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Causes and Risk Factors for Emergency Department Visits in Systemic Lupus Erythematosus: A Tertiary Center Study

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Abstract **Objectives:** Systemic Lupus Erythematosus (SLE) is associated with frequent Emergency Department (ED) utilization due to disease flares and comorbidities. However, data from Saudi Arabia and the Middle East remain limited. To describe the causes of ED visits among SLE patients and identify predictors of frequent ED visits (≥2 visits/year) in a Saudi tertiary center. **Methods:** This retrospective cohort study included adult SLE patients presenting to the ED at King Abdulaziz University Hospital, Jeddah, Saudi Arabia, between January 2019 and December 2023. SLE was defined using 2019 EULAR/ACR criteria. Data on demographics, disease characteristics, comorbidities, laboratory parameters, treatment and medication adherence were collected. ED visit causes were categorized into musculoskeletal, gastrointestinal, infectious, neurological and cardiovascular groups. Logistic regression was used to identify predictors of frequent ED visits (≥2 visits/year). **Results:** A total of 288 patients were included (87.2% female; mean age 38.3 ± 12.5 years). The most common ED visit causes were musculoskeletal complaints (24.7%) and gastrointestinal disorders (21.5%), followed by infections (16.7%). Independent predictors of frequent ED visits (≥2 visits/year) included younger age (OR 0.95, 95% CI 0.92–0.97; p<0.001), longer disease duration (OR 1.09, 95% CI 1.03–1.15; p = 0.002) and higher serum creatinine (OR 1.004, 95% CI 1.001-1.008; p = 0.025). Medication non-adherence was the strongest predictor (OR 6.45; p<0.001), while absence of glucocorticoid use (OR 2.03; p = 0.040) and gastrointestinal involvement (OR 2.87; p = 0.012) were also significant. **Conclusion:** frequent ED visits (≥2 visits/year) in SLE was associated with younger age, longer disease duration, renal impairment and medication non-adherence. Improving adherence and strengthening early outpatient management may help reduce avoidable ED visits.

Key Words Systemic lupus Erythematosus, Emergency Department, Adherence, Comorbidities, Predictors, Tertiary Care

INTRODUCTION

Systemic Lupus Erythematosus (SLE) is a chronic, multisystem autoimmune disease characterized by periods of remission and exacerbation, with potential involvement of the musculoskeletal, renal, neurological and cardiovascular systems [1,2]. The disease imposes a substantial clinical and healthcare burden due to its unpredictable course and wide range of manifestations [3,4].

Patients with SLE frequently utilize Emergency Department (ED) services for a variety of reasons, including disease flares, infections, treatment-related complications and comorbid conditions [5-10]. Previous studies have shown that ED visits are often driven by acute symptoms such as pain, fever and organ-specific complications and are associated with increased morbidity and healthcare costs [7,8,11,12]. A key clinical challenge in the emergency setting is distinguishing between lupus disease activity (flare) and non-lupus acute illnesses, particularly infections, as both may present with overlapping symptoms but require fundamentally different management strategies [13,14].

Recent advances in SLE management, including the use of targeted biologic therapies, improved immunosuppressive strategies and structured outpatient follow-up programs, have the potential to reduce acute disease exacerbations and healthcare utilization [15,16,4]. In addition, the growing role of telemedicine and digital health interventions has improved

access to care and may help prevent avoidable ED visits through earlier identification and management of disease flares [17,18]. However, the impact of these developments on ED utilization patterns remains incompletely understood, particularly in the Middle East, where data on modern SLE care models and healthcare access are still limited.

Recent regional studies have highlighted the burden and clinical characteristics of SLE in Saudi Arabia, emphasizing the need for locally relevant healthcare data and utilization patterns [19-21]. This is particularly important given potential regional differences in disease characteristics, comorbidity profiles, healthcare access and patterns of ED utilization. Understanding these factors in the local context is essential for developing targeted interventions and improving patient care.

This study aimed to address two primary objectives:

- To describe the clinical causes of Emergency Department (ED) visits among patients with Systemic Lupus Erythematosus (SLE)
- To identify clinical, laboratory and treatment-related predictors of frequent ED visits (≥2 visits/year)

Based on existing literature, we hypothesized that younger age, longer disease duration, renal impairment and medication non-adherence would be associated with increased frequency of ED visits [5,6,9,22,23].

METHODS

Design and setting. Retrospective cohort at King Abdulaziz University Hospital (Jeddah), January 2019-December 2023.

Participants. Adults (≥18 y) meeting 2019 EULAR/ACR SLE classification criteria who presented to the ED during the study window; incomplete records and non-SLE visits were excluded.

Variables and data sources. Data were abstracted retrospectively from electronic medical records. Variables included demographics, disease duration, comorbidities (e.g., hypertension, diabetes, CKD/ESRD, thyroid disease, psychiatric illness), SLE flares (neuropsychiatric, musculoskeletal, pulmonary, nephrotic syndrome, fever), prior ICU admission, pre-existing pulmonary and cardiovascular disease, serum creatinine and ED visit counts.

Primary ED visit causes were identified based on physician documentation in ED records and categorized into predefined clinical groups (infection, musculoskeletal, gastrointestinal, neurological, cardiovascular, allergy, endocrine, ophthalmologic [e.g., scleritis] and other).

Treatment variables included glucocorticoid and immunosuppressive use. Medication adherence was assessed based on documentation in medical records, including physician notes indicating non-adherence, missed follow-up visits, or inconsistent medication use.

Outcome. Frequent ED utilization was defined as ≥2 emergency department visits per year during the study period and was analyzed as a binary outcome.

Statistics. Descriptive summaries were performed; the Mann-Whitney U test was used for non-parametric comparisons. Binary logistic regression was applied to identify independent predictors. Frequent ED utilization (≥2 visits per year) was used as the dependent variable in the logistic regression model, with all included predictors entered simultaneously. Results are reported as Odds Ratios (OR), 95% Confidence Intervals (CI) and p-values. Statistical analyses were performed using available data for each variable, with incomplete or missing data handled using complete-case analysis and no imputation methods applied. Statistical analyses were conducted using SPSS v29.0.0 (IBM).

Ethics. IRB approval obtained (Ref. 222-24; NCBE HA-02-J-008); informed consent waived for retrospective review; Declaration of Helsinki adhered to. All patient data were de-identified during data extraction and analysis to ensure confidentiality.

RESULTS

Cohort profile. n = 288; 87.2% female; mean age 38.3±12.5 year. Most had disease duration > 10 year (59.7%). Hypertension was the most common comorbidity (30.6%) (Figure 1).

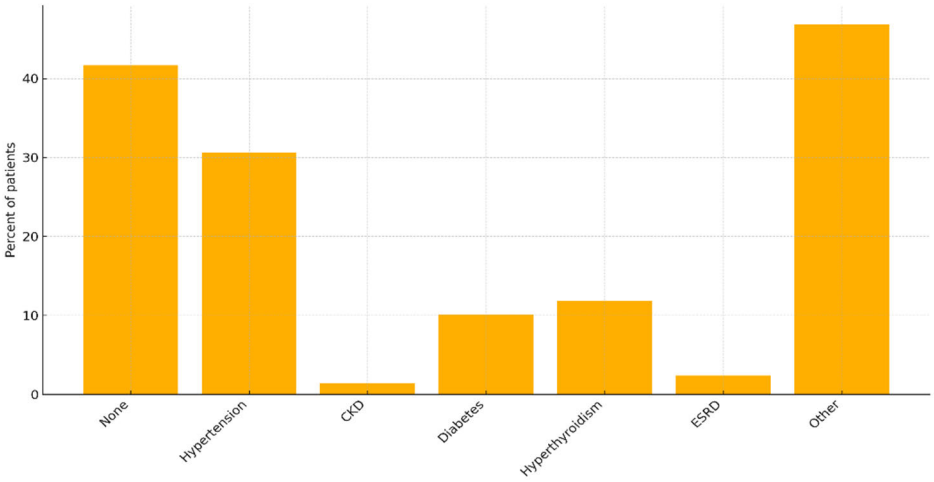

Figure 1: Comorbidities among SLE Patients (Percent of Cohort; Categories not Mutually Exclusive)

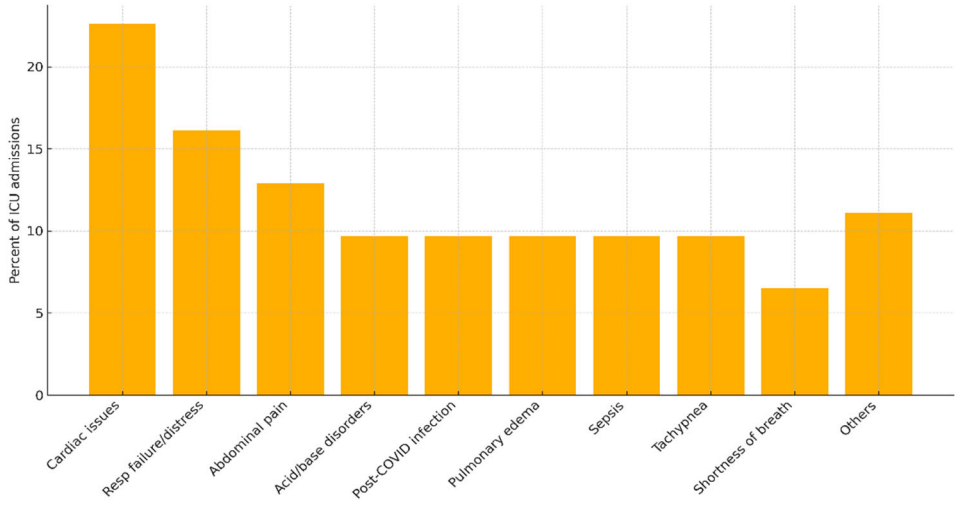

Figure 2: Reasons for ICU Admissions among SLE Patients

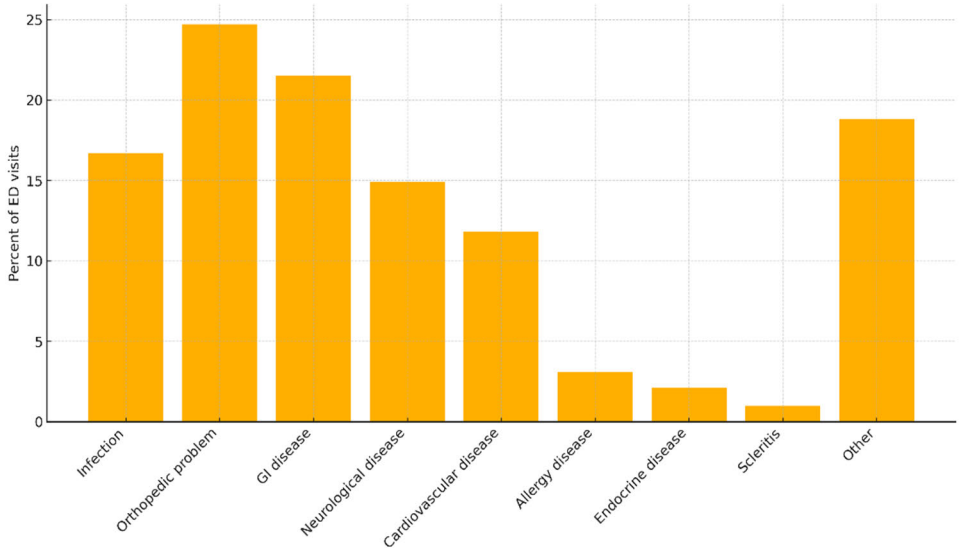

Figure 3: Causes of Emergency Department (ED) visits in SLE

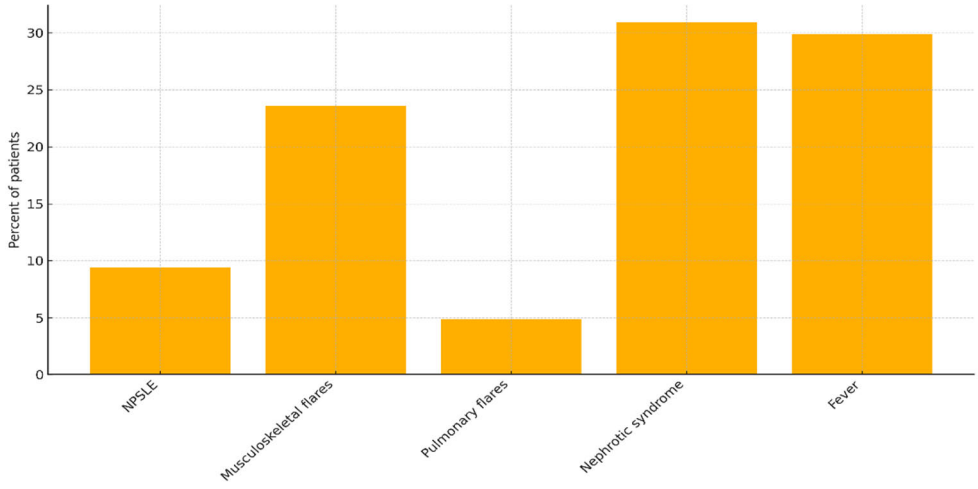

Figure 4: Distribution of SLE Flares among Study Participants

Predictors of frequent ED visits (logistic regression). Odds ratios greater than 1 indicate an increased likelihood of frequent ED visits (≥2 visits/year). Age: B = −0.054, p<0.001; OR = 0.947 (95% CI 0.923–0.972). Years since SLE diagnosis: B = 0.084, p = 0.002; OR = 1.087 (1.032–1.146). Creatinine: B = 0.004, p = 0.025; OR = 1.004 (1.001–1.008). Non-adherence: B = 1.863, p<0.001; OR = 6.445. No glucocorticoid use: B = 0.708, p = 0.040; OR ≈ 2.03. GI disease: B = 1.053, p = 0.012; OR ≈ 2.87. Other variables (sex, overall comorbidity burden, pre-existing pulmonary/cardiovascular disease, psychiatric illness, ICU admission) were not significant (Figure 4).

DISCUSSION

Frequent ED visits (≥2 visits/year) were associated with recognized drivers-including disease activity manifestations, renal dysfunction and non-adherence-reported in prior studies [5,6,8-10,12). Younger age was associated with higher ED utilization, which may reflect differences in disease activity or healthcare-seeking behavior earlier in the disease course [22]. The strong association for non-adherence (OR ≈ 6.4) highlights a potentially modifiable target for multidisciplinary interventions to reduce avoidable ED visits; however, the underlying causes of non-adherence were not directly assessed in this study [5,23]. Musculoskeletal and gastrointestinal presentations were prominent causes of ED visits and likely represent a combination of disease-related manifestations, treatment effects and non-specific symptoms requiring further evaluation [7,8,11].

These findings should be interpreted within the context of the study design, as some explanations are based on associations observed in this cohort and supported by prior literature rather than direct measurement. These results should also be considered in light of the evolving landscape of SLE management. Advances in biologic therapies, improved outpatient monitoring and multidisciplinary care models may reduce reliance on emergency services by enabling earlier intervention and better disease control [15,16]. Additionally, the increasing use of telemedicine in rheumatology has the potential to reduce avoidable ED visits through timely evaluation and management of symptoms [17,18]. In the local healthcare context, variations in access to specialized rheumatology care, follow-up continuity and patient education may influence patterns of ED utilization, highlighting the importance of system-level interventions [19-21]. However, the extent to which these approaches are implemented locally remains uncertain and warrants further investigation.

This study has several limitations. Its retrospective, single-center design may introduce documentation bias and limit generalizability, particularly as patients treated in a tertiary care setting may have more severe or complex disease. Medication adherence was assessed based on routine clinical documentation, which may be subject to misclassification [23]. In addition, the study included adult patients only and therefore does not capture emergency department utilization patterns in pediatric SLE populations. The absence of standardized disease activity and severity measures at the time of ED presentation, as well as limited data on flare severity and visit urgency, restricts the depth of clinical interpretation. In addition, the study design does not capture patient-reported reasons for choosing emergency department care over routine outpatient services. Finally, the findings may not fully represent national-level healthcare utilization, as referral pathways and access to care may vary across different healthcare settings.

These findings have important implications for clinical practice. Strengthening medication adherence support should be a key priority in outpatient SLE care [5,23]. In addition, younger patients and those with longer disease duration may benefit from closer follow-up and early patient education [22]. The diversity of ED visit causes, including musculoskeletal and gastrointestinal presentations, highlights the need for multidisciplinary care models and improved access to timely rheumatology assessment to reduce avoidable emergency visits [15]. Future studies should adopt prospective designs incorporating standardized disease activity measures and patient-reported data, including interviews, to better understand drivers of emergency department utilization.

CONCLUSION

Frequent emergency department utilization in patients with systemic lupus erythematosus was associated with younger age, longer disease duration, impaired renal function and medication non-adherence. Among these, medication non-adherence emerged as the most actionable and potentially modifiable factor. Targeted interventions focusing on improving adherence, strengthening patient education and enhancing early outpatient management may help reduce avoidable emergency department visits and improve patient outcomes.

Informed Consent Statement

Waived by the IRB owing to retrospective design.

Data Availability Statement

Available from the corresponding author on reasonable request.

Ethical Statement

Institutional Review Board Statement: Approved by the Unit of Biomedical Ethics, Research Ethics Committee, Faculty of Medicine, King Abdulaziz University Hospital (Ref. 222-24; NCBE HA-02-J-008).

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