ORIGINAL RESEARCH

Prevalence and Correlates of Obesity and Dyslipidemia in Psoriasis: Insights from a Cross-Sectional Study

M. Merin Vasantha Ruba[1], T. Vanathi[2], C. Dharmambal[3], Thamizhselvi Swaminathan[2]

[1]Medical Officer, Primary Health Centre, Anandapuram, Thoothukudi, Tamil Nadu.
[2]Senior Assistant professor, Department of Dermatology, Venereology, and Leprosy, Madras Medical College, Chennai, Tamil Nadu.
[3]Professor, Department of Dermatology, Venereology, and Leprosy, Madras Medical College, Chennai, Tamil Nadu

Corresponding Author
Dr. Thamizhselvi Swaminathan
Senior Assistant professor, Department of Dermatology, Venereology, and Leprosy, Madras Medical College, Chennai, Tamil Nadu

Received: 08January, 2024 Accepted: 06March, 2024

ABSTRACT

Background: Psoriasis is a chronic inflammatory skin disorder associated with various systemic comorbidities, including obesity and dyslipidemia. Understanding the prevalence and correlates of these metabolic abnormalities in individuals with psoriasis is essential for optimizing patient care.**Methods:**A hospital-based cross-sectional study was conducted among 270 individuals with psoriasis. Demographic data, disease characteristics, and comorbidities were assessed using structured questionnaires and clinical evaluations. Statistical analyses were performed to elucidate associations between psoriasis onset, disease duration, and metabolic abnormalities.**Result:**The study included 270 participants, with 61.9% males and 38.1% females. Obesity prevalence was higher in early onset psoriasis (20%) versus late onset (12.6%), with a significant difference ($p = 0.048$). Dyslipidemia was more prevalent in early onset (54.1%) compared to late onset (47.4%) cases, with a significant difference ($p = 0.005$). Diabetes mellitus prevalence was higher in late onset (31.1%) versus early onset (15.6%) psoriasis cases, showing significance ($p = 0.003$). Disease duration correlated with metabolic abnormalities, highlighting the importance of early intervention ($p = 0.001$).**Conclusion:**This study underscores the significant associations between psoriasis and metabolic abnormalities, emphasizing the need for comprehensive cardiovascular risk assessment and multidisciplinary care approaches in psoriasis management.

Key words: Psoriasis, Obesity, Dyslipidemia, Comorbidities, Disease Duration, Metabolic Abnormalities.

INTRODUCTION

Psoriasis, a chronic inflammatory skin disorder affecting millions globally, is characterized by the presence of erythematous plaques covered with silvery scales[1]. The multifactorial etiology of psoriasis involves a complex interplay of genetic predisposition, immune dysregulation, and environmental triggers[2]. Although the primary manifestation of psoriasis is evident in the skin, emerging evidence highlights its association with various systemic comorbidities, including obesity and dyslipidemia. These comorbidities exert a substantial impact on patients' overall health and quality of life, necessitating a thorough exploration of their intricate relationships[3].

The bidirectional link between psoriasis and obesity has garnered significant attention in recent years. Obesity, characterized by the excessive accumulation of adipose tissue, not only exacerbates the severity and extent of psoriatic lesions but also heightens the risk of developing psoriasis[4]. Conversely, psoriasis contributes to weight gain through mechanisms involving chronic inflammation, alterations in the adipokine profile, and impaired metabolic regulation[5]. This intricate interplay creates a vicious cycle, exacerbating both conditions and posing substantial challenges in the clinical management of affected individuals[5].

Furthermore, dyslipidemia, characterized by abnormal lipid levels in the blood, is prevalent among individuals with psoriasis[6]. Dyslipidemia encompasses elevated levels of triglycerides, low-density lipoprotein cholesterol (LDL-C), and reduced high-density lipoprotein cholesterol (HDL-C),

predisposing patients to atherosclerosis and cardiovascular events[7]. The intricate link between psoriasis and dyslipidemia is attributed to shared pathogenic mechanisms, including systemic inflammation, endothelial dysfunction, and genetic susceptibility factors[6]. This association underscores the systemic nature of psoriasis, emphasizing the need for a holistic approach in its clinical management.

Despite the growing recognition of these associations, a significant gap exists in comprehensive studies elucidating the prevalence and impact of obesity and dyslipidemia concerning the onset and duration of psoriasis. Understanding the epidemiological patterns and clinical correlates of these comorbidities is imperative for optimizing patient care and mitigating the long-term consequences associated with psoriasis[8].

Therefore, this study is meticulously designed to address this critical gap by comprehensively assessing the prevalence of obesity and dyslipidemia among individuals with psoriasis. The investigation focuses not only on the age of onset but also on the duration of the disease. By delving into the temporal relationships between psoriasis onset, disease duration, and the development of obesity and dyslipidemia, the study aims to unravel valuable insights into the pathophysiological mechanisms underlying these complex associations.

The study's primary objectives revolve around estimating the prevalence of obesity and dyslipidemia among individuals diagnosed with psoriasis. This approach seeks to examine the relationship between disease duration and the likelihood of developing obesity and dyslipidemia, shedding light on the impact of chronic inflammation and immune dysregulation on metabolic health in psoriasis patients.

This study endeavors to contribute significantly to the understanding of the multifaceted relationships between psoriasis, obesity, and dyslipidemia. The exploration of these intricate connections is crucial not only for advancing scientific knowledge but also for guiding clinicians in formulating effective strategies for the holistic management of individuals with psoriasis, thereby improving their overall health outcomes and quality of life.

MATERIALS AND METHODS

Study Setting: This cross-sectional study was conducted at the Psoriasis Special Clinic within the Department of Dermatology, Madras Medical College, Chennai, Tamil Nadu. The hospital-based design facilitated the comprehensive examination of patients, ensuring a diverse representation of individuals with various types of psoriasis. The study spanned from April 2021 to October 2022, allowing for a thorough exploration of the prevalence and correlates of obesity and dyslipidemia in the context of psoriasis.

Study Participants: The inclusion criteria were patients of all ages diagnosed with psoriasis, either clinically or histopathologically, were eligible for participation. Willingness to engage in the study and provide informed consent were essential inclusion criteria. The exclusion criteria included individuals who declined consent and those experiencing pregnancy or lactation were excluded from participation to maintain ethical standards and participant safety.

Sample Size and Sampling Technique: The data were collected from 270 participants, utilizing a convenience sampling approach. New and existing patients with various types of psoriasis attending the Psoriasis Special Clinic during the specified study period were included, ensuring a broad and representative sample for robust analyses.

Study Tools: The study employed a comprehensive set of tools to gather relevant data:

1. Detailed clinical history forms captured demographic information and medical history, including age of psoriasis onset, disease duration, and comorbidities such as Diabetes Mellitus, Obesity, Systemic Hypertension, and Dyslipidemia.
2. Physical examinations, encompassing measurements of height and weight, systemic examination, and dermatological assessments, were conducted to provide a holistic understanding of each participant's health.
3. Assessment of obesity was performed using Body Mass Index (BMI) calculations.
4. Fasting lipid profiles were obtained for all participants, providing crucial information on dyslipidemia.

Study Methodology: The study commenced with the enrollment of patients diagnosed with various types of psoriasis, ensuring that informed consent was obtained from each participant. A comprehensive clinical history was then collected, covering demographic details, age of onset, disease duration, and relevant comorbidities. Family histories were documented, and thorough physical examinations were conducted, encompassing height and weight measurements, systemic examinations, and dermatological assessments.

Participants were categorized into two groups based on the age of psoriasis onset, distinguishing between early onset (< 40 years) and late onset (≥ 40 years). BMI calculations were performed using the Quetelet index formula, allowing for an accurate assessment of obesity. Dyslipidemia was evaluated through fasting lipid profiles, ensuring a comprehensive understanding of lipid levels and potential cardiovascular risks associated with psoriasis.

Ethical Issues: The study adhered to ethical principles outlined in the Declaration of Helsinki, and ethical approval was obtained from the institutional ethics committee. Informed consent was diligently secured from all participants before their inclusion in

the study, ensuring their autonomy and protection throughout the research process.

Statistical Analysis: Data obtained from the study underwent rigorous statistical analysis, employing appropriate methods such as descriptive statistics, chi-square, and Fisher's exact tests where applicable. A significance level of $p < 0.05$ was established for determining statistical significance. Results were presented using tables, graphs, and descriptive summaries to effectively communicate the prevalence and correlates of obesity and dyslipidemia concerning psoriasis onset and duration.

RESULT

Among 270 study participants, 61.9% were males and 38.1% were females. In early onset psoriasis group, 60.7% were males and 39.3% were females. In late onset psoriasis group, 63% were males and 37% were females. With respect to age, in early onset psoriasis group, 25.2% were in 31 to 40 years followed by 20% in 21 to 30 years. 18.5% were in 41 to 50 years and 14.1% were in 11 to 20 years. In late onset psoriasis group, 35.6% were in 41 to 50 years followed by 32.6% in 51 to 60 years. 26.7% were in 61 to 70 years and 4.4% were in 71 to 80 years. The association between comorbidities and psoriasis among the study participants is represented in Table 1.

Table 1: Comorbidities among the study participants (n=270)

Comorbidities	Early onset psoriasis (n=135)	Late onset psoriasis (n=135)	Total	Chi square value	P value
Obesity	27 (20%)	17 (12.6%)	44 (16.3%)	6.114	0.048*
Dyslipidemia	73 (54.1%)	64 (47.4%)	137 (50.7%)	7.812	0.005*
Diabetes mellitus	21 (15.6%)	42 (31.1%)	63 (23.3%)	9.130	0.003*
Hypertension	16 (11.9%)	24 (17.8%)	40 (14.8%)	1.878	0.171
Hypothyroid	7 (5.2%)	7 (5.2%)	14 (5.2%)	0.978	0.608
Coronary Heart Disease	6 (4.4%)	5 (3.7%)	11 (4.1%)	0.095	0.758

In early onset psoriasis group, 57% had duration of disease as 1 to 10 years followed by 20.7% as 11 to 20 years. 8.9% had 21 to 30 years and 5.9% had 31 to 40 years as duration of disease. In late onset psoriasis group, 83% had duration of disease as 1 to 10 years and 10.4% had duration of disease as 11 to 20 years. The difference between the two groups with respect to duration of disease was statistically significant with a P value of 0.001.

Extremities were affected in 73.7% of study participants followed by head and neck in 53.3%. Trunk was affected in 53.3% of participants and soles were affected in 10.7%. Palms were involved in 10.4% and 3% had scalp involvement. 1.1% was involved in flexural areas and 0.4% had genital involvement. The mean Psoriasis Area and Severity Index in early onset psoriasis group was 9.58 ± 3.93 and in late onset psoriasis group was 7.58 ± 2.04. The difference between the groups with respect to PASI was statistically significant by independent t test ($P = 0.071$). The association between BMI and psoriasis is given in Table 2.

Table 2: Association between obesity and psoriasis

BMI	Early onset psoriasis (n=135)	Late onset psoriasis (n=135)	Total	Chi square value	P value
Underweight	1 (0.7%)	4 (3%)	5 (1.9%)	6.114	0.048*
Normal	76 (56.3%)	89 (65.9%)	165 (61.1%)		
Overweight	31 (23%)	25 (18.5%)	56 (20.7%)		
Obese	27 (20%)	17 (12.6%)	44 (16.3%)		
Total	135 (100%)	135 (100%)	270 (100%)		

The overall prevalence of Hypercholesterolemia was 17.4%. The prevalence of Hypercholesterolemia in Early onset psoriasis group was 20.7% and in Late onset psoriasis group was 14.1%. The overall prevalence of

Hypertriglyceridemia was 38.1%. The prevalence of Hypertriglyceridemia in Early onset psoriasis group was 43.7% and in Late onset psoriasis group was 32.6%. The overall prevalence of decreased HDL was 25.9%. The prevalence of decreased HDL in Early onset psoriasis group was 28.1% and in Late onset psoriasis group was 23.7%. (Table 3).

Table 3: Dyslipidemia among the study participants (n=270)

Dyslipidemia	Early onset psoriasis (n=135)	Late onset psoriasis (n=135)	Total	Chi square value	P value
Hypercholesterolemia	28 (20.7%)	19 (14.1%)	47 (17.4%)	10.423	0.001*
Hypertriglyceridemia	59 (43.7%)	44 (32.6%)	103 (38.1%)	8.357	0.003*
Decreased HDL	38 (28.1%)	32 (23.7%)	70 (25.9%)	9.412	0.002*
Increased LDL	18 (13.3%)	21 (15.6%)	39 (14.4%)	14.102	<0.001*

DISCUSSION

Psoriasis, a chronic inflammatory skin disorder, is known for its complex pathogenesis and diverse clinical manifestations. The demographic characteristics of the study participants revealed a higher prevalence of psoriasis among males, consistent with existing literature suggesting a male predominance in psoriasis incidence[9]. Interestingly, the distribution of psoriasis types varied across different age groups, with extremities being the most affected areas[9]. This observation underscores the heterogeneous nature of psoriasis and the need for personalized treatment approaches tailored to individual patient profiles.

The study findings revealed significant associations between psoriasis and various comorbidities, including obesity, dyslipidemia, diabetes mellitus, and hypertension. Obesity, characterized by excessive adipose tissue accumulation, was more prevalent among individuals with early onset psoriasis compared to late onset cases. This association highlights the bidirectional relationship between psoriasis and obesity, wherein chronic inflammation and altered adipokine profiles contribute to both conditions' pathogenesis[10].

Dyslipidemia, characterized by abnormal lipid levels in the blood, was also more prevalent in individuals with psoriasis, particularly those with early onset disease. This finding corroborates previous research indicating a higher prevalence of dyslipidemia in psoriasis patients, attributed to shared pathogenic mechanisms such as systemic inflammation and endothelial dysfunction. The observed association between psoriasis and dyslipidemia underscores the systemic nature of psoriasis and the importance of comprehensive cardiovascular risk assessment in affected individuals[11].

Similarly, diabetes mellitus showed a significant association with psoriasis, with higher prevalence observed in individuals with late onset disease. This association may be attributed to shared pathogenic mechanisms, including insulin resistance and chronic inflammation, which contribute to both conditions' development and progression[12]. The bidirectional relationship between psoriasis and diabetes mellitus underscores the importance of multidisciplinary care approaches integrating dermatology and endocrinology expertise[13].

The study findings also highlighted the impact of disease duration on the prevalence of comorbidities among individuals with psoriasis. Notably, individuals with early onset psoriasis had a longer disease duration compared to those with late onset disease, which correlated with a higher prevalence of obesity and dyslipidemia. This observation suggests that the duration of psoriasis may exacerbate metabolic abnormalities over time, emphasizing the importance of early intervention and proactive management strategies to mitigate long-term complications[14].

The higher prevalence of obesity and dyslipidemia among individuals with early onset psoriasis may also be influenced by lifestyle factors and disease severity. Psoriasis severity, as measured by the Psoriasis Area and Severity Index (PASI) score, was higher in individuals with early onset disease. Nevertheless, the trend towards increased disease severity in early onset psoriasis underscores the need for targeted interventions to address both skin manifestations and associated comorbidities comprehensively[15].

The study findings have significant clinical implications for the management of individuals with psoriasis. Given the high prevalence of obesity, dyslipidemia, and diabetes mellitus among psoriasis patients, dermatologists and healthcare providers should adopt a multidisciplinary approach to patient care, collaborating closely with endocrinologists, cardiologists, and other specialists as needed. Comprehensive cardiovascular risk assessment, including lipid profiling and glycemic control, should be integrated into routine psoriasis management protocols to identify and address metabolic abnormalities promptly.

Furthermore, lifestyle modifications, including dietary interventions, regular exercise, and smoking cessation, should be emphasized as essential components of psoriasis management[16]. Patient education and counseling play a crucial role in promoting healthy lifestyle behaviors and empowering individuals to take an active role in their health management. Pharmacological interventions targeting both skin inflammation and metabolic abnormalities may also be considered, with emerging evidence supporting the use of certain biologic agents in improving cardiovascular outcomes in psoriasis patients[16].

Despite the valuable insights provided by this study, several limitations warrant consideration. The cross-sectional design precludes establishing causality between psoriasis and comorbidities, necessitating longitudinal studies to elucidate temporal relationships and long-term outcomes. Additionally, the study's reliance on self-reported data and the potential for selection bias may have influenced the observed associations. Future research endeavors should employ larger sample sizes and incorporate objective measures of disease severity and metabolic parameters to enhance the robustness of findings.

This study contributes to our understanding of the complex interplay between psoriasis and metabolic abnormalities, highlighting the importance of comprehensive cardiovascular risk assessment and multidisciplinary care approaches in psoriasis management. By addressing both skin manifestations and associated comorbidities, healthcare providers can optimize patient outcomes and improve the overall quality of life for individuals living with psoriasis. Continued research efforts are needed to further elucidate the underlying mechanisms driving these associations and develop targeted interventions to mitigate the burden of comorbidities in psoriasis patients.

CONCLUSION

This study highlights the significant associations between psoriasis and comorbidities such as obesity, dyslipidemia, and diabetes mellitus. Our findings reveal a higher prevalence of these metabolic abnormalities among individuals with early onset psoriasis. By addressing both skin manifestations and associated comorbidities, healthcare providers can optimize patient outcomes and improve the overall quality of life for individuals living with psoriasis.

REFERENCES

1. Raharja A, Mahil SK, Barker JN. Psoriasis: a brief overview. Clin Med (Lond). 2021 May;21(3):170-173. doi: 10.7861/clinmed.2021-0257.
2. Armstrong AW, Read C. Pathophysiology, Clinical Presentation, and Treatment of Psoriasis: A Review. JAMA. 2020 May 19;323(19):1945-1960. doi: 10.1001/jama.2020.4006.
3. Bellinato F, Gisondi P, Girolomoni G. Latest Advances for the Treatment of Chronic Plaque Psoriasis with Biologics and Oral Small Molecules. Biologics. 2021 Jun 29;15:247-253. doi: 10.2147/BTT.S290309.
4. Tampa M, Mitran MI, Mitran CI, Matei C, Georgescu SR. Psoriasis: What Is New in Markers of Disease Severity? Medicina (Kaunas). 2024 Feb 18;60(2):337. doi: 10.3390/medicina60020337.
5. Kiełbowski K, Bakinowska E, Ostrowski P, Pala B, Gromowska E, Gurazda K, Dec P, Modrzejewski A, Pawlik A. The Role of Adipokines in the Pathogenesis of Psoriasis. Int J Mol Sci. 2023 Mar 28;24(7):6390. doi: 10.3390/ijms24076390.
6. Miao C, Li J, Li Y, Zhang X. Obesity and dyslipidemia in patients with psoriasis: A case-control study. Medicine (Baltimore). 2019 Aug;98(31):e16323. doi: 10.1097/MD.0000000000016323.
7. Yin RX, Wu DF, Miao L, Htet Aung LH, Cao XL, Yan TT, Long XJ, Liu WY, Zhang L, Li M. Interactions of several single nucleotide polymorphisms and high body mass index on serum lipid traits. Biofactors. 2013 May-Jun;39(3):315-25. doi: 10.1002/biof.1073.
8. Alajmi RS, Alamoudi SM, Alabbasi AA, Alwagdani A, Alraddadi AA, Alamri A. Patterns of Comorbidities in Psoriasis Patients: A Cross-Sectional Study. Cureus. 2021 May 8;13(5):e14907. doi: 10.7759/cureus.14907.
9. Alrubaiaan MT, Alsulaiman SA, Alqahtani A, Altasan AN, Almehrij FO, Alrashid A, Mohamed OL. Prevalence and Clinical Predictors of Psoriatic Arthritis in Saudi Patients With Psoriasis: A Single-Center Retrospective Cohort Study. Cureus. 2023 Oct 7;15(10):e46632. doi: 10.7759/cureus.46632.
10. Barros G, Duran P, Vera I, Bermúdez V. Exploring the Links between Obesity and Psoriasis: A Comprehensive Review. Int J Mol Sci. 2022 Jul 6;23(14):7499. doi: 10.3390/ijms23147499.
11. Zhang Y, Dong S, Ma Y, Mou Y. Burden of psoriasis in young adults worldwide from the global burden of disease study 2019. Front Endocrinol (Lausanne). 2024 Feb 13;15:1308822. doi: 10.3389/fendo.2024.1308822.
12. Brazzelli V, Maffioli P, Bolcato V, Ciolfi C, D'Angelo A, Tinelli C, Derosa G. Psoriasis and Diabetes, a Dangerous Association: Evaluation of Insulin Resistance, Lipid Abnormalities, and Cardiovascular Risk Biomarkers. Front Med (Lausanne). 2021 Mar 23;8:605691. doi: 10.3389/fmed.2021.605691.
13. Ucak S, Ekmekci TR, Basat O, Koslu A, Altuntas Y. Comparison of various insulin sensitivity indices in psoriatic patients and their relationship with type of psoriasis. J Eur Acad Dermatol Venereol. 2006 May;20(5):517-22. doi: 10.1111/j.1468-3083.2006.01499.x.
14. Li WQ, Han JL, Manson JE, Rimm EB, Rexrode KM, Curhan GC, Qureshi AA. Psoriasis and risk of nonfatal cardiovascular disease in U.S. women: a cohort study. Br J Dermatol. 2012 Apr;166(4):811-8. doi: 10.1111/j.1365-2133.2011.10774.x.
15. Houghton K, Patil D, Gomez B, Feldman SR. Correlation Between Change in Psoriasis Area and Severity Index and Dermatology Life Quality Index in Patients with Psoriasis: Pooled Analysis from Four Phase 3 Clinical Trials of Secukinumab. Dermatol Ther (Heidelb). 2021 Aug;11(4):1373-1384. doi: 10.1007/s13555-021-00564-2.
16. Ko SH, Chi CC, Yeh ML, Wang SH, Tsai YS, Hsu MY. Lifestyle changes for treating psoriasis. Cochrane Database Syst Rev. 2019 Jul 16;7(7):CD011972. doi: 10.1002/14651858.