Association of Glucocorticoid Use with Healthcare Utilization among Persons with Systemic Lupus Erythematosus (SLE)

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BACKGROUND

- Glucocorticoids (GCs) have long been a mainstay of treatment for SLE.
- Despite providing benefits, GCs have potential side effects that increase with dose and duration.
- GC-associated adverse events have been linked to significant increases in healthcare costs, although excess healthcare use due to GC use has not been examined in SLE.
- We examined the association of GC use and healthcare utilization

METHODS

- Data source: Data were provided by adults with SLE in FORWARD, the National Databank for Rheumatic Diseases, with physician-diagnosed SLE. Questionnaires completed at 6-month intervals from July 2015 – July 2020.
- Variables: Respondents provided comprehensive health information including GC use and dosage and healthcare during the prior 6 months.
- GC use definitions: Analyses examined 6-month healthcare utilization by GC use/non-use and by GC dose (0, 1 – <5 mg/day, 5 – <10 mg/day, ≥10mg/day).
- Observation period:
  - GC users: data were drawn from the questionnaire in which GCs were used during the observation period.
  - Non-users: Data drawn from the first questionnaire completed during the observation period
- Analysis: Adjusted analyses used double selection LASSO[a] to form the best-fitting model considering age, sex, race, BMI, comorbidities, education, smoking, SLE duration, self-reported SLE disease activity, self-reported SLE organ damage (via the Brief Index of Lupus Damage, BILD[b]), and other medications.

[a] Belloni A et al. J Economic Perspectives 2014; 28:29
[b] Yazdany J et al. Arthritis Care Res 2011; 63:1170.

RESULTS

- Of 512 participants eligible for analysis, 46.3% reported GC use in at least one 6-month period
- GC users were less likely to be male or white, had more comorbidities, had longer SLE duration, and reported more active SLE and greater disease damage (BILD) (Table 1).
- GC users (compared to non-users) had greater risk for rheumatology and other visits, blood and urine tests, and hospitalizations (Table 2).
- In analyses based on GC dosage, risks for rheumatology visits, other medical visits and blood tests were significantly elevated for each dosage group compared to the no-GC group. The highest GC dosage group also had elevated risk for lung and urine tests and hospitalizations (Table3).

CONCLUSION

- GC use was associated with greater healthcare utilization, even after adjusting for a wide range of sociodemographic and disease-related factors.
- Additional analyses are needed to explore whether greater GC use reflects more severe disease and/or whether GC use itself leads to increased healthcare utilization.

Glucocorticoid use was associated with greater healthcare utilization among adults with SLE.

Table 1. Characteristics of FORWARD participants by GC use/non-use.

Variable	No GC use 53.7% (n=275)	GC use 46.3% (n=237)	p-value
Dose of GC (mean, SD) 0 - <5 mg/day 5 - <10 mg/day ≥ 10 mg/day		9.1 (12.2) 9.5 (46) 24.3 (118) 13.4 (65)	
Male sex	8.0 (22)	3.4 (8)	0.026
White, non-Hispanic	88.4 (243)	78.1 (185)	0.002
Age at baseline observation, years	58.0 ± 13.0	59.6 ± 13.3	0.172
Education, years	14.2 (2.7)	14.5 (2.0)	0.111
College graduate	48.0 (132)	47.7 (113)	0.942
General health characteristics			
Rheumatic Disease Comorbidity Index (0 – 9)	2.4 ± 1.9	2.8 ± 1.9	0.024
Diabetes	6.9 (19)	11.4 (27)	0.077
Fractures	5.5 (15)	8.4 (20)	0.182
BMI, kg/m^2	29.2 ± 7.9	29.6 ± 9.3	0.561
Ever smoked	37.5 (103)	31.2 (74)	0.139
SLE characteristics			
SLE duration, years	23.6 ± 12.4	25.6 ± 13.1	0.083
How active is your lupus today (0 – 10 rating)	2.4 ± 2.5	3.3 ± 2.8	0.000
BILD score	3.1 ± 2.1	4.0 ± 2.4	0.000
Medications			
Hydroxychloroquine	57.8 (159)	59.1 (140)	0.774
Immunosuppressives	19.6 (54)	43.0 (102)	0.000
Belimumab use	5.1 (14)	6.8 (16)	0.425

Tabled values are % (n) or mean ± SD. P-values from t-tests or chi-square analyses.

Table 2. Healthcare utilization for GC users and non-users.

	No GC use 53.7% (n=275)	GC use 46.3% (n=237)	p*	Adjusted analyses	
				IRR (95% CI)	p
Rheumatology visits	1.5 (1.4)	2.1 (1.7)	0.000	**1.2 (1.1, 1.3)**	**<0.0001**
Other doctors	1.6 (1.9)	1.6 (1.9)	0.000	**1.3 (1.2, 1.5)**	**<.0001**
PT/OT visits	0.8 (2.3)	1.3 (2.9)	0.05	1.2 (0.95, 1.5)	0.13
Non-traditional therapy visits	0.4 (1.4)	1.1 (3.4)	0.79	1.2 (0.9, 1.6)	0.17
Lung tests	0.2 (0.5)	0.3 (0.9)	0.04	1.3 (0.96, 1.8)	0.90
Bone density tests	0.3 (0.5)	0.4 (0.5)	0.40	1.04 (0.8, 1.3)	0.74
Blood tests	2.0 (1.6)	2.9 (1.8)	0.000	**1.1 (1.07, 1.2)**	**<0.0001**
Urine tests	1.2 (1.4)	2.0 (1.7)	0.000	**1.1 (1.02, 1.2)**	**0.02**
Any hospitalization †	10.4 (28)	15.1 (35)	0.11	**1.6 (1.1, 2.2)**	**0.02**
Number of days hospitalized	0.7 (6.5) (n=28)	7.9 (8.0) (n=35)	0.04		

Tabled values are mean ± SD unless otherwise noted.
† % (n)
IRR: Incidence rate ratio from multiple regression analyses using double selection LASSO methods

Table 3. Healthcare utilization by GC dosage.

	GC dosage (mg)			
Variable	0 (n = 275)	>0 – <5 (n = 51)	5 – <10 (n = 112)	≥10 (n = 74)
Rheumatology visits				
Mean ± SD	1.5 ± 14	1.7 ± 1.2	1.9 ± 1.7	2.6 ± 1.9
IRR (95% CI)	---	**1.2 (1.1, 1.4)**	**1.1 (1.04, 1.3)**	**1.4 (1.2, 1.6)**
Other doctors				
Mean ± SD	1.6 ± 1.9	2.4 ± 2.7	2.1 ± 2.4	2.8 ± 2.6
IRR (95% CI)	---	**1.3 (1.07, 1.5)**	**1.2 (1.07, 1.4)**	**1.5 (1.3, 1.8)**
PT/OT visits				
Mean ± SD	0.8 ± 2.3	1.6 ± 3.3	0.8 ± 2.3	1.7 ± 3.3
IRR (95% CI)	---	**1.7 (1.2, 2.3)**	**0.96 (0.7, 1.3)**	**1.2 (0.9, 1.8)**
Non-traditional therapy visits				
Mean ± SD	0.4 ± 1.4	0.6 ± 1.8	0.5 ± 1.7	2.1 ± 5.2
IRR (95% CI)	---	1.07 (0.7, 1.7)	0.8 (0.5, 1.1)	**2.4 (1.6, 3.5)**
Lung tests				
Mean ± SD	0.15 ± 0.5	0.3 ± 0.9	0.21 ± 0.8	0.4 ± 1.0
IRR (95% CI)	---	**1.5 (1.0, 2.3)**	0.99 (0.7, 1.5)	**1.9 (1.3, 2.9)**
Bone density tests				
Mean ± SD	0.3 ± 0.5	0.3 ± 0.6	0.4 ± 0.5	0.4 ± 0.5
IRR (95% CI)	---	1.03 (0.8, 1.4)	0.97 (0.7, 1.3)	1.2 (0.8, 1.6)
Blood tests				
Mean ± SD	2.0 ± 1.6	2.4 ± 1.9	2.9 ± 1.8	3.1 ± 1.8
IRR (95% CI)	---	**1.1 (1.0, 1.2)**	**1.1 (1.1, 1.2)**	**1.2 (1.1, 1.4)**
Urine tests				
Mean ± SD	1.2 ± 1.4	1.6 ± 1.5	2.0 ± 1.9	2.1 ± 1.7
IRR (95% CI)	---	0.98 (0.9, 1.1)	**1.2 (1.03, 1.3)**	**1.2 (1.1, 1.4)**
Hospitalizations				
Mean ± SD	10.4% (28)	12.0% (6)	9.9% (11)	25.4% (18)
IRR (95% CI)	---	1.1 (0.7, 1.9)	1.3 (0.9, 2.0)	**2.7 (1.6, 4.3)**

IRR: Incidence rate ratio from multiple regression analyses using double selection LASSO methods.

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