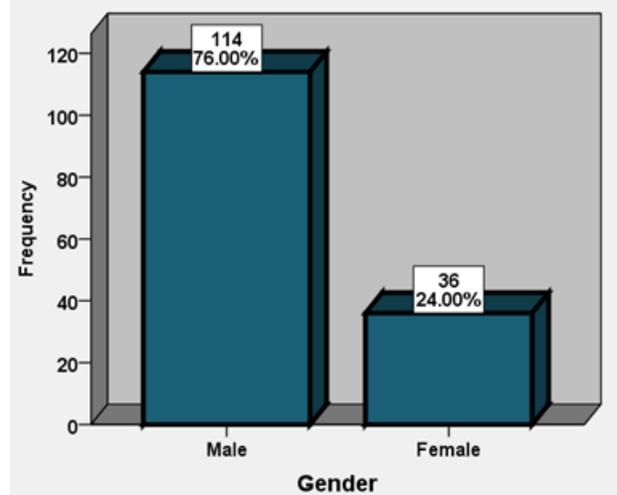


Figure 1 Frequency distribution of gender in study population.

Table 1 Summary statistics of duration of disease (months) & age in study population.

	Age (years)	Duration of disease (months)
n	150	150
Mean	49.23	53.03
Std. Deviation	17.59	35.44
Minimum	21	7
Maximum	80	120

The mean serum total cholesterol of the patients was 182.16 ± 71.59 , the mean serum triglycerides/ HDL of the patients was 157.87 ± 56.27 and the mean waist circumference of the patients was 88.29 ± 14.13 (**Table 2**). Out of 150 patients the metabolic syndrome was found in 49 (32.67%) patients (**Figure 2**). In patients having age ≤ 50 years the metabolic syndrome was diagnosed in 24 (30%) patients and in patients having age >50 years the metabolic syndrome was diagnosed in 25 (35.7%) patients. This difference was statistically insignificant. i.e. p-value=0.457 (**Table 3**). In male patients the metabolic syndrome was present in 40 (35.1%) patients and in female patients the metabolic syndrome was present in 9 (25%) patients. This difference was statistically insignificant. i.e. p-value=0.261 (**Table 3**). In patients having duration of disease ≤ 60 months the metabolic syndrome was found in 23 (26.1%) patients and in patients having

Table 2 Summary statistics of blood pressure, blood sugar level, fasting lipids and waist circumference in study population.

	<i>Blood pressure</i>		<i>Blood sugar level</i>		<i>Serum lipids</i>		<i>Waist circumference</i>
	<i>Systolic</i>	<i>Diastolic</i>	<i>Fasting</i>	<i>Post-prandial</i>	<i>Serum total cholesterol</i>	<i>Serum triglycerides/HDL</i>	
N	150	150	150	150	150	150	150
Mean	122.87	79.07	103.64	132.78	182.16	157.87	88.29
Std.Deviation	16.03	10.32	17.46	47.83	71.59	56.27	14.13
Minimum	100	60	87	20	23	17	69
Maximum	160	100	160	275	295	261	118

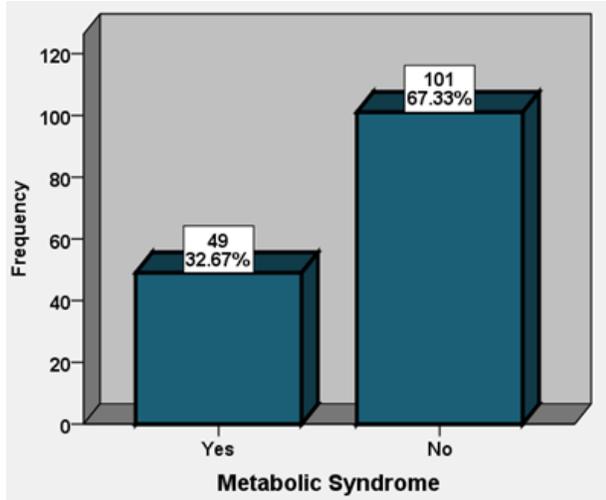


Figure 2 Distribution of metabolic syndrome in study population.

disease duration >60 months the metabolic syndrome was found in 26 (41.9%) patients. This difference was statistically significant i.e. p-value=0.042 (**Table 3**).

Discussion

In our study, the mean age of the patients was 49.23±17.59 years. Among 150 patients 114 (76%) patients were male and 36 (24%) patients were females. According to Gisoni *et al.* the mean age of psoriasis patients was 62.1 years.¹² This difference could be due to a greater percentage of geriatric population in Italy where the research was conducted. Love *et al.* carried out their research on 6549 participants and recorded the mean age of the patients as 39 years.¹³ Nisa and Qazi, found the mean age of 37 years in their study on psoriasis patients.¹⁴ A study done by Aisha Ghias *et al.* concluded the mean age of the patients with psoriasis as 51.20±10.91 years.¹¹ Both the age and gender distribution in this study was similar to the one in our study. Our study results are consisted with the findings of Love *et al.*¹³ Nisa and Qazi *et al.*¹⁴ and Ghias *et al.*¹¹ studies.

Table 3 Comparison of metabolic syndrome between age groups, gender and duration of disease in study population.

	<i>Metabolic syndrome</i>		<i>Total</i>	<i>P value</i>
	<i>Yes</i>	<i>No</i>		
Age (years)				
<50	24 (30.0%)	56 (70.0%)	80 (100%)	0.457
>50	25 (35.7%)	45 (64.3%)	70 (100%)	
Total	49 (32.7%)	101 (67.3%)	150 (100%)	
Gender				
Male	40 (35.1%)	74 (64.9%)	114 (100.0%)	0.261
Female	9 (25.0%)	27 (75.0%)	36 (100.0%)	
Total	49 (32.7%)	101 (67.3%)	150 (100.0%)	
Duration of disease				
≤60	23 (26.1%)	65 (73.9%)	88 (100.0%)	0.042
>60	26 (41.9%)	36 (58.1%)	62 (100.0%)	
Total	49 (32.7%)	101 (67.3%)	150 (100.0%)	

The abovementioned two studies conducted in Pakistan and India, shared similar findings to ours. The population, life style of study population is same in this region. That's why we found the consistent findings with them. In our study the frequency of dyslipidemia was found in 15 (10%) patients. The interrelation of psoriasis with individual components of metabolic syndrome had undergone extensive research lately. Conclusions from these cross sectional studies remained variable. Various researches done on different populations have proved that psoriasis and dyslipidemia are interlinked.¹⁵⁻¹⁷ Researchers in multiple studies have found increased prevalence of diabetes and hypertension in psoriatic patients.¹⁸⁻²⁰ One study by Lana Bassi Ferdinando *et al.* showed the frequency of dyslipidemia 23 (23.7%) patients.²¹ This difference may be due to the variation in the population. Ethnicity and geographical distribution of the population are the key indicators in the variation of findings.

In our study, the mean waist circumference of the patients was 88.29±14.13cm. Praveenkumar *et al.* observed a decreased mean waist circumference of psoriasis patients (85.36 cm) as compared to the controls (89.28 cm) but the difference was statistically insignificant.¹⁰ Waist circumference, as a criterion of metabolic syndrome was fulfilled by more participants in the control group (60%) than cases (46.7%). However, international literature indicates that over all, obesity is more common in psoriasis patients than general population.^{18,22,23} Studies indicate that abdominal obesity is more common in patients of psoriasis.^{22,24}

In an Indian study done in Puducherry, researchers found that patients suffering from psoriasis had lower waist circumferences than control groups which is similar to our study.⁸ Most of the Indian studies did not conclude obesity, independently linked to psoriasis.^{14,26-28}

Therefore obesity is a not an important indicator component of metabolic syndrome in Indian patients and similar observations are made in our study.

In our study, the mean serum total cholesterol of the patients was 182.16±71.59, the mean serum triglycerides/HDL of the patients was 157.87±56.27. A study by Lana Bassi Ferdinando *et al.*²¹ resulted in their study in psoriatic patients the median total cholesterol level of the patients was 181 (160-203) mg/dl, the Median HDL cholesterol and IQR of the patients was 42 (37.0-50.5) mg/dl and the Median triglycerides and IQR was 118 (78-164.5) mg/dl. One more study by Danijela Milčić *et al.* resulted in their study that the mean triglycerides of the patients was 1.66 ± 0.90 (mmol/l), the mean HDL-Cholesterol of the patients was 1.17±0.31 (mmol/l).¹² As the life style and physical activities are different in different population, these factors play very important role in controlling the factors. That's why we found variations in the study findings.

In our study, out of 150 patients the metabolic syndrome was found in 49 (32.67%) patients. According to different studies, of all the new cases of psoriasis, it is estimated that 30% are attributable to obesity which is an important component of metabolic syndrome.^{6,7} Madanagobalane S *et al.* had noted the incidence of metabolic syndrome in 44% of the patients with psoriasis and abdominal obesity in 34%, which was higher as compared to our study.²⁶

In an Indian study, metabolic syndrome was diagnosed in 32.5% cases of psoriasis.¹⁶ This is closely reflected in our own results. Another study concluded that metabolic syndrome was found in 45.1% cases of psoriasis.⁹ While in another Indian study, upto 60% cases of psoriasis had metabolic syndrome.¹⁰ In 2018, a study conducted in Pakistan recorded the

prevalence of metabolic syndrome in patients of psoriasis at 41%.¹¹

Gisoni *et al.*¹² showed that the prevalence of metabolic syndrome was found to be 30.1% in cases of psoriasis versus 20.6% in controls.¹² A US National Health and nutrition Examination Survey (NHANES) 2003-2006, conducted by Love *et al.* included 6549 participants. Metabolic syndrome was prevalent in 40% of psoriatic population and only 23% in controls.¹³

Salunke *et al.*; concluded in their study that metabolic syndrome was significantly more common in psoriatic patients than in controls. They had noted overall higher serum fasting lipids, increased abdominal obesity and hypertension in psoriatic patients than their age matched controls.²⁹ Similarly Ferdinando *et al.* revealed in their study the higher prevalence of metabolic syndrome in psoriasis with more attention should be given to central obesity, low HDL, hypertension and smoking habits.²¹

As seen in multiple studies above, the prevalence of metabolic syndrome in patients with psoriasis varies. Some results are close to our own, whereas others show a slightly greater preponderance of metabolic syndrome in the study population. Variation in result may be attributed to a variety of factors; demographics of the population under study. Some countries have a significantly higher geriatric population and studies show that metabolic syndrome is significantly higher in patients older than 65 years of age as compared to younger ones.²⁴ Other factors like lifestyle and dietary habits may also play a role. Sedentary lifestyle and lack of physical activity may lead to a higher incidence of metabolic syndrome as compared to those that incorporate some form of physical activity. Other possible affecters are smoking, alcohol consumption and a diet that is high in carbohydrates. In our study population the

prevalence of metabolic syndrome is reduced as compared to other studies conducted in various regions of the world due to a variety of factors such as less alcohol consumption, limited use of refined carbohydrates, majority of people engaged in the profession of manual labour and agriculture. In addition to that the desk jobs leading to obesity are also lesser. Various limitations faced during our study were the limited finances, lack of follow up by the patients and constraints of time.

Conclusion

We conclude that psoriasis patients are at a higher risk of developing the metabolic syndrome. Therefore an early screening for diabetes, hypertension, dyslipidemia and obesity in patients of chronic plaque psoriasis is recommended to avoid further complications.

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