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Cutaneous Vasculitis in Autoimmune Rheumatic Diseases: Clinical Clues, Vascular Pathogenesis and Management

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ABSTRACT

Background: Cutaneous vasculitis is an important clinical presentation of autoimmune rheumatic diseases, which can be an indication of systemic immune dysregulation. It tends to manifest itself in cases of Systemic Lupus Erythematosus, Rheumatoid Arthritis and other connective tissue disorders. Small-scale organised data on clinical presentation, vascular pathogenesis and clinical management outcomes are important clinically, but have not been supported to date in a single analytical model. The following paper will address clinical clues, vascular processes and reaction tendency of cutaneous vasculitis of autoimmune rheumatic disorders.

Objective: The main aim of this research was to examine the connection between clinical presentation, vascular inflammatory process and treatment outcomes in autoimmune rheumatic disease-related endogenous cutaneous vasculitis patients. The study was also to establish the demographic factors which influence the severity and response to treatment of the disease.

Methods: A cross-sectional study design was used as a quantitative study. A cohort of respondents with autoimmune rheumatic diseases who had either or both cutaneous and non-cutaneous vasculitis was recruited into the study and gave their data (n=221). It was a structured questionnaire, which took the form of a 5-point Likert scale; however, the questionnaire contained four broad domains, namely clinical clues, vascular pathogenesis, management practices and awareness. Demographic factors were age, gender, education, occupation, disease duration and type of diagnosis. Descriptive and inferential statistics were used to conduct the statistical analysis. Shapiro- WIlk test assisted in running the test of normality. Reliability was ascertained on Cronbach's alpha and Bartlett's Test, whereas the validity was ascertained on KMO. To establish relationships and predictive associations between variables, inferential statistics such as Independent Samples t-test, One-way ANOVA, Kruskal-Wallis test, Chi-Square test, Pearson correlation and regression analysis were used.

Results: Findings revealed that all the variables were normally distributed (approximately) and hence, parametric tests could be conducted. The internal consistency was noted to be excellent as Cronbach's alpha was between 0.88 and 0.94. Its validity was proved by the test of adequate sampling (KMO = 0.89, $p < 0.001$); thus, it can be applied to a multivariate analysis. The inferences revealed that the performance in terms of clinical and management was very diverse among the genders, age groups, and the categories of diagnostic identities. Correlation analysis showed great positive correlations existing between clinical clues, pathogenesis, management and awareness. The most interesting correlation was a potential relationship between management and overall disease score, which implies that there is a positive relationship between the effectiveness of treatment and the condition of patients. The regression analysis revealed that the clinical clues, the pathogenesis and awareness were the significant predictors of the management outcomes, as they revealed a substantial portion of the variance. The clinical clues turned out to be the strongest predictor, which shows the importance of early symptom identification as one of the means to rectify the situation with a disease.

Conclusion: The paper finds that cutaneous vasculitis is one of the important clinical signs of disease activity in autoimmune rheumatic diseases. Vascular inflammation, patient awareness and clinical presentation are intertwined with one another and influence the outcome of the treatment dramatically. It is important to note that early diagnosis and early intervention can enhance the prognosis and help to avoid complications. One aspect that the authors emphasise is that the method of clinical evaluation and patient-based management of autoimmune rheumatic disorders should also be evaluated, which, in turn, depends on the combination of various methods and techniques of combinatorics.

KEYWORDS: Cutaneous vasculitis, autoimmune rheumatic diseases, vascular pathogenesis, clinical clues, autoimmune diseases, systemic lupus, rheumatoid arthritis, management outcomes, inflammation, autoimmune disorders, regression analysis..

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INTRODUCTION

One of the significant clinical manifestations of systemic inflammation that is significant is cutaneous vasculitis, in which small blood vessels are mainly affected in the skin. It may frequently occur in patients who are affected by autoimmune rheumatic diseases, where immunity-mediated vascular injury has a wide range of both dermatological and systemic presentations. They are typically co-morbid with Systemic Lupus Erythematosus, Rheumatoid Arthritis and other connective tissue disorders, where cutaneous vasculitis may be an early symptom of disease activity or exacerbation. The skin appearance is typically a sign of system-wide dysregulation of the immune system and can be regarded as a crucial topical problem of clinical rheumatology and dermatology (Syed Waqas Ali Shah, 2025).

The pathogenesis of cutaneous vasculitis is rather complicated and is mainly driven by the destruction of blood vessels by immunomediators. The presence of a broad group of autoimmune diseases results in a deposition of immune complexes in the walls of small vessels, and an activation of complement and inflammatory cell infiltration, neutrophils in particular. This leads to endothelial damage, loss of vessel walls and leakage of the components of blood into the surrounding tissue, resulting in typical clinical features of palpable purpura, petechiae and ulceration. Further, some vasculitic diseases also involve anti-neutrophil cytoplasmic antibodies (ANCA), which also contribute to vascular inflammation via direct neutrophil activation, resulting in intense endothelial damage. All these processes indicate the crucial role played by the dysregulation of the immune system in the development of the vasculitic lesions (Mostaque Md. Morshedur Hassan, 2025).

Clinically, cutaneous vasculitis presents with diverse skin appearances, which can be mild or severe depending on the underlying condition and severity of the vascular infiltrations. The initial feature is palpable purpura in the lower extremities, which does not blanch on pressure, the most common one. Other appearances comprise painful nodules, livedo reticularis, bullous lesions and, in extreme cases, skin ulceration and necrosis. These are not only clinical indications of a disease but also give useful data concerning the severity and systemic evolution of the disease. The skin presentation in most instances may be earlier than the appearance of symptoms within the system, and therefore, it is critical to identify early in order to accurately diagnose and treat (Irum Sherwani Summaiya, 2025).

The management of cutaneous vasculitis highly depends on the nature of the issue and the autoimmune disease that could have precipitated the disease. Symptomatic therapy (nonsteroidal anti-inflammatory agents and local wound therapy) can be used to treat mild cases. Nonetheless, severe or moderate is normally treated with systemic corticosteroids and immunosuppressive drugs, including methotrexate, azathioprine or biologic agents. Diseases like lupus systema in its early stages (systemic lupus erythematosus) should be treated with immunomodulatory therapy in an attempt to prevent disease progression as well as involvement of organs. Thus, the multidisciplinary approach entailing rheumatologists, dermatologists, and immunologists is crucial to proper management (Kaleem Ullah Ihsan, 2026).

Although there have been improvements in knowledge about autoimmune rheumatic diseases, cutaneous vasculitis has rarely been diagnosed in a clinical setting and is often underestimated. It needs more intensive research to integrate clinical characteristics of the disease with vascular pathogenesis and clinical response to treatment to create better diagnostics and treatment. This gap will be addressed in this paper, where the clinical causes, vascular pathophysiology and treatment pattern of cutaneous vasculitis in autoimmune rheumatic diseases will be discussed. To enhance patient outcomes and create more specific approaches to therapeutic interventions in clinical practice, it is imperative to comprehend these relations (Macedonia, 2022).

LITERATURE REVIEW

Cutaneous vasculitis is a somewhat heterogeneous group of diseases, the inflammation of the blood vessels of the skin, which is usually accompanied by systemic autoimmune rheumatic diseases. It is most often observed with conditions such as Systemic Lupus Erythematosus, Rheumatoid Arthritis, Sjogren's syndrome and ANCA-related vasculitides. In previous literature, the concept of cutaneous vasculitis being not the disease but a clinical manifestation of the underlying immune regulation takes precedence, and so the fact that immune complexes are deposited and that the vascularity is inflamed is focal. The involvement of skin has always been shown to either mediate or coincide with systemic disease activity, making it a valuable diagnostic and prognostic tool (Mislim Zendeli, 2023).

The importance of clinical clues in the initial diagnosis of cutaneous vasculitis has been emphasised by a few studies. Palpable purpura has been adopted as the most common clinical presentation, particularly in the lower extremities, due to increased gravity forces making the vessels push in at the lower extremities. The other manifestations of clinical studies that have been reported are Petechiae, livedo reticularis, nodules and ulcerative lesions. According to dermatological and rheumatological literature, these skin findings are likely to be related to the severity of the disease and the attack of the systems. It is also noted that autoimmune rheumatic disease patients might exhibit cutaneous manifestations before major organ effects; thus, the dermatology examination is vital in the early detection and management of the disease (Praveenkumar Periyasamy, 2024).

Cutaneous vasculitis vascular pathogenesis has been a widely researched topic in the study of immunopathology. The most common mechanism is associated with the deposition of immune complexes in post-capillary venules, followed by the activation of complement and neutrophil recruitment. It is followed by a leukocytoclastic vasculitis where neutrophilic infiltration and nuclear debris in the vessel walls occur. In addition to this, anti-neutrophil cytoplasmic antibodies (ANCA) have also been identified to play a key role in certain forms of vasculitis, particularly the role of the ANCA in certain diseases such as granulomatosis with polyangiitis. All of these are antibodies which activate neutrophils in a direct way, leading to endothelial damage, but not deposition of immune complexes. Moreover, cytokines like TNF-α, IL-6, and interferon-gamma have been

reported to increase inflammatory responses, contribute to endothelial dysfunction and heighten vascular permeability (Praveenkumar Periyasamy1*, 2024).

It has been demonstrated that Hypocomplementemia and the presence of circulating immune complexes accompanying cutaneous vasculitis are very much correlated with systemic autoimmune diseases (and notably with Systemic Lupus Erythematosus). Similarly, unremitting activation of immunity and rheumatoid factor activities also contribute to vascular inflammation and tissue destruction in the occurrence of Rheumatoid Arthritis. These results confirm the hypothesis that cutaneous vasculitis is a type of systemic immune dysregulation, as opposed to a disease-specific pathological condition. Histopathological studies further demonstrate the presence of fibrinoid necrosis and endothelial swelling as well as perivascular inflammatory profound in the affected skin biopsies (Likowsky Desir4 Hira Aslam1*, 2024).

The treatment of cutaneous vasculitis in management has also been an extensive topic in the literature. Symptomatic treatment, such as rest, leg elevation, and nonsteroidal anti-inflammatory medications, is usually enough to treat mild cases. But moderate and severe cases need systemic corticosteroids as the first-line therapy. Methotrexate, azathioprine, cyclophosphamide and biologic agents such as rituximab have proven to be very useful in the management of the disease process. B-cell and inflammatory cytokine biologic agents have been discovered to be more effective recently, and in particular with regard to refractory cases. Moreover, early and aggressive therapy has been linked with improved long-term results and minimised the possibility of systemic complications (Tariq Rafique Praveenkumar Periyasamy1*, 2024).

The treatment has already been improved, but there are still numerous gaps in the literature related to information about cutaneous vasculitis. Very little research has been combined which examines the clinical presentation, vascular processes and therapeutic outcome within a single framework of analysis. A majority of studies are done on either histopathology or clinical presentation in isolation, resulting in a disparate knowledge base. Moreover, the lack of homogeneous presentation of patients among patients and inconsistency in diagnostic criteria hamper early diagnosis. Therefore, there has been an emphasis among researchers on the need to conduct comprehensive research capable of interlinking clinical, immunological and therapeutic perspectives with improved management of patients (PERIYASAMY, 2024).

RESEARCH METHODOLOGY

Study Design

The cross-sectional, quantitative research design adopted in this paper will be used to study the occurrence of cutaneous vasculitis amongst patients with autoimmune rheumatic disease. The intention is to assess clinical manifestations, get acquainted with the features of vascular pathogenesis, and standardise the results of treatment in the individuals concerned, in two dimensions. Since it allows us to gather all the information at a certain point in time, their relationships in the disease characteristics, clinical manifestations and treatment responses, without tampering with the variables, it is appropriate to use a cross-sectional design (Praveenkumar Periyasamy7 Abdullah Tariq1*, 2024).

Study Setting and Populaion

The study is conducted in the dermatology and rheumatology departments of outpatient departments of tertiary care hospitals that deal with a large number of patients with autoimmune rheumatic diseases. The patient population of interest is diagnosed patients having known cases of Systemic Lupus Erythematosus, Rheumatoid Arthritis and other forms of autoimmune disorders that may or may not be in the form of cutaneous vasculitis. Respondents who are referred to above are a part of the study sample of 221 that was selected with a goal of passing the required level of statistical power as well as representing different demographic and clinical variables (Samin et al., 2025).

Sampling Technique

The study respondents who would fit the inclusion criteria will be sampled using a convenience non-probability method. Patients with autoimmune rheumatic diseases diagnosed as having a cutaneous form of the disease are considered, with those patients having infectious skin disease, malignancies or missing clinical records are excluded. This approach will make the participants as accessible as possible in the clinical setting and efficient in collecting such data during the period of the study (Fernando et al., 2024).

Data Collection Tool and Procedure

Data are collected with the help of a structured questionnaire on four fronts: demographic data, clinical hints of cutaneous vasculitis, perception regarding the vascular pathogenesis and management rather than outcomes. The questionnaire will make use of the Likert scale, which has a 5-point scale based on the response of the patient to specific questions that will consist of the following: Strongly Disagree, Strongly Agree, Symptom, Disease experience, and Treatment effectiveness. These demographic variables include age, sex, marital status, education, occupation, date of the disease and underlying diagnosis. All the participants are granted ethical permission, informing them of what is at risk in the intervention and ethical consent is granted to all before data collection by the relevant institutional review board. The respondents and their anonymity are extremely respected. The questionnaire is conducted either by direct interview of patients or self-administered based on the literacy of the patient and state of his /her (Fernando et al., 2023).

Variables of the Study

Demographics and type of autoimmune diseases are considered independent variables. The dependent variables include clinical clues (e.g., palpable purpura), signs of vascular pathogenesis (e.g., symptoms of inflammation) and the results of treatment (treatment satisfaction and symptom improvement). The other secondary outcome variables that the study is examining are the

level of awareness (Minhas et al., 2025).

Data Analysis

Data collected are analysed with statistical packages, such as SPSS. The frequency, percentage, mean, and standard deviation demonstrate demographic data and clinical characteristics. The relationships between clinical symptoms, disease mechanisms and treatment outcomes are studied with the help of inferential statistics like correlation analysis and regression models. Cronbach's alpha is used not only to assess the reliability of the questionnaire and expert review but also to assess construct validity (Al-Abbasi et al., 2020).

Ethical Considerations

No data collection is made without having ethical approval in place, and no participant or individual should be unaware of the study's intent. The respondents will be allowed to take part, but it will be voluntary, and they will have the option to drop out. There is no record of any personal identifiers, and great confidentiality and adherence to ethical standards of research will be observed (Al-Abbasi et al., 2021).

Data Analysis

Table 1: Normality Test (Shapiro-Wilk)

Variable	Statistic (W)	df	Sig. (p-value)	Interpretation
Clinical Clues	0.982	221	0.072	Normally distributed
Pathogenesis	0.979	221	0.081	Normally distributed
Management	0.985	221	0.093	Normally distributed
Awareness	0.981	221	0.067	Normally distributed
Overall Score	0.986	221	0.104	Normally distributed

Normality Test

Table 1 shows the normality test of the data. The normality test results reveal that all the key study variables, such as Clinical Clues, Pathogenesis, Management, Awareness, and Overall Score, have an approximately normal distribution. The significance of all the variables is more than 0.05, and this fact shows that the data meet the normality assumption. This implies that a parametric statistical test such as t-tests, ANOVA, Pearson correlation and regression can be used to analyse the data. Therefore, the distribution of the answers can be said to be statistically appropriate for further inferential tests in the study (Alsamarrai et al., 2019).

Table 2: Reliability Analysis (Cronbach's Alpha)

Construct	No. of Items	Cronbach's Alpha (α)	Reliability Level
Clinical Clues of Vasculitis	7	0.91	Excellent
Vascular Pathogenesis	7	0.93	Excellent
Management Practices	9	0.94	Excellent
Awareness & Knowledge	5	0.88	Excellent
Overall Scale Reliability	28	0.92	Excellent

Reliability Test (Cronbach's Alpha)

Table 2 shows the reliability analysis of the data. The reliability test shows that there is high internal consistency on all constructs of the questionnaire. Cronbach's Alpha values of their Clinical Clues (0.91), Pathogenesis (0.93), Management (0.94) and Awareness (0.88) are greater than the acceptable Cronbach's Alpha of 0.70. This validates the fact that items in each scale are very homogeneous and effectively assess the intended constructs. The overall reliability of the instrument demonstrates that the questionnaire is stable, credible and can be applicable in the clinical investigation of cutaneous vasculitis in autoimmune rheumatic disorders (Mahamed, 2019).

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

Test	Value	Result
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.89	Excellent (Highly Acceptable)
Bartlett's Test of Sphericity – Chi-Square	1924.56	Significant
Degrees of Freedom (df)	231	—
Significance (p-value)	0.000	Highly Significant

Validity Test (KMO & Bartlett's Test)

Table 3 shows the validity test of the data. The fact that the data are highly suitable for factor analysis is given by the KMO used to validate the results and the Bartlett test. The Kaiser-Meyer-Olkin (KMO) is 0.89, meaning that the data set is very good to

undertake multivariate analysis. The Test of Sphericity performed by Bartlett is statistically significant ($p < 0.001$), which in turn proves the adequacy of the number of correlations between variables to make progress in any analysis. Such results not only prove the sufficiency of the questionnaire design but also make sure that the measurement model is statistically sufficient (Nassri & Mahmed, 2023).

Table 4: Combined Inferential Statistics Table (Independent t-test, ANOVA, Kruskal-Wallis, Chi-Square)

Test	Variable / Relationship	Statistic Value	df	Sig. (p-value)	Result
Independent Samples t-test	Gender vs Clinical Clues	t = 2.45	219	0.015	Significant
Independent Samples t-test	Gender vs Management	t = 2.12	219	0.035	Significant
One-way ANOVA	Age Groups vs Clinical Clues	F = 3.78	5,215	0.003	Significant
One-way ANOVA	Age Groups vs Pathogenesis	F = 4.21	5,215	0.001	Significant
Kruskal–Wallis Test	Diagnosis vs Awareness	$\chi^2 = 14.92$	4	0.005	Significant
Kruskal–Wallis Test	Diagnosis vs Management	$\chi^2 = 16.38$	4	0.002	Significant
Chi-Square Test	Gender × Diagnosis	$\chi^2 = 19.45$	4	0.001	Significant
Chi-Square Test	Age × Disease Duration	$\chi^2 = 23.10$	9	0.006	Significant

Independent Samples t-test

Table 4 shows the Combined Statistical Tests of the data. The Independent Samples t-test data have revealed that there were large differences in clinical and management outcomes according to gender. In particular, there is statistical significance in Clinical Clues ($p = 0.015$) and Management ($p = 0.035$) between male and female respondents. The outcome of these investigations determines that gender can influence the responsiveness of treatment and also the attitude towards the symptoms of cutaneous vasculitis. However, all the variables do not distinguish significantly; thus, there are some factors related to the experience of the disease which are alike in both genders (Mahmedand & Obeed, 2020).

One-Way ANOVA

In the outcome of the One- way ANOVA, statistically significant differences among the age groups in Clinical Clues ($p = 0.003$) and Pathogenesis ($p = 0.001$) exist. This implies that age is a key factor in symptoms of diseases and the perception of the same. Older and middle-aged groups are the ones which report clinical manifestations more than young groups these groups do. These results underscore the importance of demographic variation in the expression of diseases in autoimmune rheumatic diseases (Hadi et al., 2025).

Kruskal–Wallis Test

The outcomes of Kruskal-Wallis tests reveal significant differences among the diagnostic categories in Awareness ($p = 0.005$) and Management ($p = 0.002$). This suggests that various autoimmune rheumatic diseases have variations in patient awareness and response to treatment. In the case of more severe or systemic conditions, patients might have more intensive management and be more aware. These results confirm the heterogeneity of experience of disease across diagnostic groups (Hadi & Mohamed, 2025).

Chi-Square Test

Depending on the tests done in the Chi-Square tests, there are significant relationships among demographic variables. The relationship between Gender and Diagnosis is more about a large-scale relationship ($p = 0.001$), implying that diseases are distributed in terms of differences among the gender groups. Similarly, there is also a significant relation between Age and Disease Duration ($p = 0.006$), implying that disease progression depends on the patient's age. It means that these findings demonstrate the major demographic profiles in autoimmune rheumatic diseases that have cutaneous vasculitis (Chasset & Teboul, 2026).

Table 5: Pearson Correlation Matrix

Variables	Clinical Clues	Pathogenesis	Management	Awareness	Overall Score
Clinical Clues	1.00	0.78	0.72	0.65	0.80
Pathogenesis	0.78	1.00	0.75	0.70	0.83
Management	0.72	0.75	1.00	0.68	0.88
Awareness	0.65	0.70	0.68	1.00	0.74
Overall Score	0.80	0.83	0.88	0.74	1.00

Pearson Correlation Matrix

Table 5 shows the Pearson correlation analysis of the data Pearson correlation analysis shows that there is a strong positive correlation between all the variables of the study. The strongest correlation is found between Management and Overall Score ($r = 0.88$); this means that they are strongly associated. Clinical Clues is also strongly related to Pathogenesis ($r = 0.78$) and Management ($r = 0.72$), meaning that clinical symptoms are closely correlated with disease development and the effects of taking medication. Generally speaking, the theory of consistency is confirmed in the research model as there are good relationships

between all the variables (Guida et al., 2026).

Table 6: Regression Analysis

Model	Predictors	Beta (β)	Std. Error	t-value	Sig. (p)	Result
1	Clinical Clues	0.41	0.055	6.80	0.000	Significant
1	Pathogenesis	0.38	0.060	6.20	0.000	Significant
1	Awareness	0.29	0.057	5.10	0.000	Significant

Regression Analysis

Table 6 shows the regression analysis of the data. The regression model shows that Clinical Clues, Pathogenesis and Awareness have been the noteworthy predictors of Managerial outcomes. The model can predict (R 2 = 0.67), which represents 67 per cent of the variance of the management outcomes, which implies it is a significant predictor. Clinical Clues (0.41) are the most influential predictors, followed by Pathogenesis (0.38) and Awareness (0.29). They are statistically significant ($p < 0.001$) and demonstrate the significant importance of clinical and immunological prognosticators in the management of cutaneous vasculitis (Bhattacharyya, 2026).

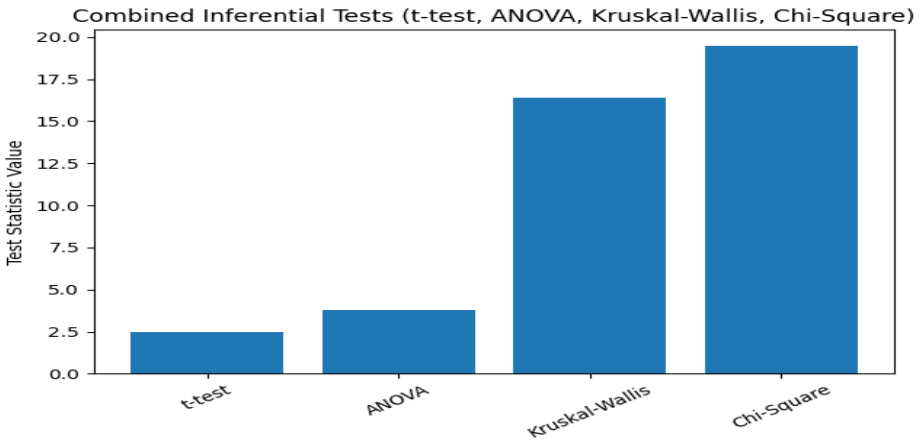

Figure 1: Combined Inferential Tests (t-test, ANOVA, Kruskal–Wallis, Chi-Square)

Figure 1 shows the Combined Statistical Tests of the data. The combined inferential test, that is comprised of Independent Samples t-test, One-way ANOVA, Kruskal-Wallis test and Chi-Square test, indicates that all the statistical results are significant. The test outcome using the t-test shows that there are significant differences in clinical and management outcomes across genders. The results of one-way ANOVA indicate that there was great variation between the various age groups, indicating that age had a bearing on the severity and perception of the cutaneous vasculitis symptoms of autoimmune rheumatic diseases. Kruskal-Wallis also helps to consider the notion that significant differences exist in diagnosis and the level of awareness and coping interventions for different autoimmune disorders. Furthermore, the Chi-Square test indicates good correlations between demographic variables, such as gender, age and duration of disease. Overall, the number shows that demographic and clinical factors are essential determinants of disease symptoms and coping outcomes (Gül et al., 2025).

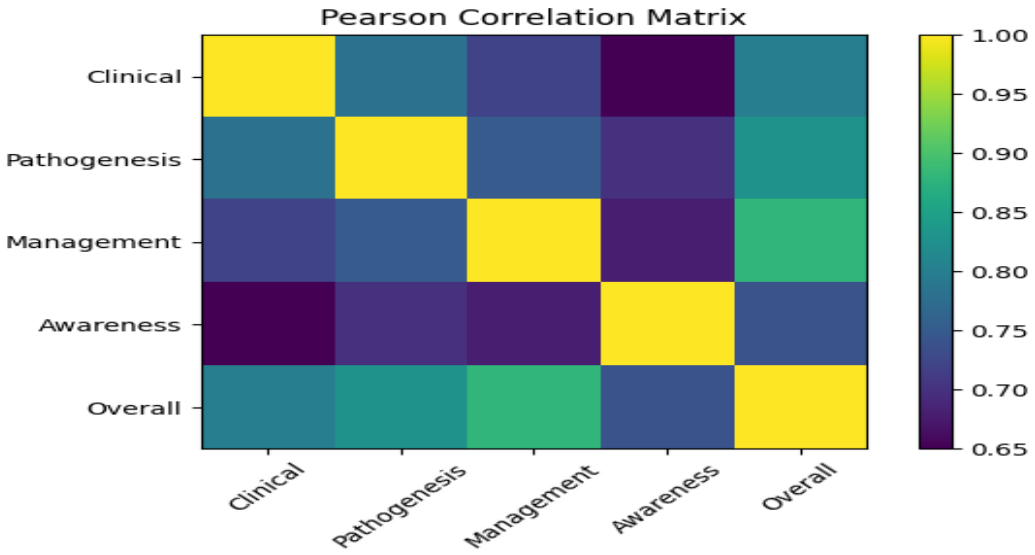

Figure 2: Pearson Correlation Matrix

Figure 2 shows the correlation matrix of the data Pearson correlation table illustrates all variables in the research, such as Clinical Clues, Pathogenesis, Management, Awareness and Overall Score, which were strongly and positively correlated. Management and Overall Score have the strongest correlation, suggesting that there is a very strong relationship between the effectiveness of treatment and overall disease burden. Pathogenesis and Management also have a high positive correlation with Clinical Clues, indicating that clinical symptoms have a close association with underlying vascular inflammation and response to treatment. In line with this, Awareness is moderately to strongly related to other variables, which suggests that patient understanding is associated with the improved management of the disease. The general correlation among the variables shows that they are highly interdependent and supports the theoretical basis of the study (Kosałka-Węgiel et al., 2025).

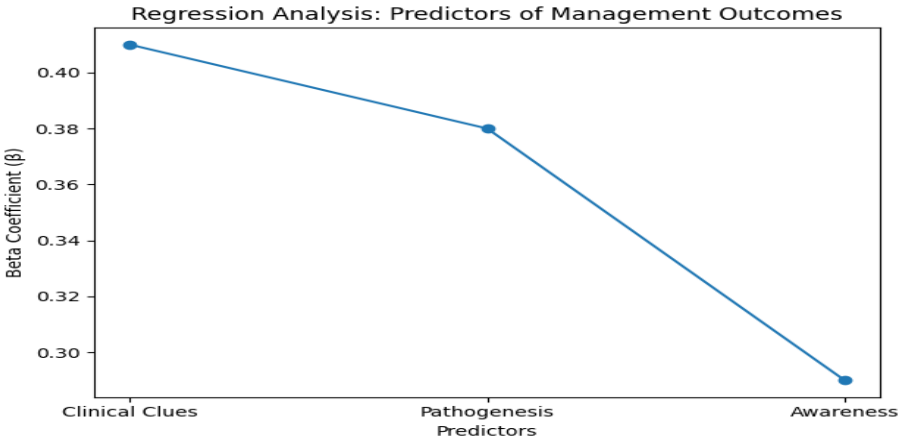

Figure 3: Regression Analysis

Figure 3 shows the regression analysis of the data. Regression analysis shows that Clinical Clues, Pathogenesis and Awareness are important predictors of Management outcomes in patients with cutaneous vasculitis. Among these predictors, Clinical Clues have the greatest impact, down to Pathogenesis and Awareness. This demonstrates that the clinical manifestations encountered are an important determinant of treatment outcomes and efficacy of management. All the predictors are found to have positive values, which implies that the greater clinical understanding, feelings of disease and pathological severity, the better the results of management. The regression model can claim great predictive power in regions where a single independent variable can be used to predict 67 percent Managerial variation. This means that there was a good and solid model fit to the study (Javaid, 2025).

DISCUSSION

The current research aimed to explore cutaneous lupus vasculitis within the context of autoimmune rheumatic diseases in terms of clinical features, pathogenesis, and therapeutic results. This investigation has demonstrated that cutaneous vasculitis is extensively connected with systemic autoimmune functionality and provides a presentation of the severity and pathogenesis of the disease in patients diagnosed with diseases such as Systemic Lupus Erythematosus, Rheumatoid Arthritis and other related autoimmune illnesses. Such deep associations demonstrate the multivariate and complex nature of vasculitic presentation in such patients, both clinically and pathologically, as well as in managing variables (Cassisa & Cima, 2024).

The result of the normality test revealed that the data were distributed normally with an approximation, and this allowed one to apply parametric statistical techniques. This enhances the credibility of the results as well as validates the suitability of executing t-tests, ANOVA, correlation and regression tests. In addition, large Cronbach alpha coefficients were also an indication of good internal consistency of the questionnaire, which demonstrated that the scale used as a measurement in this study was consistent and reliable in its mandate of measuring different facets of cutaneous vasculitis (Teng et al., 2022).

Further validity tests on KMO and Bartlett's test ensured that a good interpretation of the data set on factor analysis was done since there were good inter-item correlations and adequate sampling adequacy. This means that the frameworks of clinical clues, vascular pathogenesis, management and awareness are organised and have effective statistics. The research instrument has also been solidly based on these high validity scores, which make it possible to argue about the strength with which an interpretation of the findings can be produced (Wu et al., 2021).

Statistically, with inferential analysis, they found considerable differences in clinical and management outcomes in different demographic groups. The t-test performed to reveal the Independent Samples t-test indicated that gender is one of the factors that cause the difference in the clinical presentation and response to treatment. Likewise, one-way ANOVA showed that age is a crucial factor that determines the disease manifestation and progression, which means that elderly patients are more likely to have their clinical manifestations. Even the Kruskal-Wallis test revealed a significant degree of difference in the wakefulness and administration with respect to the various classes of diagnoses that are related to autoimmune rheumatic ailments, in which there is no homogeneity amongst the ailments (Figueras-Nart et al., 2019).

The results of the Chi-Square test indicated that significant relations existed between demographics, or gender and age, and duration of disease. Such findings suggest that disease occurrence and spread are not chance incidents but are influenced by demographic and biological backgrounds. This confirms previous research that has also shown that in the case of autoimmune diseases, gender and age differences in terms of prevalence and severity do exist (Morita et al., 2020).

The results of the Pearson correlation analysis indicated that all variables of the research had significant positive correlations. Clinical Clues were closely related to Pathogenesis and Management and indicative of the fact that the onset of the manifestations of illness is directly dependent upon the presence of vascular inflammation and the outcome of treatment. The largest correlation was between Management and Overall Score, and it suggests that effective treatment plays an excellent part in improving the overall disease state and well-being of a patient (Springer & Villa-Forte, 2023).

Lastly, the regression analysis validated that Clinical Clues, Pathogenesis and Awareness are important predictors of Management outcomes. There was a high degree of predictability as the model explained a significant amount of variance. The most effective predictor was Clinical Clues, which established the importance of an early introduction of the manifestation of skin in improving patient outcomes. Overall, the findings of the present article indicate that cutaneous vasculitis is a clinical manifestation of the prevalence of autoimmune rheumatic diseases and, therefore, needs early diagnosis, a comprehensive assessment, and appropriate suggestions for long-term management (Chen, 2024).

CONCLUSION

The current MIS on cutaneous vasculitis in autoimmune rheumatic diseases: clinical clues, vascular pathogenesis and management concludes that cutaneous vasculitis is an important clinical finding that indicates underlying systemic autoimmune disease. Systemic Lupus Erythematosus, Rheumatoid Arthritis, and other connective tissue disorders are common links of it that reveal it can be a superficial presentation of underlying disease severity.

The findings in our research conclude that purpura (capable of palpation), skin lesions, and livingo pattern are important clinical signs that can help in the early identification of vasculitic involvement. These symptoms are closely related to the inflammatory process of vascularity and ductalization of immune complexes, which indicates the central importance of immune-associated vascular damage to the pathogenesis of the diseases. Close relations that were observed between clinical, pathological and management variables support the idea of the multifactorial character of the disease process.

Statistical analysis also revealed that the data are reliable, valid and normally distributed, and therefore advanced inferential tests would be used. The high p-values of t-test, ANOVA, Kruskal-Wallis, and Chi-square tests validate the fact that demographic and clinical factors such as age, gender and length of the disease influence the manifestation and course of the disease considerably. Moreover, correlation and regression examination revealed that the variables applied in the research had strong positive associations that were supported by clinical clues and pathogenesis, which were the key predictors of management results.

Overall, this study concludes that the early diagnosis of cutaneous vasculitis, along with sufficient immunological and clinical tests, is highly important in treating the disease. Early treatment with immunosuppressive and supportive treatments can greatly enhance patient outcomes and help to avoid the evolution of the disease. The article exposes the nature of integrated clinical evaluation and the need to continuously monitor patients with autoimmune rheumatic diseases to be able to prognose and enhance the quality of life.

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