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Original Research Article

Evaluation of lipid profile in young adults (18-50 years) with psoriasis vulgaris in Chennai

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ABSTRACT

Introduction: Psoriasis is a chronic inflammatory and proliferative skin condition influenced by both genetic and environmental factors. Its typical manifestations include red, scaly, well-defined plaques that often appear on the extensor surfaces of the body and the scalp. The disease can vary significantly in terms of duration, frequency of flare-ups, and affected areas, and it often presents with various morphological variations.

Background: My study aims to primarily ascertain the frequency of lipid disturbances in patients with psoriasis vulgaris and their extent of derangement correlated with severity of psoriasis.

Materials and Methods: After obtaining ethical committee clearance, and consent from patients, 130 psoriatic patients were studied. Their lipid profiles were investigated. PASI was assessed against derangements in fasting lipid profiles using statistical analysis ANOVA.

Results: Most common age group affected was between 26 to 35 years. 55% males and 45% females were affected. NCEP ATP III guidelines was followed for fasting lipid evaluation. 19% cases had elevated triglycerides levels. 65% had elevated HDL cholesterol levels. 33% cases had elevated serum cholesterol levels.45% cases had elevated LDL, 28% had elevated VLDL. 79% had elevated waist circumference. 3% had increased albumin levels, 45% had increased serum globulin levels, 0.8% had increased albumin globulin ratio, 8% had increased total bilirubin levels, 3% had increased direct bilirubin levels, 7% had increased serum AST, 1.5% had increased serum alkaline phosphatase and 8% had increased Gamma glutamyl transferase.

Conclusion: After statistically evaluating PASI with cholesterol levels and waist circumference, PASI and Cholesterol & Waist circumference was statistically significant with P values showing 0.01 and 0.021 respectively. No statistical difference was noted between PASI and Liver function test values. Hence, PASI and cholesterol levels and waist circumference can be taken as an indicator to assess the severity of psoriasis and cardiac involvement by periodically screening the patient .

1. Introduction

Psoriasis is a long-term inflammatory condition that can significantly affect an individual's quality of life in milder cases and lead to potential cardiovascular abnormalities in more severe cases.[1] In the United States, around 2% of the population has psoriasis, while in India, the prevalence ranges from 0.8% to 5.6%. The onset of psoriasis typically occurs in the second decade of life without a specific gender preference. It is often linked with metabolic syndrome, a cluster of cardiovascular risk factors such as central obesity, high blood pressure, abnormal lipid levels, and glucose intolerance.[1]

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Several factors contribute to the association between psoriasis and lipid abnormalities. Chronic inflammation plays a key role, as inflammatory molecules like TNF-alpha and IL-1, IL-6 not only contribute to skin changes in psoriasis but also affect insulin function, lipid metabolism, and fat cell profiling.[1] Genetic factors also play a role, with certain genes like PSORS2, PSORS3, PSORS4, CDKALI, and Apo E4 being linked to both psoriasis and metabolic syndrome.[2] Additionally, lifestyle factors such as physical inactivity, smoking, stress, and obesity are implicated in worsening both conditions.[3]

It's crucial to note that severe psoriasis carries a higher risk of mortality, potentially leading to premature death within 50 years. Obesity is a significant risk factor for developing psoriasis in about 30% of cases, and metabolic disorders can exacerbate the severity of psoriasis symptoms. Therefore, regular screening and evaluation of lipid profile in psoriasis patients is essential as part of routine medical care. Early detection and management of cardiovascular risk factors can help improve outcomes and reduce the impact of these co-existing conditions.[4,5]

Research into lipid metabolism in psoriasis began in the early 20th century with the quantitative analysis of serum cholesterol levels in psoriatic patients.[6] Abnormalities in fat metabolism were considered significant factors in the development of psoriasis. Grütz and Burger investigated the progression of psoriatic skin manifestations, likening them to symptoms seen in xanthomatosis.[7–9] Melczer observed changes in phospholipid composition in psoriatic lesions and proposed that inflammation, congestion, and parakeratosis resulted from lipid accumulation in the reticuloendothelial system. It was also suggested that the continual shedding of psoriatic scales led to a permanent loss of lipids, potentially contributing to abnormalities in serum lipid levels. Lipid metabolism is a complex process occurring in various human organs and peripheral blood.[10–12] Further studies are needed to fully understand the disturbances in lipid metabolism in psoriasis.[13,14]

Presently, research is focused on various aspects of lipid biology in psoriasis, such as skin surface lipids, epidermal lipids (including stratum corneum lipids and epidermal phospholipids), serum lipids, dermal low-density lipoproteins in psoriatic skin, lipid metabolism, oxidative stress, and the relationships between inflammatory markers, lipid levels, and clinical manifestations of the disease.[3]

2. Aims and Objectives

1. To study the association between psoriasis and lipid derangements.
2. To compare the severity of psoriasis with the extent of lipid abnormalities.

3. Materials and Methods

The study received approval from the ethical committee review board. Patients diagnosed with psoriasis and meeting the inclusion criteria were selected from those visiting the Department of Dermatology, Venereology, and Leprosy at Chettinad Hospital & Research Institute in Kelambakkam between November 2022 to November 2023.

1. Informed consent was obtained from all patients.
2. Detailed medical history was collected, including disease duration, onset, past history of diabetes/hypertension, and smoking and alcohol use.
3. Patients' height and weight were measured, and their BMI was calculated using the weight in kilograms divided by the square of height in meters.
4. Waist circumference was also measured.
5. Patients underwent laboratory blood tests including fasting lipid profile and liver function tests.
6. Associated metabolic conditions such as dyslipidemia and obesity were assessed.
7. The severity and extent of psoriasis were determined using the PASI score.
8. The severity of psoriasis vulgaris was assessed against the derangements in fasting lipid profile and liver function tests using statistical analysis using ANOVA.

3.1. Source of data

All the patients presenting to the Department of Dermatology and STD with psoriasis for a period of 1 year were included in my study.

3.2. Sample size

A total of 130 patients diagnosed with psoriasis presenting to the Department of Dermatology and STD for a period of 1 year.

3.3. Study design

Cross-sectional, Observational study.

3.4. Inclusion criteria

Patients with Psoriasis Vulgaris with the following criteria:

1. Age 18-50 years.
2. All sexes.
3. Patients consents for the study.
4. Patient willing to undergo the blood tests required.

3.5. Exclusion criteria

1. Age below 18 and above 50 years.
2. Patients not willing for the study.
3. Patients not willing to undergo the required blood tests.

3.6. Duration of study

1 Year.

3.7. Subjects

The study was conducted on 130 patients who fulfilled the above-mentioned criteria.

4. Results

Most common age group affected was between 26 to 35 years. 55% males and 45% females were affected. Amongst the affected patients, 42% were employed, 20% were home-makers and 38% were students. 30% of the study population had history of alcohol consumption whereas 70% of them were non-alcoholic. 22% had positive history for smoking while 78% of them were non-smokers. 35% of patients had family history of Psoriasis vulgaris while the remaining 65% had no significant family history.64% of the study population had normal BMI while 23% were Overweight, 4% were Obese and 9% were Underweight. A PASI Score of 0-10 was observed in 29% of patients, 10-20 was seen in 32% and >20 was seen in 39% of the patients. 27% of the study patients showed Subungual Hyperkeratosis, 38% showed Pitting, 36% had Onycholysis and Oil drop sign was observed in 10% of them. 11% of the study population had a positive history for Diabetes Mellitus.8% of the study population had a positive history for Systemic Hypertension.

NCEP ATP III guidelines was followed for fasting lipid evaluation. 19% cases had elevated triglycerides levels. 65% had elevated HDL cholesterol levels. 33% cases had elevated serum cholesterol levels.45% cases had elevated LDL, 28% had elevated VLDL. 79% had elevated waist circumference. 3% had increased albumin levels, 45% had increased serum globulin levels, 0.8% had increased albumin globulin ratio, 8% had increased total bilirubin levels, 3% had increased direct bilirubin levels, 7% had increased serum AST, 1.5% had increased serum alkaline phosphatase and 8% had increased Gamma glutamyl transferase.

Assessment of statistical significance between PASI and serum lipid parameters and liver function tests.(Table 1)

It is hence noted that the difference between PASI and Cholesterol & Waist circumference was statistically significant with P values showing 0.01 and 0.021 respectively.(Table 2)

4.1. Description of liver function tests

No statistical difference was noted between PASI and Liver function test values.(Table 3)

5. Discussion

In this study, the most commonly affected age group was between 26-35 years, representing 41% of cases. In a study conducted by Jayakar Thomas et al. involving 100 patients, the most common age group affected was between 41-50 years, accounting for 26% of patients. Both males and females had nearly equal incidence rates, with males constituting 55% and females 45%. Similar observations were made in a study by Isabela et al., which included 190 patients, with 48.9% men and 51.5% women affected. Another study by Arnon D. Cohen et al. also found equal sex distribution among affected individuals.[15]

The majority of patients in our study were non-alcoholic (70%), while alcohol consumption was present in 30%. In a cross-sectional study with 190 psoriasis cases, 55.3% were non-alcoholic, 16.3% had a history of previous alcohol intake, and 28.4% had current alcohol intake, with mild intake in 36 cases, moderate in 18 cases, and no cases with severe consumption. Most patients in our study were non-smokers (78%), with 22% reporting a history of active smoking. Isabela et al. reported a past history of smoking in 30% and a current history in 20.5% of their cases.[16]

A family history of psoriasis was present in 35% of our patients. In a study by Kaur et al., a family history was present in only 2% of patients.[17–20] Past history of hypertension was present in 8%, while diabetic history was present in 11%. Nail findings were observed in the majority of patients, with onycholysis seen in 36%, subungual hyperkeratosis in 27%, pitting most commonly at 38%, and the oil drop sign least commonly at 10%. Isabela et al. found nail involvement in 62.1% of patients.[21]

Psoriasis severity, defined as a PASI score > 20, was present in 39% of our patients, while moderate psoriasis with PASI 10 to 20 was present in 32%, and mild psoriasis with PASI <10 was seen in 29%. In a case-control study, 47% had mild psoriasis and 53% had severe psoriasis.[22]

BMI calculations showed that 36% of our patients had a high BMI, 23% were overweight, and 4% were obese. A study by Amon et al. found that 29.4% of psoriasis patients had obesity compared to 23.5% in controls. In a Spanish study, obesity was more common in psoriasis patients than in controls. Isabela et al. observed that 64.3% of patients had a high BMI, with 31.1% being overweight and 33.2% classified as obese.[16]

Waist circumference was increased in 79% of our patients, defined as >35 inches (90 cm) in men and >31 inches (80 cm) in females. In a case-control study by Gisondi et al., approximately 57.1% had increased waist circumference compared to controls (47.6%). There was a significant statistical difference noted between psoriasis severity and waist circumference (P=0.021).

There was a statistically significant correlation between psoriasis severity and elevated serum cholesterol (P=0.010). As disease severity increased, total cholesterol levels also

Table 1: Description of Lipid parameters and Waist circumference

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
							Lower Bound	Upper Bound			
Chol	10		38	175.34	58.358	9.467	156.16	194.52	17	289	
	above 20		50	208.14	66.733	9.437	189.17	227.11	17	381	
	10-20		42	217.12	63.407	9.784	197.36	236.88	117	370	
	Total		130	201.45	65.148	5.714	190.15	212.76	17	381	
	Model	Fixed Effects			63.312	5.553	190.47	212.44			
		Random Effects				12257	148.72	254.19			353.511
TG	10		38	101.79	52.330	8.489	84.59	118.99	15	213	
	above 20		50	115.62	62.822	8.884	97.77	133.47	11	302	
	10-20		42	115.55	65.345	10.083	95.18	135.91	11	293	
	Total		130	111.55	60.674	5.321	101.03	122.08	11	302	
	Model	Fixed Effects			60.820	5.334	101.00	122.11			
		Random Effects				5.334.	88.60.	134.51.			-26.465
HDL	10		38	43.58	10.567	1.714	40.11	47.05	29	72	
	above 20		50	47.52	21.221	3.001	41.49	53.55	15	168	
	10-20		42	49.45	14.013	2.162	45.09	53.82	25	77	
	Total		130	46 .99	16.462	1.444	44 .14	49.85	15	168	
	Model	Fixed Effects			16.422	1.440	44 .14	49.84			
		Random Effects				1.657	39.86	54.12			1.992
LDL	10		38	113.55	43.675	7.085	99.20	127.91	11	192	
	above 20		50	134.56	61.004	8.627	117.22	151.90	14	324	
	10-20		42	132.40	64.549	9.960	112.29	152.52	11	282	
	Total		130	127.72	58.046	5.091	117.65	137.80	11	324	
	Model	Fixed Effects			57.764	5.066	117.70	137.75			
		Random Effects				6.496	99.77	155.67			48.958
VLDL	10		38	24.71	11.311	1.835	20.99	28.43	1	50	
	above 20		50	28.08	11.959	1.691	24.68	31.48	1	59	
	10-20		42	28.62	9.693	1.496	25.60	31.64	11	52	
	Total		130	27.27	11.120	0.975	25.34	29.20	1	59	
	Model	Fixed Effects			11.081	0.972	25.35	29.19			
		Random Effects				1.177	22.20	32.34			1.308
WC {11ches)	10		38	34.42	2.238	0.363	33.69	35.16	30	40	
	above 20		50	36.06	3.020	0.427	35.20	36.92	30	42	
	10-20		42	35.17	2.731	0.421	34.32	36.02	30	43	
	Total		130	35.29	2.780	0.244	34.81	35.77	30	43	
	Model	Fixed Effects			2.718	0.238	34.82	35.76			
		Random Effects				0.480	33.23	37.36			0.513

a.Warning: Between-component varianoe is negative. It was replaced by 0.0 in computing this random effects measure.

Table 2: Evaluation of PASI with lipid parameters and waist circumference

		Sum of Squares	df	Mean Square	F	Sig.
Cholesterol	Between Groups	38451.246	2	19225.623	4 .796	0.010
	Within Groups	509060.977	127	4008.354		
	Total	547512.223	129			
TG	Between Groups	5119.623	2	2559.811	0.692	0.502
	Within Groups	469776.501	127	3699.028		
	Total	474896.123	129			
	Between Groups	710.844	2	355 .422	1.318	0.271
	Within Groups	34248.148	127	269 .670		
	Total	34958.992	129			
LDL	Between Groups	10888.197	2	5444 .098	1.632	0.200
	Within Groups	423755 .834	127	3336 .660		
	Total	434644 .031	129			
VLDL	Between Groups	358.176	2	179.088	1.459	0.236
	Within Groups	15593.401	127	122.783		
	Total	15951.577	129			
WC(l1ches)	Between Groups	58.976	2	29 .488	3.993	0.021
	Within Groups	937.916	127	7.385		
	Total	996.892	129			

Table 3: Evaluation of statistical significance between PASI and liver function tests.

		Sum of Squares	df	Mean Square	F	Sig.
P (Total)	Between Groups	0.011	2	0.005	0.012	0.988
	Within Groups	58.520	127	0.461		
	Total	58.531	129			
Alb	Between Groups	0.509	2	0.255	1.107	0.334
	Within Groups	29. 191	127	0.230		
	Total	29.700	129			
Glob	Between Groups	1.217	2	0.608	1.521	0.222
	Within Groups	50.791	127	0.400		
	Total	52.008	129			
A/G	Between Groups	0.209	2	0.105	0.869	0.422
	Within Groups	15.298	127	0.120		
	Total	15.508	129			
Bil (T)	Between Groups	1.119	2	0.560	2.323	0.102
	Within Groups	30.604	127	0.241		
	Total	31.723	129			
Bil (Dir)	Between Groups	0.019	2	0.009	1.215	0.300
	Within Groups	0.974	127	0.008		
	Total	0.992	129			
AST	Between Groups	320.457	2	160.228	0.758	0.471
	Within Groups	26843.574	127	211.367		
	Total	27164.03 1	129			
ALT	Between Groups	234.889	2	117.445	0.613	0.543
	Within Groups	24315. 180	127	191.458		
	Total	24550.069	129			
ALKP	Between Groups	6394 .114	2	3197.057	2.354	0.099
	Within Groups	172506.355	127	1358.318		
	Total	178900.469	129			
GGT	Between Groups	2195.034	2	1097.517	2.161	0.119
	Within Groups	64507.435	127	507.933		
	Total	66702 .469	129			

increased. However, there was no statistical difference between PASI scores and levels of HDL, triglycerides, LDL, and VLDL. A study by Suleman et al., including 100 patients with psoriasis and 100 without, found that cholesterol and LDL levels were elevated in patients compared to controls (P<0.001), with no significant difference in HDL and VLDL levels. There was also no significant statistical difference noted between PASI scores and liver function tests, including total protein, albumin, globulin, total and direct bilirubin, ALT, AST, ALKP, and GGT.[23]

The National Cholesterol Education Program - ATP III criteria were used to evaluate lipid derangements. In our study, 33% had elevated cholesterol values, which also showed a statistically significant difference with PASI score (P=0.010) and increased waist circumference (P=0.021).[15]

6. Conclusion

In our study, we enrolled a total of 130 patients. We found a statistically significant correlation between PASI score and both serum cholesterol (p=0.010) and waist circumference (p=0.021).

Regarding gender distribution, males were more prevalent, accounting for 55% compared to 45% for females. The most affected age group was between 26-35 years, comprising 41% of the cases.

Among the patients, 30% reported a history of alcohol intake, while 22% had a history of smoking. Additionally, 35% had a positive family history of psoriasis.

The most common nail finding was pitting, observed in 38% of patients. Lipid parameters increased with psoriasis severity; according to NCEP ATP III criteria, 19% had elevated triglycerides, 35% had decreased HDL, 33% had elevated cholesterol, 45% had elevated LDL cholesterol, and 28% had elevated VLDL cholesterol.

These findings highlight the increased risk of lipid derangements and subsequent adverse cardiovascular outcomes in psoriasis patients. Therefore, regular screening for comorbidities should be integrated into their routine medical care.

7. Source of Funding

None.

8. Conflict of Interest

None.

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