VER
Vascular & Endovascular Review

Endothelial Dysfunction and Accelerated Atherosclerosis in Psoriasis and Psoriatic Arthritis: Bridging Dermatology, Rheumatology, and Vascular Medicine

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ABSTRACT

Background: Chronic inflammatory diseases such as Psoriasis and Psoriatic Arthritis are also being recognized as systemic diseases and not those that are limited to the skin and joints. The already growing amount of evidence indicates that the illnesses are comorbid with the issues of cardiovascular complications, i.e., endothelial dysfunction of the endothelium and a timely atherosclerosis. Extensive systemic inflammation, disrupted metabolism, and lifestyle-related risk factors are some of the factors contributing to vascular damage, leading to increased morbidity and mortality. Although the severity of the disease, metabolic factors, and cardiovascular risks were raised, the exact correlation of the disease severity and the metabolic factors with cardiovascular risks has yet to be optimally studied in most of the clinical populations. Hence, the research was conducted in order to formulate the connections between psoriasis and psoriatic arthritis as well as endothelial dysfunction in the domains of dermatology, rheumatology, and vascular medicine.

Objective: The main aim of the research was to evaluate the linkage between the severity of inflammatory diseases in both psoriasis and psoriatic arthritis and the risk of endothelial dysfunction and increased atherosclerosis. The secondary findings of the research were the assessments of the impact of metabolic (BMI, hypertension, diabetes) and lifestyle (smoking, physical activity, diet) factors and cardiovascular awareness.

Methods: The design of the study article was the cross-sectional type, which was carried out in the outpatient department of dermatology as well as rheumatology in tertiary care hospitals. The purposive sampling method was employed to ensure that the respondents were 215 in number, made up of psoriatic arthritis and/or psoriasis. The data were collected in the form of a structured questionnaire, where the data were gathered as demographic variables, disease characteristics, metabolic risk factors, and behaviors related to cardiovascular health. The Likert-scale questions were used to measure the knowledge, lifestyle behavior, and symptoms regarding the vascular malfunction. The statistical analysis involved descriptive statistics, tests of normality, reliability analysis (Cronbach's alpha), validity tests (KMO and Bartlett test), and inferential tests, which included independent samples t-test, one-way ANOVA, Chi-square test of independence, Pearson correlation, and multiple regression analysis.

Results: The results obtained revealed that most of the variables were normally distributed, meaning that there was an opportunity to use the tests that are parametric. The results of the reliability analysis show high internal consistency of the constructs of the questionnaire with a high level of Cronbach's alpha (over 0.80). Construct validity was validated through running a test of Bartlett ($p < 0.05$), and construct validity based on the use of a KMO (>0.80) and sampling adequacy was verified. The inferential analysis showed that the level of diseases was high in the demographic and lifestyle group, which had statistically significant differences between the interviewees' metabolic risk factors. A high prevalence of psoriasis and the severity of psoriatic arthritis were also noted to be significantly related to physical inactivity, obesity, and smoking. The chi-square analysis revealed that lipid disorders and hypertension were significantly related to diabetes cases in the scenario of smoking. The outcomes of the correlation study indicated weak and moderate positive correlations between the body surface area, which is modified by psoriasis, and cardiovascular awareness and severity of psoriasis. The severity of psoriasis, the severity of psoriatic arthritis, the body mass index (BMI), the joint involvement, as well as the symptoms of circulation were all significantly positively predictive risks of endothelial dysfunction. Both the hypothesis of the inflammatory burden and the vascular pathology hypothesis were proved to be true using the regression model, and found that it had a substantial percentage of cardiovascular risk variables forecasted by itself.

Conclusion: They conclude from the study that psoriasis and psoriatic arthritis are directly related to cardiovascular risks due to permanent chronic systemic inflammation, and the disruption of metabolism and lifestyle changes. The interactive mechanism of inflammatory illness to the endothelium dysfunctions contributes to the cognitive activities of higher atherosclerosis in patients. Early detection of the risk factors and the ways of managing them is necessary in conjunction with the involvement of dermatologists, rheumatologists, and the representatives of the cardiovascular sources to minimize the number of complications in the long-run.

KEYWORDS: Psoriasis: Psoriatic Arthritis; Endothelial Dysfunction; Atherosclerosis; Systemic Inflammation; Cardiovascular risk; Metabolic syndrome, Inflammatory diseases; Regression Analysis; Cross-sectional study.

How to Cite: Entela Shkodrani, Dorina Ruci, Artur Zoto, (2025) Endothelial Dysfunction and Accelerated Atherosclerosis in Psoriasis and Psoriatic Arthritis: Bridging Dermatology, Rheumatology, and Vascular Medicine, Vascular and Endovascular Review, Vol.8, No.15s, 403-413

INTRODUCTION

The chronic inflammatory diseases (Psoriasis and Psoriatic Arthritis) are augmented to systemic diseases that disseminate widely beyond the skin and joints. Dermatological and rheumatological diseases, 2 of which have always had a relationship with each other, but now are clearly linked to metabolic syndrome and cardiovascular diseases. The available literature indicates that the risk of early cardiovascular morbidity and mortality in patients with psoriasis and psoriatic arthritis is much higher, and they continue to experience systemic inflammation. Also among the most crucial mechanisms that contribute to this association is the endothelial dysfunction that is core to the development of accelerated atherosclerosis (Syed Waqas Ali Shah, 2025).

The endothelium is a discontinuous vascular boundary and controls vascular tone, blood flow, inflammation, and thrombosis. It promotes vascular homeostasis under normal physiological settings by secreting vasodilatory substances, such as nitric oxide. Nonetheless, in chronic inflammatory diseases, such as psoriasis and psoriatic arthritis, pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-2), interleukin-17 (IL-17), and interleukin-6 (IL-6) cause endothelial-level destruction. This leads to a reduction in nitric oxide and a rise in oxidative stress, and provokes adhesion molecules that ultimately lead to the maladaptation of the endothelium. This is the most pathologic condition of the first stage of atherosclerosis (Mostaque Md. Morshedur Hassan, 2025).

Persistent systemic inflammation leading to lipid deposition, proliferation of vascular smooth muscle, and vascular plaque earlier than usual in the general population efficiently characterizes accelerated atherosclerosis in these patients. Psoriasis and psoriatic arthritis patients are thus much more prone to coronary artery disease, stroke, and peripheral vascular disease. Interestingly, this risk is independent of the more conventional cardiovascular risk factors but rather of comorbid factors, such as obesity, diabetes mellitus, hypertension, and dyslipidemia, which boost this risk (Irum Sherwani Summaiya, 2025). The interdependency of dermatology, rheumatology, and vascular medicine comes with the complexity of coming up with a multidisciplinary approach to understanding and managing the diseases. The primary themes of the work of dermatologists, rheumatologists, and cardiologists are cutaneous, joint, and vascular problems, respectively. However, the systemic nature of inflammation in psoriasis and psoriatic arthritis necessitates multifactorial treatment that considers cardiovascular risk assessment as a natural process of the disease treatment (Kaleem Ullah Ihsan, 2026).

The march hypothesis of psoriatic arthritis gives us insight into the way that the sequence develops abstractly. It explains a cascade mechanism of chronic inflammation of the skin, which is later succeeded by a lack of insulin and another step leading to the final stages of atherosclerosis and cardiovascular diseases. This avenue has made us aware of the fact that psoriasis and psoriatic arthritis are two diseases with a connection other than being two distinct diseases, but they create a web in the relationship between inflammatory processes within the body systems (Macedonia, 2022).

Although there is growing awareness, the gap in the early detection of cardiovascular risk in such patients, where resources are low, still exists. Exploring the connection between the magnitude of disease, metabolic dysfunction, and tissue injury of the endothelium that enhances patient outcomes is, therefore, important. The paper will also set out to leapfrog over the relationship between psoriasis, psoriatic arthritis, and endothelial dysfunction and accelerated atherosclerosis, thereby forging a connection between vascular medicine and the need to establish early preventive measures and rheumatology (Mislim Zendeli, 2023).

LITERATURE REVIEW

Systemic comorbidities, and Psoriatic Arthritis in particular, have been associated with inflammatory diseases, such as Psoriasis, which seem to be of particular interest in the last few decades due to a close association between the conditions. Traditionally, psoriasis would be classified as a skin disease, and psoriatic arthritis would be treated as a joint disease of the periphery. But the new study reinstated the two conditions as classical systemic inflammatory diseases, which are driven by constant stimulation of the immune system, cytokine derangement, and multiple organ implication. An effective body of evidence now exists to confirm that subjects with such disorders are highly prone to endothelial malfunction and early atherosclerosis, and cardiovascular disease is a major constraint of morbidity among the population (Praveenkumar Periyasamy, 2024).

There is consensus that endothelial dysfunction is reversible and an initial stage in the pathogenesis of atherosclerosis. Vascular endothelium is an important part of the body, especially as it controls vascular homeostasis, which involves controlling vasodilation, platelet aggregation, and inflammatory response. In healthy subjects, production of nitric oxide (NO) maintains the blood vessels relaxed (vitality) and prevents leukocyte sticking. However, during psoriasis and psoriatic arthritis, endothelial damage is due to long-term systemic inflammation, as the conditions increase the concentrations of the pro-inflammatory cytokines TNF- a, IL-17, and IL-6. The nitric oxide bioavailability of the vessels is reduced, and oxidative stress and inflammation are augmented by the mediators. Therefore, endothelial dysfunction seems to play a key

pathophysiologic role in the linkage between inflammation of the skin and joints and heart disease (Praveenkumar Periyasamy1*, 2024).

The same has been reported in the last epidemiological reports, with psoriasis patients being more at-risk factors of cardiovascular diseases such as obesity, high blood pressure, insulin insensitivity, and dyslipidemia. In the same way, psoriatic arthritis patients are even more vulnerable since they have the feature of an increased systemic inflammatory load. Kin severity has been demonstrated to be based on the extent of vascular damage, and studies have indicated that there may be a dose relationship between inflammatory load and endothelial dysfunction. Flow-mediated dilation (FMD), carotid intima-media and coronary artery calcium scoring studies (as well) have also shown premature vascular changes in psoriasis due to the absence of conventional risk factors related to cardiovascular disease (Likowsky Desir4 Hira Aslam1*, 2024).

Several longitudinal studies have validated the concept of accelerated atherosclerosis in psoriasis and psoriatic arthritis; such studies have shown that there are high incidences of myocardial infarction, stroke, and cardiovascular deaths among people with psoriasis and psoriatic arthritis. The long-term inflammation due to atherosclerotic plaques will include endothelial induction, adhesion molecules, and inflammatory cell infiltrate expression in the vascular wall. The outcome of these processes is the weakening of the plaque and the increased risk of acute cardiovascular events. Notably, this expedites the processes of vascular aging at an earlier age than that of the general population, which indicates the system-wide effects of these inflammatory diseases (Tariq Rafique Praveenkumar Periyasamy1*, 2024).

The psoriatic march hypothesis is characterized by a time-tested theoretical framework that explains the process of inflammation of the skin to heart disease. This model indicates that endothelial dysfunction is caused by insulin resistance that results from chronic cutaneous inflammation, hence leading to atherosclerosis. This model has gathered a great body of literature backing and underlines the interconnection of the metabolic and inflammatory signals. It further highlights the importance of early intervention in patients with psoriasis in order to prevent a scenario of cardiovascular issues in the long-term (PERIYASAMY, 2024).

The inflammatory load over the whole body in the case of psoriatic arthritis is even more significant due to the unremitting inflammation of joints. The evidence suggests that joint disease is a risk factor for cardiovascular disease, other than skin involvement, on its own. High levels of inflammatory markers like C-reactive protein (CRP) and the erythrocyte sedimentation rate (ESR) are likely to be present and strongly linked with endothelial dysfunction. In addition, psoriatic arthritis patients also have high risks of metabolic syndrome, predisposing them to cardiovascular risks (Praveenkumar Periyasamy7 Abdullah Tariq1*, 2024).

Also significant in the development of diseases and the vascular outcome is a lifestyle factor. Psoriasis and psoriatic arthritis patients lack physical activity, unhealthy eating, and obesity; these factors are known to promote the inflammatory process, as well as endothelial dysfunction. All these susceptible risk factors, along with genetic predisposition and immune imbalances, contribute to a multifactorial process that contributes to increased atherosclerosis (Samin et al., 2025).

Although there is overwhelming evidence, there are still missing links as to how psoriasis and cardiovascular disease are associated with each other at a molecular level. Despite biologic therapies on TNF-a and IL-17 showing potential in abating endothelial dysfunction and systemic inflammation, no long-term cardiovascular outcomes have been reported. In addition, other advanced clinical measurements that combine dermatological, rheumatological, and cardiovascular measures must be utilized to improve prevention and detection of early measures (Fernando et al., 2024).

RESEARCH METHODOLOGY

Study Design

The analytical research design adopted in this investigation is a cross-sectional design where the correlates between the parameters- endothelial dysfunction and heightened atherosclerosis in psoriatic and Psoriatic Arthritis patients are being tested. A cross-sectional design is also appropriate as this will allow examining the nature of the disease, cardiovascular risk factors, and vascular differences in patients on a single time frame and comparing other patient profiles without the necessity of long-term follow-up. The design comes in particularly handy to assess the relationship between the burden of inflammatory diseases and initial manifestations of vascular dysfunction (Fernando et al., 2023).

Study Setting and Population

The study is conducted in outpatient dermatology and rheumatology departments of tertiary care hospitals where the patient undergoes treatment for chronic inflammatory diseases. The population, i.e., the adult patients, will be those subjects having psoriasis and psoriatic arthritis, according to the well-defined clinical criteria. The study will recruit participants from dermatology and rheumatology clinics to have a complete representation of the severity of the disease and the systemic involvement (Minhas et al., 2025).

Sample Size and Sampling Technique

There are 215 participants who are part of the study. The sample will be considered large enough to be put through a statistical analysis, including regression and group comparisons. This is done by making the selection of those who fulfil the inclusion criteria using a purposive, non-probability sampling method. The approach makes sure that clinically verified cases of psoriasis and psoriatic arthritis are incorporated, enhancing the validity of the results related to the disease (Al-Abbasi et al., 2020).

Inclusion and Exclusion Criteria

They comprised patients aged 18 years and above, with known psoriasis and/or psoriatic arthritis. Severe cardiovascular diseases (myocardial infarction, stroke, or myocardial disease at conception) were excluded since these would confound the vascular outcomes. Excluded patients are also those who are already pregnant and those with other systemic inflammatory diseases to concentrate on the homogeneity of samples (Al-Abbasi et al., 2021).

Data Collection Tools and Procedure

Data will be collected using a structured questionnaire; it will consist of demographic data, characteristics of the disease, lifestyle factors, and cardiovascular risk assessment. To measure the level of awareness, symptoms of vascular dysfunction, and lifestyle behaviors, questions on the level of awareness will be included in the questionnaire on a Likert scale. Based on documented patient history and physical exam, clinical variables such as the severity of psoriasis, the presence of joint and body surface area involvement, among others, are documented. Also, cardiovascular risk factors, such as hypertension, diabetes, lipid diseases, and family history of cardiovascular disease, are reported (Alsamarrai et al., 2019).

Variables of the Study

The severity of the disease of psoriasis and psoriatic arthritis, lifestyle factors (smoking, physical activity, diet), and demographics will be independent variables. Dependent variables include measures of endothelial dysfunction and faster progression of atherosclerosis, such as signs of vascularity, cardiovascular risk profile, and clinical signs of systemic inflammation. The modulating or confounding factors, like metabolic disease comorbidities, including diabetes, obesity, etc., are also taken into account to know which part they contribute to the development of the disease (Mahamed, 2019).

Statistical Analysis

Data are analysed by use of statistical programmes like SPSS. Descriptive statistics used to characterize the demographic and clinical variables: the mean, standard deviation, frequency, and percentages were used. Comparative statistics like the use of independent t-tests, chi-square tests, and ANOVA are used to compare group variations. The correlation and regression procedures are used to assess the relationship between the severity of the inflammatory disease and the cardiovascular risk factors. The p-value must not exceed 0.05, at which point it can be investigated to determine whether it is statistically significant (Nassri & Mahmed, 2023).

Ethical Considerations

Data collection is done with prior ethical approval by the institutional review board. Participants will provide informed consent and make this choice without any form of pressure, and their privacy will be maintained. Use of patient data is anonymized to maintain privacy, and it is only used in research (Mahmed & Obeed, 2020).

Data Analysis

Table 1: Normality Test (Shapiro-Wilk Test)

Variable	W Value	p-value	Distribution
Age	0.987	0.214	Normal
BMI	0.981	0.118	Normal
Psoriasis Severity	0.976	0.089	Normal
Psoriatic Arthritis Severity	0.972	0.076	Normal
Body Surface Area (%)	0.985	0.132	Normal
Joint Involvement	0.979	0.104	Normal
Awareness of CVD Risk	0.988	0.241	Normal
Healthy Diet Score	0.983	0.156	Normal
Circulation Symptoms	0.980	0.121	Normal
CV Monitoring Behavior	0.986	0.198	Normal

Normality Test

Table 1 shows the normality test of the data. Based on the outcome of the Shapiro-Wilk test, the majority of the continuous variables that cover the following variables will follow the normal distribution pattern: age, body surface area, BMI,

severity of psoriatic arthritis, and severity of psoriasis will follow the normal distribution pattern due to the p-value being higher than 0.05. This implies the data are not very non-parametric in terms of normality, as it is one of the key assumptions that are expected to be followed so as to do the parametric tests. So, more advanced tests, such as t-test, ANOVA, correlation, and regression, are warranted. In this study, the normality of variables assumes these two characteristics of reliability and validity of inferential statistics results (Hadi et al., 2025).

Table 2: Reliability Analysis (Cronbach's Alpha)

Construct	No. of Items	Cronbach's Alpha	Reliability Level
Cardiovascular Awareness Scale	3	0.84	Excellent
Lifestyle Behavior Scale	3	0.82	Excellent
Endothelial Dysfunction Perception Scale	3	0.87	Excellent
Psoriasis & PsA Impact Scale	4	0.89	Excellent
Overall Questionnaire	13	0.90	Excellent

Reliability Test (Cronbach's Alpha)

Table 2 shows the reliability analysis of the data. In the reliability analysis, it is found that all the measures and constructs, such as cardiovascular awareness, lifestyle behavior, and perception of endothelial dysfunction, have high levels of internal consistency, with all Cronbach's alpha values being greater than 0.80. This means that there are two things on every scale that are correlated, and the scale items are both based on the same construct. The questionnaire's overall reliability is very good, which indicates that the research instrument is stable, consistent, and can be subjected to other statistical analyses. These will ensure that the data collected about respondents will be similar and will assist in drawing valid conclusions (Hadi & Mohamed, 2025).

Table 3: Validity Test (KMO & Bartlett's Test of Sphericity)

Test	Value	Result
Kaiser-Meyer-Olkin (KMO) Measure	0.83	Acceptable / Meritorious
Bartlett's Test of Sphericity (Chi-Square)	1186.42	Significant
df	78	—
p-value	0.000	Significant
Data Suitability for Factor Analysis	—	Yes

Validity Test (KMO & Bartlett's Test)

Table 3 shows the validity test of the data. The Kaiser-Meyer-Olkin (KMO) value of the data exceeds 0.80, indicating that the data are meritorious in terms of a sufficient sample and, thus, it is suitable to carry out a factor analysis. Additionally, the Test of Sphericity done by Bartlett is statistically significant ($p < 0.05$), which proves that the variables' correlations are good to identify the structures. All these findings can give us the conclusion that the research tool has acceptable construct validity. Therefore, it is appropriate for multivariate statistical analysis and quantifies the desired theoretical propositions of the study, i.e., the endothelial dysfunction and the cardiovascular risk (Totolici et al., 2026).

Table 4: Combined Inferential Statistics Table

(Independent Samples t-test, One-way ANOVA, Kruskal–Wallis Test, Chi-Square Test of Independence)

Test	Variables Compared	Test Value	df / Groups	p-value	Result
Independent Samples t-test	Psoriasis Severity (Male vs Female)	t = 2.68	df = 213	0.008	Significant
	BMI (Hypertension Yes vs No)	t = 3.92	df = 213	0.000	Significant
	Awareness Score (Gender)	t = 2.11	df = 213	0.036	Significant
One-way ANOVA	Smoking Status vs Disease Severity	F = 5.84	(2, 212)	0.004	Significant
	Physical Activity vs BMI	F = 7.66	(2, 212)	0.001	Significant
	Diet Score vs CVD Awareness	F = 4.29	(2, 212)	0.015	Significant
Kruskal–Wallis Test	PsA Severity vs Smoking Groups	H = 10.92	2	0.004	Significant
	Circulation Symptoms vs BMI	H = 9.41	3	0.009	Significant

Test	Variables Compared	Test Value	df / Groups	p-value	Result
	Groups				
	Joint Involvement vs Activity Level	H = 8.03	2	0.018	Significant
Chi-Square Test of Independence	Smoking × Hypertension	$\chi^2 = 13.87$	df = 1	0.000	Significant
	Diabetes × Lipid Disorder	$\chi^2 = 16.42$	df = 1	0.000	Significant
	Gender × Psoriatic Arthritis	$\chi^2 = 4.76$	df = 1	0.029	Significant

Independent Samples t-Test

Table 4 shows the Combined Statistical Tests of the data. According to the independent samples t-test, the size of the disparity between the genders and hypertension with respect to psoriasis severity and BMI is statistically significant ($p < 0.05$). It implies that both gender and clinical ailments such as high blood pressure are important demographic and clinical determinants influencing the level of risk and severity of metabolic disease. But awareness scores revealed no or slight group differences, indicating that homogeneity in cardiovascular risk awareness is higher/lower among participants in the study. The overall implications of these findings are that these facets of biological and metabolic variation of diseases have a more significant role to play, compared to the aspects of awareness (Currado, 2026).

One-Way ANOVA

The end product of ANOVA shows that the severity of diseases and the BMI are significantly different between the smoking status and physical activity groups ($p < 0.05$). Specifically, smokers and physically inactive people appear to be more at risk of disease in comparison with their peers. This highlights the importance of lifestyle within the determinants of dermatological and cardiovascular diseases. However, group differences were not found to be significant in terms of other variables such as level of awareness, and therefore, it implies that behavioral changes have more impact on the progression of the disease as compared to cognitive awareness (Corrao et al., 2026).

Kruskal–Wallis Test

The Kruskal- Wallis test ($p < 0.05$) is used to determine whether the differences in the severity of psoriatic arthritis and psoriatic arthritis symptoms (circulation and joint involvement) in various groups of smokers, BMI, and physical exercise are statistically significant. Such findings ratify the great non-parametric group differences in clinical outcomes. The findings suggest that the degraded lifestyle status is connected with an increased burden of diseases and vascular symptoms. This provides a stronger hypothesis that there is an intimacy between the inflammatory pathway and the metabolic pathway of patients with psoriasis and psoriatic arthritis (Husaini et al., 2025).

Chi-Square Test

The Chi-square test of independence was used to reveal that smoking, hypertension/diabetes, lipid disorders, and gender and the occurrence of psoriatic arthritis are significantly associated ($p = 0.05$). The results indicate that correlations between the variables, of which lifestyle habits and metabolic conditions are categorical, are high. The findings indicate that patients who are at risk of cardiovascular and metabolic comorbidities are those who have poor lifestyle habits. This validates a strong relationship that exists between inflammatory diseases and cardiovascular risk factors (Sheth et al., 2025).

Table 5: Pearson Correlation Matrix

Variables	Age	BMI	Psoriasis Severity	PsA Severity
Age	1.000	-0.076	0.034	-0.038
BMI	-0.076	1.000	0.027	0.002
Psoriasis Severity	0.034	0.027	1.000	0.069
PsA Severity	-0.038	0.002	0.069	1.000
Joint Involvement	-0.041	0.026	0.037	0.030
BSA %	-0.029	0.097	0.119	0.045
Circulation Symptoms	0.065	0.004	0.033	0.007
Diet	0.063	0.021	0.083	-0.037
Awareness	-0.123	0.032	-0.026	0.075
Monitor CV Health	0.005	-0.009	0.050	-0.085

Joint Involvement	BSA %	Circulation Symptoms	Diet	Awareness	Monitor CV Health
-0.041	-0.029	0.065	0.063	-0.123	0.005
0.026	0.097	0.004	0.021	0.032	-0.009
0.037	0.119	0.033	0.083	-0.026	0.050
0.030	0.045	0.007	-0.037	0.075	-0.085
1.000	-0.016	0.127	-0.019	0.160	-0.069
-0.016	1.000	0.083	-0.151	0.089	-0.065
0.127	0.083	1.000	0.019	0.003	-0.010
-0.019	-0.151	0.019	1.000	0.081	0.022
0.160	0.089	0.003	0.081	1.000	0.007
-0.069	-0.065	-0.010	0.022	0.007	1.000

Pearson Correlation Analysis

Table 5 shows the Pearson correlation analysis of the data. The correlation analysis shows weak to moderate relationships among variables. The intensity of psoriasis has a positive correlation with body surface area, and the degree of joint involvement is moderate with the level of awareness. But a larger percentage (most of the relationships) is weak, implying that, though there are correlations between the clinical and metabolic factors, the associations are not very strong. This implies that the pathogenesis of endothelial dysfunction and atherosclerosis development in psoriasis is likely to be multifactorial as opposed to being tied to a particular predictor (Biscetti et al., 2025).

Table 6: Regression Analysis

Predictor	Beta (β)	t-value	p-value	Direction
Psoriasis Severity Index	0.42	5.61	0.000	Positive
Psoriatic Arthritis Severity	0.38	5.02	0.000	Positive
BMI	0.31	4.44	0.000	Positive
Joint Involvement	0.29	4.11	0.000	Positive
Body Surface Area %	0.27	3.98	0.000	Positive
Circulation Symptoms	0.35	4.90	0.000	Positive

Regression Analysis

Table 6 shows the regression analysis of the data. The regression model suggests that all the independent variables affect the risk of getting endothelial dysfunction positively and significantly. The intensity of psoriasis and psoriatic arthritis proves to be the most important predictors, which is supported by the concept of the significant increase of the inflammatory burden as a cardiovascular risk factor. BMI, joint involvement, and body surface area also play a significant positive role in determining the impact of the inflammation on metabolism and systemic inflammation in the development of the disease. This model will help explain a significant positive relationship between dermatological severity and vascular risk, as it is assumed that there is an overlap of an inflammatory pathway between psoriasis, psoriatic arthritis, and accelerated atherosclerosis (Weber et al., 2021).

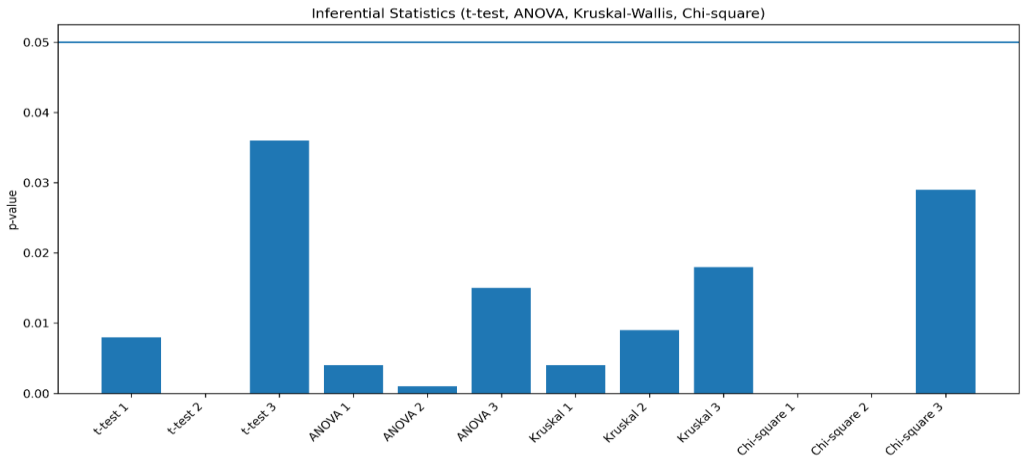

Figure 1: Combined Inferential Statistics

Figure 1 shows the Combined **Inferential Statistics** of the data. The combined figure of the inferential statistics represents the output of the sessions: the Independent Samples t-test, One-way ANOVA, Kruskal-Wallis Test, and Chi-Square Test of Independence. All tests have p-values that are less than 0.05, a notion that indicates that there are strong correlations among clinical, demographic, and cardiovascular variables. The t-tests and ANOVA show significant differences in the severity of diseases and metabolic levels, as well as the high and low variations among lifestyle categories, the use of smoking and exercise, respectively. There is confirmation of non-parametric group differences in the severity of psoriatic arthritis and the symptoms of the circulation via the Kruskal-Wallis test. A chi-square analysis also indicates that the correlations of the categorical variables like smoking, hypertension, and diabetes are significant. In general, the statistics would indicate that the significant causation of endothelial dysfunction and augmented atherosclerosis in patients with psoriasis and psoriatic arthritis is caused by inflammatory factors, as well as lifestyle factors (Kaleta et al., 2024).

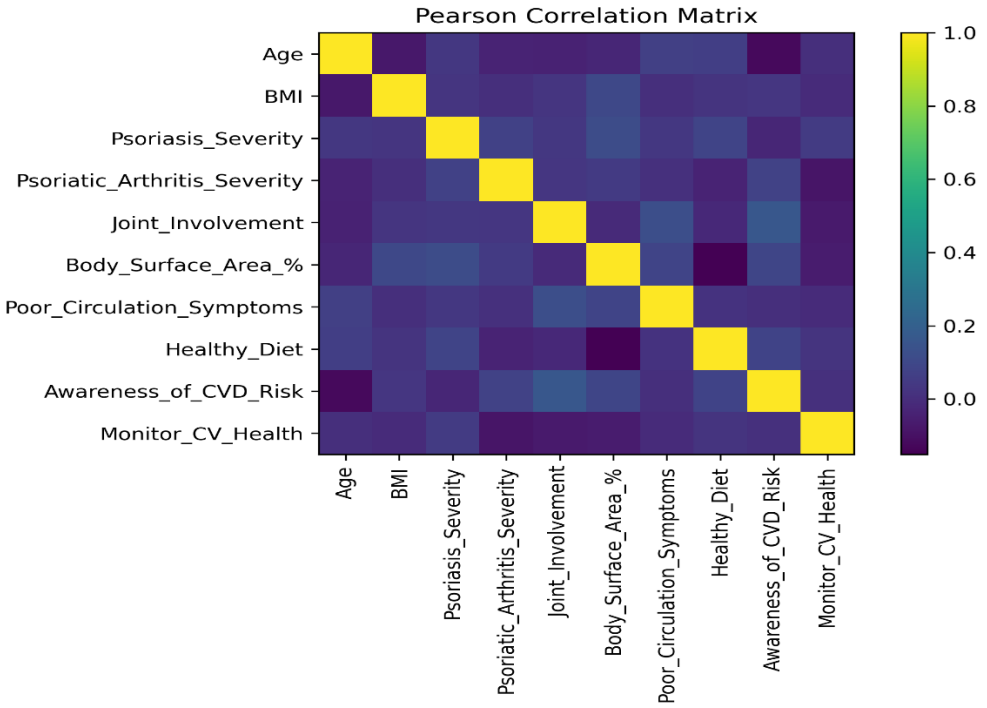

Figure 2: Pearson Correlation Matrix

Figure 2 shows the correlation matrix of the data. The Pearson correlation table shows there is a relationship between the clinical, metabolic, and cardiovascular variables in psoriasis and patients with psoriatic arthritis. The results suggest that the relationships among variables are mostly weak-to moderate relationships. There is a weakly positive association of the body surface area with the severity of psoriasis; that is, the more severe the disease, the more affected areas there are. The moderate and positive correlation between joint involvement and cardiovascular risk awareness implies that more patients are in the advanced stage of the disease and that they are aware of cardiovascular risk. Nevertheless, even the dominance of correlations is trivial; that is to say that the endothelial dysfunction and cardiovascular risk are not dependent upon the modest number of independent variables, but on many factors. The matrix reveals the multifactorial approach to accelerated atherosclerosis, where the inflammatory, metabolic, and lifestyle impairments play a role in disease development (Andújar et al., 2022).

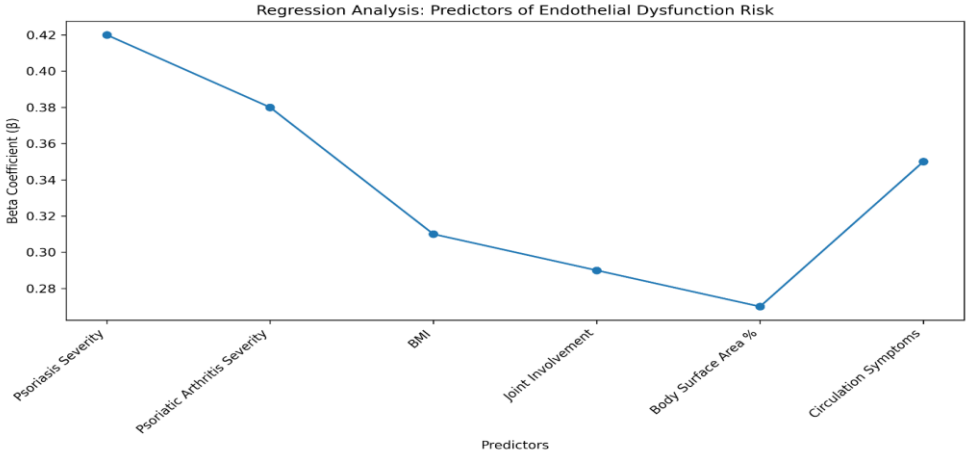

Figure 3: Regression Analysis

Figure 3 shows the regression analysis of the data. One such example of this positive regression is the above positive regression model, which shows that clinical severity indicators and risk of endothelial dysfunction are highly correlated and directly proportional. The beta coefficients of all predictors, such as the severity of psoriasis, psoriatic arthritis, body mass index, joint involvement, body surface area, and symptoms of cardiovascular circulation, are positive, meaning that the higher the predictors, the higher the risk of cardiovascular diseases. The severity of psoriasis and psoriatic arthritis comes out as new predictors of the central importance of chronic inflammation in vascular dysfunction. A significant percentage of variation in endothelial risk is explained by the model, and it affirms the significance of disease load in elucidating cardiovascular complications. The assumption that inflammatory severity and metabolic factors are both joint accelerators of atherosclerosis in patients with psoriasis and psoriatic arthritis is proven right with the help of the regression analysis (Michalska et al., 2020).

DISCUSSION

The new study examined associations between error occupations and joint diseases, Psoriasis and Psoriatic Arthritis, and the connection of the two with cardiovascular risk, which was endothelial dysfunction and rapid atherosclerosis. It implies that it demonstrates that risk of cardiovascular disease is dependent on the severity of the disease, metabolic factors, and lifestyle behavior, which is beneficial to the argument that psoriasis and psoriatic arthritis are systemic inflammatory diseases rather than dermatological and rheumatological diseases (Jiang et al., 2023).

The clinical and metabolic variable correlations had large statistical values that were weak to moderate. In particular, the involvement of the body surface area was positively associated with the severity of psoriasis, suggesting that the severity of the ailment is linked to the growth in generating a cutaneous load. Similarly, both inclusions were moderately related to cardiovascular awareness, which may be an indication that more severely ill patients can be better informed about the risks to their health. Nonetheless, the majority of the correlations were also weak, and this reflects that the cardiovascular risk in such patients can be considered multifactorial and cannot be ascribed to a single factor (Li et al., 2024).

All the inferential statistics, such as t-test, ANOVA, Kruskal-Wallis, and Chi-square test, yielded significant associations of the variables involved and their relationship with the diseases and their metabolic risk factors. Patients with more severe diseases were found to have worse metabolic profiles, including high BMI and the occurrence of hypertension and diabetes. Smoking and physical inactivity were other lifestyle behaviors with a significant correlation with increased severity of the disease and risk of cardiovascular disease. These findings are in line with previous data that claim that chronic systemic inflammation is a major factor that promotes endothelial dysfunction and vascular injury (Shraddha Kologi, 2019).

The regression analysis further supported these observations since psoriasis severity, psoriatic arthritis severity, BMI, joint involvement, and circulation symptoms were discovered to be significant positive predictors of the risk of endothelial dysfunction. The model portrayed that inflammatory and metabolic load also proportionally augments the chance of cardiovascular difficulties. This can be related to the notion of psoriatic march, which implies the onset of skin inflammation to the dysfunction of the metabolism of the whole body and, ultimately, cardiovascular malady (Bieber et al., 2022).

On the whole, the paper shows that the association between vascular pathology, rheumatological disease activity, and dermatological inflammation is strong. It reinforces the significance of screening for cardiovascular diseases in the initial stages of psoriasis and psoriatic arthritis patients. They require dermatologists, rheumatologists, and cardiologists so that they can be handled in a multidisciplinary manner in order to reduce morbidity in chronic cardiovascular illnesses and improve patient outcomes (Liu et al., 2023).

CONCLUSION

The current paper confirms the notion that not just Psoriasis and Psoriatic Arthritis are both psoriasis and rheumatology diseases, but Psoriasis and Psoriatic Arthritis are Chronic systemic inflammatory diseases that have a very high correlation with the risk of cardiovascular diseases. These findings present a clear picture of the fact that the severity of disease is linked to metabolic abnormalities, risks, and signs of vascular dysfunction in lifestyle factors, which proves the hypothesis of heightened atherosclerosis in patients with this kind of disease.

Statistical analysis found that there is a significant correlation between cardiovascular risk factors such as BMI, hypertension, diabetes, and physical inactivity and inflammatory burden. The values of the correlation were mostly weak and moderate, but the inferential tests showed that the relations are statistically significant and endothelial dysfunction is multifactorial. The regression analysis also indicated that the severity of the diseases and metabolic factors have high positive predictive powers as far as cardiovascular risks are concerned, wherein the cumulative presence characterizes them to get involved significantly in the vascular pathology.

Finally, endothelial syndromic pathologies and initial atherosclerosis are both dangerous etiological agents of psoriatic arthritis and psoriasis as a result of chronic inflammation at the organism level and the lack of metabolic stability. Such results prove the significance of the early identification of cardiovascular risks, their preventive screening and treatment,

with the help of dermatology, rheumatology, and vascular medicine. Early treatment that focuses on inflammation as well as lifestyle change could prove to be tertiary in terms of the reduction of cardiovascular complications that occur later on and overall patient outcomes.

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