

## Burden Disease to Systemic Lupus Erythematosus in Colombia, 2010-2020

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### Abstract

**Background:** Systemic Lupus Erythematosus (SLE) is a risky and high-cost disease in Colombia which is why the population is evaluated from 2010 to 2020, in addition to estimating the years adjusted by disability (DALY) due to systemic SLE in Colombia in the last decade, as well as describe the prevalence and sociodemographic factors involved in the disease.

**Methodology:** An ecological disease burden study in the Colombian population during 2010-2020 through the SISPRO and DANE registries.

**Findings:** The most affected were women between 20 and 59 with complications that affect the cardio-respiratory, musculoskeletal, and ocular and nervous systems, with disability-adjusted years (DALYs) of 9, 3 in ages 45-59 years; 1.6 in men and; 16.3 in women.

**Interpretation:** The female population loses vital years, which should propose strategies for early diagnosis and prevention of complications.

**Keywords:** Systemic Lupus Erythematosus (SLE); Global burden disease; Disability Adjusted Life Year (DALY); Years of Life lost due to Disability (YLD); Years of life lost due to premature mortality (YLL)

### Introduction

Systemic Lupus Erythematosus (SLE) is an autoimmune disease in which organs are damaged by autoantibodies and immune complexes [1]; it has a chronic inflammatory reaction of unknown etiology with variable evolution [2].

It usually occurs at an early age [3], and there are variables related to the predictors of complication and high health costs, such as kidney involvement and neuropsychiatric involvement [4].

The burden of disease studies offers a different way of analyzing health losses since it provides a composite indicator that integrates: the damages caused by premature death and those caused by living sick and disabled with different levels of severity due to a or several diseases at the same time [5].

Therefore, the disease burden attributable to a specific disease will depend on its frequency, mortality, and functional or social disability [6]. For these reasons, different measurements calculate to determine this magnitude, as explained below:

DALYs or DALYs Disability-Adjusted Life Years (DALY): disease burden is a complex indicator that makes it possible to quantify the sum of years of life lost due to premature mortality and years of life lived with disability. One year lost due to disability YLD + YLL is one year lost due to premature mortality [6].

Years of life are potentially lost or years lost due to premature mortality (YLL): the number of YLLs because of a given cause is the sum of all the people who die from that cause [6].

QALY (Quality of Life Adjusted Life Years) is the standard reference for measuring health in cost/effectiveness analysis [6].

The complications of SLE can deteriorate the quality of life and

increase mortality in younger ages; for this reason, we want to study the impact of this disease in Colombia to evaluate the burden of disease during the years 2010 to 2020 and determine the magnitude of the complications in the population.

Which raises the hypotheses: what is the burden of SLE disease in Colombia during the last ten years? In addition, what complications are associated with this disease in Colombian patients?

The main objective of this study is to estimate the burden of SLE disease with the data evaluated from the individual registry of health service provision (RIPS) in the Colombian population from 2010 to 2020. To estimate the years per SLE in Colombia in the last decade (2010 to 2020) and describe the prevalence and sociodemographic factors involved in the disease.

### Materials and Methods

An ecological study in the Colombian population for burden disease, taking data on morbidity, disability, vital statistics (mortality) from 2010 to 2020 of the Integrated Social Protection Information System (SISPRO) based on the ICE 10 diagnoses. The mortality data counteracts with the data obtained from the vital statistics of non-fetal deaths of the National Administrative Department of Statistics (DANE).

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In addition, the SPSS Statistics 28.0.1 program uses to calculate the linear and Poisson regression to evaluate the prediction of years lost due to disability in the Colombian population.

Variables such as age, sex, and department of presentation were evaluated based on the diagnosis of systemic lupus, the diagnoses of lupus nephritis, systemic lupus erythematosus with tubule-interstitial kidney disease, and systemic lupus erythematosus with pulmonary involvement then evaluated separately to determine the prevalence of complications. Additionally, DALYS and YLD calculate based on the World Health Organization (WHO) spreadsheets.

The YLL calculates by defining a potential limit of life and estimating the years lost for each death as the potential limit minus the death age; it calculates the years of expected life lost per period [7]. Using the life expectancy at birth for Colombia, taking 80 years for women and 73.7 years for men [8]. The weight of disability, according to the literature reviewed, a weight of 0.476 take for men and women [9-11].

### Inclusion criteria

A case with ICD-10 diagnosis considers M320, M321, M328, and M329 due to organic compromise. In complications, he focused on identifying the disability and sequelae of lupus nephritis and other complications evaluated in the disability of the disease, such as joint problems and the association of eye problems, the entire population from zero to 100 years old identifies with these diagnoses.

### Exclusion criteria

Diagnoses of localized lupus, such as subacute cutaneous lupus and discoid lupus erythematosus. They have excluded neonatal lupus, vascular complications such as CVD, and complications due to infection do not take into account. They are subjects of another study where causes of admission to the ICU are already widely studied in Colombia.

### Ethical considerations

As described, the present study does not have any intervention and had an anonymous data analysis, which is why considered a study of no ethical risk according to Resolution 8430 of 1993. This study adjusts

to the principles for human clinical research the last update of the declaration of helsinki of 2013.

### Results

The cases registered according to the number of people attended by SLE were 230,474 cases, with 206,316 women attending and 24,158 men attending. Figure 1 shows the general trend year by year, observing an increase in people treated with this diagnosis since 2016 (Figure 1). Prevalence of SLE of 4.78 - 1,000 in people observed, with an incidence in 2020 of 14.5% and a mortality of 0.55 cases per 100,000 inhabitants; a higher prevalence observed in women between 30 and 49 years of age, with a population pyramid that continues to show a greater predisposition for these disease infertile women between 20 and 59 years of age (Figure 2), with a higher prevalence of cases in the departments from Bogotá, Antioquia, Valle del Cauca, Cundinamarca and Santander (Figure 3).

There is a higher death in the ages of 20 to 40 years, with a higher prevalence in the female sex and a more significant disability with impairment of motor function, joints, and ocular involvement. There is no apparent report on whether these patients with disabilities in formative stages reports as employees and, therefore, lose their job since the vast majority of the report on work capacity appears undefined.

Disability kidney disease due to lupus nephritis with ICD10 N085 mainly affects ages between 25 to 30 years in 16% and between 55 to 60 years in 26%.

Complications that the reports of diagnoses associated with complications were frequent respiratory disorders associated with other connective tissue diseases with a higher prevalence in children less than four years of age and kidney disorders associated with other connective tissue diseases with a higher prevalence in people from 30 to 34 years old.

SISPRO registries are limited when contrasting diagnoses of complications linked to mortality from the disease, which is why diagnoses more associated with edema, pneumonia, and cardiac

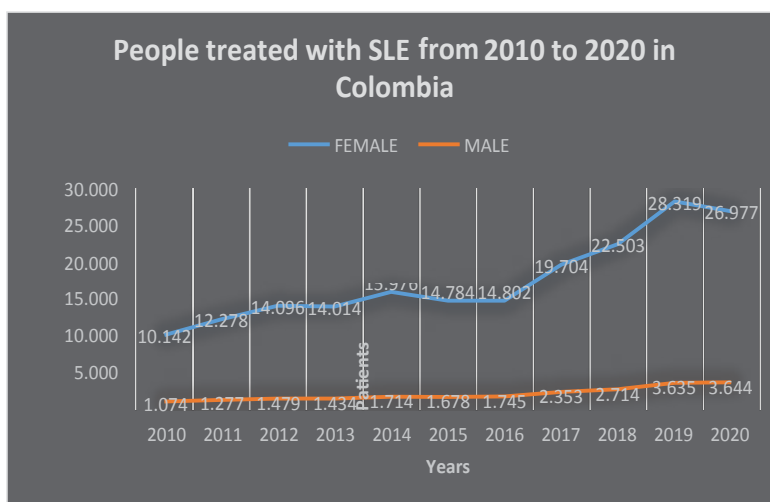


Figure 1: Number of people treated with a diagnosis of SLE.

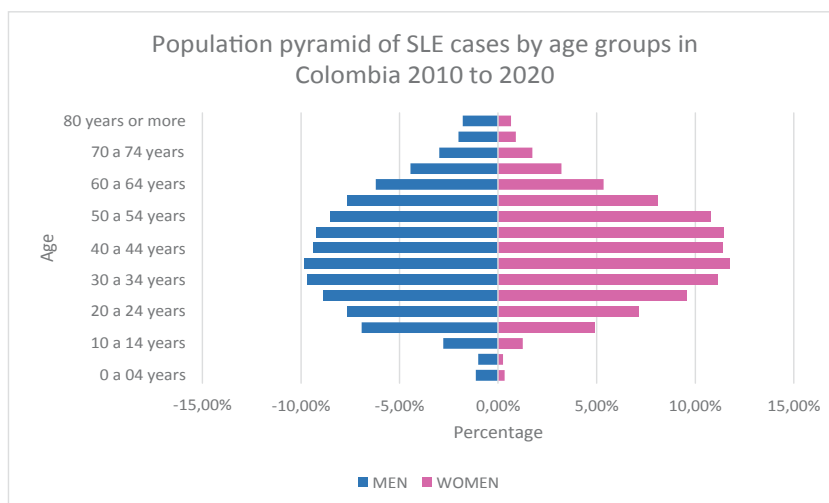


Figure 2: Population pyramid of SLE cases.

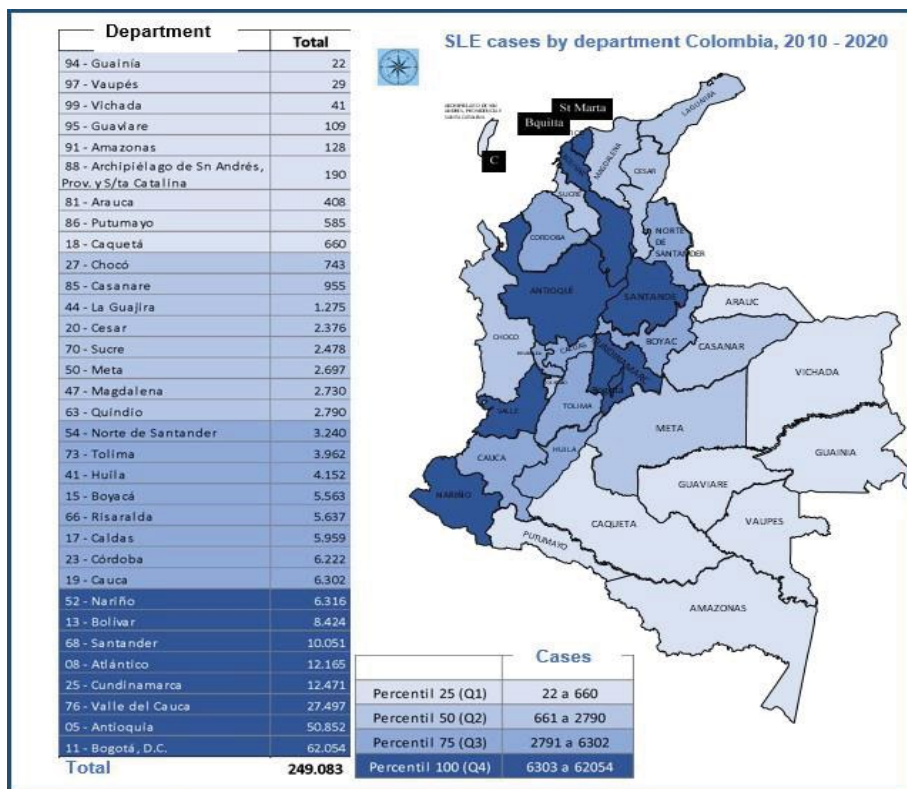


Figure 3: Georeferencing of SLE Colombia 2010 to 2020.

complications such as shock or acute myocardial infarction as the first cause of direct mortality.

DALYS observes with a rate of 9.3% and 8.3% people corresponding to 45-59 years and 60-69 years (Figure 4); a more significant loss of years of life due to SLE in the female sex, while for the calculation of YLDs, a rate of 14 and 14.6% men between the ages of 30 to 59 years

(Table 1); showing more significant loss due to disability also in women.

Linear regression where that men have a statistically significant risk of 6% of having years lost due to disability in the general population in almost their entire life cycle from 15 to 79 years (Figure 5). While women have, 80% have a greater risk of having lost years of disability in the ages of 30 to 69 years (Figure 5), comparing use the Poisson

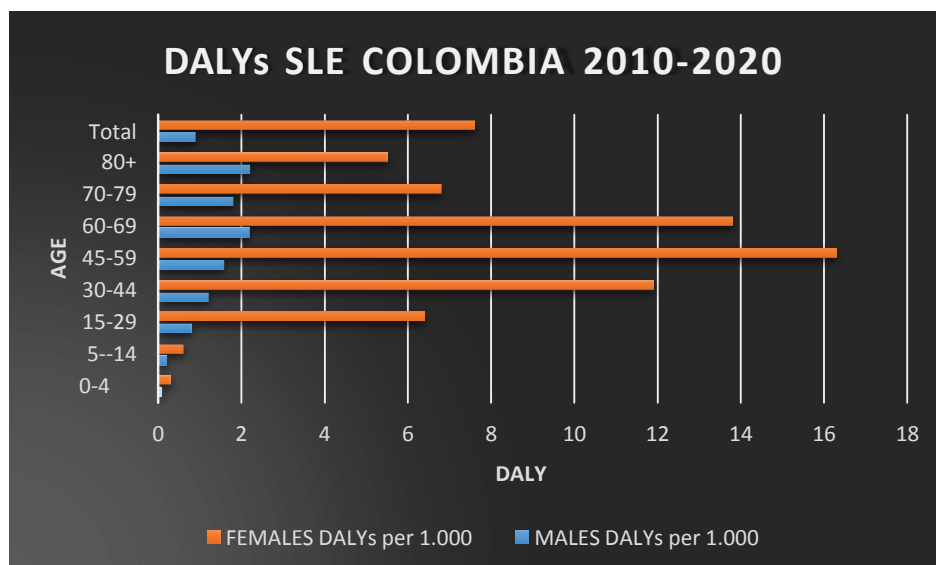


Figure 4: Dalys sle Colombia 2010-2020.

Population	Incidence	Incidence per 1	Age at onset	duration years	disability weight	ylds	years per 1	
<b>Ills</b>								
0-4	28,15,577	273	0.1	2.5	73.7	0.476	3,857	1.4
05-14	56,04,510	912	0.16	10	70	0.476	12,698	23
15-29	72,22,646	5,656	0.78	22.5	57.5	0.476	73,752	10.2
30-44	57,03,263	6,973	1.22	37.5	42.5	0.476	79,723	14
45-59	35,19,696	5,776	1.64	52.5	27.5	0.476	51,483	14.6
60-69	11,61,649	2,572	2.21	65	15	0.476	14,788	12.7
70-79	6,67,696	1,209	1.81	75	5	0.476	2,672	4
80+	1,92,682	433	2.25	85	0.3	0.476	62	0.3
<b>Total</b>	<b>2,68,87,79</b>	<b>23,804</b>	<b>0.9</b>	<b>41.9</b>	<b>38.2</b>	<b>0.48</b>	<b>2,39,035</b>	<b>8.9</b>
<b>Females</b>								
0-4	27,07,616	695	0.26	2.5	80	0.476	10,027	3.7
05-14	53,96,185	3,107	0.58	10	72.5	0.476	43,697	8.1
15-29	69,60,513	44,526	6.4	22.5	60	0.476	5,89,699	84.7
30-44	59,46,071	70,806	11.91	37.5	45	0.476	8,32,210	140
45-59	38,39,977	62,627	16.31	52.5	30	0.476	5,89,681	153.6
60-69	12,79,273	17,710	13.84	65	17.5	0.476	1,14,772	89.7
70-79	7,98,468	5,467	6.85	75	7.5	0.476	17,477	21.9
80+	2,48,923	1,378	5.54	85	0.3	0.476	196	0.8
<b>Total</b>	<b>2,71,77,06</b>	<b>2,06,316</b>	<b>7.6</b>	<b>42</b>	<b>40.6</b>	<b>0.48</b>	<b>219770</b>	<b>80.9</b>

Table 1: YLD by SLE.

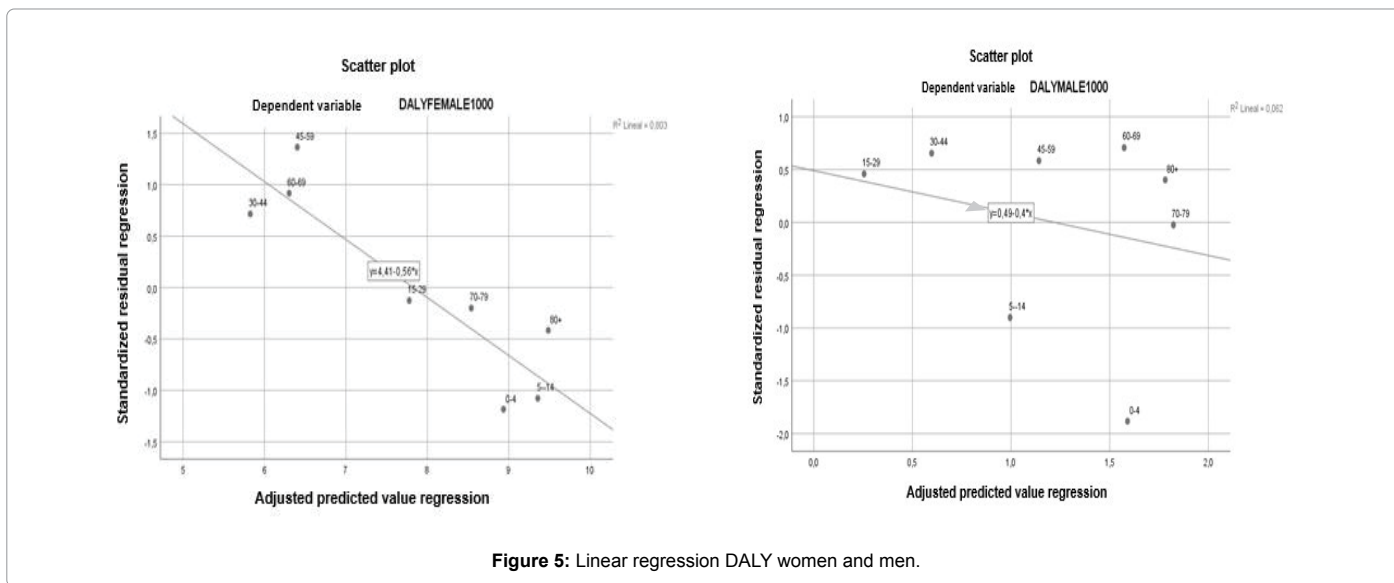


Figure 5: Linear regression DALY women and men.

regression, it observes that women have a greater risk of having years lost due to SLE compared to males.

## Discussion

The presentation of SLE is the female sex, observing that both mortality and morbidity occur in the age group of fertile women between 20 and 49 years of age. Coincides with the data sociodemographic data in Spain showing that 90% of the patients are female, 93% Caucasian (n=3,905), with a median age at diagnosis of 33 (25-45) years and a median duration of SLE from the diagnosis of 120 months [12].

In mortality, it occurs more frequently in women between 20 and 59 years of age, which is consistent with a study from Paraguay that evaluates mortality in the ICU where evidence that 90.3% of those affected were female. In addition, with a mean age of mortality of 34.3 ± 15.2 years, the time of evolution of SLE before admission to the ICU was 36.2 ± 56.4 months [13].

The most-reported complications of SLE in Colombia are complications such as ocular, musculoskeletal, nervous system, and cardiorespiratory involvement, which contrasts with studies from Paraguay where it evidences that the most frequent cause of admission to Complicated ICU is respiratory failure, pneumonia [13]. Although evaluating the SISPRO registries, the significant complications due to lupus are glomerulonephritis (lupus nephritis) and involvement of the pulmonary system due to connective tissue diseases.

The vast majority of people see their quality of life affected by being without a fixed employment contract or an undefined contract, which contrasts with studies in the United States. A study where most of all the affected people are the companions of patients, seeing Most of the caregivers (90.1%) were 60 years old or younger, more than half (54.2%) were men, and more than half (59.7%) identified themselves as the spouse or partner of the patient with lupus he was caring. Overall, health-related quality of life was close to normal for the general US population. Caregivers who were employed lost an average of 12.8% of paid work time due to caregiver responsibilities and reported a 33.5% reduction in work efficiency [14].

DALYs, 8.1 is observed with greater affection both in men and women between 30-69 years and with an YLD of 8.5 in men and 80.5

in women. In agreement with what fine in other countries, about 30.8 million (95% IU 21.5 million, 42.0 million) of DALY's were due to other disorders of musculoskeletal involvement, with a standardized rate by the age of 380.2 (95% UI 266.2, 520.3) DALY's per 100,000 inhabitants. Since 1990, the age- standardized DALY's rate has increased by 3.4% (95% UI 0.5, 6.1). The regions with the highest age-standardized DALY rates in 2017 were South Asia [629.7 (95% UI 444.5, 856.9)], Oceania [562.5 (95% UI 401.8, 752.8)] and high-income North America [507.8 (95% UI 358.2, 689.2)] Central Europe [20.8 (95% UI 12.9, 32.9)] [15].

The limitations of this study are due to the recording of RIPS diagnoses, since SISPRO, the information system chosen to extract the data, reports the frequencies of the diagnoses reported by physicians at the time of consultation or consultation. When making the death certificate, as it is a relatively low-frequency diagnosis, it is often appropriately reported since it is preferred to place in the registry the most common diagnoses such as kidney, heart, or respiratory failure, especially in cases of death registry. Leaving lupus as a rarely reported secondary diagnosis, with possible under- registration, and that when evaluating the 10-year data, the absolute frequency may not be present, and complications do not verify given by this diagnosis since the good correlation do not make in the databases. Like how a database evaluation is difficult to evaluate the incidence of the disease and only the prevalence of the data obtains.

Because it is an ecological study, the pooled measurement of the exposure-effect data confers more significant biases than other studies, such as the well-known ecological fallacy [16]. However, the most significant bias in this study is based on information bias, as explained in the limitations. The source of information is vital for the availability and quality of the data, and depending on the excellent registry of the RIPS, it will depend on evaluating morbidity, mortality, and disability, so it would also be a selection bias where, having such a large population, exclusion or repetition of the data obtained from this population with SLE may occur [17-26].

## Conclusion

Disease burden to SLE in the last ten years in Colombia is affected by an average of 8- 10 years of life lost adjusted for disability, showing that it affects both men and women in the fertile stage and active at work,

which affects the population pyramid of the country. In addition, the consequences of economic loss in the future and its complications are the involvement of several organs that systemically affect these people between 30-69 years of age-evaluating more loss that is significant by pulmonary, heart, and kidney complications. Therefore, prevention programs expand where adjustments make in approaching these high-cost diseases, diagnosing this pathology in time, and addressing the renal, pulmonary, and cardiac failures that it entails.

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