Belonging to a diabetes patients’ association is predictive of better metabolic control

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Abstract

Aim. – Diabetes mellitus (DM) management requires the patient’s involvement, but it is unknown whether belonging to a patient’s association leads to better metabolic control.

Methods. – A total of 323 type 1 (T1) and 494 type 2 (T2) outpatient diabetics were analyzed according to whether or not they were members of a diabetes patients’ association.

Results. – T1 members (M; \(N = 138\)) were older and had longer diabetes durations than non-members (nM; \(N = 185\)). Both groups had similar BP, kidney function, lipid profile, BMI and socioeducational status. HbA\(_1c\) (means ± SD) were lower in M than in nM: 8.1 ± 1.2% versus 8.4 ± 1.4%, respectively; \(P < 0.04\). T1 M practised more frequent self-monitoring of blood glucose (SMBG). T2 M (\(N = 97\)) were also older and had longer diabetes durations than nM (\(N = 397\)), and both groups had similar BP, kidney function, BMI and socioeducational status. Although M had lower HOMA \(\beta\)-cell function (50.6 ± 31.5% versus 63.5 ± 44.3%; \(P < 0.01\)), they had a similar HbA\(_1c\) and a better lipid profile. T2 M practised more frequent SMBG and were more likely to use insulin. Oral antidiabetic, antihypertensive and dyslipidaemic drug use was also similar, except for a higher use of calcium-channel blockers in T2 M.

Conclusion. – Belonging to a patients’ organization was associated with better HbA\(_1c\) in T1DM. In T2DM, which progresses relentlessly, similar HbA\(_1c\) levels and better lipid profiles were observed, despite longer known disease durations and lower \(\beta\)-cell function. These were not explained by gender, clinical, renal, therapeutic or educational parameters, but might reflect more responsibility, empowerment and/or compliance in terms of the condition or its management.

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Résumé

Affiliation à une association des patients diabétiques et degré de contrôle métabolique.

Objectif. – La prise en charge du diabète implique un investissement individuel des patients. Il n’est pas établi si l’affiliation à une association de patients est associée à un meilleur contrôle métabolique.

Méthodes. – Trois cent vingt-trois patients diabétiques de type 1 (T1) et 494 de type 2 (T2) ont été analysés par rapport à leur affiliation (M) ou non (nM) à une association de patients.

Résultats. – Chez les T1, les M (\(n = 138\)) étaient plus âgés et avaient un diabète plus ancien que les nM (\(n = 185\)). Les deux groupes ne différaient pas en terme de pression artérielle, fonction rénale, lipides, IMC, et niveau socioéducatif. L’HbA\(_1c\) était inférieure chez les M (moyenne (1DS): 8,1 (1,2 %) versus 8,4 (1,4 %) chez les nM; \(P < 0,04\)). Les M T1 effectuaient plus intensivement des automesures glycémiques (AMG). Chez les T2, les M (\(n = 97\)) étaient plus âgés et avaient une durée connue de diabète supérieure aux nM (\(n = 397\)). Les deux groupes ne différaient pas en terme de pression artérielle, fonction rénale, IMC et niveau socioéducatif. Les M T2, bien qu’ayant une sécrétion \(\beta\) résiduelle moindre (HOMA \(\beta\) 50,6 (31,5 %) versus 63,5 (44,3 %); \(P < 0,01\)), avaient une HbA\(_1c\) semblable et un profil lipidique meilleur que les nM. Les M T2 effectuaient plus souvent et plus intensivement des AMG, et étaient plus souvent insulinotraités. L’utilisation d’OAD, d’hypotenseurs, d’hypolipémiant était similaire à celle des nM, excepté pour les anticalciques.

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1. Introduction

Successful long-term diabetes management requires that patients be actively involved in their treatment, in addition to disease acceptance, basic pathophysiological awareness, sufficient autonomy and self-empowerment [1–3]. Many techniques have been developed to promote such involvement, such as individual and group counseling, self-management training and peer-reviewing, as well as the generous provision of educational materials such as leaflets, books and telephone or mail coaching. Of these, self-management education is the most widely used for adults with diabetes and its effects on glycaemic control are well-documented [4–6].

Encouraging patients to join a diabetic association was also universally adopted over the past few decades as a way to improve diabetes self-management education and access to healthcare resources in the community, while increasing self-empowerment and control of the disease. However, the impact of these latter techniques on metabolic control has only rarely, if ever, been investigated [1–6]. We therefore addressed this issue using a homogeneous patient database that included diabetic outpatients followed at two tertiary-care clinics in Brussels, Belgium, to assess whether belonging to a diabetes patients’ organization was linked to any relevant differences in glucose control and other metabolic parameters.

2. Patients and methods

All study patients had proven diabetes mellitus, either type 1 (T1DM) or type 2 (T2DM). Other forms of diabetes were excluded from the analyses. All patients were regularly (at least twice a year) followed at two Brussels-based academic centres that have large diabetes outpatients clinics.

Clinical physiological and biological variables were determined by the usual techniques, according to academic standards of quality. Those with T2DM underwent a non-invasive combined assessment of insulin sensitivity and β-cell function, using a computer-based version (http://www.dtu.ox.ac.uk) of the homeostasis model assessment (HOMA-2), from triplicate mean measures of fasting glucose and insulin levels obtained after an overnight fast and discontinuation of any glucose-lowering or glucose-sensing therapies for 24 h (or 48 h in the case of glargine or long-acting sulphonylureas) [7–9].

Active membership in a diabetes patients’ association was recorded as part of the standard medical interview. We did not differentiate among membership in one of the major associations active in Belgium, such as the Association belge du diabète (ABD), the Union des patients diabétiques (UPADI) and the Vlaamse Diabetes Vereniging (VDV). Active membership in a foreign diabetic association (such as the British Diabetic Association) was also considered for this analysis. The patients’ socioeducational status was classified as either low or high, depending on the achieved educational degree (primary school, college or higher post-college and university institutions).

Results are presented as means ± SD or as proportions. The significance of differences between means was assessed by Student’s t-test or Welch’s test for non-Gaussian distributions and by Fisher’s exact test for differences in proportions. P < 0.05 was considered significant or, if P > 0.05, then not significant (NS).

3. Results

The study included 323 T1DM and 494 T2DM patients. Those with T1DM were more often members of a patients’ association than were T2DM patients (57% versus 20%; P < 0.0001). T1DM and T2DM patients’ characteristics are presented in Tables 1 and 2, respectively, according to membership status in a patients’ organization. Both T1DM and T2DM members were older, had longer diabetes durations and were more often of European ethnic origin. Mean HbA1c and frequency of self-monitored blood glucose (SMBG) were lower and higher, respectively, in T1DM members. The use of both insulin and of SMBG was significantly more frequent in T2DM members. Leisure time exertional physical activity was also more common in T2DM members.

As regards other metabolic variables, both lipid profiles and uricaemia were significantly lower in T2DM members, but no differences were observed between members and non-members in terms of fat mass, fibrinogen, homocysteine, liver tests, and use of ACE inhibitors, β-blockers, angiotensin-II receptor antagonists, aspirin, statins or fibrates. Among T2DM patients, there were also no differences between members and non-members in the use of metformin, thiazolidinediones, sulphonylureas, glinides and/or α-glucosidase inhibitors (data not shown). However, calcium-channel blockers were more often used by members than non-members, regardless of type of diabetes (T1DM: 15.9% versus 6.6%; P < 0.01; T2DM: 29.0% versus 18.0%; P < 0.05).
Table 1
Type 1 diabetes patients

<table>
<thead>
<tr>
<th></th>
<th>Non-members</th>
<th>Members</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>185</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>45 (16)</td>
<td>49 (18)</td>
<td>0.013</td>
</tr>
<tr>
<td>Gender ratio (M:F) (%)</td>
<td>49:51</td>
<td>51:49</td>
<td>NS</td>
</tr>
<tr>
<td>Diabetes duration (years)</td>
<td>21 (12)</td>
<td>24 (13)</td>
<td>0.017</td>
</tr>
<tr>
<td>European Union ethnic origin (%)</td>
<td>89</td>
<td>96</td>
<td>0.013</td>
</tr>
<tr>
<td>Smoker (never/former/current)</td>
<td>64/19/17</td>
<td>56/24/20</td>
<td>NS</td>
</tr>
<tr>
<td>Education (%)</td>
<td>51:49</td>
<td>49:51</td>
<td>NS</td>
</tr>
<tr>
<td>Exercise practice (no/yes) (%)</td>
<td>45/55</td>
<td>44/56</td>
<td>NS</td>
</tr>
<tr>
<td>SMBG frequency (n day⁻¹)</td>
<td>185</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Fat mass (relative) (%)</td>
<td>24 (9)</td>
<td>25 (9)</td>
<td>NS</td>
</tr>
<tr>
<td>Insulin dosage (IU day⁻¹ kg⁻¹)</td>
<td>0.68 (0.26)</td>
<td>0.63 (0.26)</td>
<td>NS</td>
</tr>
<tr>
<td>Systolic blood pressure (mm Hg)</td>
<td>130 (16)</td>
<td>131 (15)</td>
<td>NS</td>
</tr>
<tr>
<td>Diastolic blood pressure (mm Hg)</td>
<td>79 (10)</td>
<td>78 (9)</td>
<td>NS</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>8.4 (1.4)</td>
<td>8.1 (1.2)</td>
<td>0.039</td>
</tr>
<tr>
<td>SMBG (%)</td>
<td>99</td>
<td>100</td>
<td>NS</td>
</tr>
<tr>
<td>SMBG frequency (n day⁻¹)</td>
<td>2.68 (1.65)</td>
<td>3.24 (1.58)</td>
<td>0.002</td>
</tr>
<tr>
<td>Creatinine (mg dl⁻¹)</td>
<td>1.0 (0.4)</td>
<td>1.1 (0.7)</td>
<td>NS</td>
</tr>
<tr>
<td>Albuminuria (µg mg creatinine⁻¹)</td>
<td>81 (316)</td>
<td>78 (220)</td>
<td>NS</td>
</tr>
<tr>
<td>Total C. HDL C⁻¹ (g dl⁻¹)</td>
<td>3.68 (0.80)</td>
<td>3.21 (1.25)</td>
<td>NS</td>
</tr>
<tr>
<td>LDL C. HDL C⁻¹ (g dl⁻¹)</td>
<td>1.76 (0.64)</td>
<td>1.84 (0.94)</td>
<td>NS</td>
</tr>
<tr>
<td>Triglycerides (mg dl⁻¹)</td>
<td>91 (49)</td>
<td>97 (54)</td>
<td>NS</td>
</tr>
<tr>
<td>Uric acid (mg dl⁻¹)</td>
<td>4.2 (1.3)</td>
<td>4.2 (1.2)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Results are expressed as means (SD) or as proportions (%). M, male; F, female; SMBG, self-monitored ambulatory blood glucose; BMI, (Quetelet’s) body mass index; C, cholesterol; LDL, low-density lipoprotein; HDL, high-density lipoprotein.

* Lower versus higher educational levels.
** Indirect bi-brachial bioimpedance measurement (OMRON BF 300).

4. Discussion

The present study demonstrates that belonging to a patients’ organization is associated with significantly lower HbA1c in T1DM patients. Moreover, in T2DM patients, a condition with unrelentingly progressive β-cell deterioration [10–12], we observed similar, lower HbA1c values and better lipid profiles, despite longer known disease durations and reduced β-cell function. These improvements were not explained by either gender, clinical, renal, therapeutic or educational parameters. The studied population comprised diabetic patients who regularly attended two university-based outpatient clinics in Brussels and the diabetologists involved in the study were themselves fervent promoters of diabetic patients’ organizations. Therefore, although the authors consider it likely that most regular clinic attendees would have been aware of the existence of such organizations, the decision to join or not was probably a matter of personal choice. Nevertheless, the study population was selected in terms of being better-educated, affluent urbanites whose awareness of the disease was more likely to be greater compared with the general diabetic population in Belgium.

It is estimated that the French-speaking parts of Belgium host around 250,000 known diabetics. Although the total number of members in the various diabetic associations is a little more than 20,000, this figure also includes those who are not themselves diabetic, but are healthcare professionals and/or patients’ relatives, whose membership represents active sponsoring. Based on various local and national sources, together with some educated guesswork, a conservative estimate of the proportion of Belgian diabetics currently an active member of a diabetic association would be 7.0%. This figure is comparable to the 7.5% reported in Scotland by the British Diabetic Association. In the present survey from two outpatients clinics in academic settings, the rate was around four times higher, most likely due to the selection of more affluent, more educated and/or more motivated patients. Affluence has previously been reported to significantly predict membership in the British Diabetic Association.

Furthermore, T1DM patients were two times more likely than T2DM patients to join an association; this mirrors the observation that insulin-treated diabetics are three times more likely to be motivated patients. Affluence has previously been reported to significantly predict membership in the British Diabetic Association. Furthermore, T1DM patients were two times more likely than T2DM patients to join an association; this mirrors the observation that insulin-treated diabetics are three times more likely to join the British Diabetic Association [4,5]. While no difference was observed in terms of achieved educational levels between study groups, a limitation of the present survey is its lack of socioeconomic or professional status assessment as potential extraneous confounders of metabolic control.

In T1DM, the most striking observation was a significant (−0.3%) reduction of HbA1c in active members. This represents a sizeable decrease and results of this magnitude are usually advocated as a reason to favour one insulin type and/or insulin regimen over another. The observed reduction in HbA1c was not ascribable to either different clinical variables, or to higher insulin doses or reduced kidney function. Not surprisingly,
this decrease of HbA1c was accompanied by a non-significant increase in frequency of hypoglycaemic episodes as well as a non-significant decrease in mean values of SMBG (data not shown).

SMBG frequency is associated with better metabolic control and lower HbA1c in T1DM and active members in this survey practised significantly more intensive SMBG (+0.56 strip day$^{-1}$). This factor may be behind some of the observed differences in metabolic control. As disposable ambulatory, glucose-monitoring meters and strips are provided free of charge by Belgian health authorities to virtually all T1DM subjects, financial considerations are not involved here, so the more intensive SMBG is probably attributable to other factors such as greater levels of self-empowerment, different dietary or lifestyle habits and/or better pathophysiological and therapeutic awareness of their chronic condition. As patients’ education and SMBG are both crucial for tailoring insulin therapy in T1DM, it may be hypothesized that both direct educational factors as well as a greater personal investment either directly or indirectly related to association membership, including peer-reviewing, may somehow be linked to better glycaemic control in T1DM.

To interpret the data in T2DM, it should be borne in mind that T2DM is a relentlessly progressive disease, with well-documented increases in HbA1c whatever the treatment modalities used, including insulin [10–12]. This progressive deterioration of HbA1c in T2DM is due to the continuous decline in residual \( \beta \)-cell function over time. In the present survey, association members had significantly longer known disease durations and exhibited a significantly lower HOMA-B index than did non-members. These lower \( \beta \)-cell function indices in members are noteworthy findings as, based solely on \( \beta \)-cell natural history, members would be expected to have higher HbA1c values than non-members; yet, the two groups showed identical (7.8%) HbA1c values. While members resorted more often to insulin, the UKPDS clearly demonstrated that insulin use per se did not modify the rise in HbA1c over time [10].

T2DM members also had significantly better lipid profiles for both cholesterol and triglycerides. Not unexpectedly, resorting to hypolipidaemic drug use was widespread in these patients (statins: 50%; fibrates: 24%; combined statins and fibrates: 8%), although the rates were similar for members and non-members. Also, no difference between members and non-members was found with respect to reported drug use. While compliance was not directly evaluable, the stringent and multilevelled controls that currently regulate SMBG or drug prescription, reimbursement, provision and delivery in Belgium suggest a greater likelihood of therapeutic compliance. The finding of significantly lower uricaemia in members may be a reflection of different dietary habits, although there was no difference in self-reported alcohol intake, and allopurinol was used by only 6% in non-members (versus 3% in members; NS). Taken altogether, these data point towards a healthier lifestyle in members, either due to a greater understanding of their disease and/or personal motivation. It is noticeable that significantly fewer members reported a complete lack of leisure-time physical activities compared with non-members.

In conclusion, we found that, in a selected population of Belgian diabetic subjects followed in tertiary-care outpatients clinics, belonging to a diabetes patients’ organization is associated with better metabolic indices in both type 1 and type 2 diabetes. This positive relationship is likely to encompass both higher educational status and disease knowledge, as well as a greater degree of personal involvement of members in the long-standing management of their chronic condition. Our data also suggest that public health authorities should at least maintain (or consider) the provision, on a per capita basis, of adequate funding for such patients’ organizations as part of a cost-effective, multifaceted, community-based approach towards reducing the burden of diabetes-related complications.

References


