

**Original research** 

### Trends in diabetes incidence from 1992 to 2015 and projections for 2024: A Portuguese General Practitioner's Network study



# Mafalda de Sousa-Uva<sup>a,\*</sup>, L. Antunes<sup>a</sup>, B. Nunes<sup>a,b</sup>, A.P. Rodrigues<sup>a</sup>, J.A. Simões<sup>c,d</sup>, R.T. Ribeiro<sup>e,f</sup>, J.M. Boavida<sup>g</sup>, C. Matias-Dias<sup>a,b</sup>

<sup>a</sup> National Health Institute Doutor Ricardo Jorge, Lisbon, Portugal

<sup>b</sup> National School of Public Health, New University of Lisbon, Lisbon, Portugal

<sup>c</sup> Unidade de Saúde Familiar Marquês de Marialva, Cantanhede, Portugal

<sup>d</sup> Faculty of Health Sciences, University of Beira Interior, Covilhã, Portugal

<sup>e</sup> APDP Diabetes Portugal, Education and Research Center (APDP-ERC), Lisbon, Portugal

<sup>f</sup> CEDOC, Chronic Diseases Research Center, NOVA Medical School, Lisbon, Portugal

<sup>g</sup> Portuguese Diabetes Programme, Directorate General of Health, Lisbon, Portugal

#### ARTICLE INFO

Article history: Received 4 February 2016 Received in revised form 26 April 2016 Accepted 13 May 2016 Available online 27 June 2016

Keywords: Diabetes Incidence Projections Portugal Epidemiology

#### ABSTRACT

*Background*: Diabetes is known as a major cause of morbidity and mortality worldwide. Portugal is known as the European country with the highest prevalence of this disease. While diabetes prevalence data is updated annually in Portugal, the General Practitioner's (GP) Sentinel Network represents the only data source on diabetes incidence. This study describes the trends in Diabetes incidence, between 1992 and 2015, and estimate projections for the future incidence rates in Portugal until 2024.

*Methods*: An ecological time-series study was conducted using data from GP Sentinel Network between 1992 and 2015. Family doctors reported all new cases of Diabetes in their patients' lists. Annual trends were estimated through Poisson regression models as well as the future incidence rates (until 2024), sex and age group stratified. Incidence rate projections were adjusted to the distribution of the resident Portuguese population given Statistics Portugal projections.

Results: The average increase in Diabetes incidence rate was in total 4.29% (CI95% 3.80–4.80) per year under study. Until 1998–2000, the annual incidence rate was higher in women, and from 1998–2000 to 2013–2015 turn out to be higher in men. The incidence rate projected for 2022–2024 was 972.77/10<sup>5</sup> inhabitants in total, and 846.74/10<sup>5</sup> and 1114.42/10<sup>5</sup>, respectively, in women and men.

*Conclusions*: This is the first study in Portugal to estimate diabetes incidence rate projections. The disturbing reported projections seem realistic if things continue as in the past. Actually, effective public health policies will need to be undertaken to minimize this alarming future scenario.

© 2016 Primary Care Diabetes Europe. Published by Elsevier Ltd. All rights reserved.

\* Corresponding author.

E-mail address: mafalda.uva@insa.min-saude.pt (M. de Sousa-Uva).

http://dx.doi.org/10.1016/j.pcd.2016.05.003

<sup>1751-9918/© 2016</sup> Primary Care Diabetes Europe. Published by Elsevier Ltd. All rights reserved.

#### 1. Introduction

Diabetes Mellitus (DM) is a chronic disease characterized by high levels of blood glucose, that develops either from the destruction of insulin-producing cells (type 1 diabetes) or when body tissues become resistant to the action of insulin, even in a state of circulating hyperinsulinemia (type 2 diabetes) [1]. Type 1 DM is an auto-immune condition that usually develops in childhood or adolescence, while type 2 DM develops in adulthood and is associated with obesity, physical inactivity and unhealthy diet. The latter represents 90% of the global cases of diabetes [2,3].

DM is known as a major cause of morbidity and mortality worldwide, being one of the main responsible for the global burden of disease [4]. It is the leading cause of blindness, kidney failure and amputation worldwide [5], and is responsible for causing cardiovascular problems that lead to 50–80% of deaths in people with diabetes [6]. The prevalence of DM in Portugal in 2014 was estimated at 13.1% (10.8% in women and 15.8% in men) [7] and Portugal is known as the European Union country with the highest prevalence of this chronic disease [8].

While prevalence data is updated annually, based on the 2010 PREVADIAB nationwide study [9], and taking into consideration demographic changes, diabetes incidence has garnered less attention as a health indicator. The General Practitioner's (GP) Sentinel Network (GP Sentinel Network) represents, in Portugal, the only data source on diabetes incidence, since 1992 to nowadays.

Thus, this study aimed to gain insight into the DM incidence trends, between 1992 and 2015, in the Portuguese population under observation of the GP Sentinel Network, as well as to make projections for the future incidence rates based on this knowledge.

#### 2. Methods

GP Sentinel Network is a network based on the volunteer work of General Practice/Family Medicine doctors whose professional activity is developed in primary healthcare centers of the Portuguese National Health System. These doctors report several health events, agreed each year. Between 1992 and 2015 (except 2001 and 2002), family doctors from GP Sentinel Network reported all new cases of DM (both types 1 and 2) in their patients' lists. Diabetes case definition used was based on Directorate-General of Health (DGS) guidelines for clinical practice [10]. From 1992 to 1995 the GP Sentinel Network covered only Portuguese mainland, but since 1996 and 1997 Madeira and Azores (Portuguese islands) began, respectively, participation in the network.

An ecological time-series study was conducted using data from the GP Network between 1992 and 2015, with exception of the years 2001 and 2002.

Every year GP's update the composition of their patients' lists, taking into account some users characteristics such as age and gender, which represent variables also considered in this study.

The annual DM incidence rates were calculated dividing the observed number of new cases by the population under effective observation from the GP Network during the years under study. The population under effective observation (PUEO) is the annual average of the GP's patients' list weekly sum:  $PUEO_t = \sum_{m=1}^{M} N_m I_{tm}$ , where  $N_m$  is the number of patients composing the GP m list; and  $I_{tm}$  is a variable that takes the value 1 if the doctor m was active in week t, and 0 otherwise. They were only considered the patients' lists from the GP's who were active on each week (which means those that reported cases, even if they were of zero). The population under effective observation used as the denominator for the annual incidence rate is the average of the PUEO in the 52 weeks of the year, namely:  $PUEO_{year} = \sum_{t=1}^{T} PUEO_t / 52$ . The population under effective observation varied between 231,292 in 1991 and 37,363 in 2015. The incidence rate estimates are presented per 100,000 inhabitants, per triennium, and disaggregated by sex and age group. The triennium 2001–2003 have only data for 2003, since the new cases of diabetes were not reported by the GP network in the years 2001 and 2002.

Poisson regression models were used to estimate the annual trends from 1992 to 2015. The observed incidence rates were then adjusted for the Portuguese population distribution, according to estimates from the Statistics Portugal [11]. The incidence rate projections from 2015 to 2024, sex and age group stratified, were also estimated using Poisson Regression models as proposed by Hakulinen and Dyba [12]. Incidence rate projections were then adjusted to the resident Portuguese population distribution given the Statistics Portugal projections [13]. Prediction intervals for the projected rates were calculated based on the work of Dyba and Hakulinen [14]. Pearson goodness of fit statistic and residual analysis were used to assess the goodness of the fitted models.

#### 3. Results

#### 3.1. Total and sex stratified incidence

In the first triennium under study, 1992–1994, the annual incidence rate was  $261.7/10^5$  inhabitants, and in the last triennium, 2013–2015, was  $630.42/10^5$  inhabitants (Fig. 1). Until 1998–2000, the annual incidence rate was higher in women, and from 1998–2000 to 2013–2015 turn out to be higher in men (Fig. 1).

The average increase in DM incidence rate was 4.29% (CI95% 3.80–4.80) per year under study. In men the annual trend was also of increase (5.16% [CI95% 4.47–5.86]) as well as in women, although slighter for the latter (4.29% [CI95% 3.80–4.80]).

#### 3.2. Total and sex stratified projected incidence

The incidence rate projected for 2022-2024 was  $972.77/10^5$  inhabitants in total (CI95%  $864.05/10^5-1081.49/10^5$ ), and  $846.74/10^5$  (CI95%  $707.98/10^5-985.49/10^5$ ) and  $1114.42/10^5$  (CI95%  $944.13/10^5-1284.72/10^5$ ), respectively, in women and men (Fig. 1).

Download English Version:

## https://daneshyari.com/en/article/2679001

Download Persian Version:

https://daneshyari.com/article/2679001

Daneshyari.com