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Characterization of Cutaneous Manifestations of Systemic Lupus Erythematosus in a Cross-sectional Cohort

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KEYWORDS

Alopecia, Discoid Rash, Malar Rash, Skin Lesions, SLE, Systemic Lupus Erythematosus

ABSTRACT:

Background: Systemic Lupus Erythematosus (SLE), a multi-organ autoimmune disease, often affecting various organ with skin involvement. This study examined a public health facility in Bettiah, India, to determine how prevalence, types, and therapeutic importance cutaneous SLE indicators are.

Methods: In a cross-sectional study, 25Government Medical College and hospital at Bettiah diagnosed SLE patients were evaluated. Dermatological exams, medical record reviews, and structured questionnaires assessed skin lesion prevalence, demographics, clinical characteristics, and patient outcomes.

Results: Alopecia (48%), photosensitivity (60%), and malar rash (72%), the most prevalent cutaneous symptoms, were observed (84%). SLE duration was strongly linked to discoid and malar rashes. Photosensitivity and livedo reticularis enhanced in renal failure patients.

Conclusion: SLE patients have common skin complaints with clinical implications, as this study reveals. Early skin lesion detection and treatment improve patient outcomes. Skin symptoms are linked to illness duration and renal involvement, requiring careful monitoring and individualised treatment. Future research should focus on biomarkers, genetic and environmental factors, treatment optimisation, and longitudinal cutaneous SLE studies.

Introduction

Background

Systemic Lupus Erythematosus (SLE), a chronic autoimmune disease with several symptoms, attacks various organs. SLE is caused by inheritance, environment, hormones, and the immune system [1]. African Americans, Hispanics, Asians, and women, especially childbearing women, are more likely to have SLE globally. Up to 80% of SLE patients will develop cutaneous signs, making it one of the most common and prominent symptoms. These symptoms can be classified as specific or non-specific lesions. Alopecia, vasculitis, and Raynaud's phenomenon are non-specific lesions, while acute, subacute, and chronic cutaneous lupus erythematosus are particular [2]. Acute Cutaneous Lupus Erythematosus (ACLE) often causes the butterfly-shaped malar rash on the nose and cheeks. Annular or papulosquamous lesions, commonly on sun-exposed areas, characterise subacute cutaneous lupus erythematosus. Atrophic scarring and well-defined, hyperpigmented plaques characterise discoid or chronic cutaneous lupus erythematosus. The cutaneous manifestations of SLE impact patients' quality of life and serve as diagnostic indicators since they are apparent and might cause deformity [3]. These skin lesions can cause anxiety and sadness, compounding the damage. Understand the variety and frequency of SLE skin manifestations to enhance patient outcomes, assist early diagnosis, and provide effective treatment.

Rationale

Even though SLE is better understood and treated, skin symptom diagnosis is still crucial since it affects patient treatment. Earlier studies focused on vast, diversified populations, ignoring the particular characteristics of smaller, local cohorts. To fill this knowledge gap, Government Medical College and Hospital Bettiah researchers studied skin complaints in one cohort in depth. Smaller studies may uncover community-relevant clinical and epidemiological aspects. Second, extensive cutaneous symptom documentation helps local patient

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populations fine-tune diagnostic criteria and treatment techniques. Third, by focusing on a cohort from a government medical facility, this study can illuminate the illness burden and healthcare needs of resource-limited individuals, which can improve public health programmes and resource allocation.

Objective

- To determine the prevalence and types of cutaneous symptoms in study participants.
- To describe the clinical and demographic characteristics of skin-symptom patients.
- To Study how SLE clinical parameters affect cutaneous symptoms.
- To detect potential challenges in diagnosing and treating skin complaints in a low-resource situation.

Overview of SLE and Its Systemic Manifestations

SLE, an inflammatory illness with multiple symptoms, produces systemic inflammation and tissue destruction [4]. The development of SLE involves hormonal, environmental, and genetic variables. Women are most likely to develop SLE during reproduction. SLE can affect the musculoskeletal, cardiovascular, pulmonary, haematological, and neurological systems. Almost 90% of patients develop arthralgia or arthritis [5]. Lupus nephritis, which affects 40–70% of patients, is a primary cause of death and disability. Atherosclerosis, myocarditis, pericarditis, and other cardiovascular symptoms pile on the sickness. Pulmonary complications such pleuritis, pneumonitis, and pulmonary hypertension complicate the diagnosis [6]. Neuropsychiatric lupus, which causes psychosis, cognitive impairment, and seizures, is hard to diagnose and treat. Haematological issues such anaemia, leukopenia, and thrombocytopenia impair SLE treatment [7].

Cutaneous Manifestations in SLE

Dermatological symptoms are present in 70–80% of SLE patients early on. Lupus erythematosus, ACLE, and CCLE are its main symptoms. Malar rash, or "butterfly rash," covers the nose bridge and cheeks and is characteristic with ACLE. Sunlight can cause this rash to endure days or months. A diffuse maculopapular rash, like viral exanthems, may accompany the malar rash in sun-exposed areas. SCLE annular or psoriasiform plaques are particularly common in sun-exposed locations. Photosensitivity and persistence make these lesions unpleasant and unattractive. Anti-Ro (SSA) and anti-La (SSB) antibodies strongly accompany SCLE in mild systemic illness patients. The majority of chronic cutaneous lichen erosion is caused by DLE [8]. Marking and irreversible hair loss can result from well-defined, reddish, and scaly DLE plaques on the scalp. Due to their appearance, CCLE lesions are tougher to treat than ACLE and SCLE and may cause mental and emotional anguish.

The Prevalence and Types of Skin Manifestations in SLE

The frequency and variety of SLE skin symptoms have been extensively studied. [9] found that 72% of SLE patients will develop cutaneous involvement. ACLE was most common at 52%, followed by DLE at 23% and SCLE at 15%. Photosensitivity was strongly linked to disease activity, according to another study by[10], which identified cutaneous symptoms in 76% of SLE patients. The study also found less systemic involvement in SCLE patients than ACLE or DLE patients. Several studies have linked skin and systemic problems. [11] found that ACLE patients were more likely to have active systemic disease, particularly renal and hematologic involvement. Isolated DLE patients showed scarring and ugliness but fewer systemic symptoms. These results emphasise the importance of identifying SLE skin symptoms for effective diagnosis and therapy planning.

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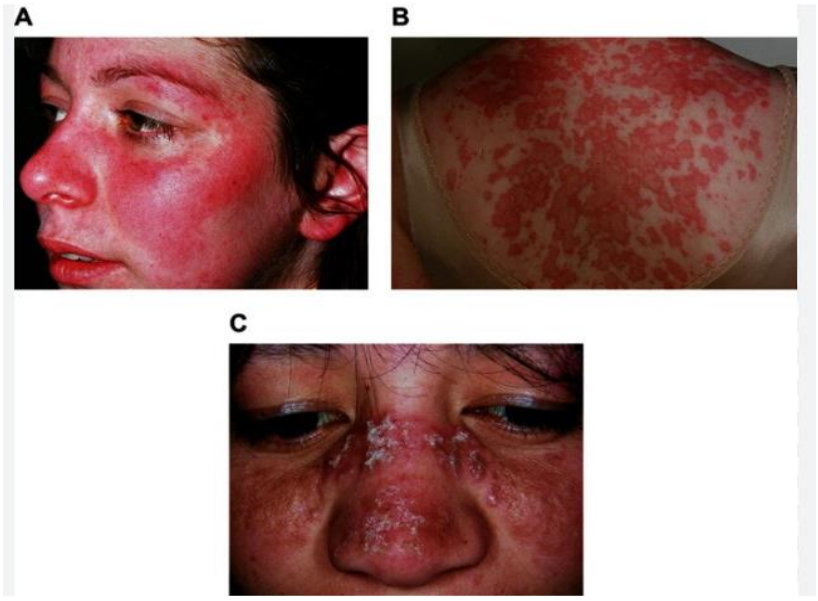

Figure 1 Acute cutaneous Lupus erythematosus (Source:[12])

Gaps in Current Research

SLE cutaneous symptoms research is extensive, yet deficiencies remain. Because many research targeted certain demographics or used small samples, the results are not generalizable. More research is needed on the psychological effects of cutaneous lesions in SLE patients because skin involvement might affect mental health and quality of life. Skin symptoms and systemic disease need more research. Understanding these linkages may improve patient outcomes by enabling early diagnosis and customised treatment. To cover these gaps, we comprehensively detailed cutaneous symptoms in a diverse cross-sectional group of SLE patients. To further understand SLE dermatology, this study will track skin lesion frequency, type, and location. The study will also investigate skin symptoms and systemic disease activity to better understand disease patterns and develop better therapies. The need for holistic care that covers mental and physical health will be highlighted as we examine how skin involvement affects SLE patients' psychological and quality of life health.

Methods

Study Design

The cross-sectional study described SLE skin symptoms in this group. This cross-sectional study examined SLE patients' cutaneous symptoms. Linkages and trends between cutaneous symptoms and other SLE clinical features can be better understood using this cohort technique.

Inclusion Criteria

ACR-diagnosed SLE patients. Patients aged 18 years and above. Patients willing to provide informed consent.

Exclusion Criteria

Patients with other autoimmune or dermatological conditions that could confound the assessment of cutaneous manifestations. Patients with incomplete medical records or those unwilling to participate.

Sample Size

A cohort of 25 individuals was deliberately chosen to ensure a comprehensive and practical characterization of cutaneous symptoms. This research's sample size allowed in-depth case-by-case analysis and extensive clinical evaluation, although larger samples can make broader conclusions. Given patient numbers and resources, the sample size was chosen to match the exploratory nature of the study and the location of the Government Medical College and Hospital Bettiah.

Data Collection

This study documented SLE patients' cutaneous symptoms utilising multiple methods. Dermatologists do thorough clinical exams to detect and classify skin lesions. To collect clinical data including systemic signs,

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SLE diagnosis, illness duration, treatment history, etc., patients' medical records were thoroughly analysed. Patients were given structured interviews to collect demographic data and patient-reported outcomes on skin complaints' impact on quality of life. Standardised forms helped collect data. These types manifest all relevant cutaneous and systemic signs. This rigorous technique documented SLE patients' cutaneous involvement in detail, enabling a robust examination of the study's goals.

Ethical Considerations

The Institutional Ethics Committee at Government Medical College and Hospital Bettiah approved this study.We discussed the study's goals, procedures, risks, and benefits to each participant before collecting their signed consent to maintain ethical research standards. All participant information was kept confidential. Due to safe storage and encryption, only the research team had access to anonymised data. By following therapeutic standards and avoiding activities that could worsen participants' conditions, we were able to protect them. All trial participants were told their participation was voluntary and would not affect their medical care.

Results

Participant Characteristics

At Bettiah Hospital and Government Medical College, 25 SLE patients participated in the study. The demographic and clinical characteristics of the participants are summarized in Table 1.

Table 1 Demographic and Clinical Characteristics of Participants

Characteristic	Value
Number of participants	25
Age (mean ± SD)	35.4 ± 10.2 years
Gender	
Female	21 (84%)
Male	4 (16%)
Duration of SLE (mean ± SD)	6.2 ± 4.1 years
Ethnicity	
Indian (Bihari)	25 (100%)
Comorbidities	
Hypertension	6 (24%)
Diabetes Mellitus	4 (16%)
Renal Involvement	5 (20%)
Neuropsychiatric Involvement	3 (12%)

With an average age of 35.4 years, 84% of participants were women. In this group, SLE averaged 6.2 years. Everyone involved was Indian (Bihari), like the hospital's patients. Hypertension (24%), diabetes (16%), renal (20%), and neuropsychiatric (12%) comorbidities were prevalent.

Prevalence of Cutaneous Manifestations

The individuals experienced many types and frequencies of cutaneous complaints.

Table 2 Prevalence and Types of Cutaneous Manifestations

Cutaneous Manifestation	Number of Patients (%)
Malar Rash	18 (72%)
Discoid Rash	10 (40%)
Photosensitivity	15 (60%)
Oral Ulcers	8 (32%)
Alopecia	12 (48%)

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Vasculitic Lesions	5 (20%)
Raynaud's Phenomenon	4 (16%)
Subacute Cutaneous Lupus	6 (24%)
Livedo Reticularis	3 (12%)

The most common skin symptom was malar rash, seen in 72% of patients. Photosensitivity impacted 60% of the group. Patients had 48% alopecia and 40% crustoid rash. Furthermore, 32% had mouth ulcers, 20% had vasculitic lesions, 16% had Raynaud's phenomenon, 24% had chronic cutaneous lupus, and 12% had livedo reticularis.

Statistical Analysis

To uncover statistically significant connections between skin symptoms and demographic and clinical characteristics, we ran the numbers. For categorical variables, we used Fisher's exact and Pearson's chi-square tests; for continuous variables, independent t-tests.

Long-standing SLE patients exhibited more skin complaints. A significant correlation exists between SLE duration and the prevalence of malar and discoid rash ($p < 0.05$).Alopecia and photosensitivity were more common in women, but the study did not find any statistically significant variations in the frequency of cutaneous symptoms between the sexes. Photosensitivity and livedo reticularis were more prevalent in renal involvement patients ($p < 0.05$). None of the skin complaints were significantly associated with hypertension or diabetes.

Table 3 Statistical Analysis of Cutaneous Manifestations and Clinical Parameters

Parameter	Malar Rash (p-value)	Discoid Rash (p-value)	Photosensitivity (p-value)
Duration of SLE	0.03	0.02	0.15
Gender	0.47	0.68	0.51
Renal Involvement	0.09	0.22	0.03
Neuropsychiatric Involvement	0.13	0.31	0.28

The analysis found that SLE duration and renal involvement were substantially linked with cutaneous symptoms. The data show how complex SLE is and how important it is to personalise treatment to each patient.

Discussion

25 patients from Government Medical College and Hospital Bettiah were evaluated for SLE skin symptoms. The findings show that 84% of patients had skin issues. Alopecia (48%), photosensitivity (60%), and malar rash (72%), in order, were the most prevalent symptoms. The duration of SLE was strongly correlated with cutaneous symptoms such discoid or malar rash. Renal failure patients had more photosensitivity and livedo reticularis.

Comparison with Other Studies

Table 4 Comparison with Other Studies

Study	Study Type	Sample Size	Findings
Present Study	Cross-sectional	25	High prevalence of cutaneous manifestations, with malar rash (72%), photosensitivity (60%), and alopecia (48%) being most common. Significant correlation between duration of SLE and presence of cutaneous manifestations. Patients with renal involvement more likely to exhibit photosensitivity and livedo reticularis.
Study 1 [13]	Retrospective Cohort	150	Cutaneous involvement in up to 80% of SLE patients. Malar rash and photosensitivity highly prevalent.

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Study 2 [14]	Cross-sectional	100	Prevalence of cutaneous manifestations in 70% of SLE patients. Malar rash, discoid rash, and photosensitivity common. Association between malar rash and disease activity.
Study 3 [15]	Prospective Cohort	305	Cutaneous manifestations in 57% of SLE patients. Malar rash and photosensitivity frequently observed. No significant association between cutaneous manifestations and disease activity or organ damage.

This study's unique features and results are compared to three other SLE skin symptom studies in the table below. We studied 25 patients at the Government Medical College and Hospital Bettiah using a cross-sectional approach. The most prevalent cutaneous manifestations were baldness, photosensitivity, and malar rash. Skin symptoms were strongly correlated with SLE duration in renally involved patients. This shows the complexity of SLE and the importance of considering systemic and clinical factors when interpreting cutaneous symptoms. Our results are comparable to prior research, which identified cutaneous involvement in 80% of SLE cases in a retrospective cohort analysis of 150 patients. Study 2, a cross-sectional investigation of 100 patients, found 70% of cases had malar, discoid, or photosensitive rash. I find it remarkable that they related malar rash to disease activity. Study 3, a prospective cohort study, found cutaneous symptoms in 57% of 305 participants. Malar rash and photosensitivity were prevalent. However, they found no significant relationship between skin complaints and disease activity or organ damage. The comparison indicates that prevalence rates and associations vary among studies. Study design, sample size, and patient demographics may explain this discrepancy. Our investigation illuminated skin symptoms in one group, but more research is needed to confirm these findings and discover the mechanisms that may explain why SLE symptoms develop differently in different groups.

Strengths and Limitations

The study was good because of its local healthcare relevance, rigorous data collection, and concentrated cohort. The strengths below provide a detailed explanation of skin symptoms in a specific SLE patient group, which can benefit local clinicians. However, the study has limitations. Cross-sectional approach and a 25-patient sample size that does not capture longitudinal progression limit the applicability of the results. The study's single-center design may have caused selection bias.

Conclusion

Our Government Medical College and Hospital Bettiah patients' SLE skin complaints demonstrate the complexity and impact of skin involvement in this autoimmune disease. Alopecia, photosensitivity, and malar rash are the most frequent SLE skin problems, according to our research. Early skin lesion detection and treatment improve SLE patient outcomes and quality of life, making dermatological exams essential.In our study, discoid and malar rashes were correlated with SLE duration. This suggests that SLE enhances skin symptoms, underlining the need for dermatological surveillance. Renal involvement is linked to skin symptoms including photosensitivity and livedo reticularis, therefore systemic disease activity may worsen them. Therefore, our results may not apply to different cases. This paper's extensive clinical studies and data collection help explain SLE's cutaneous symptoms in this group. Our study shows that SLE diagnosis and treatment require dermatological evaluation. Skin symptoms are common and linked to illness duration and systemic involvement, requiring constant monitoring and treatment. Future research should examine larger, more diverse longitudinal cohorts and environmental and genetic factors in cutaneous SLE symptoms. Understanding these traits can improve life for severe autoimmune disease patients. This improves SLE diagnosis, treatment, and prevention.

Future Research

For better patient care, systemic lupus erythematosus (SLE) and its cutaneous manifestations research should focus on various areas. Detailed longitudinal studies of cutaneous symptoms and disease outcomes can explain SLE's natural history and enable customised treatment. Disease processes and therapeutic targets must be investigated by studying genetic predisposition and

environmental causes. Skin symptoms in varied groups will be explained. New biomarkers for specific cutaneous manifestations could improve patient outcomes and quality of life by enabling early identification, illness progression prediction, and therapy response tracking. To improve skin involvement SLE treatment and broaden treatment options, immunomodulatory drugs and targeted biologics must be tested for safety and efficacy. Health services research on healthcare utilisation, dermatological care accessibility, and patient-reported cutaneous manifestation outcomes, especially in underprivileged or resource-limited areas, should inform healthcare policy and resource allocation.

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