Relationship Between Patient-Reported Outcomes to Hospitalization in Patients Living With SLE: A Retrospective Cohort Study Utilizing the FORWARD Lupus Registry

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BACKGROUND

Systemic Lupus Erythematosus (SLE) is a complex autoimmune disease with diverse symptoms and multisystemic manifestations.[1] Reducing exacerbations (flares), often leading to hospitalization, remains a challenge in the care of patients with SLE.[2]

OBJECTIVE

This study aims to understand the association of validated Patient Reported Outcomes (PROs) instruments such as Systemic Lupus Activity Questionnaire (SLAQ) and Brief Index of Lupus Damage (BILD) to hospitalization.

METHODS

The FORWARD Lupus Registry (FLR) is a US longitudinal patient-reported registry, collected through FORWARD, The National Databank for Rheumatic Diseases.[3] All participants were 18 years of age and above. Patients with at least two consecutive FLR biannual surveys with MD-confirmed SLE, who completed age, sex, SLAQ flare, SLAQ, and BILD at baseline (the first FLR biannual survey) and hospitalization (emergency room [ER] and/or all-cause hospitalization) at their consecutive biannual survey (the second FLR biannual survey) between January 2007 and September 2023 were included. Descriptive analyses were conducted on socio-demographics, disease characteristics, Rheumatic Disease Comorbidity Index (RDCI),[4] and treatment at baseline, stratified by hospitalization (0 or 1+). Hospitalization was defined as any ER visit or all-cause hospitalization. Group differences were assessed using t-test and Chi-square tests (or Fisher's exact test), when appropriate. Three distinct multivariate logistic regression models examined the relationship of prior SLAQ flare (model 1), SLAQ score (model 2), and BILD score (model 3) at baseline to hospitalization, individually, adjusting for potential confounders (age, sex, insurance type, total annual income, RDCI, and treatments).

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RESULTS

> The study cohort included 383 patients, 94% females. The baseline mean age was 59.06 (SD 12.91) years, 78.1% Caucasian.

> Of the study population, 98 (25.6%) had an ER visit or all-cause hospitalization in their consecutive biannual survey (87; 22.7% ER, 53; 13.8% all-cause hospitalization, 42; 11% both ER and all-cause hospitalization).

> The mean BILD and SLAQ scores were significantly higher in the ≥ 1 Hospitalization group (BILD: 4.21 (SD 2.43) vs 3.18 (SD 2.03), p<0.001; SLAQ: 14.45 (SD 7.99) vs 9.79 (SD 6.68), p <0.001), with more flares reported through the SLAQ flare component (70% vs 51%, p<0.001).
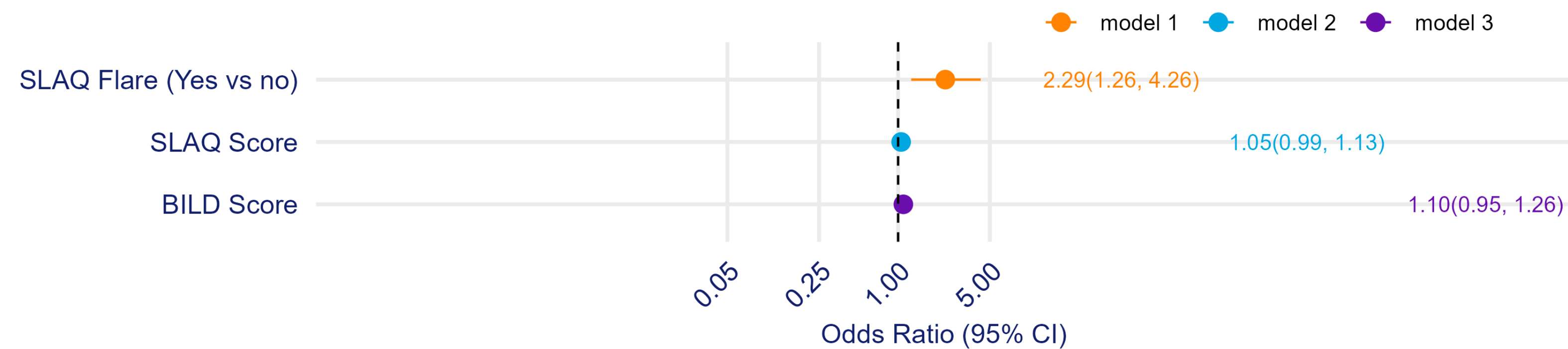
Table 1: Characteristics of FORWARD Lupus Registry Participants, by the Following 6 Month ER/All-Cause Hospitalization

Variable, mean (SD) or %	Overall, N = 383	No Hospitalization, N = 285	≥ 1 Hospitalization, N = 98	p-value
Age, yr (SD)	59.06 (12.91)	59.09 (12.62)	58.97 (13.79)	>0.9
Female (%)	361 (94%)	265 (93%)	96 (98%)	0.12
Race, Caucasian (%)	299 (78.1%)	230 (81%)	69 (70%)	0.047*
Insurance Type				0.004**
Private	95 (25%)	75 (26%)	20 (20%)	
Medicare	194 (51%)	141 (49%)	53 (54%)	
Medicaid	33 (8.6%)	19 (6.7%)	14 (14%)	
PPO	43 (11%)	40 (14%)	3 (3.1%)	
HMO	12 (3.1%)	7 (2.5%)	5 (5.1%)	
No insurance	6 (1.6%)	3 (1.1%)	3 (3.1%)	
Total Annual income, $ (SD)	64,969.97 (40,989.26)	68,971.77 (41,736.73)	53,294.12 (36,511.19)	0.001**
Disease Duration, yr (SD)	22.38 (11.83)	22.05 (11.44)	23.36 (12.93)	0.7
BILD Score[1] (SD)	3.44 (2.18)	3.18 (2.03)	4.21 (2.43)	<0.001***
SLAQ Score[2] (SD)	10.98 (7.32)	9.79 (6.68)	14.45 (7.99)	<0.001***
SLAQ Flare[3]				<0.001***
No, no flare	168 (44%)	139 (49%)	29 (30%)	
Yes, mild flare	109 (28%)	80 (28%)	29 (30%)	
Yes, moderate flare	83 (22%)	55 (19%)	28 (29%)	
Yes, severe flare	23 (6.0%)	11 (3.9%)	12 (12%)	
Rheumatic Disease Comorbidity Index (RDCI)	2.61 (1.90)	2.36 (1.76)	3.36 (2.10)	<0.001***
Treatments (SLE)				
Hydroxychloroquine	232 (61%)	171 (60%)	61 (62%)	0.2
Glucocorticoids	134 (35%)	93 (33%)	41 (42%)	0.056
Nonsteroidal anti-inflammatory drugs	104 (27%)	80 (28%)	24 (24%)	0.2
Disease-modifying antirheumatic drugs	283 (74%)	207 (73%)	76 (78%)	0.13
Immunosuppressants	132 (34%)	92 (32%)	40 (41%)	0.068
Belimumab	20 (5.2%)	17 (5.9%)	3 (3.1%)	0.15

1. BILD score ranges from 0 to 24, with higher scores indicating worse cumulative Lupus-related damage
2. SLAQ score is a composite score that ranges from 0 to 47, with higher scores indicating higher SLE disease activity
3. SLAQ Flare is one component of the SLAQ questionnaire enquiring for the presence and severity of lupus activity (no: no flare, yes: mild-severe flare)
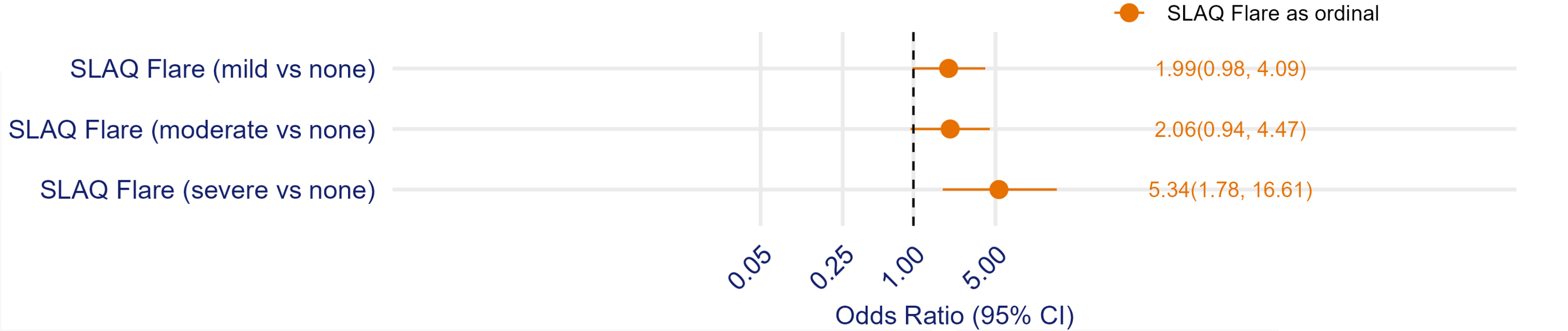*p<0.05; **p<0.01; ***p<0.001

> Across the three distinct multivariate logistic models that included baseline SLAQ flare, SLAQ score, OR BILD score as independent variable to explore their relationship with hospitalization, the SLAQ flare was found to be a significant predictor of hospitalization (model 1: OR=2.26; 95%CI 1.24-4.14), while SLAQ score and BILD score were not (model 2: OR=1.05; 95%CI 0.99-1.13, model 3: OR=1.10; 95%CI 0.96-1.27, respectively).

Figure 1: Forest Plot of Three Multivariate Logistic Regression Models for Hospitalization: SLAQ Flare, SLAQ Score, and BILD Score as Potential Key Predictors

> RDCI was a statistically significant predictor of hospitalization in all three multivariate models, increasing the odds of hospitalization (OR=1.32; 95%CI 1.14-1.53, OR=1.35; 95%CI 1.07-1.70, OR=1.29; 95%CI 1.10-1.51, respectively, in Models 1, 2, and 3).

Figure 2: Forest Plot of Multivariate Logistic Regression Model for Hospitalization: SLAQ Flare (Ordinal) as Potential Key Predictor

CONCLUSION

> SLE patients with any flare reported by the SLAQ flare component are at higher risk of subsequent hospitalization. The severity of the flare is directly linked to the risk, with severe flares significantly increasing the risk of hospitalization.

> Patient-reported flare severity should be closely monitored, with timely interventions for moderate or severe flares to minimize hospitalizations and improve SLE management.

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