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Original Research Article

Clinical and Immunological Manifestations of Patients Presenting With Systemic Lupus Erythematosus At Tertiary Care Hospital, Karachi

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Abstract: *Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease that affects multiple organ systems, with a high prevalence among young women. It presents various clinical and immunological manifestations, including arthritis, skin rashes, oral ulcers, hematological abnormalities, and neurological involvement. Early diagnosis and management depend on recognising key clinical symptoms and autoantibody profiles. Understanding SLE patterns in different populations is essential for improving diagnostic accuracy, treatment strategies, and patient outcomes.* ***Objective:*** *This study aims to assess the clinical and immunological characteristics of SLE patients in a tertiary care hospital, identifying common symptoms, disease manifestations, and associated autoantibodies.* ***Methodology****: A cross-sectional study was conducted on 131 patients diagnosed with SLE at a tertiary care hospital. Data were collected on demographics, clinical symptoms, and immunological markers, including antinuclear antibodies (ANA), anti-dsDNA, anti-Sm, anti-Ro, anti-La, and antiphospholipid antibodies. Statistical analysis was performed using SPSS version 23 to determine the prevalence and associations of disease manifestations.* ***Results:*** *The study population had a strong female predominance (77.9%), with most patients aged 20–40 (77.9%). Arthritis (67.2%), skin rash (67.2%), oral ulcers (77.1%), and photosensitivity (67.2%) were the most frequent symptoms. Neurological involvement was noted in 36% of patients, while hematological abnormalities included hemolytic anemia (31.3%), thrombocytopenia (29.8%), and leukopenia (13%). Immunological analysis showed ANA positivity in 78.6% of patients, with anti-dsDNA (61.1%) as the most common specific autoantibody. Other antibodies included anti-Sm (20.6%), anti-Ro (15.3%), anti-La (14.5%), and anti-RNP (10.7%). Antiphospholipid antibodies were present in 15.3%–13.7% of patients, indicating a risk of thrombotic complications. Comorbid conditions, such as hypertension (32.8%), diabetes (21.4%), dyslipidemia (16.8%), smoking (25.2%), and obesity (23.7%), were also prevalent, highlighting increased cardiovascular risk.* ***Conclusion:*** *The findings emphasise arthritis, skin rash, oral ulcers, and anti-dsDNA positivity as key features of SLE diagnosis. The high prevalence of autoantibodies and cardiovascular risk factors calls for regular monitoring, multidisciplinary management, and early intervention to improve patient outcomes. Future research should focus on long-term disease progression and genetic predisposition, with more extensive multicenter studies to refine diagnostic and treatment strategies.*

Keywords: Systemic Lupus Erythematosus (SLE), Autoantibodies, Anti-dsDNA, Clinical Manifestations, Cardiovascular Risk, Lupus Nephritis, Antiphospholipid Syndrome

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Introduction

Systemic lupus erythematosus (SLE) is one of the chronic multisystem autoimmune disorders of the body in which the immune cells of our body mistakenly target our body's cells and tissues. This happens because of B and T cells' hyperactive response in our immune system. Our immune system cannot tolerate self-antigens. This disease is marked by production and impaired clearance of antibodies, deposition of immune complexes in the body tissues and activation of complement and cytokines (1). It affects multiple organs, i.e. kidneys, lungs, heart, brain, skin, etc. It mainly affects adult women but can affect children too. In compliance with one study, the exact incidence, prevalence, and gender of SLE remains unknown due to the lack of standardised methodology accepted by all studies (2). Its prevalence varies widely in different subcontinents. As far as Asia is concerned, the annual incidence ranges from 2.8 to 8.6 per 100,000 persons-year, and the prevalence alters from 26.5 to 103 per 100,000 persons-year, according to one study (3). Genetic and environmental factors, sex hormones, changes in B and T cell activity, and RES function abnormalities all play a significant role in the development of SLE. The characteristic feature of SLE is development of autoantibodies. Symptoms and severity of this disease utterly depend on the specific autoantibodies present (4, 5). Systemic lupus erythematosus runs in families, indicating a role of genes. Several types of genes related to the immune system that encode different immune components like HLA, IRF5, ITGAM, BLK, CTLA4, etc. are involved in the predisposition of the disease. Moreover, environmental triggers like irradiation, infections, smoking, etc. increase the risk of this disease as well (5).

Patients who have this disease suffer from some general symptoms like fever, weight loss, fatigue, etc., which are not SLE specific. However, as multiple organs are involved, patients may experience symptoms related to that particular organ. In cSLE hematological, neurological and renal manifestations seem to be more prominent, on the contrary, aSLE typically presents with Raynaud's phenomenon, pulmonary complications and photosensitivity (6, 7). The most common cause of morbidity and mortality among patients with SLE is lupus nephritis. One study found that noncanonical autophagy was more influential in developing lupus-like disease than macrophagy in macrophages (8). The American College of Rheumatology established the classification criteria for SLE and contains laboratory biomarkers like proteinuria, hemolytic anemia, urinary casts, antinuclear antibody (ANA), DNA antibody, etc (6-9). There are 11 criteria, out of which four should be favorable to build a diagnosis of SLE. The ACR criteria did not prove to help understand the clinical manifestations and laboratory diagnosis of SLE. However, the

classification criteria of SLE have progressed from previous versions, 1982 and 1997 revised ACR criteria, to SLICC and the latest EULAR/ACR 2019 criteria. Each set improved from the last by adding new helpful details and concepts (10-11). This disease has a relapsing–remitting pattern with worsening of symptoms followed by a symptom-free interval. Patients mainly present with symptoms related to joint, skin, mucosal inflammation, and some hematological abnormalities. In severe cases, the patient may experience cardiac, renal, pulmonary, and neurological complications, which could be lethal. Conditions like inflammatory myositis are barely noticed (11-13). SLE involves multiple autoantibodies and immune complexes. With time, as more advanced tests for autoantibodies are available, every single patient of SLE exhibits immunological irregularities (14-16). A study done by Khan et al found skin rash 10.7%, photosensitivity 85%, oral ulcers 81.4%, arthritis 65.7%, serositis 7.1%, neurologic disorder 10.7%, hemolytic anemia 57.4%, leukopenia 32.6%, thrombocytopenia 33.3%, Anti-dsDNA 50.7%, Anti-Ro 32.1%, Anti-La 19.3%, Anti-Sm 15%, Anti-RNP 20.7%, Lupus anticoagulant 2.1%, Anticardiolipin antibody 26.4%, Beta 2 glycoprotein antibody 0.7% and Antinuclear antibodies 82.9% (17). Our study aimed to assess the frequency, clinical manifestations, signs suggestive of SLE and the most common symptoms that patients encounter throughout the disease in a tertiary care hospital. Moreover, immunological manifestations of the patients were also analysed, including the presence of different types of autoantibodies and complement levels in the serum of affected individuals. By investigating SLE's clinical and immunological features, our clinicians and researchers can diagnose it correctly and make better treatment plans to improve patients' quality of life.

Methodology

This cross-sectional study was conducted at the Department of Medicine, JPMC, Karachi, over six months following the approval of the synopsis. One hundred thirty-one patients were included, based on a prevalence of leukopenia of 32.6%, with a margin of error of 8% and a 95% confidence level, as calculated using WHO software. The study employed a non-probability consecutive sampling technique. Patients newly diagnosed with systemic lupus erythematosus, aged between 20 and 60 years and of either gender, were included. Patients with a history of hypothyroidism, hyperthyroidism, vasculitis, seropositive or seronegative arthritis, HIV, hepatitis B or C, stroke, acute coronary syndrome, chronic obstructive pulmonary disease, asthma, chronic liver disease, or those who are pregnant (confirmed by a dating scan) were excluded.

Approval from the College of Physicians and Surgeons Pakistan and permission from the institutional ethical review committee was obtained before commencing the study. Informed consent was obtained from all participants for inclusion in the study, and their data were used for research purposes. Demographic information, including age, gender, and residence status, was recorded. Patients were examined for clinical features, and blood samples were sent to the hospital laboratory to analyse complete blood count and immunological markers per the operational definition. All findings related to the study variables were documented in a structured proforma.

Data was analysed using SPSS Version 20. Mean and standard deviation were calculated for continuous variables such as age. Data will be presented as mean ± SD for normally distributed quantitative variables, while for non-normally distributed variables, the median and interquartile range (IQR) will be reported. Frequency and percentages will be computed for categorical variables, including gender, hypertension, diabetes mellitus type II, dyslipidemia, smoking status, obesity status, and clinical and immunological features. Stratification was performed based on age, gender, hypertension, diabetes mellitus type II, dyslipidemia, smoking status, and obesity status to assess their impact on the outcome variable. Post-stratification, the chi-square or Fisher's exact test was applied, considering a p-value of ≤ 0.05 as statistically significant.

Results

One hundred thirty-one patients with Systemic Lupus Erythematosus (SLE) participated in this study. Most were between 20 and 40 (77.9%), while 22.1% were aged 41 to 60. Most were women (77.9%), with men making up 22.1%.

Among the participants, 21.4% had diabetes, and 32.8% had hypertension. Dyslipidemia was seen in 16.8%, while 25.2% were smokers. Obesity affected 23.7% of patients. Skin rash and photosensitivity were each present in 67.2% of cases. Oral ulcers appeared in 77.1%, and arthritis affected 67.2% of the patients. Serositis was less common, occurring in 22.1%.

Neurological disorders were identified in 36%, while 64% showed no related symptoms. Hemolytic anemia was found in 31.3%, leukopenia in 13%, and thrombocytopenia in 29.8%.

Regarding immunological markers, 61.1% tested positive for anti-dsDNA antibodies, a key indicator of SLE. Other autoantibodies included anti-Ro (15.3%), anti-La (14.5%), anti-Sm (20.6%), and anti-RNP (10.7%). Lupus anticoagulant appeared in 13.7%, while anticardiolipin and beta-2 glycoprotein antibodies were each present in 15.3%. Antinuclear antibodies (ANA) were the most frequent, detected in 78.6% of patients.

These findings highlight the high prevalence of SLE among young women and its association with hypertension, diabetes, and obesity. Common symptoms included arthritis, skin rash, oral ulcers, and anti-dsDNA positivity, reinforcing their role in SLE diagnosis and management.

Table 1: Distribution of baseline characteristics among the study participants.

Variables	N (%)
Age	
20 to 40 years	102 (77.9)
41 to 60 years	29 (22.1)
Gender	
Male	29 (22.1)
Female	102 (77.9)
Diabetes mellitus	
Yes	28 (21.4)
No	103 (78.6)
Hypertension	
Yes	43 (32.8)
No	88 (67.2)
Dyslipidemia	
Yes	22 (16.8)
No	109 (83.2)
Smoking status	
Yes	33 (25.2)
No	98 (74.8)
Obesity status	
Yes	31 (23.7)
No	100 (76.3)
Total	131 (100)

Table 2: Distribution of clinical characteristics, clinic-immunological profile of patients.

Variables	Frequency (percentage) n=131
Skin rash	
Yes	88 (67.2)
No	43 (32.8)
Photosensitivity	
Yes	88 (67.2)
No	43 (32.8)
Oral ulcers	
Yes	101 (77.1)
No	30 (22.9)
Arthritis	
Yes	88 (67.2)
No	43 (32.8)
Serositis	
Yes	29 (22.1)
No	102 (77.9)
Neurological disorder	
Yes	09 (36)
No	16 (64)
Hemolytic anemia	
Yes	41 (31.3)
No	90 (68.7)
Leukopenia	
Yes	17 (13)
No	114 (87)
Thrombocytopenia	
Yes	39 (29.8)
No	92 (70.2)
Anti-dsDNA	
Yes	80 (61.1)
No	51 (38.9)
Anti-Ro	
Yes	20 (15.3)
No	111 (84.7)
Anti-La	
Yes	19 (14.5)
No	112 (85.5)
Anti-Sm	
Yes	27 (20.6)
No	104 (79.4)
Anti-RNP	
Yes	14 (10.7)
No	117 (89.3)
Lupus anticoagulant	
Yes	18 (13.7)
No	113 (86.3)
Anticardiolipin antibody	
Yes	20 (15.3)
No	11 (84.7)
Beta 2 glycoprotein antibody	
Yes	20 (15.3)
No	111 (84.7)
Antinuclear antibodies	
Yes	103 (78.6)
No	28 (21.4)

Discussion

This study looks at the clinical and immunological profile of Systemic Lupus Erythematosus (SLE) patients in a tertiary care hospital. The results confirm a strong female predominance (77.9%), with most patients between 20 and 40 years old (77.9%). These findings align with global trends, as SLE primarily affects young women, likely due to hormonal influences on immune function (18).

Among the clinical symptoms, arthritis (67.2%), skin rash (67.2%), oral ulcers (77.1%), and photosensitivity (67.2%) were the most common. These results are consistent with previous studies highlighting joint and skin involvement as early signs of SLE (19, 20). Serositis (22.1%) appeared less frequently, which matches reports suggesting that pleuritis and pericarditis occur later in the disease course (21). The high rate of oral ulcers may be linked to mucosal inflammation driven by immune complex deposition (22).

Neurological symptoms were reported in 36% of patients, slightly higher than in other studies (23). Diagnosing neuropsychiatric SLE remains challenging, as symptoms often overlap with different conditions and require advanced imaging or biomarkers for confirmation (24). Hematological abnormalities were also common, with hemolytic anemia (31.3%), thrombocytopenia (29.8%), and leukopenia (13%). These findings reinforce previous reports that describe anemia of chronic disease, immune-mediated hemolysis, and thrombocytopenia as frequent hematological complications of SLE (25).

Among immunological markers, ANA positivity (78.6%) was the most frequent, confirming its role as a key diagnostic tool for SLE (26). Anti-dsDNA antibodies (61.1%), known for their link to disease activity and lupus nephritis, were also prevalent (27). Other autoantibodies, including anti-Ro (15.3%), anti-La (14.5%), anti-Sm (20.6%), and anti-RNP (10.7%), showed varying frequencies, consistent with their reported associations with specific clinical features (28). The presence of lupus anticoagulant (13.7%), anticardiolipin (15.3%), and beta-2 glycoprotein antibodies (15.3%) suggests that some patients may be at higher risk for antiphospholipid syndrome (APS), a major cause of vascular complications in SLE (29).

Hypertension (32.8%), diabetes (21.4%), dyslipidemia (16.8%), smoking (25.2%), and obesity (23.7%) were also common. These conditions increase cardiovascular risk, which remains a leading cause of death in SLE patients (30). This highlights the need for regular screening and lifestyle interventions to manage these risks (31).

While our findings align with global data, some differences emerged. The prevalence of neurological involvement (36%) was slightly higher than the reported range of 20–30% in other studies (32). This could be due to differences in study populations, diagnostic criteria, or the availability of specialised neurological assessments. The high frequency of anti-dsDNA antibodies suggests an increased risk of lupus nephritis, though further research, including kidney biopsy studies, is needed to confirm this association (33).

These findings underscore the importance of early symptom recognition and comprehensive immunological testing for SLE. The high prevalence of anti-dsDNA and hematological abnormalities suggests that regular monitoring for renal and hematologic complications is essential. Additionally, cardiovascular risk factors highlight the need for a multidisciplinary approach to patient care, involving rheumatologists, nephrologists, and cardiologists.

Future studies should focus on genetic predispositions, long-term disease outcomes, and treatment responses to improve personalised management strategies. More significant, multicenter studies with longer follow-ups could help identify key risk factors for severe disease progression.

LIMITATIONS

This study has some limitations. Conducting it in a single tertiary care hospital may limit how well the findings apply to the broader population. A multicenter research could provide a clearer picture of SLE prevalence and variations across different regions. The cross-sectional design captures disease manifestations at a single point, making assessing how SLE progresses or responds to treatment over time complex. While we examined clinical and immunological markers, the study did not include biopsy data for lupus nephritis, which is essential for confirmation. The absence of a control group also limits comparisons with healthy individuals or those with other autoimmune diseases. Future research should focus on long-term follow-ups, genetic factors, and tissue biopsy findings to deepen our understanding of SLE progression and treatment responses.

Conclusion

Arthritis, skin rash, oral ulcers, and anti-dsDNA positivity emerged as the most frequent diagnostic features. The presence of autoantibodies, particularly anti-dsDNA, ANA, and antiphospholipid antibodies, highlights the need for ongoing monitoring to detect organ involvement and thrombotic risks early.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-DEDS-808/24)

Consent for publication

Approved

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The authors declared the absence of a conflict of interest.

Author Contribution

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Study Design, manuscript review, critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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