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Description of a French Population of Diabetics Treated Followed up by General Practitioners

Mathilde FRUCHART[a], Antoine LAMER[a] , Madleen LEMAITRE[a,b], Jean-Baptiste BEUSCART[a], Matthieu CALAFIORE[a,c] and Paul QUINDROIT[a1]
[a] *Univ. Lille, CHU Lille, ULR 2694 - METRICS: Évaluation des technologies de santé et des pratiques médicales, F-59000 Lille, France*
[b] *CHU Lille, Department of Diabetology, Endocrinology, Metabolism and Nutrition Lille University Hospital, F-59000 Lille, France*
[c] *Department of General Practice, University of Lille, Lille, F-59000 Lille, France*

Abstract. In France, the prevalence of treated diabetes has been estimated at 4.6%, or more than 3 million people and 5.2% in Northern France. The reuse of primary care data allows to study outpatient clinical data such as laboratory results and drug prescriptions, which are not documented in claims and hospital databases. In this study, we selected the population of treated diabetics from the Wattrelos primary care data warehouse, in North of France. Firstly, we studied the laboratory results of diabetics by identifying whether the recommendations of the French National Authority for Health (HAS) were respected. In a second step, we studied the prescriptions of diabetics by identifying the oral hypoglycemic agents treatments and insulins treatments. The diabetic population represents 690 patients of the health care center. The recommendations on labortatory are respected for 84% of diabetics. The majority of diabetics are treated with oral hypoglycemic agents 68.6%. As recommended by the HAS, metformin is the first-line treatment in the diabetic population.

Keywords. Diabetes mellitus, primary care, general practitioner, data reuse

1. Introduction

In France, the prevalence of treated diabetes has been estimated at 4.6%, or more than 3 million people and 5.2% in Northern France [1]. This prevalence increases with age and, at equal age, is higher in men than in women. Over the last 10 years, the number of people treated for diabetes has increased by an average of 5%/year. Within the management and follow-up of diabetes, blood and urine tests are necessary. The French National Authority for Health (HAS) recommends at least twice a year the measurement of glycated hemoglobin and once a year a renal evaluation (measurement of creatinine) [2].

For about ten years, health data warehouses have been implemented in hospitals and contain all the data collected during the stay (laboratory results, biometric measurements, physicians' letters, diagnosis). However, the data is specific to the hospital and no follow-

[1] Corresponding Author: Quindroit Paul, E-mail: paul.quindroit@univ-lille.fr.

up outside the hospital is recorded. In contrast, data warehouses based on claims databases contain data on the reimbursement of care for all health insurance beneficiaries but do not contain clinical data [3]. Primary care data refers to all clinical data outside the hospital setting and provides an overview of patient follow-up over several years. It includes data from a consultation with a General Practitioner (GP), prescriptions for drug and laboratory results. The reuse of primary care data is increasingly being addressed, but only a few retrospective studies were conducted with this kind of data [4,5]. The French project PriCaDa aims to reuse primary care data to improve GP practices in collaboration with the multidisciplinary health centre (MHC) in Wattrelos, in North of France. The objective of this study is to use the data warehouse to analyze data from the diabetic population of the Wattrelos MHC.

2. Methods

We implemented a data warehouse based on the Wattrelos MHC [6]. It contains data from the patients' medical records of six GPs (year of birth, sex, reason for consultation and data from the consultation, biometric measurements taken at the consultation as weight/height, drug prescriptions, laboratory results, medical history, letters prescribing external medical procedures). An observation phase with GPs was carried out to understand data capture and to identify meaningful and usable variables.

The data were transformed and loaded into the common data model Observational Medical Outcomes Partnership (OMOP) [7]. The source data contained a vocabulary specific to the health care structure, filled in free text or in a local terminology. These anonymised data are stored on a secure server. The collection, transformation and loading of this data is managed automatically by an extract-transform-load (ETL) process, implemented in Python and PostgreSQL.

The diabetic population is identifiable by different methods and is GP-dependent. For example, some GPs indicate the disease in the medical histories section with ICD10 codes or free text. Other GPs indicate the disease in the diagnosis consultation section in free text.

Our inclusion criteria were adult patients (age >= 18 years old) treated with anti-diabetics (oral hypoglycemic agents or insulin) over a 5-year period (from 2015 to 2020). We selected patients who had at least one prescription for drugs with an ATC code starting with A10, corresponding to the Drugs used in diabetes class [8]. We extracted prescribed drugs, lab test results, biometric measurements taken during the consultation of this population for the five years.

Firstly, we assessed if diabetics complied with the recommendations of the HAS on laboratory tests, in computing the number of patients with at least one creatinine result, the number of patients with more than two glycated haemoglobin (HbA1c) results and the number of patients with a HbA1c result per year [9]. In a second step we studied general prescriptions (all drugs) and antidiabetic prescriptions on the population of the year 2020. For the prescriptions, we focused on the year 2020 and we extracted prescriptions of oral hypoglycemic agents (OHAs; ATC codes started with A10 except A10A) and prescriptions of the insulin treatments (ATC codes started with A10A).

3. Results

3.1. Diabetic population

Over the period 2015 to 2020, 9,435 adult patients consulted in the Wattrelos MHC. The adult diabetic population represents 690 patients (7.3% of adult patients) treated with anti-diabetic drugs. The mean age (standard-deviation) of these patients is 65.7 (13.2) years old at the consultation and the population includes 46.8% women.

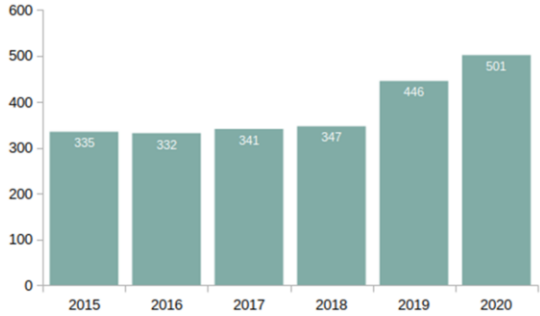

Figure 1. Number of diabetic patients per year

Diabetics population represents a mean (standard-deviation) of 3,152 (785.4) consultations per year (12.8% of the adult population), 15,596 (2,387.9) drugs prescriptions (23.5 % of the adult population) and 21,031 (2,699.8) laboratory results per year (18.5 % of the adult population). The Figure 1 represent the number of diabetic patients per year. Regarding the HAS recommendations, on average 84.4% of diabetic patients had more than two HbA1c laboratory results and 84.3% had at least one creatinine laboratory result.

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3.2. Diabetes prescriptions for the year 2020

The majority of patients (68.6%) had only OHAs prescribed and 22. 2% had prescriptions for both insulin and OHAs during the year (Figure 2).

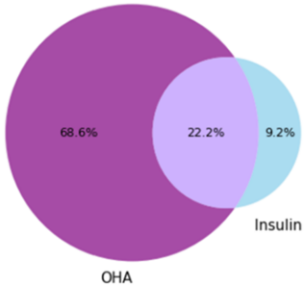

Figure 2. Distribution of patients by category of anti-diabetic prescriptions in 2020.

Concerning general prescriptions, (without anti-diabetics prescriptions), paracetamol (7.0%), acetylsalicylic acid (4.4%) and atorvastatin (3.5%) are the most prescribed (Figure 3). For the two categories of antidiabetics, metformin (43.8% of OHAs) and insulin glargine (41.5% of insulin treatments) were the most prescribed (Figure 3).

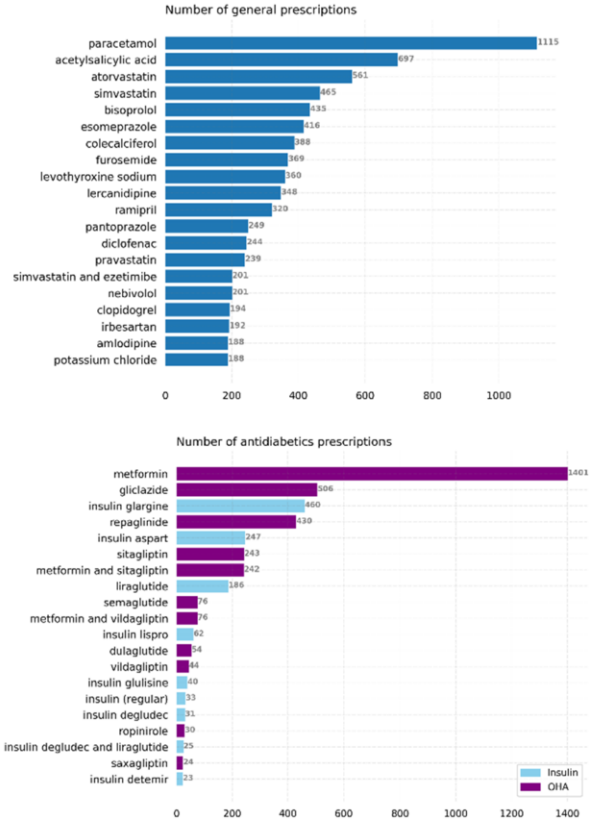

Figure 3. Distribution of the most prescribed drugs in 2020 (up: general prescriptions, down:by category of anti-diabetic prescriptions).

4. Discussion and Conclusions

We demonstrated the possibility to reuse the data of a primary care data warehouse to describe a diabetic population, which is currently rarely performed in France. The prevalence of diabetes in the Wattrelos MHC is higher than in the north of France (8.2% vs 5.2% in 2020). Moreover, diabetics account for a significant proportion of GP consultations, prescriptions and laboratory tests. The results also show that the HAS recommendations are relatively well followed. It should be noted that some laboratory tests are prescribed by medical doctors other than those of the MHC and that the results are sometimes not transmitted to the GPs. Finally, as recommended by the HAS, metformin is the first-line treatment in the diabetic population [2].

This study had several strengths. Firstly, we studied data in general practice with a large number of diabetic patients (n=690). This is the only source of data in which outpatient laboratory results may be queried. Secondly, we have a long period of data (5 years), that enabled us to study the follow-up of the number of consultations over time. Thirdly, the reuse of real-life data indicates that our results could be extended to outpatients more generally to assess compliance with the recommendations.

The present study had several limitations. Firstly, we are not able to distinguish between type 1 diabetes, type 2 diabetes or other types of diabetes. This information is usually filled in by free text by GPs or is missing from the data. Secondly, we considered only pharmacologically treated diabetics. For the same reason, diabetics under preventive hygiene and dietary measures are not documented in a structured format and are therefore difficult to reuse. For now, data came from a single health center but this study will be extended to other centres of the region.

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