Poor glycaemic control in secondary care insulin treated patients correlates with bad process indicators

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Background and aims: Evidence based medicine and quality control systems drive diabetes care, but room for improvement, not only in glycemic control, but also in follow up of other outcome and process indicators, exists. In the present study we examine how glycemic control is related to other outcome and process indicators.

Materials and methods: We used the 2009 data from a Belgian quality assurance study that has been carried out since 2001 in all hospital-based diabetes centres (n=113) and provides data (demographics, blood glucose control, cardiovascular risk status, diabetes complications, self-monitoring, and drug treatment) on a cross-sectional random 10% sample of the adult type 1 and type 2 diabetes patients on ≥ 2 daily insulin injections. Logistic regression analysis was used to examine the relationship of HbA1c with 5 process and 5 outcome indicators, while adjusting for age, diabetes duration and gender.

Results: In the type 1 diabetes population (n=3407; 57% males) the median age, diabetes duration and HbA1c were 47 years, 17 years and 7.8%, respectively. In the type 2 diabetes population (n=7879; 49% males) the median age, diabetes duration and HbA1c were 69 years, 14 years and 7.5%, respectively. Table 1 shows the performance in terms of process and intermediate outcome by HbA1c and diabetes type (Table legend: (1) $p<0.05$; (2) $p<0.01$; (3) $p<0.001$: Results from logistic regression analysis, after adjustment for age, gender and diabetes duration. HbA1c < 7% is used as reference.). Especially in type 2 and to a minor extent in type 1 diabetes, patients with the worst glycemic control (HbA1c ≥ 9%) were significantly less likely to be screened for complications (except for microalbuminuria screening) than the patients with optimal glycemic control (HbA1c < 7%). In both diabetes types, patients with suboptimal glycemic control (HbA1c ≥ 7%) were significantly less likely to reach blood pressure and blood lipid targets compared to patients with optimal glycemic control. Moreover in type 1 diabetes the proportion of smokers increased si**gnificant**ly with increasing HbA1c. These results were independent of age, diabetes duration and gender.

Conclusion: Quality of care in this population of diabetes patients with advanced disease stage was relatively good in terms of process and intermediate outcome. However suboptimal glycemic control was found to go hand in hand with poorer results for both other outcome and process indicators. The identification of patients characterised by this cluster of poor performance

and of the causal factors merits further investigation

Table 1: Performance rates by HbA1c and type of diabetes

	HbA1c			
Type 1 diabetes	**<7% (n=692)**	**7-7.9% (n=1119)**	**8-8.9% (n=891)**	**≥9% (n=677)**
% Screening microalbuminuria	89	88	88	87
% Eye examination	85	87	87	80(2)
% Foot sensation examination	88	87	85	84
% Foot pulses examination	88	89	91	88
% ≥ 3 HbA1c determinations/year	68	75(1)	70	60(2)
% Blood pressure < 130/80 mmHg	40	32(2)	33(1)	32(1)
% LDL < 100 mg/dl	63	59	52(2)	49(2)
% Cholesterol < 175 mg/dl	53	45(1)	42(2)	36(3)
% BMI < 25 kg/m²	52	45	45	46
% non-smoking	84	82(1)	77(3)	67(3)
Type 2 diabetes	**<7% (n=2473)**	**7-7.9% (n=2689)**	**8-8.9% (n=1589)**	**≥9% (n=1031)**
% Screening microalbuminuria	86	86	84	82
% Eye examination	83	82	84	76(3)
% Foot sensation examination	81	81	81	77(3)
% Foot pulses examination	87	88	88	85(1)
% ≥ 3 HbA1c determinations/year	57	60	57	48(3)
% Blood pressure < 130/80 mmHg	24	21(2)	19(3)	20(2)
% LDL < 100 mg/dl	65	66	62(1)	53(3)
% Cholesterol < 175 mg/dl	60	58(1)	55(3)	46(3)
% BMI < 25 kg/m²	15	13	13	12
% non-smoking	88	87	87	83

(1) $p<0.05$; (2) $p<0.01$; (3) $p<0.001$: Results from logistic regression analysis, after adjustment for age, gender and diabetes duration. HbA1c < 7% is used as reference