Evaluation of the locus of control in patients with type 2 diabetes after long-term management by group care

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SUMMARY

Aim: To investigate the locus of control in patients with type 2 diabetes followed by systemic group education (Group Care) and traditional one-to-one care.

Methods: In a post-hoc analysis, two questionnaires were administered to 56 patients who had been followed for 5–7 years by Group Care and 51 controls followed by individual care, similar by age, sex, diabetes duration, glycaemia, insulinemia, weight and other clinical variables. Patients on Group Care had lower HbA1c (7.40 ± 1.21%) than controls (7.99 ± 1.48%), P = 0.027. The Peyrot and Rubin questionnaire, specific for diabetes, and the Wallston and Wallston questionnaire, more generic for chronic diseases, were administered. Both questionnaires explore 3 areas: internal control of disease, and the role of chance or powerful other people, including health operators, in changing the disease.

Results: Both questionnaires showed lower scores for chance in patients followed by Group Care (P < 0.001), while scores for powerful others did not differ from those of patients followed by traditional care. The Peyrot and Rubin tool showed increased Internal Control (P < 0.001) in the patients followed by Group Care. Multivariate analysis showed that the HOMA index of insulin resistance was inversely related to Internal Control (β = -0.144, P = 0.005) independently of BMI and HbA1c.

Conclusion: Fatalistic attitudes were lower and internal control higher in patients with type 2 diabetes followed by Group Care. These changes may be related to insulin resistance, above and beyond the effects of body weight and metabolic control.

Key-words: Type 2 diabetes · Locus of control · Group care · Patient education · Insulin resistance.

RÉSUMÉ

Évaluation du locus de contrôle de patients diabétiques de type 2 après une éducation de groupe prolongée

Objectif : Nous avons étudié de manière rétrospective le locus de contrôle de patients diabétiques pris en charge soit dans des sessions d’éducation thérapeutique (Group Care), soit en consultation traditionnelle individuelle.

Méthodes : Nous avons étudié 56 patients qui ont suivi l’éducation de groupe durant 5 à 7 ans et 51 témoins appariés selon l’âge, la durée du diabète, la glycémie, le poids et l’insulinémie, qui avaient été suivis en consultation traditionnelle. Deux questionnaires furent utilisés : Peyrot et Rubin, spécifique du diabète, et Wallston et Wallston, spécifique des maladies chroniques. Les deux questionnaires évaluent 3 zones : le contrôle interne de la maladie, le rôle de la fatalité et la collaboration avec les soignants. Les patients pris en charge en éducation de groupe avaient une HbA1C (7,40 ± 1,21) inférieure à celle des témoins (7,99 ± 1,48, P = 0.027).

Résultats : Les deux questionnaires montrent que les patients pris en charge en éducation de groupe étaient moins fatalistes (P < 0.001) mais avaient le même niveau de collaboration avec les soignants que ceux suivis en consultation traditionnelle. Le contrôle interne était augmenté chez les patients pris en charge en éducation de groupe (Peyrot et Rubin, P < 0.001). L’analyse multivariée montre que l’indicateur d’insulinorésistance HOMA-IR était en corrélation inverse avec le contrôle interne de la maladie (β = -0,144, P = 0,005) de manière indépendante de l’indice de masse corporelle et de l’HbA1C.

Conclusion : Le contrôle interne de la maladie était plus élevé, et le fatalisme plus bas chez les patients pris en charge en éducation de groupe que chez les patients suivis en consultation traditionnelle. Il n’y avait pas de différence de confiance vis-à-vis des soignants. Le contrôle interne de la maladie pourrait être en corrélation avec l’insulinorésistance, de manière indépendante au poids et à l’équilibre métabolique.

Mots-clés : Diabète de type 2 · Locus de contrôle · Éducation de groupe · Éducation thérapeutique · Insulinorésistance.
The locus of control theory was developed by Rotter [1] and is often used to assess self-management behaviour in chronic illnesses [1-5]. The concept of locus of control denotes a context of outer- or inner-directed behaviour in various situations that patients have to face in daily life. Individuals who firmly believe in their ability to cope with anything that might happen to them are regarded as having an internal locus of control [1-5]. Those who feel that control of their disease lies outside their ability to intervene, e.g. others, chance or fate, are considered to have an external one. For example, in any nutritional plan, a favourable placement of the locus of control is very important when an individual learns to maintain desirable eating behaviours, especially when under pressure to “break down” and participate in unwanted behaviours.

Adapting to diabetes is a complex process for patients, which requires recognition of the seriousness of the disease through the slow and gradual realization that some physiological integrity has been lost. Progressive internalisation of the disease, while avoiding the development of excessive illness behaviour and depression, are essential parts of this process [6-8].

Education can help achieve this goal through a systematic patient-centred process [9] that leads to acquiring and retaining the knowledge and skills necessary to live the most satisfactory life possible, even with a chronic disease [10]. We have developed and tested a model to manage type 2 diabetes mellitus (T2DM) by Group Care, a systemic group education approach [11-14] that resulted in improved knowledge of diabetes, health behaviours and quality of life along with sustained body weight reduction, increased HDL-cholesterol and stabilization of HbA1c.

We hypothesized that changing attitudes in the patients followed by Group Care might be associated with a more favourable locus of control. In this paper, we report on a cross-sectional assessment of locus of control in patients followed by Group Care for 5-7 years compared to control patients followed for the same length of time with a traditional one-to-one medical and educational approach.

Patients and methods

In a post-hoc analysis, we studied 56 consecutive patients followed by Group Care and 51 consecutive controls, being parts of cohorts that were originally randomised in 1996 [12-14] and of a second randomization carried out 2 years later. In total, patients and controls had been managed by Group Care and, respectively, one-to-one care for 5-7 years. Patients and controls were similar by age, sex, family history, duration of diabetes, schooling, occupation, blood glucose, insulin levels and body mass index (table I). Patients followed by Group Care had lower HbA1c than the controls, P = 0.027. The HOMA index of insulin resistance was calculated according to the formula [15]: HOMA = Glycaemia (mmol/l) x Insulinaemia (ng/ml)/22.5.

The locus of control was measured by two separate questionnaires, one specific for diabetes (Peyrot and Rubin) [16] and one generic for chronic diseases (Wallston and Wallston) [17].

The questionnaire of Peyrot and Rubin includes a set of 18 statements measuring expectancies of internal, chance, and

### Table I
Clinical data of patients at baseline.

<table>
<thead>
<tr>
<th></th>
<th>Group care (n = 56)</th>
<th>Controls (n = 51)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>M = 30; F = 26</td>
<td>M = 32; F = 19</td>
<td>N.S.</td>
</tr>
<tr>
<td>Age</td>
<td>65.55 (42-83)</td>
<td>66.45 (47-85)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Schoolinga</td>
<td>N = 10, P = 37, M = 8, H = 1, U = 0</td>
<td>N = 3, P = 41, M = 4, H = 2, U = 1</td>
<td>N.S.</td>
</tr>
<tr>
<td>Occupationb</td>
<td>H = 10, R = 27, W = 9, B = 7, O = 3</td>
<td>H = 6, R = 30, W = 10, B = 2, O = 3</td>
<td>N.S.</td>
</tr>
<tr>
<td>Known duration of diabetes (years)</td>
<td>15.04 (7-30)</td>
<td>16.75 (6-39)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Attendance in clinic before study (years)</td>
<td>10.67 (7-18)</td>
<td>10.96 (6-16)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Family history of diabetes (Yes/No)</td>
<td>31</td>
<td>33</td>
<td>N.S.</td>
</tr>
<tr>
<td>HbA1c (% of total Hb)</td>
<td>7.40 ± 1.21</td>
<td>7.99 ± 1.48</td>
<td>P = 0.027</td>
</tr>
<tr>
<td>Glycaemia (mmol/l)</td>
<td>9.6 ± 2.9</td>
<td>10.0 ± 3.8</td>
<td>N.S.</td>
</tr>
<tr>
<td>Insulinaemia (ng/ml)</td>
<td>6.7 ± 4.7</td>
<td>6.1 ± 4.1</td>
<td>N.S.</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>2.74 ± 1.94</td>
<td>2.54 ± 1.97</td>
<td>N.S.</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>28.1 ± 4.4</td>
<td>28.1 ± 3.7</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

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*a* P = Primary school, M = Middle school, H = High school, U = University degree.

*b* H = Housewife, R = Retired, W = White collar, B = Blue collar, S = Student, O = Other.
“powerful other” control over diabetes-related health outcomes, drawing upon the Multidimensional Health Locus of Control (MHLC) scale [16]. The final questionnaire consisted of 6 items in each of three domains which measure the degree to which subjects consider their diabetes to be under their control (diabetes-specific internal locus of control), dependent on others (Powerful Others), or finally dependent on chance or fate (Chance). The items were constructed to make the instrument appropriate for older children, adolescents, and adults, and for both type 1 and type 2 subjects. Patients were instructed to answer each item as it applied to their diabetes.

The Wallston and Wallston questionnaire [17] is believed to be quite general because it explores a wide range of situations from daily life without reflecting on the subjects’ beliefs on any particular topic. The MHLC scale [17] allows a specific and multidimensional evaluation of the locus of control, as perceived by the subjects, regarding their personal health. It also includes a set of 18 statements and is also structured on 3 subscales investigating the degree to which subjects consider the situation to be under their control (Internality), dependent on others (Powerful Others), or chance/fate (Chance).

The Powerful others Health Locus of Control scales (PHLC) measure the subjects’ belief that other individuals more powerful than themselves (relatives, friends, carers) control their health. The Chance Health Locus of Control (CHLC) scales measure the perceived lack of control over health, or the conviction that the subjects’ state of health is determined by chance, destiny, or both. Both PHLC and CHLC scales measure “external” dimensions.

All items had identical response options (from “strongly disagree”, scoring 1, to “strongly agree”, scoring 6 on a 6-point Likert-like format) and none required reverse scoring. Generally, each questionnaire can be completed in 3-5 minutes. Both questionnaires were checked for internal consistency, by Cronbach’s alpha coefficient [18].

### Statistical analysis

Group comparisons on mean questionnaire scores were carried out using a t-test for independent data. The significance/non significance of the difference between groups was then controlled for sex, age, family history, schooling and duration of diabetes, using a multivariate regression model.

Moreover, in order to check for the possible influence of the locus of control on clinical variables, a multivariate regression model was fitted, using one by one the different clinical variables as dependent variables and the locus of control ones as independent variables, controlling for type of group care, sex, age, familiarity, schooling and duration of diabetes. BMI and HbA1c were also inserted in the model as control variables in the case of HOMA. The Statistical Package for Social Sciences (SPSS Inc., Chicago, IL) was used for calculations and to check the validity of questionnaires.

### Results

The values for locus of control are listed in table II. Descriptive analysis indicates that both questionnaires showed lower scores for CHLC (P < 0.001) in patients followed by Group Care, while scores for PHLC did not differ from those obtained by control patients followed by traditional one-to-one care.

Increased Internal Control (P < 0.001) in the patients followed by Group Care was detected by the diabetes-specific Peyrot and Rubin questionnaire, though not by the more generic Wallston and Wallston tool.

Multivariate analysis showed that the HOMA index of insulin resistance was inversely related to Internal Control ($\beta = -0.144$, $P = 0.005$), independently of BMI and HbA1c. There was no direct correlation between locus of control and the other clinical variables.

### Discussion

This paper suggests that Group Care may have reduced the patients’ fatalistic attitudes and increased their Internal Control without modifying beliefs or trust in the influence of other persons, including health care providers. It also suggests that a more internal locus of control may be associated with lower insulin resistance in these patients, above

<table>
<thead>
<tr>
<th>Table II</th>
<th>Results of the locus of control by the Peyrot &amp; Rubin, and Wallston &amp; Wallston questionnaires.</th>
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<tr>
<td></td>
<td><strong>Peyrot &amp; Rubin</strong> [16]</td>
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<td></td>
<td><strong>Internal Control</strong></td>
</tr>
<tr>
<td>Group Care</td>
<td>31.8 ± 4.1</td>
</tr>
<tr>
<td>Control</td>
<td>28.8 ± 6.5</td>
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<tr>
<td>Significance</td>
<td>P &lt; 0.001</td>
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</tbody>
</table>
and beyond the effects of improved body mass index and metabolic control.

Type 2 diabetes is a condition that requires continuous support for health behaviour adaptation, rather than emergency medical interventions [8]. It is more and more difficult, with increasing duration of diabetes, to improve diabetes-related outcomes without improving patient self-management. Ninety-five percent or more of the decisions related to health that people living with diabetes have to take every day are made without consulting health care providers [7]. Choices about food and drinks, tobacco smoking, physical activity, adherence to drug prescription, clinic attendance, blood glucose self-monitoring, have to be taken on a daily basis and personal, emotional, cultural and social elements play a main role in this decision-making process [8,19]. In spite of this, most patients, even if they have received sufficient information, do not wish to be active participants and fully involved in making decisions related to their medical assessment and management [20].

Adhering to daily complex regimens can elicit considerable emotional responses in patients which, in turn, may interfere with appropriate coping with diabetes [20]. Emotional responses appear to be closely connected with attitudes towards the disease, reflecting the patient’s psychological adjustment and how much responsibility he/she is prepared to assume for self-management. Hence, psychological and emotional adjustment is the key to successful treatment of diabetes [21].

Rubin et al. introduced group sessions into their education programme to teach skills aimed at coping with the emotional barriers of living with diabetes [22]. Interventions directly focused on enhancing patients’ participation in diabetes care proved to be most powerful. Patient empowering group education and guided preparation to diabetes consultations were very effective in the long term [8,23,24].

Our Group Care programme is focused on modifying patients’ lifestyle by providing guidance to appropriate eating, exercise and healthy practices in general [12-14]. Inducing conscious conducts, i.e. understanding why choices have to be made rather than passive behavioural change, is the goal of our model. Although studied with a cross-sectional, post-hoc approach in this paper, Group Care may have been effective in modifying the locus of control from external (destiny, relatives, friends, health care providers) to internal (inner directed behaviours), in contrast with patients cared for with a more traditional, one-to-one method.

Individual instruction is time consuming and may get health care providers much too involved in forcing changes that may not last in the long period. In contrast, groups stimulate formation and comparison of opinions and numerous social and psychological experiences dealing with behavioural changes in a non-judgemental environment, where participants can express themselves and give their point of view. Changes may be partly due to the fact that positive decisions are facilitated by diminishing the antagonistic forces within each individual rather than applying external pressure.

This survey was carried out after the conclusion of our randomised control trial on Group versus individual Care [12-14]. A post-hoc analysis may have been influenced by attrition bias as some patients, usually because they moved to other areas, did not remain on Group Care. In addition, it was possible to study a limited sample of our population, although enrolling consecutive patients should have minimised selection bias.

In conclusion, Group Care appears to reduce fatalistic attitudes and to increase internal control in patients with type 2 diabetes without modifying their trust and reliance in health care providers. That changes were positively associated with insulin resistance, independently of body mass index and metabolic control, suggests that the programme may have induced such positive behaviours as healthier lifestyles and more careful adherence to prescription plans. Other areas connected with insulin resistance may also deserve investigation, as connections between bio-medical and psycho-social variables have been suggested for other chronic diseases [25].

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