PRIMARY CARE DIABETES XXX (2017) XXX–XXX

Contents lists available at ScienceDirect

Primary Care Diabetes

journal homepage: http://www.elsevier.com/locate/pcd

Original research

Epidemiological trends and direct costs of diabetes in a Northern Italy area: 2012 health administrative records analysis LHT n. 20 Verona

J. Demurtas[a], N. Alba[b], G. Rigon[c,*], M.V. Nesoti[d], C. Bovo[e], A. Vaona[c]

[a] Primary Care Department, LHT South-East Tuscany, Grosseto, Italy
[b] Management Control Unit, Azienda ULSS20 Verona, Via della Valverde 42, 37122 Verona, Italy
[c] Primary Care Department, Azienda ULSS20 Verona, Via della Valverde 42, 37122 Verona, Italy
[d] Medical Direction Unit Azienda Ospedaliera di Verona, Via della Valverde 42, 37122 Verona, Italy
[e] Azienda Ospedaliero-Universitaria di Verona, Italy

ARTICLE INFO

Article history:
Received 25 August 2015
Received in revised form
30 May 2017
Accepted 1 June 2017
Available online xxx

Keywords:
Diabetes
Outpatient care
Medications
Hospitalization
Costs
Adjusted Clinical Group

ABSTRACT

Objective: This analysis estimates type 1 and type 2 diabetes direct costs in 2012, in terms of hospital care, outpatient visits, diagnostics and medications, in a local healthcare trust in Northern Italy (ULSS n.20 Verona).

Methods: The Johns Hopkins Adjusted Clinical Group (ACG®) System was used to analyze data, including hospital discharges, emergency room admissions, medical encounter records, disease registries, copayment exemptions, home care services, psychiatric services, rehabilitation services, and medications. Data from general practitioners and nursing homes were not directly available. Patients obtained from the first analysis were subsequently divided in two groups (type 1 and type 2 diabetes) according to ATC drug classification system and age. Costs were estimated from inpatient and outpatients fees and drugs costs.

Results: ULSS n. 20 takes care of about 480.000 people. We identified 974 people affected by type 1 diabetes (prevalence 0,2%) and 24.087 people affected by type 2 diabetes (prevalence 5,0%) among the residents in 2012.

Hospitalization mean annual cost was 4.753,50€ (SD 9.330,19€) for type 1 diabetes and 1.718,08€ (SD 5.087,34€) for type 2 diabetes.

Outpatient care mean annual cost was 1.401,76€ (SD 4.394,88€) for type 1 diabetes and 669,15€ (SD 2.121,24€) for type 2 diabetes.

Medications mean annual cost was 1,369,35€ (SD1.781,18€) for type 1 diabetes and 874,07€ (SD 2.832,2€) for type 2 diabetes.

Conclusions: ACG® diabetes data analysis agrees with data obtained by more expensive methods and seems to be a comprehensive and applicable tool to analyze chronic diseases dynamics in the Italian setting in order to prioritize future research and analyze the effects of interventions aimed to ensure the sustainability of public health services.

* *Corresponding author.*
E-mail address: giuliorigon@gmail.com (G. Rigon).
http://dx.doi.org/10.1016/j.pcd.2017.06.001

Because of the combination between prevalence data and epidemiological trends, we could be at the eve of a dramatic increase of diabetes costs with major concerns for the Italian NHS ability to withstand.

1. Introduction

According to data coming from Italian National Institute of Statistics (ISTAT), diabetes prevalence in Italy is 5.5% and it arrives to 15% in 65–74 aged people and to 25% in the population over 75 years [1,2]. International Diabetes Federation (IDF) estimates that by 2025 more than 3.2 million of Italian people (age range 20–75 years) will be affected by diabetes [3]. Italian Barometer Diabetes Report 2013 [4] provides very similar prevalence data, assuming that diabetic population in Italy at the moment exceeds 3 million people without considering about 1 million people with diabetes who have not yet received the diagnosis and 2.7 million with IGT (Impaired Glucose Tolerance). The substantial burden of diabetes has a heavy impact on public health: in 2002, 59% of mortality was attributable to non-communicable diseases, in 2030 this rate will increase to 69% [5]. While cancer and cardiovascular disease mortality is declining, diabetes mortality rate is growing by 1.1% for men and 1.3% for women per year. From 1990 to 2013 diabetes rose from 26th to 17th position in life years loss causes [6] world ranking, but it is at the sixth position in Italy [7].

Consequently, the impact of diabetes is dramatic also on economic resources consumption. An analysis of a sample of 21 Italian LHTs [8] (approximately 9 million citizens) found more than one patient with diabetes every four had a hospital admission in the previous 12 months. The hospitalization risk for specific complications/comorbidities, age and sex-adjusted, is two to eight times higher in presence of diabetes. This means that there are more than 12,000 admissions due to diabetes every 100,000 people per year with huge economic rebounds [7]. On average, per capita annual cost is about 2600–3100 euros [8], more than double if compared with people of the same age and sex without diabetes [7], but recent data on urban Turin area report a cost even 4 times more [9]. Diabetes related direct costs continue to be predominantly attributable to hospital admissions which account for 57% of global direct costs, while medications costs account for less than 7% [10]. Furthermore direct costs increase with the number of chronic complications. Direct costs for people with diabetes in Italy amount to about 9 billion a year, about 9% of national health expenditure. On the basis of the prevalence trends reaching 4 million people with diabetes, even if costs will not change, the expenditure will grow up to 12 billion euros a year.

Diabetes imposes a substantial burden on Italian economy also in terms of increase of indirect costs (reduced work productivity, reduced labor force participation from chronic disability, and premature mortality).

Johns Hopkins Adjusted Clinical Group (ACG®) System measures the morbidity burden of patient populations based on disease patterns, age and gender relying on the diagnostic and/or pharmaceutical code information found in insurance claims or other electronic medical records, providing a more accurate representation of the morbidity burden of populations, subgroups or individual patients. The ACG System has been used in commercial and research settings [10,11].

In Italy healthcare is provided to all citizens by the public national health system and by a partnership with accredited private organizations and it is administered on a regional basis. The country is divided into 20 Regions and each Region charges healthcare responsibility to public local healthcare trusts (LHTs). Every Italian citizen is assisted by a LHT and healthcare administrative data are collected in a regional standardized database.

The aim of this study is to define direct medical costs for people with type 1 and 2 diabetes and make a comparison with direct medical cost for people without diabetes in 2012 in LHT "ULSS20 Verona" area using the Johns Hopkins Adjusted Clinical Group (ACG®) System as an administrative mean of identification of people with diabetes.

2. Design and methods

Patients with diabetes were identified from the population living in LHT "ULSS20 Verona" area using the Johns Hopkins Adjusted Clinical Group (ACG®) System (v. 10.0.2i).

All the residents living on 31/12/2012 and all the residents died during 2012 were included in this study. The ACG® System was used to analyze data including hospital discharges, emergency room admissions, medical encounter records, disease registries, copayment exemptions, home care services, psychiatric services, rehabilitation services, and medications. Data from general practitioners and nursing homes were not directly available. Costs were estimated from inpatient and outpatients[1] fees and drugs costs. The ACG® System was used to analyze all the available claims data, including hospital discharges.

The diabetes condition marker calculated by the ACG® System from diagnosis and/or pharmacy criteria (meglitinides, non-sulfonylureas, sulfonylureas, thiazolidinediones, other antihyperglycemic agents, long and short-acting insulins) was used to select the population of interest. In order to classify patients into type 1 or 2 diabetes the Expanded Diagnosis Clusters (EDCs) groups of clinically similar diagnoses, were used (END06-type 2 diabetes, w/o complication, END07-type 2 diabetes, w/o complication, END08-type 1 diabetes, w/o complication, END09-type 1 diabetes, w/o complication). The

[1] The outpatient service costs include costs of care provided by all specialists (including diabetologists) but not general practitioners.

Please cite this article in press as: J. Demurtas, et al., Epidemiological trends and direct costs of diabetes in a Northern Italy area: 2012 health administrative records analysis LHT n. 20 Verona, Prim. Care Diab. (2017), http://dx.doi.org/10.1016/j.pcd.2017.06.001