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Mortality in Systemic Lupus Erythematous in Milton Cato Memorial Hospital Saint Vincent and the Grenadines; A 5-year Retrospective Study

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Authors' contributions

This work was carried out in collaboration among all authors. Authors AO, IA designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors AO and IA managed the analyses of the study. OA managed the literature searches and contributed in the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Systemic Lupus Erythematous (SLE) is a rare, severe and lasting autoimmune disease that can vary in severity from mild to possibly life-threatening with a multi-system manifestation characterized by symptoms relating to joint, skin or mucosal inflammation, or with a varying degree of haematological abnormality or constitutional features, with women affected predominantly with peak onset (15-44) years of age.
Aim: This study was aimed at estimating the incidence and mortality of Systemic Lupus Erythematous lupus in Milton Cato Memorial Hospital Saint Vincent and the Grenadines, including temporal trends and variations in age and sex from 2014 to 2018 by using routinely collected administrative health data/patient records.
Methods: From 2014 to 2018, individuals with SLE were identified from the hospital records of Milton Cato Memorial Hospital, which records information on all patient coming in for healthcare services. A structured data extraction tool was employed to extract the data from the hospital

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record using the open data kit (ODK). Data was analysed using Statistical Package for Social Sciences (SPSS) version 23 and R Studio statistical software for analysis. The Chi-square test was used to test for association. All statistical tests were two-tailed and Level of Confidence was set at 95%, and *P=<0.05* was considered to be statistically significant.

Results: The mean age of patient with SLE was 28.52 ± 13.03 years old and the median age was 30 years old, almost all 25(92.6%) were females. Every year, women showed a significantly increase in incidence of Systemic Lupus Erythematous (SLE), there was an annual decrease in the incidence from 2014 to 2018, with a peak incidence in 2016 (0.11/1000 person-years). The lowest incidence was noted in 2018 (0.02/1000 person-years). Among sex, there was an annual decrease in the incidence from 2014 to 2018, with a peak incidence in 2015 and 2016 for male (0.02/1000 person-years) and in 2016 for females (0.21/1000 person-years) respectively. The lowest incidence was noted in 2018 (0.00/1000 person-years) and (0.04/1000 person-years) for both male and female respectively. Case fatality from SLE shows that 2017 had the highest case fatality of 33% compared to the other years, 2014 (25%), 2015(25%) and 2016 (9%) with 2018 having no case fatality at all.

Conclusions: This study showed that the incidence of SLE in Saint Vincent have decreased in the last decade, whereas the mortality rates of SLE have increased. Age and sex were found to be risk factors for SLE. This discovery of increased mortality of SLE suggests that this disease is no longer rare and will have implications for future healthcare planning and health service utilizations.

Keywords: Systemic Lupus Erythematous (SLE); mortality; incidence; Saint Vincent and the Grenadines.

1. INTRODUCTION

Systemic Lupus Erythematous (SLE) is an uncommon, severe and lasting autoimmune disease that can vary in severity from minor to possibly life-threatening, with a multi-system manifestation characterized by symptoms relating to joint, skin or mucosal inflammation, or with a wavering degree of haematological abnormality or constitutional features [1]. In some cases, patients may present with more severe and potentially life-threatening renal, neurological or cardiopulmonary difficulties [2]. It is considered as the prototypal connective tissue ailment, where the key pathogenesis relays to a dysfunctional immune system that results in overproduction of various autoantibodies, complement activation, and immune complex deposition leading to varied scientific appearances and target tissue destruction [2]. Its cause is not known, but it is thought to result from an intricate communication between genetics and ecological exposures [3,4]. Most of its pathology is facilitated by either direct or indirect effects of these autoantibodies, as well as other components of the innate and adaptive immune systems [3,4].

Pathogenesis of SLE is connected with functional deficit of multiple immunologic constituents, including the innate immune system, altered immune tolerance mechanisms, hyper-activation of T and B cells, reduced ability of immune complexes and apoptotic cell clearance, and flaws in multiple immune regulatory networks [5]. The failure of these mechanisms could be due to the effect of variants within SLE susceptibility genes [5]. To date, many diverse genes have been found to add to disease vulnerability [5]. In a small fraction of patients (<5%), a single gene could become the key player for this disease [6]; conversely, multiple genes have been implicated in most patients [6]. It is projected that at smallest four proneness genes or loci are required for the development of the ailment [7]. The susceptibility genes most widely considered are within the foremost histocompatibility complex (MHC) [7].

The popularity of SLE can vary significantly depending on race, disease description and technique of authentication, but is generally recognized as a rare disease, affecting less than 0.1% of the populace [8]. The commonness of SLE is projected to be between 40 and 400 cases per 100,000 persons [9]. Generally speaking, SLE has a reverting and settling nature where patients experience incidents of symptom exacerbation spread with periods of somewhat low disease activity [9] While the exact etiology of SLE still remains unclear, genetic predisposition and environmental and hormonal factors are thought to play vital parts in its pathogenesis [9]. Severity, attainment risk, and clinical exhibitions of this disease can vary by

background, geography, and sex, with a dominance that is higher in women during their childbearing ages and some non-European populaces such as African Americans, Hispanics, and Asians [9]. It disturbs women more than men and incidence tends to be highest between the ages of 15 and 44 years [10]. It is nine times more common in females [8]. The incidence and popularity of SLE is largely elevated worldwide among non-white racial groups [10].

Systemic lupus erythematosus (SLE) is being reported more largely and with more severe clinical manifestations in women of African descent living in North America and the UK in comparison with white populaces [11]. Studies has demonstrated a 3-4-fold increased risk of SLE in women of African descent, as well as higher rates of renal disease and premature death [11]. Increased rates of renal problems with interrelated poor results are also frequent in Barbados [12].Systemic lupus erythematosus has been thought to be rare in Africa, with an aggregate prevalence disease frequency from West Africa (low rates), through the Caribbean (intermediate rates), to the highest rates in North America and Europe in populations of the diaspora [11,13] Contrary, recent report recognized a high dominance of SLE among recent West African migrants to the UK, which was in contrast with generally known indication [11,14]. The crux of the issue is whether SLE has certainly been underdiagnosed in Africa, or if there is, in fact, a disease "gradient [11,15].

Having an understanding of the occurrence and predominance of SLE may support the knowledge of the problem linked with the condition and enable resource provision to increase the quality of life of people with SLE [10]. It may also provide clinicians and policy-makers with valuable information for prioritization of services and estimation of the impacts of policy and practice decisions. There have been no studies looking at specific aspects of the burden of SLE in Saint Vincent and the Grenadines, and there is no current systematic approach to monitoring changes in incidence and prevalence of SLE in Saint Vincent and the Grenadines. To improve its management, it is important to know the prevalence of the disease, including the clinical and socioeconomic characteristics of the affected population. Also, the trend of peak age of the prevalence and incidence of SLE by sex and mortality has not been reported thus far in Saint Vincent and the Grenadines. The purpose of the study was to estimate the incidence and mortality of Systemic Lupus Erythematous lupus in Milton Cato Memorial Hospital Saint Vincent and the Grenadines, including temporal trends and variations in age and sex from 2014 to 2018 by using routinely collected administrative health data/patient records.

2. METHODOLOGY

2.1 Study Area

Saint Vincent and the Grenadines (SVG) is an upper-middle-income multi-island state in the eastern Caribbean, located in the Windward Island chain of the Lesser Antilles [16]. It comprises of 32 islands, inlets, and cays, but only 7 of these beyond the main island of Saint Vincent are inhabited (Bequia, Canouan, Mayreau, Union, Mustique, Palm Island, and Petit Saint Vincent [16]. The main island of Saint Vincent is the largest island in size at 340 square kilometers with over 90 percent of the population [16]. The islands are linked by sea ferries and air charters through four Grenadine airports [16]. The country is divided into six administrative units, or parishes: Charlotte, Grenadines, Saint Andrew, Saint David, Saint George, and Saint Patrick [16]. Five of these parishes are situated on the island of Saint Vincent [16] Kingstown, located in the Saint George Parish on Saint Vincent Island, is the capital of the country and largest urban center [16].

In 2020, SVG had a projected population of 110,172, the male population (56,052) outnumbered the female (54,120) [17] The population is young, with almost 25% under the age of 15 and 41.7% under the age of 35 [17] Although this under-35 age group has decreased since the 2001 census by 6.1%, it remains the prevalent proportion of the total population [17]. The 2020 census determined the population aged under 5 years to be 8,723. A little over 9% of the population is over the age of 65.5 [17]. According to the Saint Vincent 2001 Housing and Population Census, 24.2% of the population lived in and around the capital, Kingstown, in 2011 [17] Since then, the urban population has increased by 2 percentage points [18].

Saint Vincent, like the rest of the countries of the Organization of Eastern Caribbean States (OECS), is facing an increase in elderly population and a decline in the fertility rate [19]. This shift is mainly the result of long-term attainments in growing access to care and

treatment for infectious diseases [19]. The aging population adds to the increased burden of chronic diseases [19] Life expectancy for Vincentians averages 72 years of age overall, 74 for females and 70 for males [19] Chronic non-communicable diseases (NCDs) account for 70% of visits to outpatient services and are among the top five causes of death [20] In 2004 the top five cause of death, in rank order, were diabetes, malignant neoplasms, cerebrovascular disease, heart disease, and hypertension [19].

As with many of its neighbouring countries, primary care service handling indicators are very strong, with universal coverage of vaccines for key childhood illnesses and skilled attendance at delivery [16]. The country is experiencing epidemiological transitions, as seen in the increasing burden of non-communicable diseases (NCDs), which accounts for the top five causes of death, and in the increasing average age of the population [16]. The estimated prevalence of HIV in Saint Vincent is 1%, but stigma against individuals with HIV and AIDS continues to persist across the islands [16].

Health care service delivery in Saint Vincent is basically provided by the public sector, but the private sector has grown in recent years to supplement the inadequate specialty services and relieve some of the burden on the public sector [16]. The private commercial sector is not well documented but is known to be concentrated in Kingstown [16]. Data on the division of health services between the public and private sectors are not available [16]. Specialized health services are also concentrated in Kingstown. NGOs provide inadequate care, mostly through service delivery [16]. At the primary care level, the public sector is divided into nine Health Districts with 39 health clinics spread throughout the country [16]. On average, each health clinic is equipped to cater to a population of 2,900 with no patient required to travel more than three miles to access care [16]. At the secondary level, Milton Cato Memorial Hospital (MCMH) which is a 215-bed hospital, is the country's only governmental acute care referral hospital providing specialist care [16]. The private sector is active at the primary care level with private providers offering generalist and/or obstetric services [16]. Tertiary care is limited on the island in both sectors [16]. The private sector offers more long-term care facilities for the elderly with five facilities, while the one public sector facility primarily serves the disadvantaged populations [16]. The private sector also offers innovative diagnostics, which are restricted in the public sector to the lab at MCMH [16].

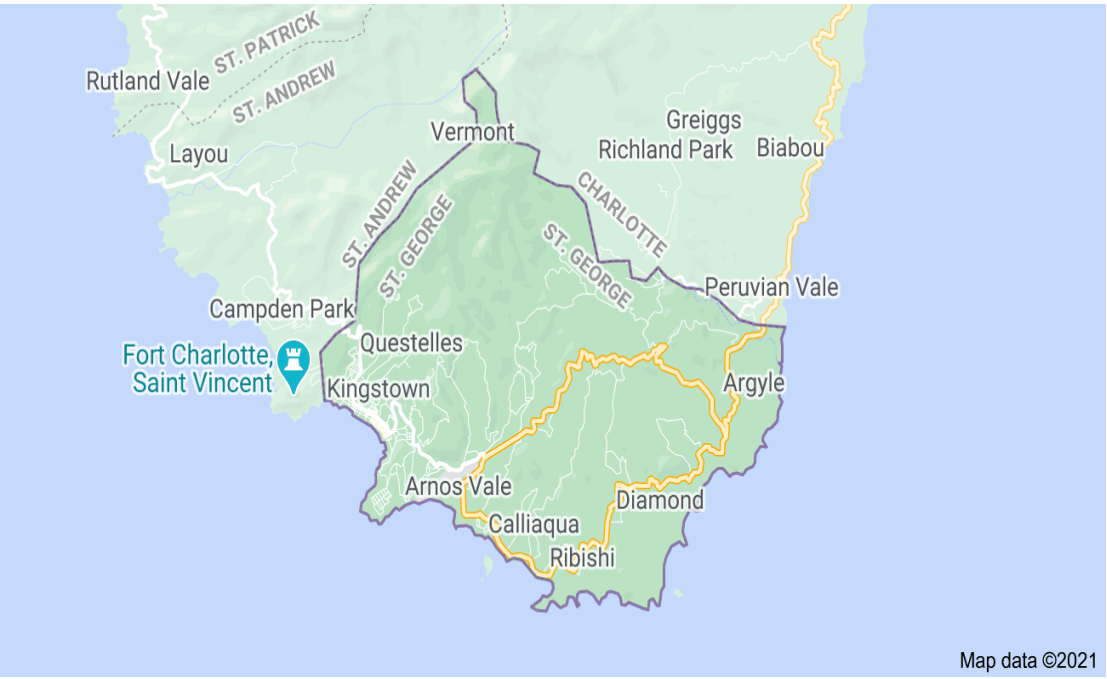


Fig. 1. Map and parishes of saint vincent and the Grenadines

Financing for the health sector is provided through the Ministry of Health's (MOHE) portion of the Consolidated Fund, the National Insurance Service (NIS), and private expenditures [16]. Available data on private expenditures are limited. Public health services are primarily covered most through the MOHE budget. Primary care services are free of charge and all other services are highly subsidized. NIS covers the costs of hospital services for its members [16].

2.2 Study Design

The study utilized a retrospective population-based study which consists of secondary data derived from Milton Cato Memorial Hospital of patients with Autoimmune disease from 2014-2018.

2.3 Inclusion Criteria

Data on SLE from 2014-2018.

2.4 Exclusion Criteria

Incomplete data on SLE from 2014-2018.

2.5 Data Collection Procedure

A structured data extraction tool was employed to extract the data from the hospital record with the aid of an android mobile device using the open data kit (ODK). The data extraction tool was developed and modified with reference to existing tools used in similar studies. The data extraction tool comprises of information on sociodemographic (age, sex), year of diagnosis and diagnosis.

2.6 Outcome Measures and Data Analysis

For annual incidence, the year-specific numerator included subjects with incident cases of SLE in the specific calendar year, and the denominator included the mid-year population from the Population and Demographic Health Survey (DHS) from 2013-2019 which are cross-sectional surveys conducted every year, compiled by the Statistical Office Ministry of Finance, Economic Planning, Sustainable development and Information Technology of the Government of Saint Vincent and the Grenadines Population. This nationally representative survey involved a multi-stage sampling design up to the household level with enumeration areas distributed by region and type of residence using the most recent national census as its sampling frame. Crude rates, sex- and age-specific rates, standardized rates adjusted for sex and age using the 2014-2018 mid-year population, and their 95% confidence intervals (CIs) were calculated.

Incident cases of SLE disease were defined as those without SLE, disease in a particular year (e.g., 2014) and the preceding year (e.g., 2012 to 2013) that met the algorithm in that year (e.g., 2014) and the following year (e.g., 2015). Subgroup analyses were performed according to age and sex, the mortality rate in cases of Systemic Lupus Erythematous (SLE) was estimated by dividing the number of incidents SLE cases who died during the study period by the number of person-years for SLE cases since diagnosis. Mortality rates were also stratified by time since diagnosis.

Data was edited, collated and entered into the 2019 Microsoft Excel Data Sheet, after which it was exported into the International Business Machine (IBM) Statistical Package for Social Sciences (SPSS) version 23.0 and R Studio statistical software for analysis. The analysis involved the calculation of descriptive statistics (such as frequency distributions, percentages and means) and inferential statistics. Continuous variables were expressed as means ± standard deviation while categorical variables were expressed as absolute frequencies. Parametric analysis was used after tests for normality confirmed that continuous variables were normally distributed. The Chi-square test was used to test for association. All statistical tests were two-tailed and Level of Confidence was set at 95%, and $P=<0.05$ was considered to be statistically significant. Test of normality was done to check for normal distribution of data using the Shapiro-Wilk test and Kolmogorov-Smirnov Test with significance level set at 0.05. Assumptions were set that if the significant value of both tests ($p > 0.05$), the data is normal. If it is below 0.05, the data significantly deviates from a normal distribution and non-parametric testing was employed such as the median was used instead of the mean to represent summative statistics, due to the median is not affected by outliers or extreme values.

The information provided by the probability value (p-value) does not provide an estimate for the magnitude of the effect of interest and the precision of this magnitude [21]. As a result of

this, most of the inferential statistics reported in this report, did not only provide information on the p-value, but also on the magnitude of the effect (effect size statistics) in the form of correlation coefficient, regression coefficient and also their confidence intervals (CIs). Confidence intervals (CIs) were interpreted as the value that encompasses the population or 'true' value. This style of reporting both the effect sizes and their CIs gave a clear understanding of the relationships between the variables [21].

3. RESULTS

Table 1 shows the socio-demographics distribution of patient with Systemic Lupus Erythematous (SLE)in respect to age and sex. From 2014 to 2018, the total number of cases of Systemic Lupus Erythematous (SLE) in Milton Cato General Hospital was 27, with more than one-third 11(40.7%) occurring in the year 2016. Among the cases of Systemic Lupus Erythematous (SLE) the mean age was 28.52 ± 13.03 and a median Age of 30yrs old, almost all 25(92.6%) were females.

Fig. 2 shows the trend in incidence by year. Every year, women showed a significantly increase in incidence of Systemic Lupus Erythematous (SLE), there was an annual decrease in the incidence from 2014 to 2018, with a peak incidence in 2016 (0.11/1000 person-years). The lowest incidence was noted in 2018 (0.02/1000 person-years). Among sex, there was an annual decrease in the incidence from 2014 to 2018, with a peak incidence in 2015 and 2016 for male (0.02/1000 person-years) and in 2016 for females (0.21/1000 person-years) respectively. The lowest incidence was noted in 2018 (0.00/1000 person-years) and (0.0/1000 person-years) for both male and female respectively.

Fig. 3 shows that the overall peak age of incidence was between 21-30 years in 2014. In 2014, there was no cases of SLE among males. However, the peak age of prevalence among women was similar to the overall incidence graph 21-30 years of age.

Fig. 4 shows that the overall peak age of incidence was between 41-45 years in 2015. In 2015, the peak age incidence among men was different 6-10 years. However, the peak age of prevalence among women was similar to the overall incidence graph 41-45 years of age.

Table 1. Socio-demographics characteristics of patients with SLE

Variable	Frequency (n=27)	Percentage (%)
Age		
≤10	1	3.7
11-15	4	14.8
16-20	3	11.1
21-25	4	14.8
26-30	2	7.4
31-35	7	25.9
36-40	1	3.7
41-45	1	3.7
46-50	3	11.1
51-55	0	0.0
56-60	1	3.7
Mean ± S.D (28.52 ± 13.03) yrs. old, 95% C.I for Mean (23.36-33.68), Median Age = 30 yrs. old		
Sex		
Male	2	7.4
Female	25	92.6
Year		
2014	4	14.8
2015	4	14.8
2016	11	40.7
2017	6	22.2
2018	2	7.4

S.D=Standard deviation, C. I= Confidence Interval

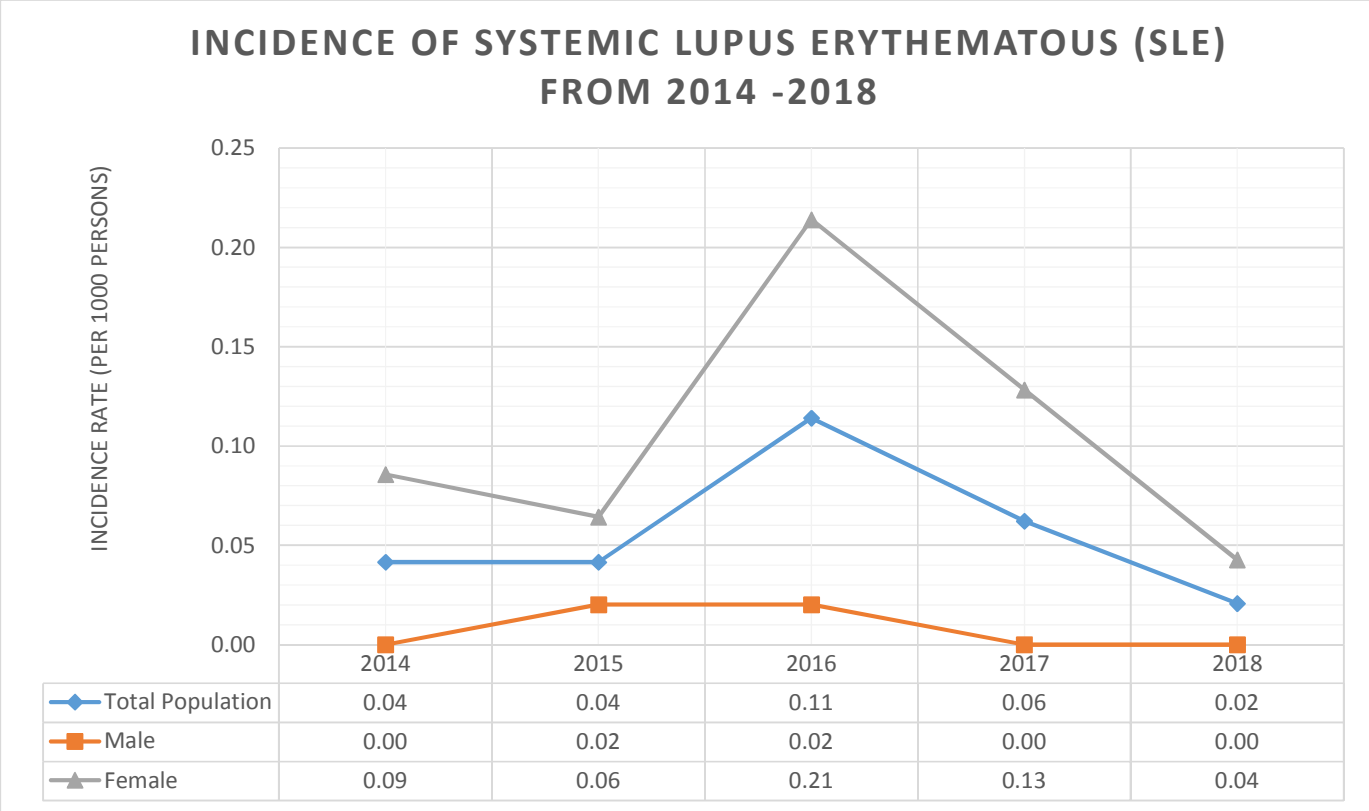
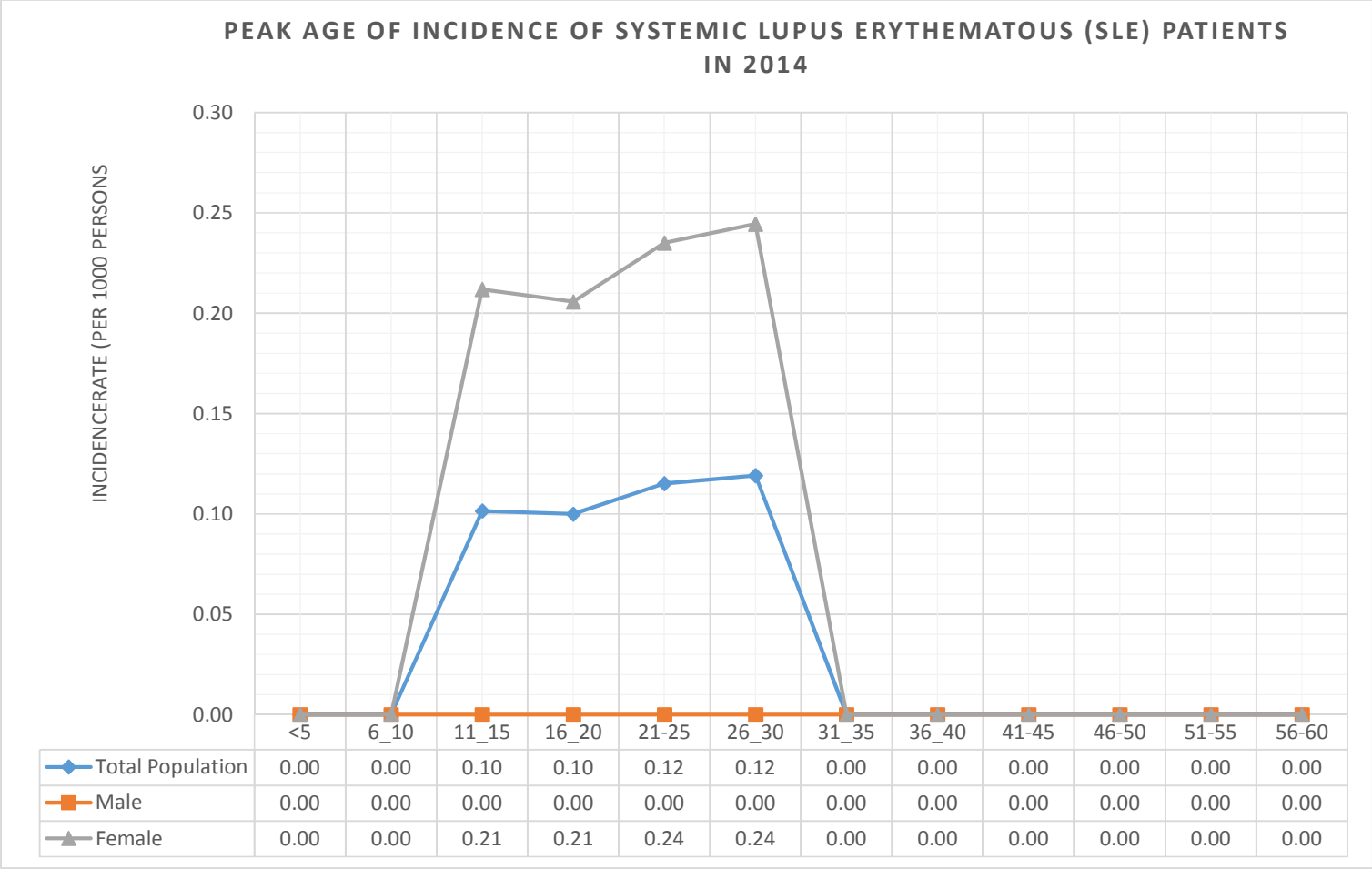
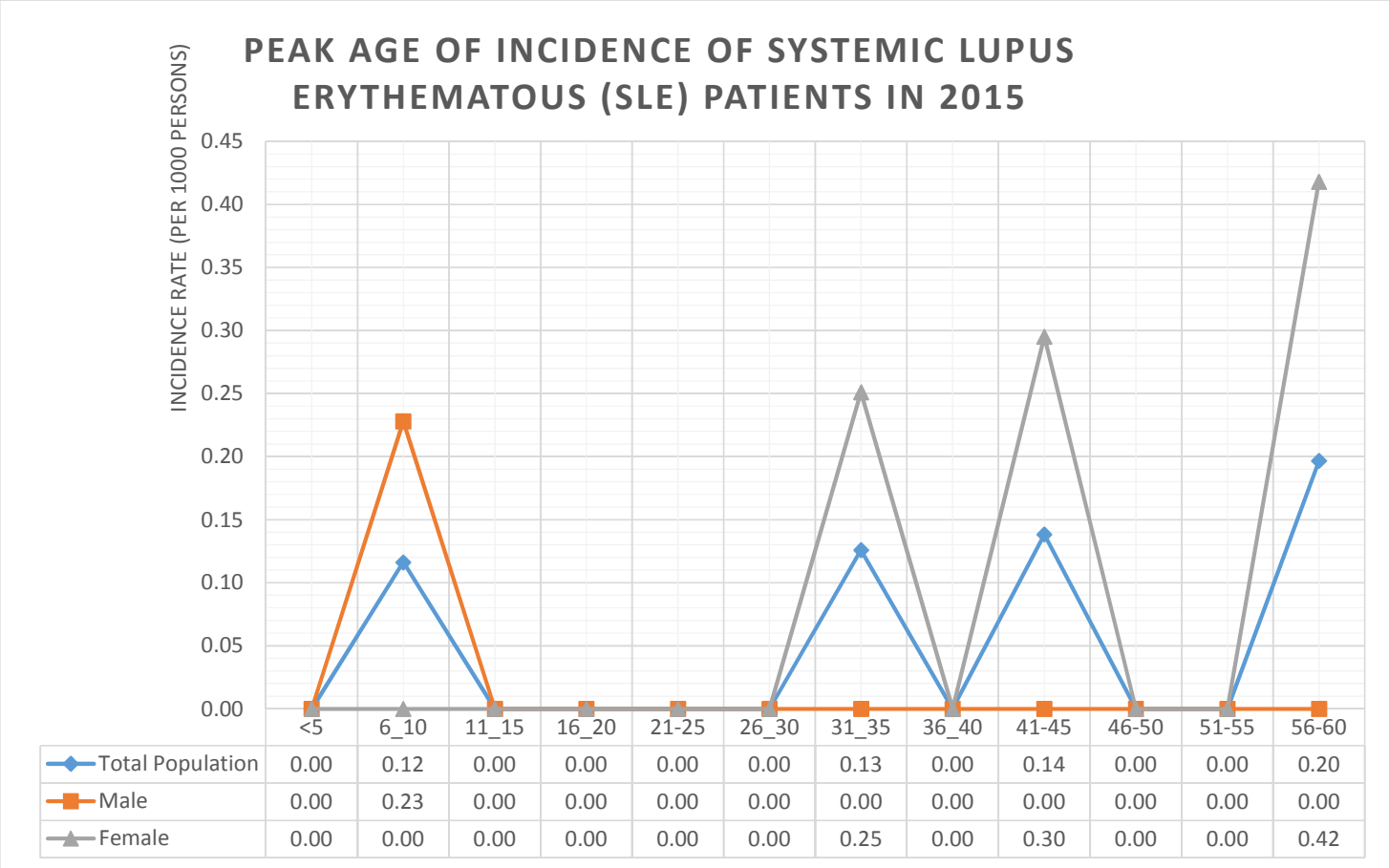


Fig. 2. Incidence of systemic lupus erythematous (SLE) from 2014 -2018



	<5	6_10	11_15	16_20	21-25	26_30	31_35	36_40	41-45	46-50	51-55	56-60
Total Population	0.00	0.00	0.10	0.10	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00
Male	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Female	0.00	0.00	0.21	0.21	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00

Fig. 3. Peak age of incidence of systemic lupus erythematous (SLE) patients in 2014



	<5	6_10	11_15	16_20	21-25	26_30	31_35	36_40	41-45	46-50	51-55	56-60
Total Population	0.00	0.12	0.00	0.00	0.00	0.00	0.13	0.00	0.14	0.00	0.00	0.20
Male	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Female	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.30	0.00	0.00	0.42

Fig. 4. Peak age of incidence of systemic lupus erythematous (SLE) patients in 2015

Fig. 5 shows that the overall peak age of incidence was between 31-35 years in 2016. In 2016, the peak age incidence among men and women was similar to the overall incidence graph 31-35 years of age.

Fig. 6 shows that the overall peak age of incidence was between 16-20 years in 2017. In 2017, there was no cases of SLE among males. However, the peak age of prevalence among women was similar to the overall incidence graph 20-26 years of age.

Fig. 7 shows that the overall peak age of incidence was between 36-40 years in 2018. In 2018, there was no cases of SLE among males. However, the peak age of prevalence among women was similar to the overall incidence graph 36-40 years of age.

In Table 2, among sex, the females had higher proportions across the years (2014-2018) compared to that of the male we hereby fail to reject the null hypothesis which postulates that, there is no significant higher proportion of *females to males who have* Systemic Lupus Erythematous (SLE) *from 2014 -2018 in Saint Vincent and the Grenadines* due to there was no statistically significant association observed *(p>0.05)*. Among the age groups, those within the age group of 31-35 years had significantly higher proportions across the years (2014-2018) compared to that of other age group, this difference was not statistically significant (p>0.05). We hereby fail to reject the null hypothesis which postulates that there is no significant higher proportion of individuals ≥ 40 years of age compared to other age groups who have Systemic Lupus Erythematous (SLE) from 2014 -2018 in Saint Vincent and the Grenadines.

In Table 3, those within the age group of 31-35 years had higher proportions between both male and female compared to that of other age group to having Systemic Lupus Erythematous (SLE). However, there was no statistically significant association observed between age and sex (p>0.05).

Fig. 8 shows Case fatality from SLE shows that 2017 had the highest case fatality of 33% compared to the other years, 2014 (25%), 2015(25%) and 2016 (9%) with 2018 having no case fatality at all.

4. DISCUSSION

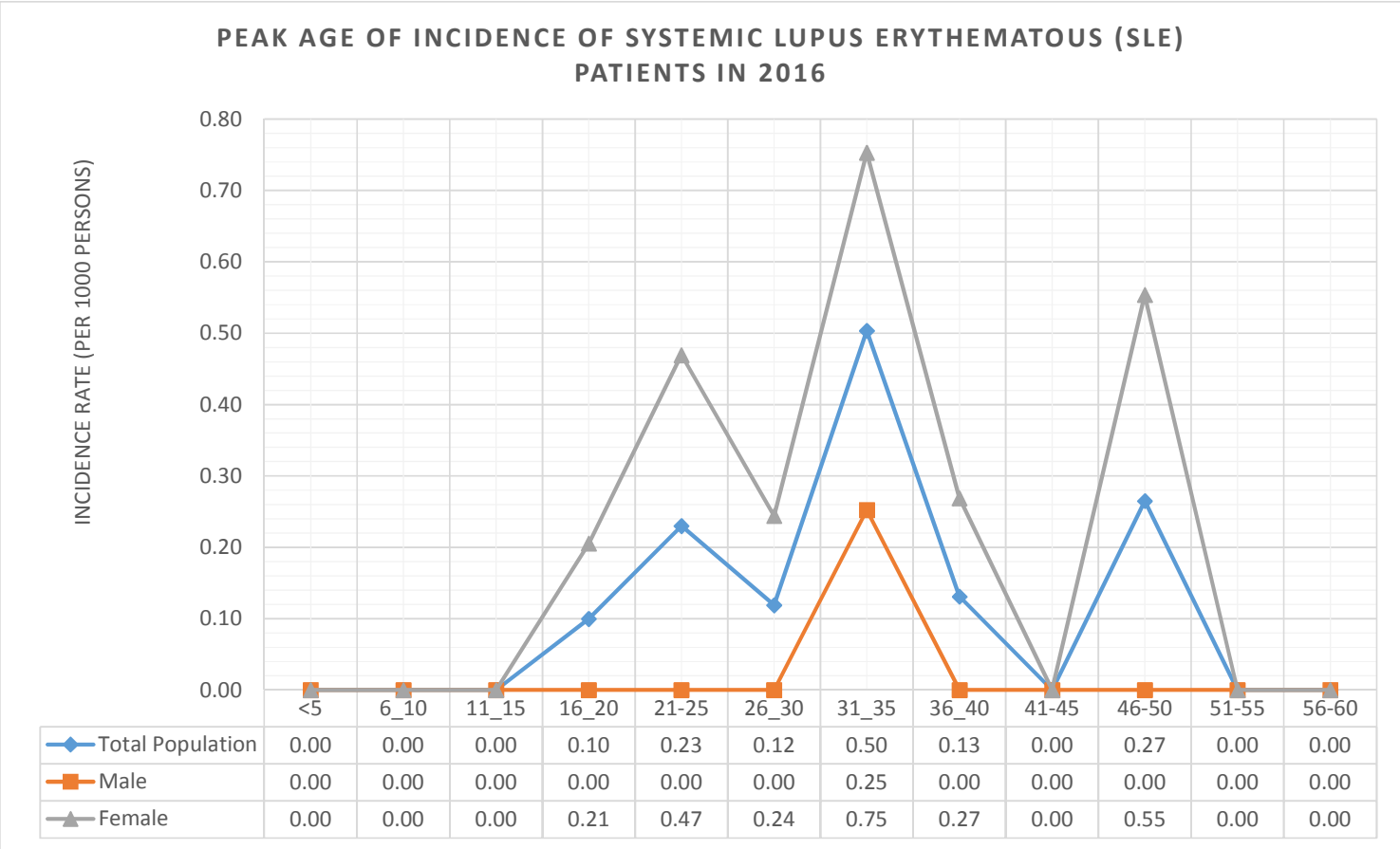
4.1 Incidence of Systemic Lupus Erythematous (SLE)

In this study, we observed a decreasing trend in the incidence of SLE with a baseline of 0.04 per1000 person-years in 2014 to 0.02 per 1000 person-years in 2018. The decrease in trend reported in the present study might be explained by the poor diagnostic or confirmatory test to confirm the diagnosis using ≥4 American College of Rheumatology (ACR) criteria or a renal biopsy of lupus nephritis/end-stage renal disease or a rheumatologist's diagnosis), this gap of poor diagnosis could underestimate or mask the actual burden of SLE. Also due to the use of the hospital database could stem from the lack of accurate diagnosis. Another explanation of the findings is that data analyzed in this study were obtained when subjects visited healthcare institutions. Therefore, no information was available for SLE patients who did not visit a healthcare institution, which could underestimate the SLE burden.

The incidence rate of SLE reported was lower compared to that reported in Korea who reported an incidence rate of (5.42/100,000 person-years in 2005 to 3.6/100,000 person-years), in the Latin America and Incidence rate of 4.7 to 8.7/per/ 100000 person's years was reported, in North America an incidence rate of 23.2/100 000 person-years was reported while in Africa and Ukraine an incidence rate of (0.3/100 000 person-years) was reported [22,23]. This difference between the incidence rate of both studies can be overestimated or underestimated due to various population size of both countries and the difference in multiplier rate (1000 vs 100000) by both studies which impairs the basis of comparison. The population size in the Caribbean was approximately 120,000 people as at the time of the study.

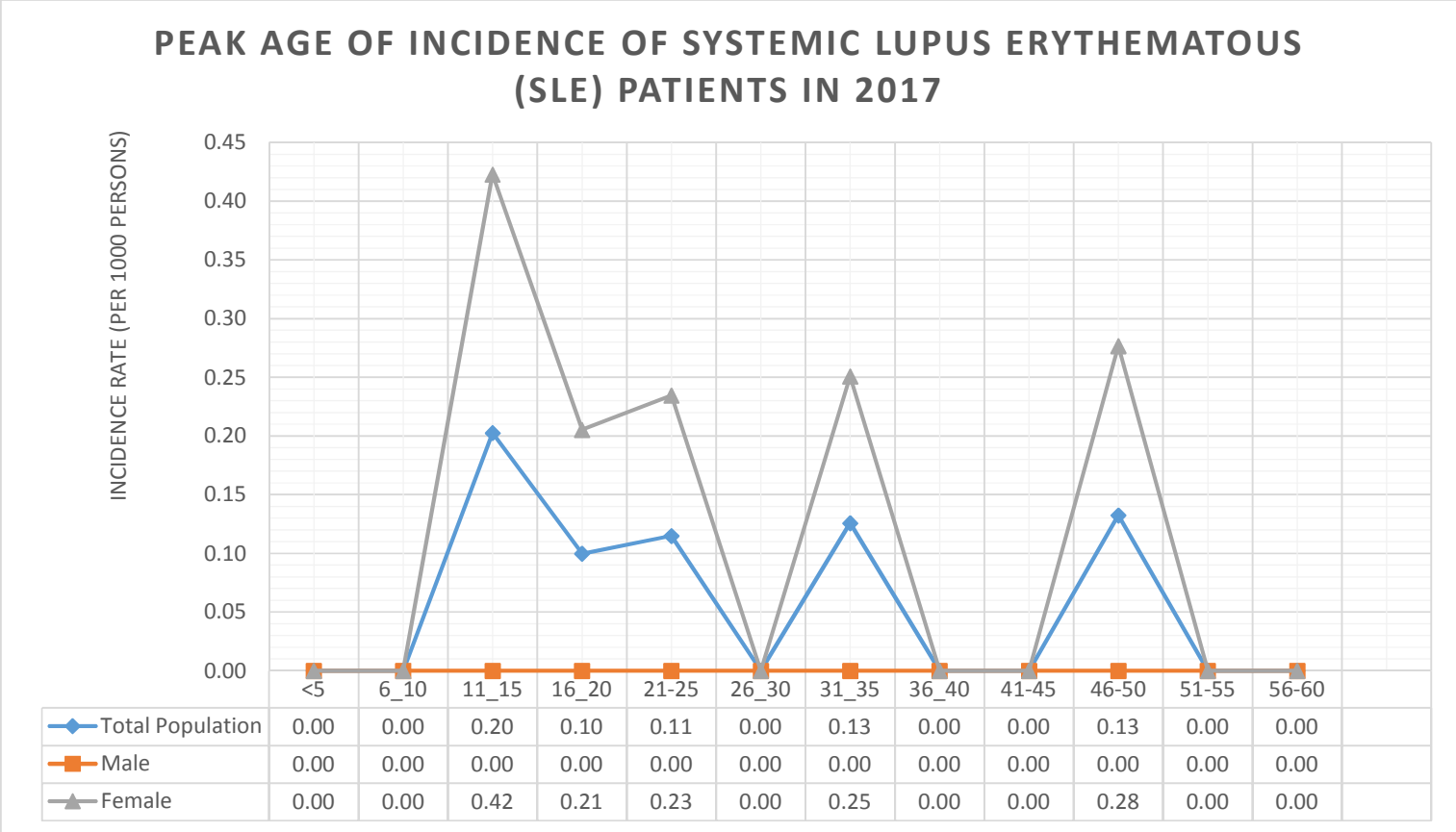
4.2 Social Demographic Characteristics of Individuals who have (SLE)

The incidence of SLE increased continuously with age until it reached a peak, after which, it declined slowly. The incidence of SLE among female in this study peaks



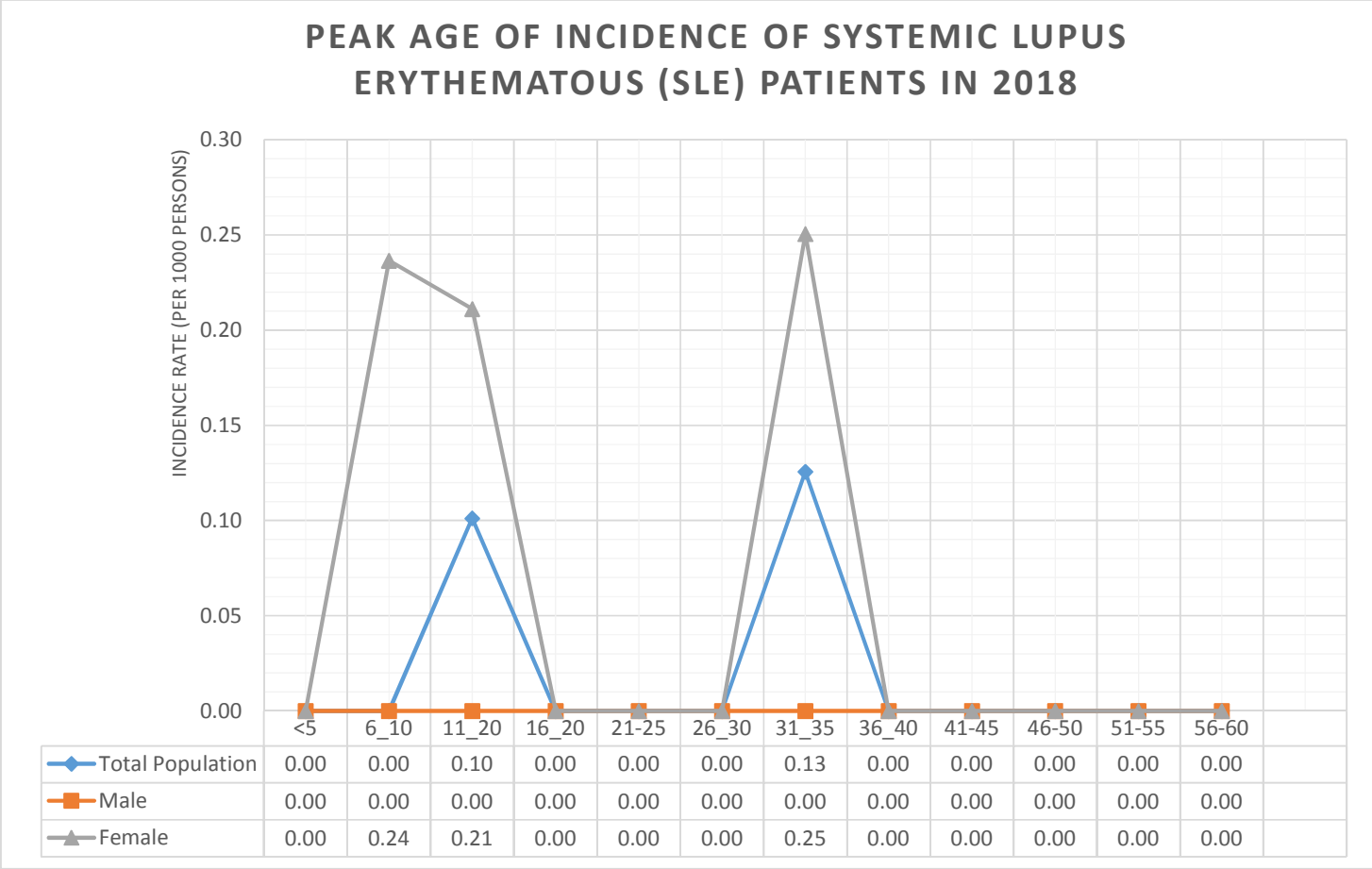
	<5	6_10	11_15	16_20	21-25	26_30	31_35	36_40	41-45	46-50	51-55	56-60
Total Population	0.00	0.00	0.00	0.10	0.23	0.12	0.50	0.13	0.00	0.27	0.00	0.00
Male	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00
Female	0.00	0.00	0.00	0.21	0.47	0.24	0.75	0.27	0.00	0.55	0.00	0.00

Fig. 5. Peak age of incidence of systemic lupus erythematous (SLE) patients in 2016



	<5	6_10	11_15	16_20	21-25	26_30	31_35	36_40	41-45	46-50	51-55	56-60
Total Population	0.00	0.00	0.20	0.10	0.11	0.00	0.13	0.00	0.00	0.13	0.00	0.00
Male	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Female	0.00	0.00	0.42	0.21	0.23	0.00	0.25	0.00	0.00	0.28	0.00	0.00

Fig. 6. Peak age of incidence of systemic lupus erythematous (SLE) patients in 2017



	<5	6_10	11_20	16_20	21-25	26_30	31_35	36_40	41-45	46-50	51-55	56-60
Total Population	0.00	0.00	0.10	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00
Male	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Female	0.00	0.24	0.21	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00

Fig. 7. Peak age of incidence of systemic lupus erythematous (SLE) patients in 2018

Table 2. Trend analysis by age group and sex

Variable							df	χ2(p-value)	*95%Confidence Interval (p-value)*	
Sex	2014	2015	2016	2017	2018					
	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Freq (%)	Total (%)			Lower Limit	UpperLimit
Male	0(0)	1(50.0)	1(9.1)	0(0.0)	0(0.0)	2(7.4)				
Female	4(100)	3(75.0)	10(90.9)	6(100)	2(100)	25(92.6)	4	0.301(0.767)	0.615	0.918
Total	4(100)	4(100)	11(100)	6(100)	2(100)	27(100)				
Age										
≤10	0(0.0)	1(25.0)	0(0.0)	0(0.0)	0(0.0)	1(3.7)	24	0.013(0.933)	0.844	1.000
11-15	1(25.0)	0(0.0)	0(0.0)	2(33.3)	1(50.0)	4(14.8)				
16-20	1(25.0)	0(0.0)	1(9.1)	1(16.7)	0(0.0)	3(11.1)				
21-25	1(25.0)	0(0.0)	2(18.2)	1(16.7)	0(0.0)	4(14.8)				
26-30	1(25.0)	0(0.0)	1(9.1)	0(0.0)	0(0.0)	2(7.4)				
31-35	0(0.0)	1(25.0)	4(36.4)	1(16.7)	1(50.0)	7(25.9)				
36-40	0(0.0)	0(0.0)	1(9.1)	0(0.0)	0(0.0)	1(3.7)				
41-45	0(0.0)	1(25.0)	0(0.0)	0(0.0)	0(0.0)	1(3.7)				
46-50	0(0.0)	0(0.0)	2(18.2)	1(16.7)	0(0.0)	3(11.1)				
51-55	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)				
56-60	0(0.0)	1(25.0)	0(0.0)	0(0.0)	0(0.0)	1(3.7)				
Total	4(100)	4(100)	11(100)	6(100)	2(100)	27(100)				

**Statistically significant (p<0.05). F (Fisher's Exact test) CI = Confidence Interval), χ2= chi-square test statistics, df= degree of freedom*

Table 3. Association between social demographic characteristics

Variable	Sex			df	χ2(p-value)	95% Confidence Interval (P-value)	
	Male	Female					
	Freq (%)	Freq (%)	Total (%)			Lower Limit	Upper Limit
Age							
≤10	1(50.0)	0(0.0)	1(3.7)	8	11.093(0.533) [F]	0.355	0.712
11-15	0(0.0)	4(16.0)	4(14.8)				
16-20	0(0.0)	3(12.0)	3(11.1)				
21-25	0(0.0)	4(16.0)	4(14.8)				
26-30	0(0.0)	2(8.0)	2(7.4)				
31-35	1(14.3)	6(24.0)	7(25.9)				
36-40	0(0.0)	1(4.0)	1(3.7)				
41-45	0(0.0)	1(4.0)	1(3.7)				
46-50	0(0.0)	3(12.0)	3(11.3)				
51-55	0(0.0)	0(0.0)	0(0.0)				
56-60	0(0.0)	0(0.0)	1(3.7)				
Total	2(100)	25(100)	27(100)				

**Statistically significant (p<0.05). F (Fisher's Exact test) CI = Confidence Interval), Y= Yates Correction, χ2= chi-square test statistics, df= degree of freedom*

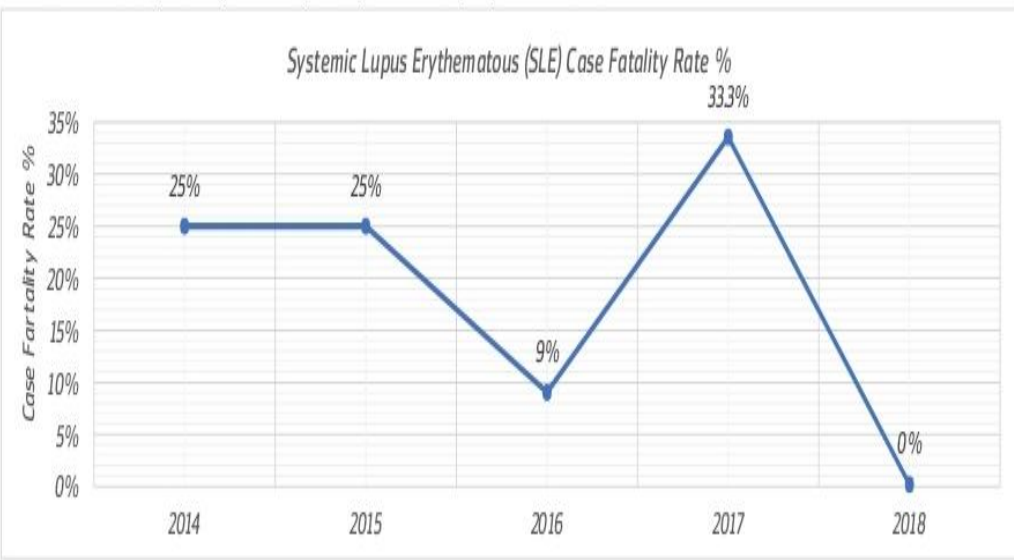


Fig. 8. Case fatality from systemic lupus erythematous (SLE) from 2014 -2018

occurring at 31 to 35years. This pattern might be related to the use of contraceptive pills during the reproductive age. The incidence of SLE had a peak in their middle age 31 to 35 years of age, however, this could be attributable to the small numbers of males in the study. This finding was similar with a study from Norwegian study [24].

Also, findings from the study confirmed female predominance in the incidence rate of SLE, with approximately 10-fold higher prevalence in women than in men. Studies have reported that this ratio tends to increase with age and peaks during the childbearing ages, declining slowly thereafter [24,25]. The female-to-male ratio of patients with SLE was similar to a study who reported a higher incidence rate of SLE in women compared with men and in African Americans compared to Caucasians as most natives in Saint Vincent and the Grenadines are of African descent [26]. Reports from a Medicaid data from 2000 to 2010 and identified 65788 SLE patients- 93.1% were women [27]. Similar studies on a sex-specific incidence rates of SLE also reported higher incidence in women than men [28,29].

4.3 Case-mortality and Morbidity from Systemic Lupus Erythematous (SLE)

The study findings found increased mortality in people with SLE compared with the general population. Our case % mortality rate was 33%, which shows that one-third of person that have SLE dies from it. This finding has serious implication on the healthcare of the country, this finding reveals the gap in the management and treatment of TID. This rate was higher than that found by a similar study in the US which reported SLE mortality rates per 1000 patient-years among Native American (27.52), Caucasian (20.17), and African American (24.13) patients and were lower among Hispanic (7.12) or Asian (5.18) patients [30]. Also, recent studies in the United Kingdom also reported a mortality rate of 15.84/1000 person-years (95% CI 13.91, 18.04) [31].

However, this difference could be attributed to both rates were unadjusted and our cohort was on average older. The standardized mortality rate (SMR) is more informative than the crude mortality rate because this compares mortality rates to people without SLE of the same age and gender and therefore assesses the excess mortality due to SLE. Alternatively, it may be due to our cases having milder disease or to the different study methods used. However, our study didn't compute age specific mortality rate and sex-specific mortality rate due lack of availability of data and poor management health information system in the country as at the time of the study.

5. CONCLUSION

Sequel to the findings of this study, this study showed that the incidence of SLE in Saint

Vincent have decreased in the last decade, whereas the mortality rates of SLE have increased. This finding of increased mortality of SLE suggests that this disease is no longer rare and will have implications for future healthcare planning and health service utilizations. This finding can, therefore, be used for planning and evaluating health services for this group of patients. Age and sex were found to be risk factors for SLE. Our data confirmed the known predilection of SLE in women. The peak age of diagnosis is middle age, contrary to the generally held belief that lupus mainly targets young people.

6. RECOMMENDATIONS

Disease Registries should be expanded to a population-based multidisciplinary autoimmune disease such as SLE registry to enhance collection and analysis of data over time on causation, natural history, morbidity and mortality of autoimmune diseases. Utilizing a multidisciplinary, integrated approach with collection of data on multiple diseases. Support research on the feasibility and optimal design of the registry to allow collation of data at the state and national levels.

Develop communication and information dissemination strategies for health care providers, patients and their families, and the public using a broad range of formats and technologies to maximize access and incorporate current information resources. Also, culturally sensitive public awareness information materials aimed at patients, families, and health care providers of diverse races and ethnicities should be developed.

At a public level the epidemiological studies are necessary to assess the social and economic burdens impacting the health systems in the country. Future research may include looking at the geographic distribution of cases to better assess potential environmental influences, direct health care costs, and pharmaceutical use.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Ethical approval was gotten to access medical information of patients from the Ministry of Health and Wellness and Hospital Administrator at Milton Cato Memorial Hospital in Saint Vincent and the Grenadines.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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