

CLINICAL AND IMMUNOLOGICAL PROFILE OF SYSTEMIC LUPUS ERYTHEMATOSUS: AN INSTITUTIONAL STUDY

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ABSTRACT

Background: Systemic Lupus Erythematosus is a chronic, multisystem autoimmune disease characterized by the production of autoantibodies and immune complex-mediated tissue injury, resulting in diverse clinical manifestations and variable disease course. The heterogeneity in clinical presentation and immunological profile across populations necessitates region-specific evaluation. This study was conducted to analyze the clinical spectrum and immunological characteristics of SLE patients and to assess the correlation between autoantibody profile and clinical manifestations. **Materials and Methods:** This retrospective and prospective study included 24 patients who fulfilled the classification criteria of the American College of Rheumatology. Patients were evaluated over a one-year period. Detailed clinical assessment was performed, including cutaneous, musculoskeletal, renal, neurological, hematological, and cardiopulmonary involvement. Laboratory investigations included complete blood count, erythrocyte sedimentation rate (ESR), renal and liver function tests, and urine analysis. Immunological evaluation comprised antinuclear antibody (ANA) testing and extractable nuclear antigen (ENA) profile including anti-dsDNA, anti-Smith, anti-SSA, anti-SSB, anti-U1RNP, and antiphospholipid antibodies. Statistical analysis was performed using descriptive statistics. **Results:** The study showed a strong female predominance (95.8%) with a female-to-male ratio of 23:1. The mean age of patients was 34 years, with the highest incidence observed in the 26–45-year age group. Hematological manifestations were the most common, with anemia observed in 87.5% of patients, followed by arthritis (45.8%) and renal involvement (41.7%). Cutaneous manifestations included photosensitivity (41.7%) and malar rash (25%). Neurological manifestations such as seizures (12.5%) and psychosis (4.2%) were less frequent. ANA positivity was seen in 100% of patients. Anti-dsDNA antibodies were present in 41.7% and showed a significant association with pericarditis. Anti-U1RNP antibodies were associated with hepatomegaly, while anti-Scl-70 antibodies were associated with gastrointestinal manifestations. ESR was elevated in the majority of patients. **Conclusion:** SLE predominantly affects young females and presents with a wide spectrum of clinical and immunological features. Hematological abnormalities are the most frequent manifestations, followed by musculoskeletal and renal involvement. ANA remains a highly sensitive diagnostic marker, while specific autoantibodies such as anti-dsDNA correlate with disease activity and organ involvement. Understanding the clinical-immunological correlation is essential for early diagnosis, prognostication, and effective management of SLE patients.

INTRODUCTION

Systemic lupus erythematosus (SLE) is a typical autoimmune disease with varied clinical manifestations involving multiple organs,^[1] and is characterized by a spectrum of immunological

abnormalities and production of autoantibodies resulting in widespread inflammation causing tissue and organ damage. The prevalence of SLE is 6.5 to 178.0 per 1,00,000 globally,^[2] with varying epidemiologic information. The incidence rate and severity of clinical manifestations of SLE are higher

among Asians and individuals of African origin than Caucasians.^[2] Variations observed in the clinical presentation and disease course of SLE among different populations suggest the importance of genetics in disease pathogenesis.^[3]

Systemic lupus erythematosus (SLE) usually develops in a small subset of patients over 50 years ranging from 6–18% of cases. These patients frequently show a more insidious onset with non-specific clinical features,^[4,5] leading to a delay in the correct diagnosis and follow-up.^[6]

In India, the reported prevalence of SLE is 3.2 per 100,000.^[7] In North and West Indian areas, SLE patients,^[8] have higher proportions of malar rash, arthritis, renal, and hematological manifestations. In contrast, serositis and hematological manifestations were reported to be more frequent in SLE patients from Kolkata, East India in comparison to other manifestations.^[9] Arthritis and hematological manifestations were reported to be more common in SLE patients from South India.^[10]

An Indian study of 100 patients showed that prolonged fever was the commonest presenting symptom. Other symptoms with decreased frequency were arthralgia, hemolytic anemia, malar rash, splenomegaly, lymphadenopathy, hepatomegaly.^[11] The present study focuses on re-evaluating the clinical and immunological features of patients presenting with SLE to our centre.

Aim and Objective

- To study the clinical and immunological profile of patients with SLE
- To correlate the antibody profile with clinical symptoms

MATERIALS AND METHODS

Study Design: Prospective and Retrospective study

Study Location: KMCH Hospital.

Study Population: Patients fulfilling the American College of Rheumatology (1982) for SLE.

Justification of sample size

Convenient sampling

Sample Size: SLE positive patients in the period of 2020 June to 2021 may.

Inclusion Criteria

- All patients satisfying the revised American College of Rheumatology criteria (1982) for SLE were included in the study,

Methodology

All patients satisfying the revised American College of Rheumatology criteria (1982) for SLE were included in the study over a one-year period. The classification criteria for Systemic Lupus Erythematosus proposed by the American College of Rheumatology in 1997 are widely used for diagnosis of SLE which includes patients who fulfill at least four out of eleven defined features, either simultaneously or serially during the course of illness. These criteria include mucocutaneous

manifestations such as malar rash, discoid rash, photosensitivity, and oral ulcers; musculoskeletal involvement in the form of non-erosive arthritis affecting two or more peripheral joints; serosal involvement presenting as pleuritis or pericarditis; renal disorders characterized by persistent proteinuria greater than 0.5 g/day or the presence of cellular casts; and neurological manifestations such as seizures or psychosis in the absence of other causes. Hematological abnormalities include hemolytic anemia, leukopenia, lymphopenia, or thrombocytopenia. Immunological criteria encompass the presence of anti-double-stranded DNA antibodies, anti-Smith antibodies, or antiphospholipid antibodies. Additionally, a positive antinuclear antibody (ANA) test is included as a separate criterion. These criteria, while highly useful for standardization, are primarily intended for classification rather than definitive diagnosis, and clinical judgment remains essential in individual cases.^[12]

Clinical assessment included information on medical history, presenting chief complaints, assessment of various organs involvement like cutaneous, musculoskeletal, nervous, cardiopulmonary and GIT. Routine investigations including complete blood count, ESR, urine analysis, 24 hr urine protein excretion, renal function tests, liver function tests, random blood glucose and lipid profile were done in SLE patients. Immunological investigations like anti-nuclear antibody (ANA), anti-dsDNA, anti-Sm, anti-SSA anti-SSB, Anti-U1RNP and anti Cardiolipin antibody were done wherever required. DATA were collected from the Medical records departments of KMCH.

Statistical Analysis

The collected data were analysed with IBM.SPSS statistics software. To describe about the data, descriptive statistics, frequency analysis and percentage analysis were used for categorical variables.

RESULTS

Of the 24 patients, 23 (95.8%) were females and 1 (4.2%) was male. The prevalence of the disease was higher in the female population (TABLE1, FIGURE 1). Out of the 24 patients, the prevalence was found to be highest in the the age group of 26 to 45 years (58%).The disease commonly manifested early in adult life. (TABLE 2, FIGURE 2). Out of 24 people, Anemia (87%) was the most common symptom among 21 patients in our study. [Table 3, FIGURE 3). Common ANA pattern in our study was cytoplasm granular Malar rash is associated with Anti- histone (0.010). Pericarditis is associated with dsDNA (0.006). Ulcerative colitis is associated with Anti scl-70(0.042) Hepatomegaly is associated with U1RNP (0.036). (Figure 4, Table 4)

Table 1: Distribution of Gender

GENDER	Frequency	Percent
Female	23	95.8%
Male	1	4.2%

Table 2: Distribution of age

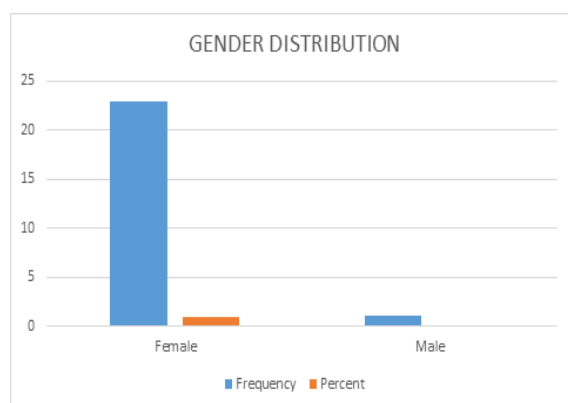
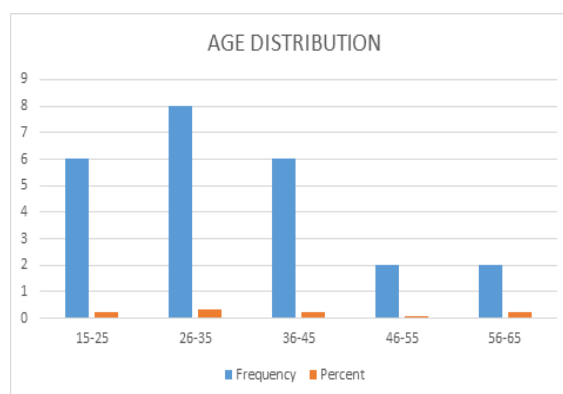
AGE	Frequency	Percent
15-25	6	25.2%
26-35	8	33.6%
36-45	6	25.2%
46-55	2	8.4%
56-65	2	25.2%

Table 3: Clinical Manifestation

Symptoms	Frequency	Percent
Malar rash	6/24	25%
Discoid rash	3/24	12.5%
Photosensitivity	10/24	41.7%
Oral ulcer	7/24	29.2%
Arthritis	11/24	45.8%
Pericarditis	5/24	20.8%
Pleuritis	2/24	8.3%
Hematuria	4/24	16.7%
Proteinuria	6/24	25%
Seizures	3/24	12.5%
Psychosis	1/24	4.2%
Anemia	21/24	87.5%
Leucocytopenia	2/24	8.3%
Thrombocytopenia	5/24	20.8%

Table 4: ANA Patterns

Parameters	Frequency	Percent
ds-DNA	10/24	41.7%
Smith	5/24	20.8%
U1-RNP	5/24	20.8%
SS-A	7/24	29.2%
SS-B	3/24	12.5%
Nucleosome	6/24	25%
RO-52	6/24	25%
Histone	3/24	12.5%
AMA M2	3/24	2.5%
Ribosomal P	2/24	8.3%
Anti MI-2	5/24	20.8%
Anti-Ku	5/24	20.8%
Cardiolipin	1/24	4.2%
Anti- Scl 70	1/24	4.2%

**Figure 1: Distribution of Gender****Figure 2: Distribution of age**

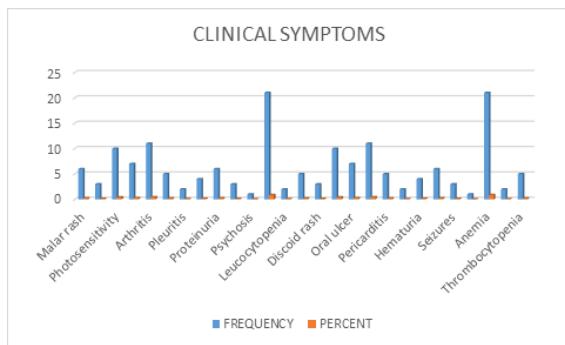


Figure 3: Clinical Manifestation

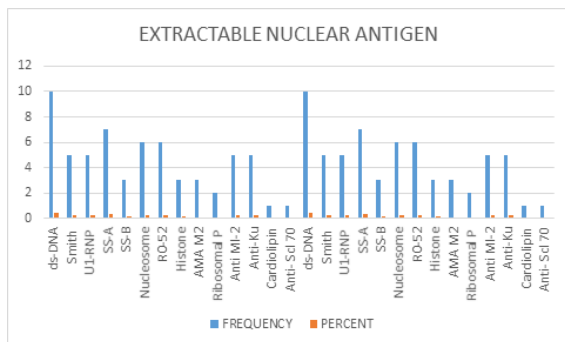


Figure 4: ANA Pattern

DISCUSSION

In the present study, out of 24 patients with Systemic Lupus Erythematosus, there was a marked female predominance, with 23 females and 1 male, and an age range of 17–64 years. The mean age was 34 years, and the female-to-male ratio was 23:1. Binoy et al. reported a comparable female predominance with a ratio of 19:1, while another Indian series by Malaviya et al. reported a ratio of 8:1.^[13,14] The increased prevalence among females is attributed to hormonal influences, although male patients exhibit a similar clinical profile. The median age in our study was 30 years, which is comparable to findings by Masi et al. and Hochberg et al. (31 and 30 years, respectively), while Binoy et al. reported an earlier median age of 21.6 years. Indian studies by Malaviya et al. and Vaidya et al. reported median ages of 24 and 26 years, respectively.^[13-16]

Malar rash was observed in 25% of patients in our study, which is lower than that reported by Malaviya et al. (66%), Vaidya et al. (53.18%), and Binoy et al. (40%).^[14-16] Discoid rash was seen in 12.5% of patients, which is higher than that reported by Malaviya et al. (5%) and Binoy et al. (5.3%).^[13,14] Photosensitivity was observed in 41.7% of patients, higher than that reported by Vaidya et al. (9.55%) and Binoy et al. (37%), but lower than Malaviya et al. (67%).^[14-16] These variations may be due to differences in geographic and occupational exposure. Oral ulcers were present in 21% of patients, which is lower than reports by Malaviya et al. (64%), Binoy et al. (64%), and Madhavan et al. (48.1%), possibly reflecting early disease manifestations or selection bias.^[13,14,17]

Hematological manifestations were prominent, with anemia observed in 87.5% of patients, which is higher than that reported in previous studies.^[13,14] Leukopenia was noted in 8.3% of patients, lower than earlier reports, while thrombocytopenia (20.8%) was higher compared to other Indian studies.^[13,14,17]

These differences may be attributed to disease duration and patient selection. Arthritis was observed in 45% of patients, which is lower than previous studies reporting higher frequencies, possibly due to its chronic nature and variation in disease duration.^[13,14,17] Cardiovascular manifestations were observed in 20.8% of patients, higher than earlier studies.^[13-16]

Neurological manifestations were present in 16.7% of patients, including seizures (12.5%) and psychosis (4.2%), showing variability when compared with other studies.^[13-17] Renal involvement was observed in 41.7% of patients, with hematuria in 16.7% and proteinuria in 25%, which is lower than that reported by Malaviya et al. (73%) but comparable to other studies.^[13,14,17] Pulmonary involvement was seen in 8.3% of patients, which is relatively lower compared to other Indian studies.^[13-16]

Immunologically, antinuclear antibody (ANA) positivity was observed in 100% of patients, slightly higher than reported in earlier studies, likely due to the use of more sensitive assays.^[13,14] Anti-double-stranded DNA antibodies were detected in 41.7% of patients, which is lower compared to previous studies.^[13,14]

The limitations of this study include the small sample size, likely influenced by the COVID-19 pandemic, and possible selection bias due to the predominance of younger patients. Further large-scale studies across diverse age groups are required for better generalization of findings.

CONCLUSION

In this study of patients with Systemic Lupus Erythematosus, the mean age at presentation was 34 years, with a median age of 30 years, and the highest incidence observed in the 26–35-year age group. Hematological manifestations were the most common clinical presentation, with anemia noted in 87% of patients, followed by arthritis (45%) and renal involvement (41.7%). Among hematological abnormalities, hemolytic anemia predominated, while leukopenia (8.3%) and thrombocytopenia (20.8%) were less frequent.

Immunologically, antinuclear antibody (ANA) positivity was observed in all patients, reaffirming its high sensitivity in SLE. Anti-double-stranded DNA (anti-dsDNA) antibodies were detected in 41.7% of cases and showed a significant association with pericarditis, indicating their relevance in disease activity and organ involvement. Anti-U1RNP antibodies were present in 20.8% of patients and were associated with hepatomegaly, while anti-Scl-70 antibodies, observed in 4.2% of cases, showed an

association with gastrointestinal manifestations such as ulcerative colitis.

Erythrocyte sedimentation rate (ESR) was elevated in the majority of patients and was markedly increased in those with active disease and vasculitis, reflecting its utility as an indicator of disease activity. Overall, the study highlights the diverse clinical and immunological spectrum of SLE and emphasizes the importance of correlating antibody profiles with clinical manifestations for improved diagnosis and management.

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