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Assessment of Psoriasis Severity Using Psoriasis Area and Severity Index (PASI) and its Association with Lipid Profile Parameters

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Author`s Contribution

[1]Substantial contributions to the conception or design of the work; or the acquisition, [4,6]Active participation in active methodology, [2,3]analysis, or interpretation of data for the work, [5]Drafting the work or revising it critically for important intellectual content

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ABSTRACT

Objective: To explore potential association between specific lipid profile parameters and PASI scores in psoriatic patients at a tertiary care Hospital.

Methodology: A descriptive cross-sectional study was carried out on patients attending the skin outpatient department and the Diagnostic Research Laboratory of the Department of Physiology at Liaquat University of Medical & Health Sciences Jamshoro/Hyderabad, from February to August 2022. Diagnosed patients of Psoriasis between 18 and 50 years, male and female were included. A 5ml blood sample was taken from each participant in fasting and the samples were used to perform a lipid profile analysis. All financial costs related to the investigations were covered by the researchers.

Results: The average age of patients with psoriasis was 45.99±10.33 (range 18-60 years). Out of the total 102 patients, 76 (74.5%) were male patients and 26 (25.5%) were female. The mean duration of psoriasis was 6.46 ± 4.49 years. For total cholesterol, 60 patients (58.8%) had increased levels > 200 mg/dL, in 68 patients (66.7%) low-density lipoprotein (LDL), increased levels > 130 mg/dL, in terms of high-density lipoprotein (HDL), in (57.8%) patients it was <40 mg/dL, while for triglycerides, in (87.3%) patients had increased levels > 150 mg/dL**.** Patients with moderate and severe psoriasis exhibited higher rates of abnormal lipid profiles compared to those with mild psoriasis. Significant p-values were found for total cholesterol, LDL, and HDL levels, indicating associations with psoriasis severity. However, triglyceride levels showed no significant difference across the severity groups.

Conclusion: This study revealed elevated lipid profiles among psoriatic patients, potentially contributing to lipid profile abnormalities. The high frequency of dyslipidemia observed is closely linked to the severity of psoriasis.

Key words: Psoriasis Area Severity Index, Total cholesterol, LDL, HDL, Triglyceride

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Introduction

Swelling of the skin is give rise to by a malfunction in the defense system is called as psoriasis. Inflammation may manifest externally as scaly patches or elevated plaques, with their appearance differing depending on the individual's type of skin.[2] A hyperactive immune system accelerates the generation of skin cells. Usually, skin cells grow and shed throughout a monthly phase, however with psoriatic skin, the entire process is accomplished in as few as three to four days. In this condition, dead skin cells accumulate on the skin's surface instead of being shed. Psoriasis plaques can reportedly cause itching, burning, and stinging in some cases. Although the elbows, knees, and scalp are particularly prone to the formation of plaques and scales, they can occur anywhere on the body.[3]

Psoriasis-related swelling can present on other parts of the body. Psoriasis is a skin condition characterized by inflammation and excessive cell growth that can cause major disfigurement and disability.[4] Psoriasis lesions, which most commonly appear on the hands, feet, elbows, knees, scalp, nails and trunk are characterized by red, scaly, sharply demarcated, indurate plaques. About 1–3% of the world's population suffers from this disease.[4] About 125 million people around the world have psoriasis, according to the World Psoriasis Day Consortium.[5] Type I psoriasis typically manifests between the ages of 15 and 30, and it is associated with HLA, whereas type II psoriasis typically manifests after the age of 40, and it is not associated with HLA.[6] Psoriasis sufferers have been found to have elevated serum lipid levels and an abnormal plasma lipid metabolism.[7–9] Psoriatic patients have been found to have abnormally high levels of total cholesterol, total triglycerides, and low-density lipoprotein cholesterol.

The level of HDL-C (good cholesterol) is either unaltered or decreased. Psoriasis is linked to metabolic syndrome because of the condition's association with dyslipidemia, a diagnostic criterion for the syndrome.[10,11] Higher body mass index (BMI) >30kg/m^2, a sedentary lifestyle, a high-fat diet, and the use of retinoid or cyclosporine as treatment all increase the risk of dyslipidemia in psoriatic patients. Increased cardiovascular mortality has been linked to the chronic inflammatory nature of psoriasis and dyslipidemia, which in turn has been linked to comorbidities like atherosclerosis, coronary artery disease, and myocardial infarction.[12,13] Causes of dyslipidemia in psoriasis range from genetics to lifestyle choices. In terms of mechanisms, the connection between psoriasis and cardiometabolic disorders can be attributed to shared inflammatory pathways, the release of adipokines, insulin resistance, angiogenesis, oxidative stress, microparticles, and an increased tendency towards hypercoagulability.[14]

Furthermore, dyslipidemia keeps the skin's inflammatory response going, which furthers the development of atherosclerosis.[13] Sickness is directly proportional to the number of antibodies against oxidized LDL. Multiple studies from all over the world have linked dyslipidemia to psoriasis.[7–9] Unfortunately, dyslipidemia in psoriatic patients is frequently missed or untreated. Dermatologists should take dyslipidemia into account to improve early assessment of cardiovascular risk and mortality, as it is an independent risk factor for cardiovascular events.

Methodology

A cross-sectional descriptive study was carried out on patients who visited the skin outpatient department, Department of Physiology, and Diagnostic Research Laboratory at Liaquat University of Medical & Health Sciences Jamshoro/Hyderabad over the period of six months after approval of ethical committee form February 2022 to August 2022. The study included a sample size of 102 diagnosed patients of psoriasis aged between 18 and 50 years, encompassing both males and females. Patients below 18 and above 50 years of age, as well as those with diabetes mellitus, hypertension, tobacco smoking, alcohol consumption, obesity, or any diagnosed inflammatory comorbidity, were excluded from the stud. Non-probability purposive sampling was utilized in this study.

All participants who met the inclusion criteria were enrolled after obtaining informed consent following an explanation of the study objectives. Psoriasis severity was defined as follows: mild when the Psoriasis Area and Severity Index (PASI) was less than 7; moderate when the PASI was between 7 and 15 (or classified as severe when difficult-to-treat sites were affected or there was a significant psychosocial impact); and severe when the PASI was greater than 15. Patients were counseled to arrive the following morning after a minimum of 12 hours of fasting. Upon their arrival, a 5ml blood sample was taken from each participant. This procedure was explained to the patients during the initial counseling session to ensure compliance with the fasting requirement, which is crucial for accurate lipid profile analysis. After that the samples were used to perform a lipid profile analysis using a COBAS ROCHE machine. Lipid profile abnormalities were defined as follows: Total cholesterol was considered increased if its level was above 200 mg/dL. Low-density lipoprotein (LDL) levels were classified as abnormal if these exceed above 130 mg/dL. High-density lipoprotein (HDL) levels were considered abnormal if these decreased as below 40 mg/dL and triglyceride levels were deemed abnormal on increases above 150 mg/dL. All financial costs related to the investigations were covered by the researchers, ensuring no financial burden on the study participants. A self-made detailed questionnaire was employed to collect demographic information and various study-related variables. The exclusion criteria were carefully chosen to minimize bias and ensure the relevance and specificity of the findings to the study's objectives. SPSS version 26 was used for the data entry and its analysis.

Results

The study involved 102 patients, whose ages ranged from 18 to 60 years, with a mean age of 45.99±10.33 years. The age distribution was divided into three groups: 21.5% (22 patients) were between 18 to 30 years, 28.4% (29 patients) were between 31 to 40 years, and the largest group, 50.0% (51 patients), were between 41 to 50 years. Regarding gender distribution, 74.5% of the patients (76 individuals) were male, while 25.5% (26 individuals) were female. For total cholesterol, 42 patients (41.2%) had normal levels, while 60 patients (58.8%) had increased levels > 200 mg/dL. Regarding low-density lipoprotein (LDL), 34 patients (33.3%) had normal levels, whereas 68 patients (66.7%) had increased levels > 130 mg/dL. In terms of high-density lipoprotein (HDL), 43 patients (42.2%) had normal levels and 59 patients (57.8%) had abnormal levels <40 mg/dL), while for triglycerides, 13 patients (12.7%) had normal levels and (87.3%) patients had increased levels > 150 mg/dL**. (**Table I)

Table 1: Frequency of normal and abnormal lipid levels in psoriatic patients (N=102)

Lipid profile test		N	%
Total cholesterol	Normal (< 200mg/dL)	42	41.2
	Increased (> 200mg/dL)	60	58.8
Low-density lipoprotein	Normal (< 130 mg/dL)	34	33.3
	Increased (> 130 mg/dL)	68	66.7
High-density lipoprotein	Normal (> 40mg/dL)	43	42.2
	Abnormal (< 40mg/dL)	59	57.8
Triglycerides	Normal (< 150mg/dL)	13	12.7
	Increased (> 150mg/dL)	89	87.3

Among 102 patients, distributed into mild, moderate, and severe groups, variations in total cholesterol, LDL, HDL, and triglyceride levels were observed. Notably, patients with moderate and severe psoriasis exhibited higher rates of abnormal lipid profiles compared to those with mild psoriasis. Significant p-values were found for total cholesterol, LDL, and HDL levels, indicating associations with psoriasis severity. However, triglyceride levels showed no significant difference across the severity groups. (Table II)

There was found a positive correlation of severity of disease with total cholesterol and LDL. (Figure 1)

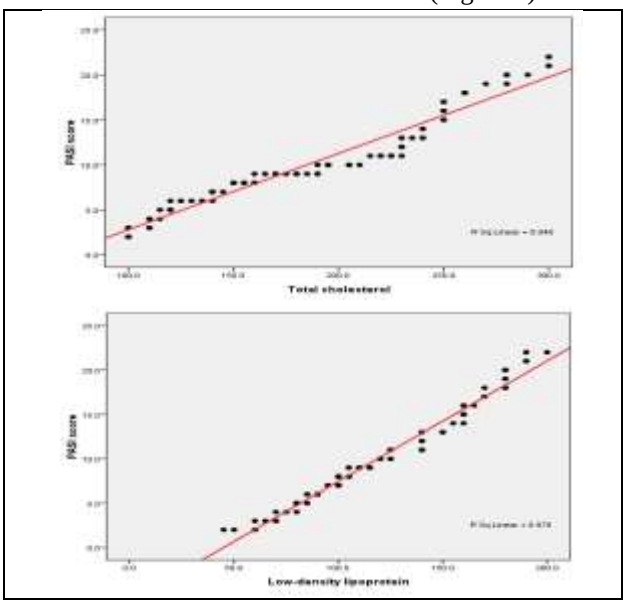

Figure 1. Correlation between total cholesterol, LDL and PASI score. (n=102)

Discussion

Psoriasis is a prevalent, chronic, and recurring inflammatory skin condition with unknown cause.[15] Significantly, an elevated body mass index has been found as a barrier to the success of biological therapies for psoriasis [6]. Besides from obesity, dyslipidemia, characterized by alterations to cholesterol levels, has emerged as another crucial feature of the psoriasis situation.[16] However current study has been done on 102 psoriatic patients with an overall mean age of 45.99±10.33 years, to explore potential association between specific lipid profile parameters and PASI scores. However, we also found the male predominancy 74.5% in contrast ot females. In the comparison of this study Mostafa A et al[17] reported that the mean of the psoriatic patients was 45.7 ± 15.6 years and like our findings they found males in majority 54% and females 46%. Furthermore, our findings regarding age and gender were also supported by the

Table II: Frequency of normal and abnormal cholesterol levels with psoriasis area and severity index (PASI). (n=102)

Lipid profile		Severity index (PASI)			Total	P-value
		Mild (n=33)	Moderate (n=41)	Severe (n=28)		
Total Cholesterol	Normal <200mg/dL	20 (60.6%)	11 (26.8%)	11 (39.3%)	42 (41.2%)	0.013*
	Increased >200mg/dL	13 (39.4%)	30 (73.2%)	17 (60.7%)	60 (58.8%)	
Low-density lipoprotein	Normal <130 mg/dL	18 (54.5%)	10 (24.4%)	6 (21.4%)	34 (33.3%)	0.007
	Raised >130 mg/dL	15 (45.5%)	31 (75.6%)	22 (78.6%)	68 (66.7%)	
High-Density Lipoprotein	Normal >40mg/dL	19 (57.6%)	12 (29.3%)	12 (42.9%)	43 (42.2%)	0.049
	Abnormal <40mg/dL	14 (42.4%)	29 (70.7%)	16 (57.1%)	59 (57.8%)	
Triglycerides	Normal < 150mg/dL	2 (6.1%)	6 (14.6%)	5 (17.9%)	13 (12.7%)	0.347
	Increased >150mg/dL	31(93.9%)	35 (85.4%)	23 (82.1%)	89 (87.3%)	

Alamri A et al[18] and Fernandez-Torres RM et al[19]. The exact reason for male predominance in psoriasis is not fully understood, but it may be attributed to several lifestyle factors. Higher rates of smoking and alcohol consumption in males, both known triggers for psoriasis, could contribute to the increased prevalence. Additionally, males might be more prone to environmental factors or occupational exposures that exacerbate psoriasis.

In this study there was a significant rate of dyslipidemia among psoriatic patients like total cholesterol was raised among (58.8%) of the cases, followed by low-density lipoprotein (LDL), was raised in (66.7%) of the cases, high-density lipoprotein (HDL) was decreased in (57.8%) patients, while for triglycerides, in (87.3%) patients it was increased levels > 150 mg/dL. Furthermore, there was there was a positive cocreation between lipid profile abnormalities and severity of the disease. These findings were supported by the Ghafoor R et al[20], where they observed that the dyslipidemia was higher among psoriatic patients compared to healthy controls. Psoriatic patients need comprehensive lipid and cardiovascular assessments, as they should be regarded as individuals with an elevated risk of cardiovascular diseases.[20] In the comparison of the is study Miao C et al[15] revealed a significant elevation in triglyceride (TG) levels among psoriatic patients, while their HDL levels were lower compared to controls, aligning with most previous studies.

However, inconsistently they found there were no significant differences in the concentrations of cholesterol (CHO) and low-density lipoprotein (LDL), between the psoriatic patients and the controls.[15] In aligns to this study in a meta-analysis by Ramezani M et al[21] found changes in serum lipids, lipoprotein, and apolipoprotein profiles among patients with psoriasis compared to the healthy controls, suggesting a possibly higher probability of atherosclerotic and the CVD diseases among such individuals. In aligns to this series Jamil A et al[22] also observed that there is a high incidence of dyslipidemia among psoriasis patients, with 55.8% of the psoriatic patients being affected. Our findings are consistent with those of Mohammed JQ et al[23] who reported that a high percentage of psoriatic and PsA patients experienced dyslipidemia compared to healthy controls and like this series they also observed that dyslipidemia was linked to the increased activity of the disease in both psoriatic and PsA patients. This study has several limitations, including a small sample size and the absence of a control group for comparison. The precise mechanisms connecting chronic inflammation to alterations in lipid metabolism in psoriasis are still unknown. Additionally, it is unclear whether chronic inflammation is the cause or the consequence of these lipid metabolism changes.

Conclusion

The study revealed that individuals with psoriasis are more likely to suffer from dyslipidemia, and this condition is also associated with the severity of psoriasis. This underscores the systemic nature of psoriasis. Therefore, continuous screening for dyslipidemia is essential to reduce morbidity related to lipid abnormalities among psoriasis patients.

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