

A Real-World Study of Healthcare Resource Utilization and Costs for Systemic Lupus Erythematosus Patients In Taiwan

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OBJECTIVE

- To examine the real-world healthcare resource utilization, costs, and treatment patterns of patients with systemic lupus erythematosus (SLE) in Taiwan.

METHODS

Data Source

- Taiwan’s National Health Insurance Database (NHIRD) was used to perform a retrospective claims-based analysis of patients holding catastrophic illness certificates for systemic lupus erythematosus.

Study Period

- Data from January 1, 2014, through December 31, 2019, were used as the study period, and patients holding catastrophic illness certificates for SLE in 2015-2017 were identified.

Patient Population

- Patients were included if they had catastrophic illness certificates issued for SLE (ICD-9: 710.0; ICD-10-CM codes: M32.x).
- Patients were excluded if they (1) disenrolled in the NHIRD in the one year before or after the index date, or (2) aged < 18 years at index.

Patient Groups

- The identified patients were assigned to one of three mutually exclusive severity groups as mild, moderate, or severe patients based on the highest severity category they experience during the one-year period after the enrollment date. The classification criteria of disease severity defined by Garris et al. 2013 and local clinical expert opinion.

Statistical Analysis

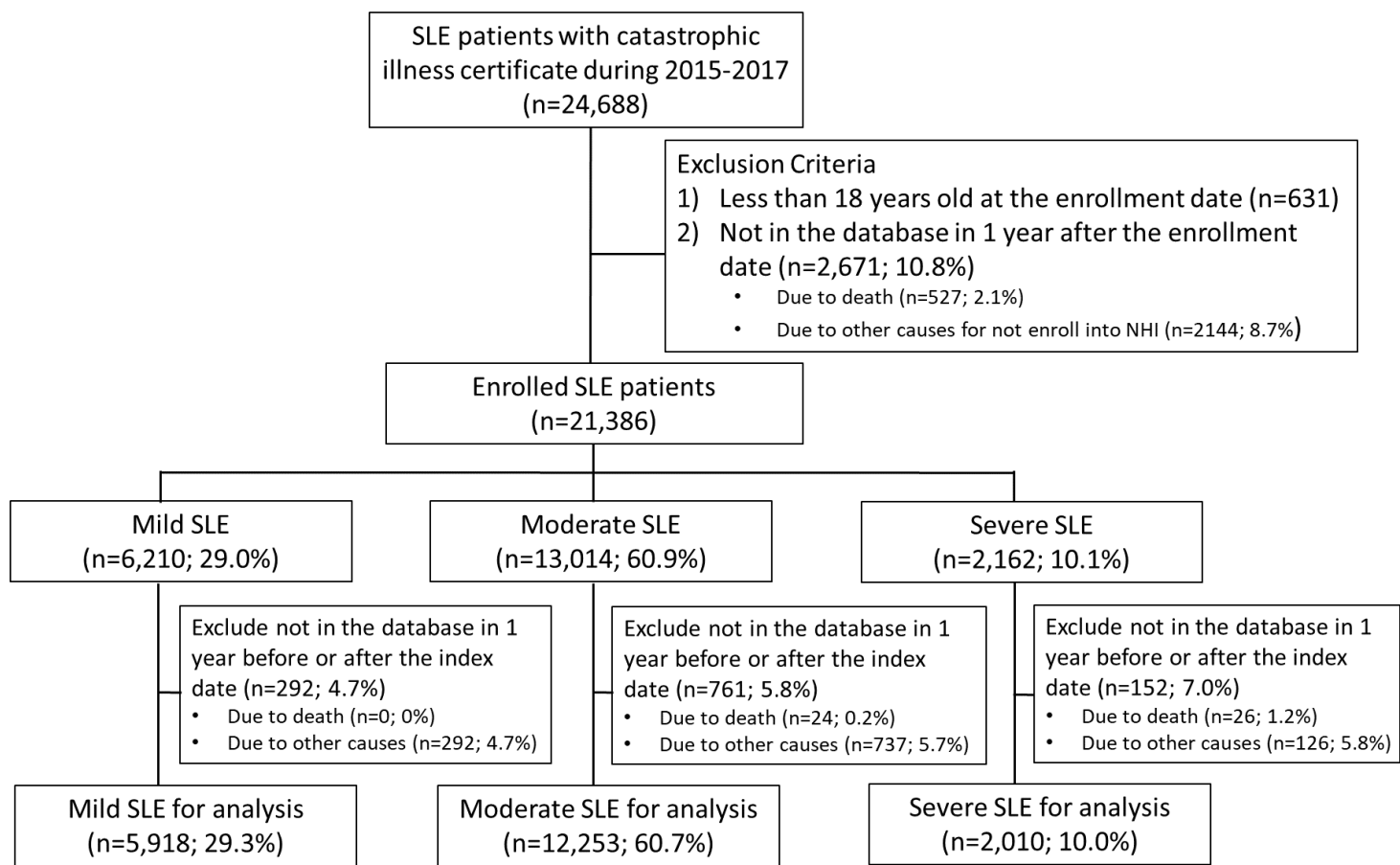
- Healthcare resource utilization and costs were measured at index and during the two-year follow-up period after the index date. Costs were presented in New Taiwan Dollars (NT\$) at nominal values at the time of claim.

RESULTS

Demographics and Severity

- There were 20,181 patients with catastrophic illness certificates for SLE included in this study with the average prevalence of 97.0 and the average incidence of 4.0 per 100,000 in 2015-2017.
- Of these patients, 29.3% (n=5,918) were mild SLE, 60.7%(n=12,253) were moderate SLE and 10.0% (n=2,010) were severe SLE (Figure 1).

Figure 1. Patient Flow Diagram



Healthcare Resource Utilization

- During the first year of follow up, 50.1% of severe patients had all-cause hospitalization with 2.8 admissions and 25.2 length of stays, while 24.0% for moderate patients with 2.2 admissions and 19.6 days, and 11.0% for mild patients with 1.7 admission and 17.5 days.
- On average, compared to the mild and moderate severity cohorts, severe SLE patients had higher resource utilization rates and frequency for hospital admissions, ER visits, and outpatient visits, and longer hospital days, regardless of all-cause or SLE-related, in both the first year and second year of follow-up (Table 1).

Healthcare Costs (NT\$)

- Overall, higher severity SLE patients incurred higher costs than mild SLE patients in both Year 1 and Year 2.
- Outpatient costs constituted a significant proportion of total costs (severe: 58%; moderate: 74%; mild: 85%). Medication costs were 23%, 30%, 30% of total costs for mild, moderate, and severe patients, respectively.
- As shown in Figure 2, outpatient costs dominate inpatient costs and ER costs, and non-medication costs dominate medication costs, for all patient severities in both follow-up years. However, mild patients had higher percentage of outpatient costs than severe patients (82% vs. 58% in the first year), but severe patients had a higher percentage of medication costs compared to mild patients (30% vs. 23% in the first year).

Treatment Utilization (1-year follow-up)

- Moderate to severe patients had numerically higher utilization rate of all types of treatment compared with mild patients (Table 2).
- 27.8% of severe patients used high-dose oral glucocorticoids (> 15 mg/day) compared to <0.1% for mild and 9.7% for moderate patients.
- More than 70% of moderate to severe patients were prescribed ≥2 treatments at a given time.
- For patients with concomitant treatment, glucocorticoid dosage increased with the number of immunosuppressant used, especially in severe patients.
- 80.4% of moderate to severe patients received glucocorticoid-based therapy as the first-line treatment and median treatment duration was 3.1 months.
- Severe patients were more likely to use other medications with potential interactions than the other severity groups (Table 3).

Table 1. SLE-Related Healthcare Resource Utilization

	Year 1						Year 2					
	Mild (n=5,918)		Moderate (n=12,253)		Severe (n=2,010)		Mild (n=5,627)		Moderate (n=11,465)		Severe (n=1,837)	
	N	%	N	%	N	%	N	%	N	%	N	%
Hospitalizations, n (%)	388	6.6%	2,563	20.9%	924	46.0%	489	8.7%	2,103	18.3%	510	27.8%
Hospital Days, mean ± SD	11.6 ± 38.4		16.6 ± 47.7		23.8 ± 93.7		14.4 ± 55.2		15.9 ± 47.6		19.7 ± 50.7	
Intensive Care Unit	0.2 ± 0.9		0.4 ± 2.6		0.7 ± 4.2		0.3 ± 1.3		0.4 ± 2.9		0.4 ± 1.9	
General Ward	11.4 ± 38.4		16.1 ± 46.9		23.1 ± 92.9		14.2 ± 55.1		15.4 ± 46.3		19.3 ± 50.2	
Frequency, mean ± SD	1.5 ± 1.3		2.1 ± 2.0		2.78 ± 3.2		1.6 ± 1.4		2.0 ± 2.2		2.3 ± 2.3	
Intensive Care Unit	0.1 ± 0.3		0.1 ± 0.4		0.1 ± 0.4		0.1 ± 0.3		0.1 ± 0.3		0.1 ± 0.4	
General Ward	1.5 ± 1.3		2.1 ± 2.0		2.8 ± 3.2		1.6 ± 1.4		2.0 ± 2.2		2.3 ± 2.3	
ED Visits, n (%)	390	6.6%	2,015	16.4%	568	28.3%	446	7.9%	1,703	14.9%	393	21.4%
Frequency, mean ± SD	1.4 ± 1.0		1.8 ± 3.12		2.28 ± 4.78		1.6 ± 2.1		1.7 ± 2.4		2.0 ± 2.1	
Outpatient Visits, n (%)	4,246	71.8%	11,853	96.7%	1,900	94.5%	4,070	72.3%	10,911	95.2%	1,715	93.4%
Frequency, mean ± SD	14.2 ± 10.5		20.2 ± 12.9		24.9 ± 14.3		14.6 ± 11.2		19.7 ± 13.3		22.6 ± 14.2	

Note: SD = Standard Deviation

REFERENCE:
1. Garris, C., Jhingran, P., Bass, D., Engel-Nitz, N. M., Riedel, A., & Dennis, G. (2013). Healthcare utilization and cost of systemic lupus erythematosus in a US managed care health plan. Journal of medical economics, 16(5), 667–677.

DISCLOSURES

*PC, WF, and BW are paid consultants to Eli Lilly and Co. KJN, CW, and TT are employees of Eli Lilly and Co. This study was sponsored by Eli Lilly and Company.

Figure 2. Distribution of Direct Costs

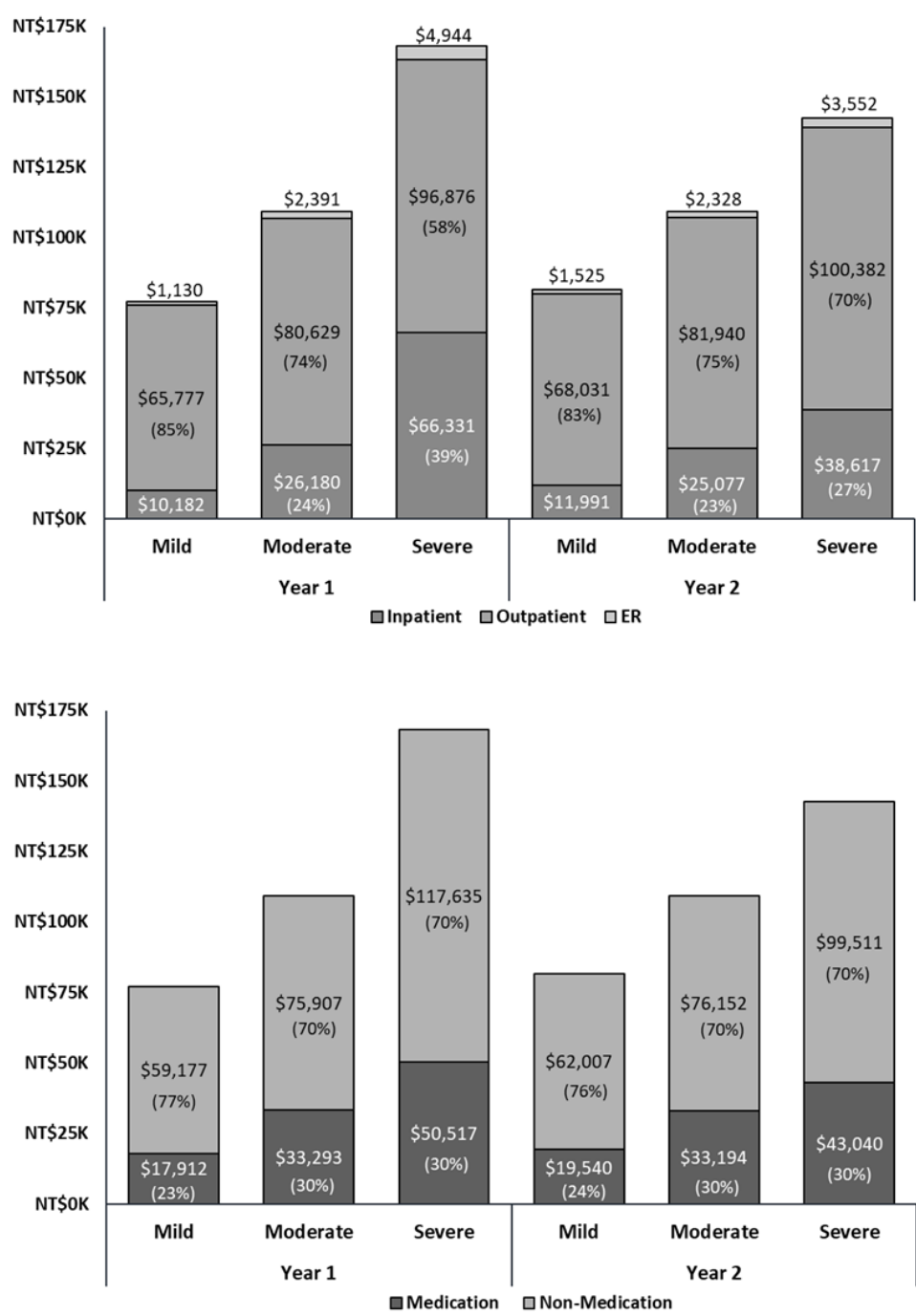


Table 2. Treatment Utilization During 1-Year Follow-Up Period

	Total (n=20,181)		Mild (n=5,918)		Moderate (n=12,253)		Severe (n=2,010)	
	N	%	N	%	N	%	N	%
NSAID	7,212	35.7	1,405	23.7	4,983	40.7	824	41.0
Glucocorticoid	14,019	69.5	2,015	34.1	10,297	84.0	1,707	84.9
Hydroxychloroquine	13,278	65.8	2,867	48.5	8,970	73.2	1,441	71.7
Immunosuppressant	7,630	37.8	0	0.0	6,319	51.6	1,311	65.2
Methotrexate	898	4.5	0	0.0	786	6.4	112	5.6
Azathioprine	5,642	28.0	0	0.0	4,843	39.5	799	39.8
Leflunomide	132	0.7	0	0.0	117	1.0	15	0.8
Cyclosporin	854	4.2	0	0.0	715	5.8	139	6.9
Mycophenolate	959	4.8	0	0.0	774	6.3	185	9.2
Cyclophosphamide	790	3.9	0	0.0	17	0.1	773	38.5

LIMITATIONS

- As with any claims-based analysis, this study is based on coding without additional clinical information.
- Patient severity classification is based on a published claims-based algorithm that incorporates SLEDAI, SLAM, BILAG and expert clinical opinion, which uses claims rather than clinical outcomes and may not be representative of commonly utilized disease activity and severity metrics used in clinical practice.
- There is a lag in data availability in the NHIRD, so the results may not be representative of the most recent reimbursement environment in Taiwan.

Table 3. Utilization of CYP3A4 and CYP2C19 Inhibitors

Medication	Total (n=20,181)		Mild (n=5,918)		Moderate (n=12,253)		Severe (n=2,010)	
	N	%	N	%	N	%	N	%
CYP3A4 inhibitors (strong)								
Clarithromycin	483	2.4	109	1.8	305	2.5	69	3.4
Ketoconazole	302	1.5	70	1.2	190	1.6	42	2.1
Loperamide	1,948	9.7	242	4.1	1,407	11.5	299	14.9
CYP3A4 inhibitors (moderate)								
Amiodarone	130	0.6	37	0.6	72	0.6	21	1.0
Danazol	100	0.5	7	0.1	72	0.6	21	1.0
Diltiazem	628	3.1	124	2.1	420	3.4	84	4.2
Erythromycin	873	4.3	249	4.2	530	4.3	94	4.7
Haloperidol	95	0.5	16	0.3	46	0.4	33	1.6
CYP2C19 inhibitors (strong)								
Chloramphenicol	1,275	6.3	339	5.7	789	6.4	147	7.3
Amitriptyline	163	0.8	31	0.5	97	0.8	35	1.7
Imipramine	458	2.3	112	1.9	261	2.1	85	4.2
Lansoprazole	131	0.7	37	0.6	70	0.6	24	1.2

Note: Only treatments with more than 1% utilization are displayed

CONCLUSIONS

- SLE has substantial impact on HCRU and costs in Taiwan, especially for those with higher disease severity.
- The complexity and intensity of therapeutic approaches in SLE were associated with increased disease severity and patients were often resistant to treatment.
- A new, effective treatment for SLE patients may offer significant savings in healthcare resource utilization and costs.