Jasim et al. Scr Med. 2025 May-Jun;56(3):451-9. DOI:10.5937/scriptamed56-57843

ORIGINAL ARTICLE

Correlation Between Psoriasis Severity and Dyslipidaemia in Iraqi Patients

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Citation:
Jasim SA, Abbas M, Mustafa ET, Abdulqader SK. Correlation between psoriasis severity and dyslipidaemia in Iraqi patients. Scr Med. 2025 May-Jun;56(3):451-9.

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Abstract

Background/Aim: Psoriasis is a persistent systemic disorder characterised by chronic inflammation and linked to multiple comorbidities, including arthritis, cardiometabolic disorders, obesity and hyperlipidaemia. Objective of this study was to identify the relationship of abnormal lipid profiles and psoriasis, as well as to pinpoint factors that correlate with disease severity.

Methods: A cross-sectional study was carried out at the dermatology clinic over 6 months from the 1 August 2024 to the 1 February 2025. Patients aged 15 years and above with a diagnosis of psoriasis were enrolled. For each patient two sets of data were collected, demographical characteristics (age, sex, disease duration and the body mass index (BMI)) and the lipid profile (total cholesterol (TC), total triglyceride (TG), low-density lipoprotein (LDL) and high-density lipoprotein (HDL)). The psoriasis severity determined by the Psoriasis Area and Severity Index (PASI) and accordingly, the association between patients' BMI and lipid profile with PASI score were assessed.

Results: A total of 93 psoriasis patients were recruited over the study period. The mean of the patients age was 45.49 ± 10.71 years with about two-thirds of them being females. Severe psoriasis where significantly correlated with BMI and elevated serum levels of TG and TC, LDL and low levels of HDL, $p < 0.001$. PASI score had a positive significant correlation with each of BMI ($p < 0.001$), disease duration ($p = 0.046$), TC ($p < 0.001$), TG ($p < 0.001$) and LDL-C ($p = 0.003$). On the other hand, the PASI score displayed a significant negative correlation with HDL-C ($p < 0.001$)

Conclusion: A significant association between psoriasis severity and metabolic disturbances, including dyslipidaemia and overweight was found in Iraqi adults with psoriasis.

Key words: Body mass index; Lipoproteins, HDL; Triglycerides; Psoriasis; PASI.

Received: 11 March 2025
Revision received: 11 April 2025
Accepted: 11 April 2025

Introduction

Psoriasis is a prevalent systemic immunometabolic disease that impacts up to 4 % of the general population and unfortunately, remains incurable.[1, 2] It is not merely a dermatological condition but is also associated with multiple comorbidities, including inflammatory arthritis, cardiometabolic disorders and depression, all of which significantly impact patients' quality of life.[3]

The disease manifests in various forms with psoriasis vulgaris being the most common type.[4] It arises from an interplay between biological pre-

disposition and external stimuli including infection, microbiota dysbiosis of the skin and gut, anxiety, smoking, overweight, medications and alcohol consumption.[5, 6]

As an incurable disease, psoriasis requires a personalised treatment plan aimed at controlling symptoms of the disease and identifying and preventing comorbidities. This approach helps to reduce the severity of symptoms while minimising both the physical and psychological consequences.[1] Identifying factors associated with psoriasis severity is crucial for optimising treatment strategies, among these, dyslipidaemia in isolation or as part of metabolic syndrome. Dyslipidaemia was extensively linked to psoriasis[7, 8] and has been proposed as a significant correlate of disease severity.[9, 10]

The metabolic disturbances in psoriasis have been the venue of diverse literatures during the last century.[11] However, most of these studies were conducted outside the Mediterranean area where dyslipidaemia is prevalent because of genetic and environmental causes like lifestyle and dietary habits.[12] Studies examining the correlation between dyslipidaemia and psoriasis severity in Middle Eastern populations are limited.[13] This study aimed to assess the association between abnormal lipid profiles and psoriasis severity in adult patients, as well as to identify factors that correlate with disease severity.

Methods

A cross-sectional study was carried out at the dermatology outpatient care facility over 6 months from the 1 August 2024 to the 1 February 2025. Patient enrolled in the study after matching the inclusion criteria: the age of 15 years and above and a diagnosis of psoriasis. Individuals were excluded if they had a history of familial hyperlipidaemia or diabetes, or if they had received topical psoriasis treatment within the past month or systemic therapy for psoriasis within the six months preceding the study.

For each patient incorporated in the present study two sets of data were collected, patients' demographical characteristics (age, sex, disease duration and the body mass index (BMI) that determined by dividing the patient's weight in kg by the square value of length in meters and when the resultant value > 25 the adult considered overweight), the lipid profile was determined by fasting sample obtained after at least 12 hours of fasting where a venous sample are obtained (5 mL) for assessment of total cholesterol (TC), triglyceride level (TG), low-density lipoprotein level (LDL) and high-density lipoprotein level (HDL). The following limits are taken as the level of lipid profile which define dyslipidaemia:[14] TC ≥ 200 mg/dL, LDL-C ≥ 130 mg/dL, HDL< 40 mg/dL (for men), < 50 mg/dL (for women) and ≥ TG 150 mg/dL. Ethical consent was signed by all patients recruited before blood samples were obtained.

The extent and severity of psoriasis were assessed using the Psoriasis Area and Severity Index (PASI),[15] which is a frequently adopted tool for assessing the severity and extent of psoriasis. It quantifies disease severity based on the extent of the body surface area affected and the intensity of key symptoms (erythema, induration and desquamation). The human body was categorised into four main parts (head, upper limbs, trunk and lower limbs), with each scored separately for severity (0–4) and affected area (0–6). The final PASI score ranged from 0 to 72, with higher scores reflect greater disease severity. Clinically, PASI < 10 is mild, 10–20 is moderate and > 20 is severe. Since this scoring system is subjective, it's prone to inter-observer variability. To address this issue along with potential bias, the score was determined by two dermatologists who are not involved in the current study. In cases of minor discrepancies between the scores, the average of the two scores was used.

Statistics

All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS), version 25 (Chicago, USA). A significance threshold of $p < 0.05$ was established. Continuous variables were analysed using the Student t-test and presented as mean ± standard deviation (SD). Binomial variables were examined using the Chi-square test and expressed as frequencies and percentages. Pearson's correlation analysis was performed to evaluate the relationships between the Psoriasis Area and Severity Index (PASI) score and other factors.

Results

A total of 93 patients with psoriasis were enrolled. The average age of the patients was 45.49 ± 10.71 years with about two-thirds of them being females. Normal and overweight were reported in 67.74 % and 32.23 %, respectively. Slightly more than half of the patients (51.61 %) had 0-6 months disease duration, 41.36 % had > 6-12 months duration and 6.45 % had > 12 months duration, as shown in Table 1.

Table 1: Demographic characteristics of the study population (n = 93)

Variables	Value
Age, years	
Mean ± SD	37.0 ± 13.34
Range	18-66
Sex	
Male	33 (35.48 %)
Female	60 (64.52 %)
Body mass index, kg/m²	
Normal weight	63 (67.74 %)
Overweight	30 (32.23 %)
Disease duration, months	
0-6	48 (51.61 %)
> 6-12	39 (41.36 %)
> 12	6 (6.45 %)

SD: standard deviation;

Elevated serum level of TG, TC and LDL was reported in 52.69 %, 51.61 % and 25.81 % of the patients, respectively. On the other hand, a reduced level of HDL was found in 29.03 % of them (Table 2).

Table 2: The lipid profile in the studied sample with psoriasis (n = 93)

Variables	Value
Triglycerides, mg/dL	
Normal	44 (47.31 %)
Elevated	49 (52.69 %)
Total cholesterol, mg/dL	
Normal	45 (48.39 %)
Elevated	48 (51.61 %)
LDL, mg/dL	
Normal	69 (74.19 %)
Elevated	24 (25.81 %)
HDL, mg/dL	
Normal	66 (70.97 %)
Reduced	27 (29.03 %)

LDL: low-density lipoprotein level; HDL: high-density lipoprotein level;

According to the PASI score, 12 patients (12.9 %) had mild disease, 42 subjects (45.16 %) had moderate severity and 39 patients (41.94 %) had severe disease (Figure 1).

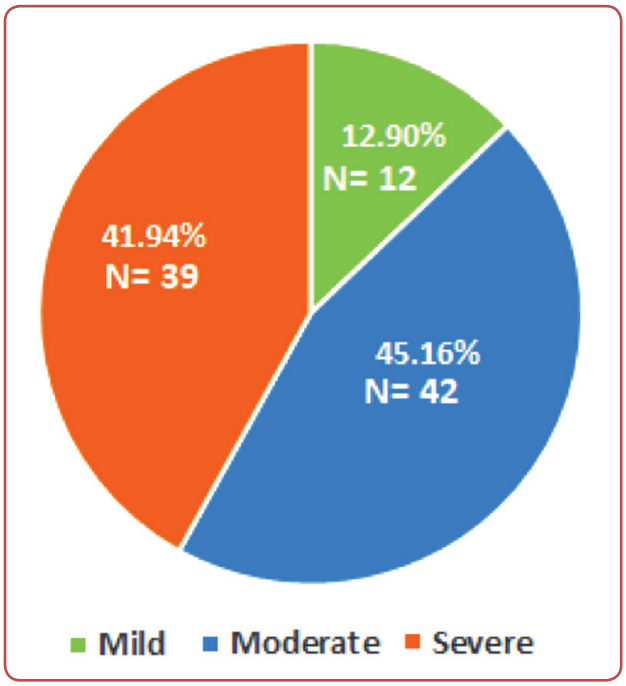

Figure 1: Psoriasis severity according to the Psoriasis Area and Severity Index (PASI) score

Two demographic characteristics were significantly associated with psoriasis severity. Overweight patients represented 53.85 % of the severe group compared with 0 % and 21.43 % of the mild and moderate group, respectively with significant differences. Moreover, > 6-12 and > 12 months disease duration were more prevalent among patients with severe disease (61.54 % and 7.69 %, respectively) than either those with mild disease (0 % for both) or those with moderate disease (35.71 % and 7.14 %, respectively) with significant differences (Table 3).

Elevated serum levels of TG and TC were more frequent among patients with severe disease (84.61 % for both) than either those with moderate disease (30.95 % and 28.57 %, respectively) or those with mild disease (25 % for both) with significant differences. In contrast, 46.15 % of patients with severe disease had reduced levels of HDL compared with 85.71 % of those with moderate disease and 0 % of those with mild disease with significant differences (Table 4).

Table 3: The association of demographic variables with psoriasis severity

Variables	Mild (n = 12)	Moderate (n = 42)	Severe (n = 39)	p-value
Age, years				
Mean ± SD	34.5 ± 16.12	40.14 ± 12.6	38.92 ± 17.8	0.427
Range	19-60	18-63	20-66	
Sex				
Male	3 (25.00 %)	12 (28.57 %)	18 (46.15 %)	0.183
Female	9 (75.00 %)	30 (71.43 %)	21 (53.85 %)	
BMI, kg/m^2				
Normal weight	12 (100.00 %)	33 (78.57 %)	18 (46.15 %)	< 0.001
Overweight	0 (0.00 %)	9 (21.43 %)	21 (53.85 %)	
Duration, months				
0-6	12 (100.00 %)	24 (57.14 %)	12 (30.77 %)	0.001
> 6-12	0 (0.00 %)	15 (35.71 %)	24 (61.54 %)	
> 12	0 (0.00 %)	3 (7.14 %)	3 (7.69 %)	

BMI: body mass index;

Table 4: Association of lipid profile with psoriasis severity

Variables	Mild (n = 12)	Moderate (n = 42)	Severe (n = 39)	p-value
TG, mg/dL				
Normal	9 (75.00 %)	29 (69.05 %)	6 (15.38 %)	< 0.001
Elevated	3 (25.00 %)	13 (30.95 %)	33 (84.62 %)	
TC, mg/dL				
Normal	9 (75.00 %)	30 (71.43 %)	6 (15.38 %)	< 0.001
Elevated	3 (25.00 %)	12 (28.57 %)	33 (84.62 %)	
LDL, mg/dL				
Normal	9 (75.00 %)	33 (78.57 %)	27 (69.23 %)	0.629
Elevated	3 (25.00 %)	9 (21.43 %)	12 (30.77 %)	
HDL, mg/dL				
Normal	0 (0.00 %)	6 (14.29 %)	21 (53.85 %)	< 0.001
Reduced	12 (100.00 %)	36 (85.71 %)	18 (46.15 %)	

TC: total cholesterol; TG. triglyceride level; LDL: low-density lipoprotein level; HDL: high-density lipoprotein level;

Table 5: Pearson's correlation between by the Psoriasis Area and Severity Index (PASI) score and other variables

Variables	PASI	
	r	p-value
Age	0.005	0.963
BMI	0.456	< 0.001
Duration	0.207	0.046
TC	0.553	< 0.001
TG	0.492	< 0.001
HDL	-0.368	< 0.001
LDL	0.304	0.003

BMI: body mass index; TC: total cholesterol; TG. triglyceride level; LDL: low-density lipoprotein level; HDL: high-density lipoprotein level;

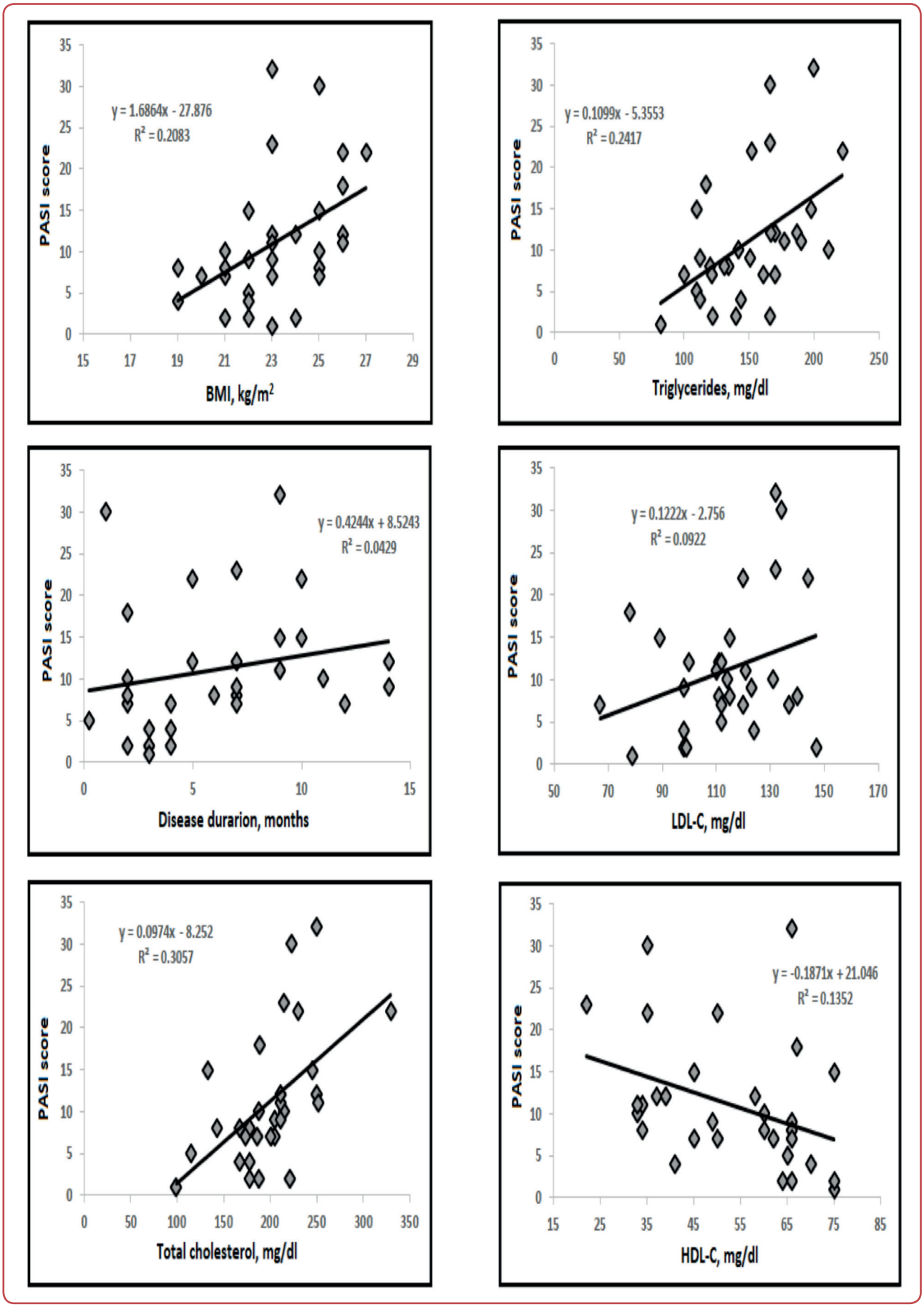

Figure 2: Scatter plot and regression line between by the Psoriasis Area and Severity Index (PASI) score in psoriatic patients with patients' body mass index (BMI), disease duration, total cholesterol (TC), triglyceride (TG), low-density lipoprotein (LDL) and high-density lipoprotein (HDL) levels

Pearson's correlation was used to investigate the correlation of the PASI score with other variables. PASI score had a positive significant correlation with each of BMI ($p < 0.001$), disease duration ($p = 0.046$), TC ($p < 0.001$), TG ($p < 0.001$) and LDL-C ($p = 0.003$). However, the PASI score displayed a significant negative correlation with HDL-C ($p < 0.001$) as seen in Table 5, Figure 2.

Discussions

In this study, the relationship of derangements in four serum lipids with psoriasis severity were examined in Iraqi adults diagnosed with psoriasis. Elevated levels of TG, TC and LDL in 52.69 %, 51.61 and 25.81 %, respectively were reported, while 29.03 % had reduced HDL levels. By dividing the patients into 3 groups by psoriasis severity that was estimated by PASI score, patients with severe psoriasis had significantly higher TG and TC levels ($p < 0.001$). Mild and moderate severity psoriasis is associated with higher reduction of HDL levels ($p < 0.001$). By Pearson's correlation, significant correlations between severity of psoriasis and dyslipidaemia and BMI were reported as PASI score correlated positively with BMI ($p < 0.001$), disease duration ($p = 0.046$), TC ($p < 0.001$), TG ($p < 0.001$) and LDL-C ($p = 0.003$), while negatively correlating with HDL-C ($p < 0.001$).

Numerous types of dyslipidaemias have been reported in patients with psoriasis with high TG, TC and LDL being the most reported.[16] In the current study, elevated serum level of TG, TC and LDL was reported in 52.69 %, 51.61 % and 25.81 % of the patients, respectively and reduced level of HDL was found only in 29.03 %, this result goes with a previous Iraqi study.[17] In addition, a study done in Lebanon showed that Lebanese patients with psoriasis had a higher prevalence of dyslipidaemia than controls.[18] In the UK a prospective large population-based study concluded that higher serum levels of HDL had decreased risk of psoriasis.[19] The lipid derangements in psoriasis patients have been described previously, but whether this represents a coincidental finding or there is a true correlation between psoriasis and alterations of lipid profile is still a matter of debate as the available data fail to build a conclusion.[8] Adding to this conflict, dyslipidaemia is proved to be common in Iraqi adults, so further research is required to establish a causal relationship between psoriasis and dyslipidaemia.[20-22]

Multiple theories adopted to explain the characteristic derangements in lipid profile in psoriasis patients including high levels of TC, TG, LDL and decreased HDL. Authors suggest an increased synthesis of cholesterol in response to loss of cholesterol from the scaling of skin in patients with psoriasis. Others suggested structural and functional gastrointestinal abnormalities which indirectly affect lipid levels.[23] A gut microbial dysbiosis has been suggested to result in metabolic disturbance in adults with psoriasis with resultant disease progression.[24]

In the current study, only 32.23 % of patients with psoriasis were overweight but overweight was associated significantly with severe psoriasis ($p < 0.001$). A bidirectional relationship has been proved between overweight and psoriasis.[10] Psoriasis may contribute to overweight through various mechanisms, including its psychological impact, which can lead to depression and social isolation. These factors may, in turn, result in unhealthy eating habits, increased alcohol consumption and reduced physical activity. A meta-analysis by Mirghani et al[25] outlined that overweight is a significant co-morbidity in adults with psoriasis as it was associated with obesity. On the other hand, obesity may itself represent a trigger for psoriasis in genetically susceptible individuals.[26]

Whether dyslipidaemia and overweight carry an association with the severity of psoriasis is a subject of debate. In this study severe psoriasis was associated significantly with dyslipidaemia and overweight and by Pearson correlation a significant positive correlation was found between PASI score and each of BMI, disease duration, TC, TG and LDL-C, while significant negative correlation with HDL-C were reported. In Egypt the severity of psoriasis patients was found to correlate with metabolic syndrome which constitutes dyslipidaemia and central obesity as PASI scores were correlated positively with waist circumference and LDL-C, however, neither the TC and TG level nor BMI correlated significantly with PASI which does not match the result of the current study. These conflicting results have been also documented by several other studies.[27-29]

The positive correlation between BMI and PASI score had been attributed to the fact that overweight status linked a chronic low-grade inflammation with proinflammatory cytokines secretions and leptin with the resultant increased inflammatory milieu can exacerbate keratino-

cyte proliferation, angiogenesis and immune activation, leading to more severe psoriatic lesions and higher PASI scores.[28] Others proved that increased BMI is associated with insulin resistance and superior values of IGF-1 that linked to keratinocyte hyperproliferation that represents the hallmark of psoriasis.[27] While the correlation with dyslipidaemia explained by lipid abnormalities may activate dendritic cells and promote Th1 and Th17 responses, leading to increased keratinocyte proliferation and sustained skin inflammation, correlating with higher PASI scores.[30]

Other studies argue against a significant correlation between dyslipidaemia and high BMI with PASI score as mixed results regarding the correlations are reported.[31] For example, a study by Rocha-Pereira et al investigated lipid profiles in psoriasis patients but did not establish a direct correlation between dyslipidaemia and PASI scores. These discrepancies may be attributed to various factors, including differences in study design, sample sizes, patient populations and methodologies used to assess psoriasis severity and metabolic parameters.

Based on the results of the current study, clinicians should consider integrated management strategies targeting both psoriasis and metabolic dysfunction, including lifestyle interventions and lipid-lowering therapies where appropriate.

This study had some limitations to be declared, including the small sample size and the single centre settings that limit the ability to drive conclusions and possibility of bias during patient selection and the inability to investigate the temporal relation between the severity of psoriasis and dyslipidaemia and overweight which is a known downside of cross-sectional studies in general.[32]

Conclusion

A significant correlation between psoriasis severity, as measured by PASI score and metabolic disturbances, including dyslipidaemia and overweight, in Iraqi adults with psoriasis was found. Early detection and treatment of dyslipidaemia and overweight in these patients are advisable.

Ethics

The Ethics Committee of AL Kindy Hospital approved the study under IRB number 221, dated 22 September 2024.

Acknowledgement

None.

Conflicts of interest

The authors declare that there is no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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