DIABETES MELLITUS EPIDEMIOLOGY

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Abstract

The worldwide diabetes epidemics is evolving proportionally with the overweight/obesity epidemics. 246 million people with diabetes (type 2 diabetes constituting about 90%) were registered worldwide in 2007. It was estimated that 285 million people had diabetes in 2010, a number that will grow to approximately 438 million people by 2030 [1]. It was estimated that in Romania in 2010 the number of people with diabetes would reach 1351400 [1], which equals a prevalence of 8.4% of the adult population (20-79 years) [1]. In December 2010 the number of patients with diabetes in Dolj County was 29520 (11.72% type 1 diabetes, 88.15 type 2 diabetes and 0.13% other specific types of diabetes), accounting for 4.19% of the population [3]. Although theoretically we have expected a decrease in the number of newly diagnosed cases of diabetes in 2009 and 2010 compared to 2006 (date from which diabetes was diagnosed currently), taking into consideration the number of old unknown cases diagnosed through active screening due to the National Program of Evaluation the Population Health (June 2007 – January 2009), the ascending trend of new cases of diabetes continued, sustaining the worldwide diabetes epidemics also in Dolj County. Diabetes is worldwide recognized as the fifth leading cause of death. Diabetes survival rate is ten years lower compared to the general population [4]. Cardiovascular complications are responsible for approximately 80% of type 2 diabetes-related deaths [4]. Medical expenses for people with diabetes are two times higher than for the general population, growing higher every year.

keywords*: diabetes epidemics, estimated prevalence, active screening for diabetes*

Background

The worldwide diabetes epidemics is evolving proportionally with the overweight/obesity epidemics. Both type 1 and 2 diabetes are rapidly increasing, with a growing number of type 2 diabetes in younger ages, a situation that untill recently was considered exceptionally.

A Global Perspective

246 million people with diabetes (type 2 diabetes constituting about 90%) were registered worldwide in 2007. It was estimated that 285 million people had diabetes in 2010, a number that will grow to approximately 438 million people by 2030 [1]. The estimated prevalence of diabetes (20-79 years) for 2010 is 6.6% and it is expected that by 2030 it will

reach 7.8% [1]. Diabetes prevalence is known to have a wide variation, from 1.1% in Rwanda to 30.9% in Nauru [1]. Epidemiology studies conducted in the U.S. project that 25.8 million people (18.8 million people diagnosed and 7 million people undiagnosed), 8.3% of the U.S. population, have diabetes [2]. Regarding Europe, the number of persons with diabetes was expected to reach 55.2 million, accounting for 8.5% of the adult population in 2010, with a wide country variation, from 2.1% in Iceland to 12% in Germany [1].

The number of adults with impaired glucose tolerance (IGT) was estimated to approximately 344 million in 2010 and to 472 million in 2030 [1]. The prevalence of IGT (20-79 years) was estimated at 7.9% in 2010 and is projected to increase to 8.4% of the adult population by 2030 [1]. 50% of all the people with IGT will develop diabetes in the next 10 years.

For every patient diagnosed with diabetes, there is at least another undiagnosed patient, which emphasises the importance of active screening for diabetes. Diabetes prevalence is increasing proportionally with obesity prevalence (over 85% of the diabetes patients have been or are obese).

Age Distribution

While in the developed countries the increase in diabetes prevalence is registered especially in the older population (over 65 years old), in developing countries, which have the most significant increase in diabetes prevalence, the growth is reported especially in the adult population (45-65 years).

Worldwide, the 40-59 age group has the largest number of people with diabetes. In 2010 it was estimated that almost 132 million people with ages ranging from 40 to 59 years had diabetes, 75% of whom from low- and middle-income countries [1]. For the year 2030, it is projected that the number of people aged 40-59 with diabetes will reach 188 million, over 80% of whom living in newly developed or developing countries [1]. The estimates for 2030 also project an increase in the number of people with diabetes aged 60-79 years to 196 million [1].

Type of Diabetes Distribution

Although type 1 diabetes is characteristic in younger people, it may appear at any age. It is estimated that the number of people with type 1 diabetes aged under 20 years equals the number of patients with type 1 diabetes aged over 20 years. Type 2 diabetes is known as an illness of the adult and the number of people with type 2 diabetes is rapidly growing. However, over the last years, type 2 diabetes in childhood and adolescence has increased all over the world (which increases the risks of chronic complications at smaller ages).

The prevalence of type 1 diabetes is 0.09% with wide regional variations. If in Finland the incidence of type 1 diabetes is 35.3 per 100000 per year, in Mexico and Korea type 1 diabetes has an incidence of 0.6 per 100000 per year.

2010 Estimates for Romania

It was estimated that in Romania in 2010 the number of people with diabetes would reach 1351400 [1], which equals a prevalence of 8.4% of the adult population (20-79 years) [1]. Regarding the incidence of type 1 diabetes (0-14 years), it was estimated at 5.4 new cases per 100000 per year [1]. IGT prevalence for 2010 was estimated at 17% of the adult

population [1]. Gestational diabetes is known to affect 2-5% of all pregnant women.

Dolj County Overview

In December 2010 the number of patients with diabetes in Dolj County was 29520 (11.72% type 1 diabetes, 88.15 type 2 diabetes and 0.13% other specific types of diabetes), accounting for 4.19% of the population [3]. We have noticed a gradual increase of diabetes in Dolj County. Among the plausible explanations we can mention: the ascending trend in life expectancy in both diagnosed diabetes patients and in the general population, the increase of newly diagnosed cases as a result of a better detection as well as a real incidence increase (proportionally with obesity increase), the modifications of diabetes diagnosis criteria, the better accessibility of the population to the diabetologist (due to the increase in the number of diabetologists and medical facilities). In table 1 and figure 1 we present the diabetes mellitus prevalence evolution in Dolj County, in the last 57 years.

Table 1. Newly diagnosed diabetes mellitus in Dolj County 1954-2010

Year	New Cases	Year	New Cases	Year	New Cases
1954	175	1973	210	1992	414
1955	70	1974	410	1993	682
1956	40	1975	390	1994	815
1957	25	1976	380	1995	796
1958	40	1977	350	1996	874
1959	45	1978	390	1997	1614
1960	80	1979	385	1998	1301
1961	85	1980	395	1999	1737
1962	70	1981	372	2000	2063
1963	86	1982	365	2001	2123
1964	85	1983	320	2002	2301
1965	87	1984	310	2003	1859
1966	89	1985	250	2004	1879
1967	92	1986	270	2005	1866
1968	87	1987	272	2006	2167
1969	170	1988	400	2007	3566
1970	165	1989	272	2008	4273
1971	175	1990	250	2009	2822
1972	250	1991	400	2010	2843

In figure 2 we have represented comparatively the cases of diabetes newly diagnosed monthly, beginning with the year 2006 (date from which diabetes was diagnosed currently) and the next four years, with the following traits: in the second semester of 2007 we have registered two to three times more new cases of diabetes as a consequence

of the National Program of Evaluation the Population Health (June 2007 – January 2009). This increase was constant through the active screening period (including the year 2008), reaching its peak in March 2008. Although theoretically we have expected a decrease of the number of newly diagnosed cases of diabetes in the next two years compared to 2006, taking into consideration the number of old unknown cases diagnosed through active screening, the ascending trend of new cases of diabetes continued, sustaining the worldwide diabetes epidemics also in Dolj County.

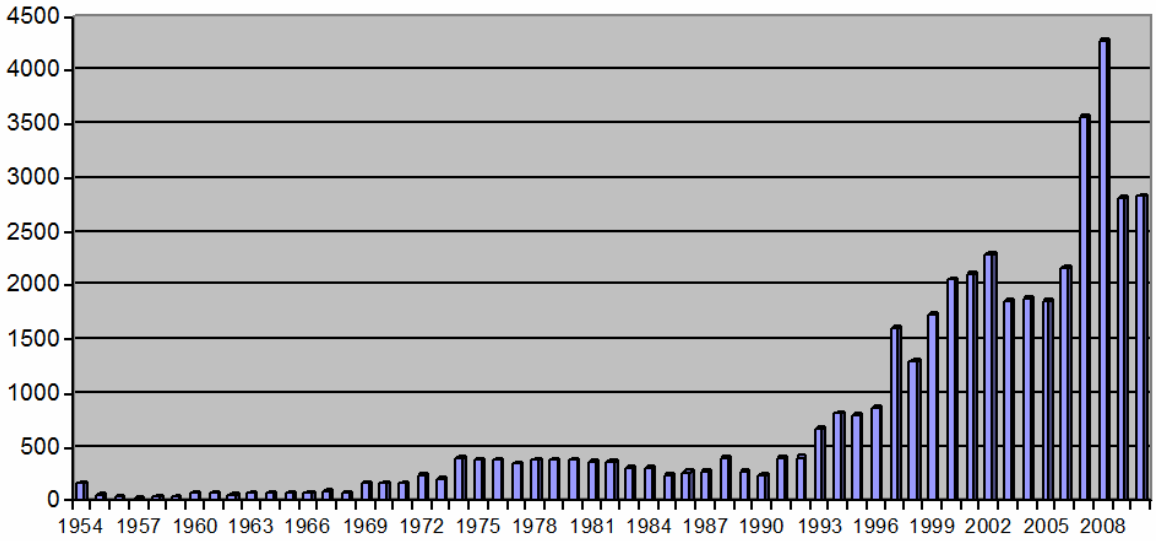

Fig. 1. Newly diagnosed diabetes mellitus in Dolj County 1954-2010

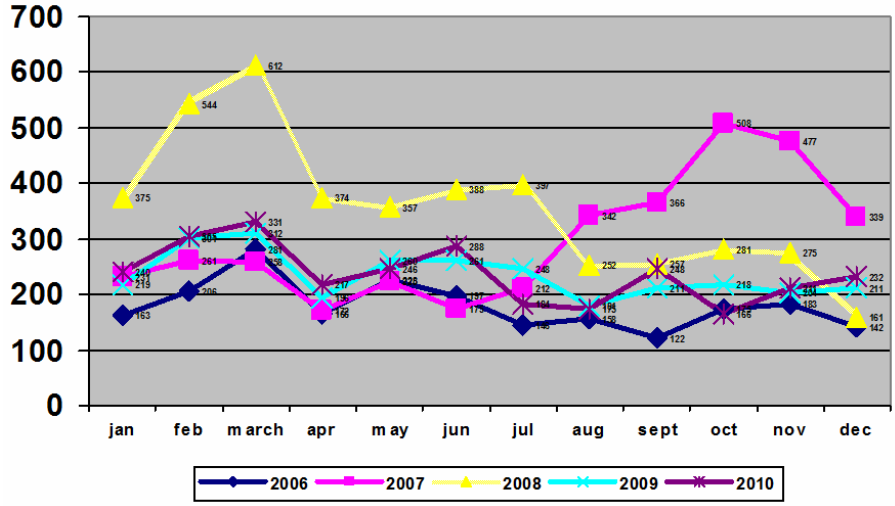

Fig. 2. Newly diagnosed diabetes mellitus in Dolj County Jan.2006-dec.2010

Chronic Complications of Diabetes Mellitus - Prevalence

Diabetic nephropathy appears in the evolution of diabetes in 20% of all patients after 15 years, in 30% after 25 years and in 34% after 40 years (more frequent in type 1 diabetes and at patients with genetic predisposition) [4].

Background diabetic retinopathy is diagnosed in 90% of the patients with diabetes after 15 years of evolution, and after 40 years 55% of the patients present proliferative diabetic retinopathy [4].

Diabetic neuropathy is found in 60% of the patients after 25 years of evolution (more frequent in type 2 diabetes) [4].

Macrovascular Complications: Diabetic gangrene and nontraumatic lower-limb amputations occur in 7% of the patients each year (sixty times more frequent in patients with diabetes compared to the rest of population, their most important cause being diabetic arteriopathy) [4].

Ischemic cardiopathy and cerebrovascular disease are two times more frequent in patients with diabetes (especially type 2 diabetes) in comparison to patients without diabetes [4].

EPIDIAB, a prospective study conducted in 13 Romanian counties starting 2000, has shown the existence of chronic complications from the moment of the diagnosis at an important percent of type 2 diabetes patients, respectively: cardiovascular and atherosclerotic disease 32%, diabetic nephropathy 2%, diabetic retinopathy 12.4% and diabetic neuropathy 24.3% [5].

Diabetes Mellitus Mortality

Although diabetes mortality is difficult to approximate, diabetes is worldwide recognized as the fifth leading cause of death. It was estimated that almost four million deaths in the 20-79 age group may be attributable to diabetes in 2010, respectively 6.8% of all registered deaths [1], showing a 5.5% increase over the estimates for the year 2007 [1]. Regarding the sex distribution of diabetes-related mortality, there are more deaths in women than in men. IDF estimated that the number of diabetes-related deaths in Romania in 2010 (20-79 years) was 18068 (8985 men and 9083 women) [1].

Diabetes survival rate is ten years lower compared to the general population [4]. Cardiovascular complications are responsible for approximately 80% of type 2 diabetes-related deaths [4].

Healthcare Expenditure

Medical expenses for people with diabetes are two times higher than for the general population. It was estimated that in 2010 about 106 billion $ were spent on healthcare for diabetes in Europe, accounting for 28% of the global expenditure [1]. There is a wide variation of the medical expenses from one country to another, from more than 7000 $ per person in Luxembourg, to about 15 $ in Montenegro [1]. The medical expenses estimated for Romania for 2010 were 295 $ per person [1].

North America is predicted to account for 57% of the global expenditure [1]. It was estimated that in 2010 almost 214 billion $ were spent in the US on diabetes healthcare, the medical expenses per patient reaching 7383 $ [1].

The global diabetes expenditure is higher every year. In 2007, 174 billions $ were spent on diabetes healthcare in the US, indirect costs (disability, work loss, premature mortality) accounting for 58 billion $ [2].

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