

QUALITY OF TREATMENT OF DIABETES MELLITUS TYPE 2 IN THE CZECH REPUBLIC

Tomas Dolezal¹, Milan Kvapil², Alena Petrikova³

¹HETA (Institute for Health Economics and Technology Assessment), Prague, Czech Republic

²Czech Diabetology Association, Czech Republic

³Department of Applied Pharmacy, Faculty of Pharmacy, University of Veterinary and Pharmaceutical Sciences, Brno, Czech Republic



Objectives

Aim of this study was to evaluate the quality of medical treatment of diabetes patients and its trends in the Czech Republic and to compare the findings with the international research.

Based on the International Diabetes Federation the prevalence of diabetes was 9,7% in 2007 and is expected to rise to 11,7% in 2025 in the Czech Republic (see table 1).

Table 1. Prevalence of Diabetes Mellitus in selected countries /according to the International Diabetes Federation/

Country	2003	2007	2025
Czech Republic	9,5%	9,7%	11,7%
Slovakia	8,7%	8,8%	10,7%
Hungary	9,7%	9,8%	11,2%
Poland	9,0%	9,1%	11,0%
Germany	10,2%	11,8%	11,9%
Austria	9,6%	11,1%	11,9%
Slovenia	9,6%	9,8%	12,0%
Europe (average)	7,8%	8,4%	9,1%

91.6% of patients from respected number of patient (approx. 774 000 patients) are type 2 diabetes patients. Such condition is considered preventable therefore this analysis doesn't focus only on the quality of compensation of the level of blood glucose but also on broader perspective including the complex modification of risks of diabetes 2 type patients.

Methods

Data were extracted from Czech cross-sectional studies from 20051 and 20072 and from European-based studies3. Follow-up of short term parameters of quality of healthcare (HbA1c, BMI, blood pressure, lipids, treatment algorithms) which help to predict long-term incidence of complications (see table 2).

Frequency of microvascular and macrovascular complications was also assessed and the data were compared to statistics of the Czech Institute for Health Information and Statistics.

Table 2:

Short term parameters of quality of health care:

- Diabetes compensation (level of HbA1c, reaching of end-point levels)
- Control of other risk factors (BMI, blood pressure, level of lipids)
- Treatment algorithms

Long term parameters of quality of healthcare:

- Occurrence of microvascular complications (diabetic nephropathy, neuropathy, and retinopathy)
- Occurrence of macrovascular complications (coronary heart disease, peripheral arterial disease, and stroke)

Results

Concerning short-term parameters there is wide variation across European countries.

Short term parameters of quality of health care

Table 2. Compensation of diabetes 2 type

	Škrha 2005 ¹ (Czech Republic)	Doležal 2008 ² (Czech Republic)	Anděl 2008 ³ (8 new countries of EU)
Average age (years)	66±11	63	62,2
Time from diagnosis of diabetes (years)	9±11	10	10,2
Glucose level (fasting) (mmol/l)	7,9±2,4	N. A.	N. A.
HbA1c (%)	7,7/7,9 (DCCT) = 6,07 (IFCC)	6,0 (IFCC) = 7,64 (DCCT)	7,7 (DCCT)
Reaching of end-point value of HbA1c (<7,0% according to DCCT) (<5,3% according to IFCC)	42%	36,3%	35,8%
Creatinin (μmol/l)	93±32	N.a.	N.a.
Albuminurie (μg/min)	17,3±15,7	N.a.	N.a.

N. A. – not assessed

We have not found significant differences between CR and selected European countries³ although there is insufficient evidence in revealing end-point values, e.g. HbA1c (7,7 % in CR vs. 7,8 % in Great Britain*), BMI (29,9 in CR2 vs. 28,7 CODE-2 study²) and reaching of target HbA1c values (36-42%^{1,2} in CR vs. 36%³) (see Table 2).

Table 3. Reaching the target levels at diabetes type 2 patients

	Škrha 2005 ¹ (Czech Republic)	Anděl 2008 ³ (8 new countries of EU)
Blood pressure systolic <130 mm Hg/	31%	19%
Blood pressure diastolic <80 mm Hg/	63%	19,7%
Cholesterol level	27% (<5,0 mmol/l)	19,7% (<4,5 mmol/l)
HDL-cholesterol >1,1 mmol/l/	55%	60%
Triglycerids	56% (<2,0 mmol/l)	43,5%

The diabetic patients are reaching the target therapeutic values only in minority of cases (31% in systolic blood pressure¹, 27% in total cholesterol¹ and in 36% of HbA1c²) (see tables 2 and 3).

The main differences and similarities between treatment in the Czech Republic and other countries are described in tables 4 and 5. 74 % of Czech patients compared with 50 % European patients are treated with metformin. Percentage of patients using antihypertension drugs (83 %) and hypolipidemics (63 %) is similar in the Czech Republic and the European average³. These figures reflect the prevalence of associated diseases.

Table 4. Diabetes mellitus type 2 treatment algorithms

	Škrha 2005 ¹ (Czech Republic)	Doležal 2008 ² (Czech Republic)	ÚZIS 2008 ⁶ (Czech Republic)	Anděl 2008 ³ (8 new countries of EU)
Patients on diet	29,8%	10,5%	27,1%	N.a.
Patients treated with p.o. antidiabetes medicines	49,2%	49,9%	56,3%	N.a.
Patients treated by metformin (from p.o. antidiabetes medicines)	45,3%	74%	N.a.	50%
Patients treated with insuline	21%	39,6%	25,8%	N.a.

Table 5. Treatment of associated diseases

	Doležal 2008 ² (Czech Republic)	Anděl 2008 ³ (8 new countries of EU)
Patients treated with antihypertension medicines	82,8%	82,5%
Patients treated with hypolipidemics	63,4%	62,3%

Long term parameters of quality of healthcare:

There is high prevalence of diabetic macrovascular and microvascular complications - diabetic nephropathy = 28,3%¹, retinopathy = 25%⁷, diabetic foot = 4,6%⁷(see table 6).

Data obtained from the Institute of Health Information and Statistics⁶ are collected on regular basis. Unfortunately data are not collected as an active clinical search but only as based on an obligatory passive reporting system therefore data on occurrence of microvascular complications can be underestimated.

Macrovascular complications are described in table 7, the prevalence of coronary heart disease (CHD) was observed to be between 42%¹ and 49%⁷, stroke between 9,3%⁷ and 11,4%¹. There is no significant difference between the Czech data^{1,7} and the EU countries³ nevertheless there is a space for improvement in terms of early detections of these complications.

Table 6. Occurrence of microvascular complications

	Škrha 2005 ¹ (Czech Republic)	Doležal 2008 ² (Czech Republic)	ÚZIS 2008 ⁶ (Czech Republic)	Anděl 2008 ³ (8 new countries of EU)
Nephropathy	N.a.	28,3%	9,8%	25,3%
Retinopathy	19%	25%	11,7%	31,8%
Diabetic leg	3%	4,6%	5,6%	3%
Amputations	N.a.	N.a.	1,1%	1,7%

Table 7. Occurrence of macrovascular complications

	Škrha 2005 ¹ (Czech Republic)	Doležal 2008 ² (Czech Republic)	ÚZIS 2008 ⁶ (Czech Republic)	Anděl 2008 ³ (8 new countries of EU)
Coronary heart disease	41,6%	49%	N.a.	43,4%
Peripheral arterial disease	17,7%	9,5%	N.a.	15,6%
Stroke	11,4%	9,3%	N.a.	7,2%

Conclusion

This comparative analysis is the first example of systematic evaluation of the quality of health care concerning diabetes patients in the Czech Republic.

Data concerning the Czech Republic were obtained from two cross sectional studies^{1,2}. Comparison was done with an adequate study from 8 new European Union countries³ and other published studies. Regarding short term parameters of quality of diabetes patient's health care no significant differences were observed between the Czech Republic and Eastern even Western European countries. On the other hand we could be concerned with the unsatisfactory levels certain parameters such as HbA1c.

Based on this pilot project it is evident that there is a need of continuous follow-up of parameters of the quality of health care of diabetes patients especially with respect of more effective evaluation of changes in the treatment algorithms. Valid parameters of the quality of the health care are essential milestones for establishment of detailed pharmaco-economic analyses which would help for sustainable investments in the treatment of the diabetic patients in the Czech Republic.

References

- 1 Škrha J (2005) Diabetes Mellitus 2002 V České republice - Epidemiologická Studie. *DMEV* 5-12.
- 2 Doležal T, Písaříková Z, Zemanová P and Bartásková D (2009) Costs of Type II Diabetes in the Conditions of the Czech Republic's Medical Care System. *Vnitřní Lek* 55:342-344.
- 3 Anděl M, Grzeszczak W, Michalek J, Medvescek M, Norkus A, Rasa I, Niewada M, Kaminski B, Kraml P and Madacsy L (2008) A Multinational, Multi-Centre, Observational, Cross-Sectional Survey Assessing Diabetes Secondary Care in Central and Eastern Europe (DEPAC Survey). *Diabet Med* 25:1195-1203.
- 4 Mainous AG, III, Diaz VA, Saxena S, Baker R, Everett CJ, Koopman RJ and Majeed A (2006) Diabetes Management in the USA and England: Comparative Analysis of National Surveys. *J R Soc Med* 99:463-469.
- 5 Jonsson B (2002) Revealing the Cost of Type II Diabetes in Europe. *Diabetologia* 45:55-12.
- 6 ÚZIS (2009) Činnost oboru diabetologie, péče o diabetiky v roce 2008.