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Review

Prevalence and incidence of systemic lupus erythematosus in France: A 2010 nation-wide population-based study

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ABSTRACT

To date, only a small number of studies have examined the epidemiology of systemic lupus erythematosus (SLE) on a nation-wide basis. We used French national administrative databases to analyze the nation-wide prevalence and incidence rates of SLE within the largest French health insurance scheme, which covers 86% of the population (almost 58,200,000 individuals). Patients with SLE were identified if they had full coverage for a chronic disease with a code (ICD-10th M32) in the health insurance information system, or if they had a SLE code in the hospital discharge database as a primary or secondary diagnosis in 2010. We defined incident cases as patients who had a new long-term disease diagnosis of SLE in 2010. Overall, 27,369 individuals were identified as having SLE, of whom 88% were female. The crude 2010 prevalence of identified SLE was 47.0/100,000, and the WHO age-standardized rate was 40.8/100,000. The crude 2010 annual incidence of SLE was 3.32 cases per 100,000 with peaks in females aged 30–39 years old (9.11/100,000) and in males aged 50–59 years old (1.78/100,000). Major differences in regional age-standardized prevalence rates were observed, with the highest rates in the Caribbean oversea areas (up to 126.7/100,000), and the lowest rates in north-western metropolitan territories (down to 29.6/100,000). This is the largest nation-wide population-based study of SLE patients to date, based on more than 58 million beneficiaries of the French health insurance system. These data and subsequent analyses provide guidance to both clinicians and policymakers for improving care of SLE.

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1. Introduction

Systemic lupus erythematosus (SLE) is an autoimmune disease with significant impact on morbidity, mortality, and quality of life [1,2]. Previous studies have demonstrated considerable variability of incidence and prevalence across genders, age groups, geographical regions and ethnic backgrounds [3–9]. Importantly, only a few population-based studies have been performed in SLE to date [9,10], and these were mostly restricted to limited geographical regions or non-representative health insurance schemes [3,11–13]. In this nation-wide population-based study, we used national administrative databases to determine the 2010 prevalence and incidence rates for SLE among the most common French health insurance scheme, which covers 86% of the population (almost 58.2 million beneficiaries). To the best of our knowledge, this is the largest population-based study of SLE to date. Determining the nation-wide epidemiology and sociodemographic characteristics of SLE is an important step to understand the public health impact of the disease and to further study quality of care as well as disease complications.

2. Patients and methods

2.1. Study population and case identification

2.1.1. Data sources

The French National Health Insurance System consists of several specific schemes that cover the entire population. The general scheme, the Health Insurance Fund for Salaried Workers (CNAMTS), covers all French employees (including state employees) as well as specific subgroups such as students. It accounts for approximately 86% of the population (about 58.2 million beneficiaries in 2010). The National Health Insurance Fund for Agricultural Workers and Farmers (MSA) and the one for the self-employed (RSI) represent 5 to 6% each, while 12 additional specific schemes cover the remaining 3%. The National Health Insurance Information System (Système National d'Information Inter-régimes de l'Assurance Maladie; SNIIRAM) contains patient-level, individualized, anonymized and chained data on all reimbursements for patient health care expenditures including pharmaceutical products as well as outpatient medical and nursing care, prescribed or performed by French healthcare professionals [14]. The database also contains for each patient the status regarding full reimbursement of care related to a severe and costly long-term disease (LTD) [15]. In the general scheme of the French National Health Insurance System, nearly one in seven patients received full reimbursement for a LTD in 2008 [16]. Information from this database can be linked to the French hospital discharge database (Programme de Médicalisation des Systèmes d'Information; PMSI), which provides information about all patients discharged from hospitals in France, including an International Classification of Diseases, 10th edition (ICD-10) primary diagnostic code and up to 15 non-primary diagnoses per hospitalization, medical procedures and French diagnosis-related groups [17]. Therefore, all French residents seeking outpatient healthcare are captured in the SNIIRAM database. All those with an inpatient stay are captured in the PMSI hospitalization database.

2.1.2. Case identification and data collection

We used 5 alternative definitions for identifying SLE cases with a recorded ICD-10 code for SLE (M32 and all subtypes except M32.0 — i.e., iatrogenic lupus [18]). First, using the SNIIRAM data from the 1st of January 2010 to the 31st of December 2010, we identified all LTD individuals with a diagnosis of SLE, defined as having the LTD code shared for SLE, systemic sclerosis and severe necrotizing vasculitis (Code ALD21) and a recorded ICD-10 diagnosis of SLE in the LTD database. Second, we used the 2010 hospitalization data (PMSI), to identify all individuals with a diagnosis of SLE, defined as having at least one hospital discharge with a recorded primary or secondary ICD-10 code for SLE during this year. Third, we used a composite definition (which was considered our primary definition) in which patients were defined as having SLE when they fulfilled either the first or the second definition, as stated above. Forth, we performed further analysis on the basis of this composite definition with a more restricted definition by selecting patients with at least two hospitalizations with a recorded ICD-10 code for SLE. Fifth, we expanded the third definition by also taking into account hospitalization (PMSI) data of 2 additional years (2008 & 2009).

We defined incident cases as patients who appeared in the 2010 SNIIRAM database with a new LTD ICD-10 diagnosis of SLE.

We did not exclude pediatric-onset disease in our estimates. Racial and ethnic statistics are not available. This study was performed in accordance with ethical principles stated in the Declaration of Helsinki and was approved by our review board committee (Paris Île-de-France VI). Analyses of the SNIIRAM and PMSI database were approved by the National Commission for the personal data protection (CNIL).

2.1.3. Statistical analysis

The crude prevalence rate was calculated based on the number of cases that had been identified during the study period. Vital status was available for about 90% of patients, allowing the calculation of a death rate restricted to patients with available data. The crude incidence rate was calculated by identifying new cases with the LTD code during the study period. For each case definition, we divided the number of identified cases by the appropriate population denominator, i.e. the insured population obtained from the National Directory of Insured Individuals (RNIAM: Répertoire National Inter-régimes de l'Assurance Maladie) [19]. Crude prevalence and incidence estimates were generated under the assumption of no error (perfect sensitivity and specificity); therefore, no confidence intervals are provided because these estimates are based on the whole population studied and not a sample. To allow comparison with other studies, age-standardized estimates were calculated according to the world standard (World Health Organization, WHO) [20], International Agency for Research on Cancer [21] and European reference populations [22]. To provide analyses by regions, crude rates were age- and sex-standardized according to the structure of the whole French population, as provided by the RNIAM. Statistical analyses and maps of incidence and prevalence were generated using the Quantum GIS™ software version 2.0.1 and the open-source Geofla® Shapefiles from Institut Géographique National (Paris, France).

3. Results

3.1. 2010 French nation-wide prevalence rates

Among the 58,186,535 health care beneficiaries for the year 2010, we identified 24,679 prevalent SLE cases using the LTD definition alone, yielding a crude prevalence rate of 42.4 cases per 100,000