

Hospitalizations, Renal Activity and Damage Incur the Highest Medical Costs Among Filipino Patients with Systemic Lupus Erythematosus

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Abstract

Introduction: Systemic lupus erythematosus (SLE) predominantly affects individuals at peak age of productivity, and medical costs negatively impact on personal, family and community resources. This study aimed to identify annual medical costs and cost predictors among Filipino SLE patients.

Methods: Direct annual healthcare costs were determined by survey questionnaires conducted among patients aged > 18 years with minimum one-year illness duration, consecutively seen at the lupus clinics of University of Santo Tomas (UST) Hospital from February to July 2016. Excluded were costs related to biologics. Predictors of cost were estimated using multiple regression analysis.

Results: Respondents included 300 SLE patients, 270 females, (94%) age range 11-62 years, mean age 32.84±9.89 at SLE diagnosis, mean disease duration 5.87±5.58 (1-36) years. Median and mean annual direct medical cost was Php 90,950 and Php 133,040 respectively (range Php 17,440-

859,050). Annual cost was higher in those requiring dialysis (n=16) compared to those not requiring dialysis (n=150) vs those without nephritis (n=134), (median Php 595,400 vs 144,700 vs 55,020 respectively), $p<0.001$. End stage renal disease (ESRD) ($p<0.001$), mycophenolate use ($p<0.001$), high frequency of clinic visits ($p=0.016$) and lupus-related hospitalizations ($p=0.018$) were independent variables which significantly contributed to annual costs.

Conclusion: Nephritis especially if requiring dialysis was the most important cost predictor in this cohort, increasing annual costs to seven-fold. Mycophenolate use, lupus-related hospitalizations and clinic visits increased annual costs by 147.2%, 173.8% and 2.6% respectively. This study reinforces the need for early recognition and aggressive disease control to prevent complications especially in those with renal involvement.

Keywords: hospitalization, renal activity, nephritis, systemic lupus erythematosus, SLE

Introduction

Systemic lupus erythematosus (SLE) is a systemic autoimmune disease characterized by chronic inflammation in multiple organs, and predominantly affecting women in the peak years of life when they are potentially most productive.¹ With an unpredictable disease course and tendency for substantial progression to organ damage the disease can create a profound impact on individual quality of life, family, and society particularly the entire health care system.²⁻⁴

Healthcare costs include both direct and indirect costs. Direct costs represent costs of all kinds of resources used for treating a disease,^{1, 2, 5} including costs associated with the diagnosis, treatment, continuing care, emergency care, and rehabilitation. Direct costs also include nonmedical costs to patients and their caregivers that are associated

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with a disease but are not medical in nature such as transportation, household expenditures, and informal care. Indirect costs represent productivity losses related to morbidity and mortality, which can be related to labor or non-labor activities - usually accounting for a substantial proportion of total costs in most cost-of-illness (COI) studies. Intangible costs refer to the patient's psychological pain, discomfort, anxiety, depression, and distress related to an illness or the related treatment. These are very difficult to quantify in monetary terms and are therefore usually omitted in COI studies.⁶ Thus, early and aggressive control of disease activity and prevention of end-organ damage will significantly reduce both direct and indirect medical costs of SLE patients.⁷⁻¹⁴

Known drivers of high healthcare costs among SLE patients include recurrent disease flares, damage accrual, disease duration and neuropsychiatric events.^{12,15} The need for reliable data is essential for understanding the increased burden of SLE and its complications, with significant implications on resource allocation and access to

subspecialty care particularly in low-income populations. This study will focus on direct medical healthcare costs incurred by Filipino SLE patients seen in a single tertiary care center.

Methods

This cross-sectional investigator-assisted survey was conducted among SLE patients aged >18 years old with at least one-year duration of illness, consecutively seen at the UST hospital from February to July 2016. Three hundred SLE patients were invited to answer the survey questionnaires and all provided written consent to participate in the study. All participants met at least four of the eleven criteria of the 1997 American College of Rheumatology revised criteria for the classification of SLE.¹⁶ The study protocol was approved by the UST Hospital Institutional Review and Ethics Board.

Demographic data obtained from medical records included age, gender, civil status, employment status and educational attainment. SLE disease characteristics included disease duration, and disease activity assessed by SLE Disease Activity Index (SLEDAI)¹⁷, frequency and organ involvement of disease flare. Assisted by any of the authors, each participant completed the survey instrument (Geslani KG, Navarra SV. Survey of health care costs among Filipinos with systemic lupus erythematosus. University of Santo Tomas Hospital, Manila, Philippines. (Unpublished)) consisting of both multiple choice and open-ended questions. The instrument surveyed income categorized as personal and combined household income. Sources of funds were identified as personal e.g. savings or pensions, health insurance coverage including Philippine Health Insurance Corporation (PHIC), loans, or government subsidy eg Philippine Charity Sweepstakes Office (PCSO).¹⁸ Health care resource utilization over the past 12 months included visits to health care professionals, hospitalizations, emergency room visits, surgical or biopsy procedures, dialysis, medications and percent allocation for medications from monthly budget. Treatment adherence was indirectly assessed by asking frequency of "missed" doses due to financial constraints. Non-medical costs including transportation and food were also estimated.

Demographic, disease, cost, and employment characteristics were expressed using means, standard deviations (SDs), and proportions, as appropriate. We used univariate and multivariate multiple linear regression to determine predictors of increased costs. Due to skewness of the direct cost data, the results were log-transformed for the regression model and annual costs were transformed using the natural logarithmic function and coefficients. The data was interpreted as percent increase in the annual cost for every unit increase in the predictor. All statistical analyses were performed using IBM SPSS 20 statistical software.

Results

Demographics, SLE disease characteristics and survey responses from all 300 participants were included in the analysis. Table I shows majority of participants were female (94%), single (53%), college graduate (38%), unemployed (53%) and dependents (58%). Average age at SLE diagnosis was 26.25 ± 9.9 SD years old with average disease duration of 5.87 ± 5.58 SD years. Disease flares occurring in 61% of patients included nephritis in 40% followed by mucocutaneous and musculoskeletal flares (19%). Use of immunosuppressives in 42% of patients was mostly due to lupus nephritis, with 32% on mycophenolate mofetil (MMF) and 10% undergoing intravenous cyclophosphamide (CYP) infusions.

As shown in Table II, 58% of patients had no personal income. Monthly household income in 27% ranged from Php 8,000 to 15,000 followed by 15,000-30,000 (26%) and $\leq 8,000$ (21%). The estimated average costs related to SLE are shown in Table III with an estimated mean of Php 133,040 spent annually or Php 11,086 monthly by an SLE patient. Half of patients spent more than Php 90,950 annually (Php 17,400-Php 859,000), with 50% of patients spending more than Php 7,580 monthly (Php 1,450-Php 71,600).

Eighty-eight percent of SLE patients relied on other sources for medical funds including contributions by family members, Philippine Charity Sweepstakes office (PCSO) and government and private insurance coverage. Fifty-three percent of respondents spent a quarter of their household budget on medications alone while 23% spent more than half of their budget on medications. Forty-nine percent reported to "sometimes" miss, and 13% "always" miss medications due to lack of funds.

On the average, SLE patients were spending 86% of their annual and monthly cost on medical expenses while 13% were allotted for non-medical expenses. The estimated average annual medical cost is Php 68,400 which included consultation fees, ambulatory infusions, and laboratory and ancillary procedures. SLE patients undergoing dialysis spent an average of Php 480,000 annually. Furthermore, patients were spending Php 43,740 annually on medication and infusion fees only. Annual non-medical expenses like food and transportation cost an average of Php 6,600 (range Php 1,200-38,400) and Php 4,020 (range Php 0-180,000) respectively. For those hospitalized within the past 12 months, patients spent an average of Php 53,000 (range Php 5,000 to Php 2,000,000).

There were significant differences in the average annual cost of SLE across categories of civil status ($p=0.003$), and income support status ($p=0.012$). In particular, a divorced/widowed patient significantly had the highest average annual cost than patients who are single and married. Sole

Table I. Demographics of survey respondents, N=300

Demographics	N (%) / SD (range)
Age, SD (range)	
Mean present age in years	32.8±10.5 (19-69)
Mean age in years at diagnosis	26.25±9.95 (8-62)
Gender N (%)	
Female	281 (94%)
Male	19 (6%)
Adult, N (%)	72 (71.3)
Civil status, N (%)	
Single	160 (53)
Married	131 (44)
Widowed/Divorced	9 (3)
Educational attainment, N (%)	
Elementary graduate	63 (21)
High school graduate	61 (20)
Vocational	37 (12)
College level	11 (4)
College graduate	115 (38)
Post graduate	13 (4)

Table II. Profile of survey respondents according to income status (N=300)

Demographic	N (%)
Monthly personal income (Php)*	
None	172 (58)
≤ 8,000	37 (12)
8,000 – 15,000	44 (14)
15,001 – 30,000	29 (10)
30,001 – 50,000	9 (3)
50,001 – 100,000	8 (2.7)
More than 100,000	1 (0.3)
Monthly HOUSEHOLD INCOME (Php)*	
≤ 8,000	62 (21)
8,001 – 15,000	80 (27)
15,001 – 30,000	77 (26)
30,001 – 50,000	49 (16)
50,001 – 100,000	18 (6)
More than 100,000	14 (5)

*Php: Philippine peso

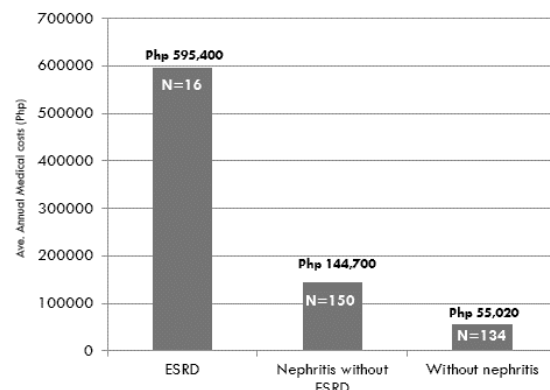
earners and those who are dependent have higher average annual costs than those who are self-supporting or with co-earners.

Furthermore, patients who allotted more than 25% of their budget on medications had higher annual costs than those with less percentage spent on medications ($p<0.001$). Patients who admitted to always “miss doses” due to lack of funds had higher costs than those who answered

Table III. Annual average healthcare costs of SLE patients (Php*)

Costs	n	Mean	SD	Median	Min.	Max.
Total medical costs	300	115,534	134,511	68,400	8,220	735,600
Dialysis	16	480,000	0	480,000	480,000	480,000
Laboratory	300	7,040	9,286	3,000	600	70,000
ER/OPD consultation	300	2,100	5,597	700	200	67,200
Medications	300	76,425	66,013	43,740	4,320	304,800
Non-medical costs	300	17,507	19,587	12,000	2,400	184,800
Food	300	7,087	3,995	6,600	1,200	38,400
Travel	300	10,419	18,520	4,020	0	180,000
Total costs	300	133,041	139,985	90,950	17,440	859,050

*Php: Philippine peso, ER: emergency department, OPD: outpatient department



ESRD: end stage renal disease, Php: Philippine peso

Figure 1. SLE patients with ESRD incur highest direct health care costs compared to patients with nephritis only and to those without nephritis

“sometimes” and not at all ($p<0.001$). Patients hospitalized for the last 12 months had higher average annual costs ($p<0.001$). Immunosuppressive use like MMF increased the annual cost to Php 154,800.

Regarding renal involvement, 50% had lupus nephritis without renal failure, and 5% were on dialysis due to end stage renal disease (ESRD). The latter had a significantly higher annual overall costs of Php 595,400 compared to nephritis patients who were not on dialysis ($p<0.001$) (Figure 1).

By multiple regression, end stage renal disease, mycophenolate use, lupus-related hospitalizations and clinic visits were significant direct healthcare cost drivers in this study. Patients with ESRD had seven times higher average annual costs ($p<0.001$). Immunosuppressive use significantly increased annual costs ($p<0.001$); specifically, cyclophosphamide and mycophenolate mofetil increased average cost by 26.2% (or 1.3 times higher) and 147.2% (or 2.5 times higher), respectively. Those who were hospitalized for lupus-related reasons increased the annual cost by 173.8% ($p=0.007$). Clinic visits also significantly increased the average annual cost ($p=0.016$).

Discussion

Systemic lupus erythematosus (SLE) and lupus nephritis in particular has a high prevalence in Asians compared to Caucasians.¹⁹⁻²³ SLE significantly increases healthcare utilization and costs due to the disease itself as well as from the complications of the disease and treatment. The burden of cost in caring for lupus patients is attributed to both direct and indirect expenditures with indirect costs still representing a considerable proportion of the total costs on the healthcare system and on society.²⁴⁻²⁸

We have estimated the annual costs incurred by patients with SLE aged >18 years with minimum one-year illness duration. Our analysis showed that persons with SLE incurred a median and mean annual direct medical costs of Php 90,900 and Php 133,000, respectively. Regression analyses showed that the strongest predictor of increased direct costs was higher in patients requiring dialysis, increasing annual costs up to seven times, compared to those with nephritis not requiring dialysis and those without nephritis at all.

Mycophenolate use, lupus-related hospitalization and clinic visits increased annual costs by 147.2%, 173.8% and 2.6% respectively. These cost predictors which significantly contributed to annual costs are supported by previous studies thus reinforcing the need for early and aggressive disease control and prevention of complications especially in those with renal involvement.^{9-11,15,29-34}

This retrospective direct cost-of-illness study depicts the magnitude of healthcare costs among lupus patients comparable to those in other Asian countries. In a third-world country like the Philippines where health resources and job opportunities are not equal to all, health status creates an important impact. Estimating the economic burden of chronic illness is essential for health policy makers to make informed decisions.

Conclusion

Healthcare costs among SLE patients pose a significant socio-economic burden not only on the patient, but also on the family, community and society in general. Furthermore, delayed or inadequate treatment due to financial constraints can cause substantial disability, subsequent productivity loss and more organ damage entailing even higher treatment costs. Whereas this paper estimates the direct healthcare costs among Filipino SLE patients, further studies to include both direct and indirect healthcare costs among these patients will provide a more accurate picture of the actual burden of illness of SLE among Filipinos.

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