

THE EVOLUTION OF THE DIABETES MELLITUS IN SIBIU COUNTY DURING 2007-2009

CARMEN NARCISA NATEA¹

University „Lucian Blaga” of Sibiu

Keywords:
epidemiology, diabetes mellitus, incidence

Abstract: The adult diabetes epidemiology is one of the most deficitary aspects of this disease in our country. Diabetes became a health problem with major importance for persons, medicine and society.. The associate conditions and chronic complications in the prevalence of the diabetes is very impressive. The biological impact of the disease is major, evaluated by the decrease of life expectancy (mortality increase) due to the affected quality of life because of the acute and chronic complications. The most common are diabetic retinopathy, neuropathy, hipertension, which occur to a third of the newly diagnosed patients. The diabetes prevalence in Romania including both clinical manifested forms and the subclinical ones (altered glucose tolerance) varies according to geographical area and urban and rural environment between 2-9 percents of the population. Periodic epidemiological studies are important for two reasons: they indicate the medical, social, financial, dimension of diabetes in a given population; the comparative follow-up of the incidence and prevalence of diabetes can reveal the diseases's tendency. Diabetes may be considered to have become an epidemic disease. The romanian epidemics amplitude is evaluated by the five years prospective study- EPIDIAB.

Cuvinte cheie:
epidemiologie, diabet zaharat, incidență

Rezumat: Epidemiologia DZ la adult în țara noastră este unul dintre aspectele cele mai deficitare ale acestei afecțiuni. DZ a devenit o problemă de sănătate de importanță majoră pentru individ, medicină și societate. Prevalența complicațiilor cronice și a condițiilor asociate, în diabet, e impresionantă. Impactul biologic al bolii este considerabil, evaluat prin reducerea speranței de viață (creșterea mortalității), scăderea speranței de sănătate prin afectarea calității vieții, datorită complicațiilor acute, dar mai ales a celor cronice. Cele mai comune sunt retinopatia diabetică (RD), neuropatia, HTA, care sunt întâlnite la 1/3 din bolnavii nou-descoperiți. Prevalența DZ în România, incluzând atât formele clinice manifeste, cât și cele subclinice („toleranța alterată la glucoză”) variază în funcție de zona geografică și mediu (urban și rural) între 2 și 9% din populație. Studiile epidemiologice periodice sunt importante din două motive (3): ele indică dimensiunea medicală, socială și, în final, financiară a diabetului zaharat într-o populație dată; urmărirea comparativă a incidenței și prevalenței diabetului zaharat poate informa asupra tendințelor pe care le are boala. Se poate considera că DZ a devenit o boală epidemică. Amplitudinea epidemiei din România se evaluează prin studiul prospectiv pe 5 ani – (EPIDIAB - Epidemia în Diabet).

INTRODUCTION

Definition: Health is a state of complete physical, mental and social wellness, it doesn't only imply the absence of disease and infirmity. (OMS)

Aside from the known diabetics there is at least a same amount of people without a specified diagnostic. The reasons are an uneducated population suffering by the disease's symptoms, a late medical consult and an unsatisfying training of the general practitioners in the diabetics problematics, especially because diabetes implies a long evolutions without any symptoms or with nonspecifics ones.

The results of diabetics' diagnosis in the population at risk adressed to the selected groups can not be correlated with the ones obtained in general population.

The diagnostic methods used are:

- glucose dosage in venous plasma
- TTGO
- HbA1c

Table no. 1. The prevalence of the diabetes mellitus in different world countries

Australia	4,3%	> 25 ani	1985
Danemarca	5,8%	60-74 ani	1987
Finlanda	3,3%	> 30 ani	1991
Grecia	4,3%	Toate	1984
Israel	4,3%	> 15 ani	1984
Olanda	8,4%	50-74 ani*	1995
Malta	7,7%	> 15 ani	1986
Polonia	3,5%	30-64 ani*	1989
România	4,7%	25-65 ani*	1972
Spania	5,6%	DZ tip 2*	1992
Suedia	4,3%	Toate	1991
SUA	6,4%	20-74 ani*	1987

*criteriul – TTGO

Results can be obtained from:

- data reports from CJDNBM (district centers for diabetes, nutrition and diseases)
- individual studies

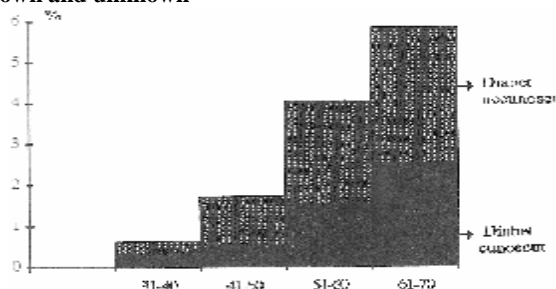
¹ Corresponding Author : Carmen Narcisa Natea, Emergency Clinical Hospital of Sibiu, Diabetes, Nutrition and Metabolic Diseases, 2-4 B-dul Corneliu Coposu street, Code: 550245, România, e-mail: narcisa_20@yahoo.com, tel +40-0746979083

Article received on 27.08.2010 and accepted for publication on 26.10.2010

ACTA MEDICA TRANSILVANICA December 2010; 2(4) 207-211

- the EPIDAB study

Figure no. 1. The percentage distribution of the diabetes known and unknown



1. The epidemiology of the Diabetes mellitus Type I in Romania:

In Romania, *diabetes mellitus type I* represented approx. 7% of the total forms of diabetes mellitus.

The cumulated incidence for a 10 years period in the studies made in our country show almost equal figures

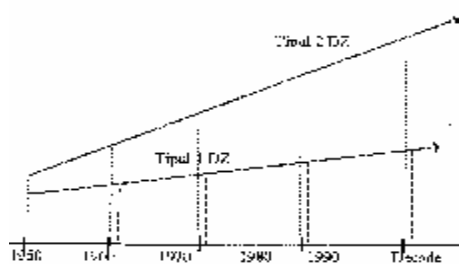
The distribution of the type I Diabetes mellitus over the decades, suggests a gradual genetic predisposition for β cell impairing, which can occur anytime in life.

The incidence varies depending on the geographical area, so the maximal incidence has been found in the N-W of Romania (Cluj)-5,5 cases /100000/year, and the minimal incidence – in Vaslui county-0,8 cases/100000/year.

Reported to the ethnic group- we found an increased incidence in the Hungarian people, comparing it with other people, (gypsy, germans, Serbians)-that explains the maintenance of genetic susceptibility;

Reported to the nutritional factors: cow milk, nitrates and nitrites, vitamin D, Zinc and nitrosamines were incriminated in the development of diabetes mellitus type I.

Figure no. 2. The diabetes mellitus type II incidence in the last two decades compared to the one of diabetes mellitus type I



2. 2. The epidemiology of Diabetes mellitus Type II in Romania:

The real prevalence of this type of diabetes in Romania is 5% compared with patients diagnosed with type I diabetes which is 2% of people. Most cases are found in older people, (according to all studies), showing a high frequency of diabetes disease after a stroke. The number of people with type II diabetes increased in the last decades comparing with patients with type I diabetes which is relatively the same.

2. 3. The epidemiology chronic complications of Diabetes mellitus:

Diabetic nephropathy (DN) - is a progressive kidney disease which appears especially on patients with type I diabetes. There is a genetical predisposition for this complication (high frequency in people who had parents with diabetic nephropathy or parents with arterial hypertension). Clinical signs of DN appears after 5 years of damage progression, followed by a quickly increase of new cases,

reaching at 25 new cases/year/1000 diabetics, after 10 years of progression. Later, the percentage of diabetics with DN may reach 20% after 15 years, 30% after 20 years and 35% after 40 years.

Diabetic retinopathy (DR) - does not progress in the same way with DN. DR has an incidence which progresses from 2%/year (after 3 years from onset) to 5%/year (after 5 years) and 10%/year (after 10 years), so after 15 years of progression, 90% of diabetics have “background retinopathy.”Proliferative retinopathy occurs after 10-15 years of evolution, with a rate of 3%/year and it’s prevalence is linear: 10% after 15 years, 20% after 20 years, 40% after after 30 years and 55% after 40 years.

Diabetic neuropathy - is defined by alteration of at least 2 electrophysiological parameters, and it occurs in varying percentages: 5% in type I diabetes and 15% in type II diabetes in 5 years of progression; DN can reach 10% in type I diabetes and 20% in type II diabetes after 10 years of progression, 15% in type I and 45% in type II after 20 years and 20% in type I and 60% in type II after 25 years of progression.

Diabetic gangrene and leg amputations - in Romania there are 7 cases/1000diabetics/year. This complication typically occurs in elderly men with type II diabetes.

Ischemic cardiopathy and cerebrovascular disease - are included in diabetic macrovascular disease and occur in both types of diabetes.

Epidemiology of diabetic foot: diabetic foot (DF) is a pathological status not a proper diagnosis. It is rather a concept that includes: peripheral neuropathy, angiopathy and infection. It is not necessary the coexistence of all the pathological features for the foot ulceration. Amputation and ulceration is the tragic outcome for diabetic foot. Amputation frequency varies a lot between countries and geographical areas. About 40-60% of non traumatic leg amputations are performed in diabetic patients. Incidence of leg amputation in most studies was established at 7-206/100000/year.

The number of patients with newly diagnosed diabetes in 2000 in the studied counties was 15097. EPIDIAB data: type I diabetes was 975 (6%), type II diabetes-14122 (94%); ♂-6794 (46,1%) and ♀-8304 (53,9%).

The incidence of diabetes was 214,490/100000; type I-13,920/100000 and type II-200,60/100000.

THE AIM OF THE STUDY

Evaluate the incidence of diabetes in Sibiu county between 2007-2009, comorbidities and complications of diabetes during diagnosis.

MATERIAL AND METHOD

Patients diagnosed with diabetes during 2007-2009 in the antidiabetic Center, Sibiu, were included in the study.

- data were evaluated in EPIDIAB program, for 2007 2008 and 2009.
- we performed statistical processing of the following parameters: diabetes type, duration of disease, the distribution by gender, age of patients, environment, BMI, comorbidities and complications (arterial hypertension, dyslipidemia, ketoacidosis, cardiovascular disease, peripheral arteriopathy, diabetic neuropathy, retinopathy and nephropathy, therapeutic structure).

The results were obtained by analysing the evidence files of diabetics from ADC Sibiu, based on clinical examination (blood pressure measurement, abdominal size, body weight, BMI, testing sensitivities of legs and tendon reflexes, peripheral pulse palpation), blood tests (glucose, cholesterol, triglycerides, HDL cholesterol, LDL cholesterol, urea, uric acid, serum creatinine, proteinuria, urinalysis test), ophthalmoscope exam,

PUBLIC HEALTH AND MANAGEMENT

oscillometric exam, Doppler exam for the diagnosis of peripheral arteriopathy.

RESULTS AND DISCUSSION

EPIDIAB 2007 (January-December):

- disease incidence was 159,03%: 8,60% for type I diabetes and 91,39% for type II diabetes.
- environment: 79,41% patients were from urban areas and 20,59% from rural areas.
- it was not reported significant differences between genders: 58,09% ♀ and 48,91% ♂
- depending on age: 63,96% had 40-65 years old and over 65 (30,5%).
- depending on BMI-most patients are overweight (61,98%) and obese (17,23%)
- mild hypertension(18,81%)was prevalent in patient with type II diabetes (18,30%); severe form of hypertension was found only in patients with type II diabetes.
- dyslipidemia screening was performed in 63,56% (414 patient) and was positive in 39,05% of cases (217 patient).
- peripheral arteriopathy was found in 14,49% (80) of 552 investigated patients, and prevailed in type II diabetes.
- ischemic cardiopathy-was detected in 39,8% (201 patient) . 196 had type II diabetes.
- cerebrovascular disease was detected in 38 patient (5,64%) with type II diabetes.
- diabetic retinopathy is present in 9,35% of cases (63 of 180 investigated patient).
- diabetic nephropathy was detected in 1,63 of patient (11).
- diabetic polyneuropathy was detected in 4,55% (23 cases) from 269.
- ulcers were detected in 1,58% from cases (8 patients)
- therapeutic structure reveals 52,28% patients with diet, 8,51% treated with sulfonylureas,16,44 % with metformin, 5,35%-SU+metformin,-all patient with type II diabetes; insulin therapy was instituted in 11,68% in patient (all of them with type I diabetes and 8,79% with type II diabetes and 5,74%-had other therapies.)
- all patient were enrolled in education programs about diabetes (lifestyle, therapy, generalities about diabetes).
- 40% of patient received glucometers.

EPIDIAB 2008(January-December):

- *disease incidence was 164,37%: 3,17% for type I diabetes and 96,83% for type II diabetes.
- environment: 77,34% in patient were from urban areas and 22,66% from rural areas.
- it was not reported significant differences between genders:52,02% ♀ and 47,98% ♂
- depending on age: 62,68% had 40-65 years old and over 65 (33,13).
- depending on BMI-most patients are overweight (64,84%) and obese (15,71%)
- mild hypertension(18,44%)was prevalent in patient with type II diabetes (18,30%); severe form of hypertension was found only in patient with type II diabetes.
- dyslipidemia screening was performed in 91,99% (620 patient) and was positive in 39,05% of cases (271 patient).
- peripheral arteriopathy was found in 14,49% (80) of 552 investigated patients, and prevailed in type II diabetes.
- ischemic cardiopathy-was detected in 39,80% (276 patient) . 260 had type II diabetes.
- cerebrovascular disease was detected in 109 patient (21,58%) with type II diabetes.
- diabetic retinopathy is present in 10,95% of cases (76 of 265 investigated patient).
- diabetic nephropathy was detected in 2,45 of patient (17

patient).

- diabetic polyneuropathy was detected in 5,82% from 302.
- ulcers were detected in 1,87% from cases (13 patients)
- therapeutic structure reveals 50,86% patients with diet, 8,65% treated with sulfonylureas,17,29 % with metformin, 6,2%-SU+metformin,-all patient with type II diabetes; insulin therapy was instituted in 12,97% in patient (all of them with type I diabetes and 10,12% with type II diabetes and 5,48%-had other therapies.)
- all patient were enrolled in education programs about diabetes (lifestyle, therapy, generalities about diabetes).
- 60% of patient received glucometers.

EPIDIAB 2009(January-December):

- disease incidence was 189,35%: 7,61% for type I diabetes and 98,39% for type II diabetes.
- environment: 79,41% in patient were from urban areas and 20,59% from rural areas.
- it was not reported significant differences between genders:61,09% ♀ and 38,91% ♂
- depending on BMI-most patients are overweight (61,98%) and obese (47,23%)
- depending on age: 63,96% had 40-65 years old and over 65 (23,5%).
- mild hypertension(18,81%)was prevalent in patient with type II diabetes (78,81%); severe form of hypertension was found only in patient with type II diabetes.(3,17)
- dyslipidemia screening was performed in 63,56% (621 patient) and was positive in 44,16% of cases (523 patient).
- peripheral arteriopathy was found in 30,69% (115) of 255 investigated patients, and prevailed in type II diabetes.
- ischemic cardiopathy-was detected in 39,8% (301 patient) . 276 had type II diabetes.
- cerebrovascular disease was detected in 98 patient (5,64%), all with type II diabetes.
- diabetic retinopathy is present in 9,50% of cases (78 of 247 investigated patient).
- diabetic nephropathy was detected in 3,99 in patient (18).
- diabetic polyneuropathy was detected in 4,55% (43 cases) from 369.
- ulcers were detected in 1,58% from cases (10 patients)
- therapeutic structure reveals 52,28% patients with diet, 8,51% treated with sulfonylureas,16,44 % with metformin, 5,35%-SU+metformin,-all patient with type II diabetes; insulin therapy was instituted in 13,97% in patient (all of them with type I diabetes and 8,79% with type II diabetes and 5,74%-had other therapies.)
- all patient were enrolled in education programs about diabetes (lifestyle, therapy, generalities about diabetes).
- 90% of patient received glucometers.

CONCLUSIONS

1. The number of the patients with newly detected diabetes which were included in EPIDIAB program in 2000 was 15097; in Sibiu county were reported 959 new cases of diabetes.
2. In 1975 were registered 1575 patients with diabetes mellitus in Sibiu county, in 2006 were registered 12274 cases, with 1208 much more/year. In 2009 were 16836 diabetes cases and in the first semester of 2010-644 cases of diabetes mellitus.
3. Predominantly patients are from urban area comparing with rural area.
4. Sibiu County it was registered a continuous increase of type II diabetes reaching at 10778 in 2007, while in 2008 it has registered 12204 type II diabetes cases.

PUBLIC HEALTH AND MANAGEMENT

Table no. 2. The evolution of the cases of diabetes mellitus in the county of Sibiu during 1975-2010

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
No. total	1370	1247	1979	2042	2726	2761	3399	2430	2407	3072	3388	4011	4913	7321	7959	9134	9152	9152	9321
Case rate	257	231	20	339	389	10	373	232	261	326	277	552	671	712	518	459	17	17	306
URBAN	1156	1355	1472	1553	1846	2068	2273	2397	2519	2519	2519	2519	2519	2519	2519	2519	2519	2519	2519
RURAL	214	152	507	519	880	693	726	533	888	553	869	1192	1192	1192	1192	1192	1192	1192	1192
TYPE I	1103	1424	1388	1784	1688	2208	2475	2358	2770	2580	3083	3293	3673	3665	4262	4421	4412	4640	4640
TYPE II	267	403	441	458	500	553	574	595	608	712	755	918	840	966	797	713	740	744	744
Obese	66	82	85	91	93	102	102	102	161	116	175	153	213	267	253	181	218	218	209
Consultation	6790	12215	13013	14125	17330	18707	14417	14545	16771	19997	17854	17754	18247	12217	17170	12187	10667	11181	11181
Intervent.	-	-	-	-	-	-	-	-	-	488	534	482	277	434	431	408	436	436	436

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
No. total	1569	2838	2102	3325	7001	7424	7983	8134	8201	8695	10424	11141	11733	12274	13819	15325	15836
Case rate	463	883	642	812	812	803	904	555	1031	1114	973	1114	1159	2087	2482	2162	1173
URBAN	1416	1941	1527	2363	5663	5557	6106	6512	7321	7697	8112	8526	9112	9529	11457	12217	12217
RURAL	1103	1197	1103	1352	1338	1867	1367	1303	1280	1446	2312	2312	2312	2312	2312	2312	2312
TYPE I	2927	4842	3137	3471	9977	7751	8785	9411	9333	9741	9741	9741	9741	9741	9741	9741	9741
TYPE II	337	744	624	715	1064	1139	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315	1315
Obese	227	272	272	244	411	327	371	367	364	220	235	235	235	235	235	235	235
Consultation	11532	11117	11532	13977	13066	12393	12472	11903	11122	12194	11122	11122	11122	11122	11122	11122	11122
Intervent.	227	447	447	532	371	296	309	296	294	245	245	245	245	245	245	245	245

Table no. 3. EPIDIAB Programme (7)

OBJECTIVES	PURPOSES
1. Epidemiological analysis	1. Knowledge of the diabetes epidemic -magnitude and dynamics of incidence -demographic correlations
2. Care quality analysis	-knowledge of current levels of quality care. Improving the consequences of diabetes complications, quality of life. -improving cost benefit.
3. Strategic prediction	Developing appropriate preventive strategies and the quality of care

- The increasing of diabetes cases was proved by the increasing consultation number.
- It has been found an increase of diabetes incidence in Sibiu county from 159,03‰ in 2005 to 164,37‰ in 2006 and 189,35‰ in 2007 during the EPIDIAB program.
- Most of the newly diagnosed patient are from urban area (>70%), prevailing women.
- Most of newly diagnosed patient were overweight or obese (>70%).
- 1/3 of newly diagnosed patient were presented with a different form of arterial hypertension (slight and medium).as well as ischemic heart disease (>35%) and severe cardiovascular disease (5% in cases, especially type II diabetes).
- Over 50% of newly diagnosed cases had dyslipidemia in 2007 -523 patients comparing to 2005 (271).
- The specific complications of diabetes were found since the beginning of the diagnosis: over 4% polineuropathy, with 1,58% severe forms of legs gangrene, diabetic nephropathy (3,5%), diabetic retinopathy (>9%) tending to increase in the last years of complicated cases since onset which proves the silent evolution of diabetes in the first 4 or 5 years.
- Newly diagnosed patient needed differential therapy: >50% only by diet and the rest needed mixed therapy: diet +/-insulin +/-OAD.
- The absence of medical education, appropriate lifestyle and diet, led to complications of the diabetes.

- Vulcu – „Managamentul serviciilor de sănătate” , vol.1, edit. Univ. „Lucian Blaga” Sibiu, 2007;
- Constantin Ionescu Targoviste – Tratat de Diabet, edit. Academiei Romane, București, 2004;
- Viorel Serban- Actualități în tratamentul DZ, edit. Brumar, Timișoara, 2002;
- Constantin Ionescu Târgoviște – Diabetologie modernă, edit. Tehnica, București, 1997;
- Constantin Ionescu Târgoviște, Danciulescu R., et. Al.- Particularități fenotipice la sexul feminin, edit. Ilex, Bucuresti, 2002;
- Jurnalul Roman de Diabet, Nutritie si Boli Metabolice- vol. 12, nr. 3/2005, edit. Ilex, Bucuresti;
- Liviu Vulcu, Carmen Domnariu, Dana Vulcu – Management sanitar, vol.2, edit. Univ. „Lucian Blaga” Sibiu, 2006;
- Serban V., Timir R., Dabelea D.,et. al.- The epidemiology of childhood onset type 1 diabetes mellitus in Romania, I. Ped. Endocrinology and. Metab., 2001;
- Grupul International de Lucru asupra Piciorului Diabetic – Consensul International privind Piciorul Diabetic, oct., 2002;
- Jurnalul Roman de Diabet, Nutritie si Boli Metabolice- vol. 2, nr. 2/2001, edit. Ilex, Bucuresti;
- Kocova M., Trucco M., Konstantinova M.,- A cold spot of IDDM incidence in Europe, Diabetes Care, 16, 1993;
- Zimmet P., Shaw J., Murray., - The Diabetes epidemic in full flight: fare casting in future Diabetes Voice, 2003;
- Eurodiab ACE Study Group Variation and trends in incidence of childhood diabetes in Europe: Lancet, 2000;
- Vinicor F., Burton B., Foster B., Eastman R.- Diabetes care, 2000;
- Borssen S., Bergenheim T., Lithner F., - The epidemiology

BIBLIOGRAPHY

- Comisia de Specialitate a MSP Diabet Si Endocrinologie- DZ- Ghid terapeutic, Bucuresti, iulie 2007;
- Carmen Domnariu, Adela Cojan, Violeta Francu, Liviu

- of foot lesions in diabetic patients aged 15-50years, Diabet Med., 1990;
17. Tudor Constantin – Piciorul diabeticului, edit. Helicon, Timișoara, 1996;
 18. Andrei Veresiu – Piciorul diabetic, etiopatogeneza, screening, diagnostic și principii de tratament, edit. Echinox, Cluj-Napoca, 2005;
 19. Mincu I. – Diabetul zaharat, edit. Medicală, București, 1977;
 20. Reiber G. E.- Epidemiology of foot ulcers and amputations in the diabetic foot – The diabetic foot, 6 th ed. , Mosbz, 2001.
 21. ADA – Medical Management of Type 2 Diabetes, 4 th, ed. 2004;
 22. Boulton A.- Diabetic Neuropathy, Aventis Pharma, 2001.