Patients’ impatience is an independent determinant of poor diabetes control

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Abstract

Aims. – Some individuals have a preference for the present rather than for the future. We investigated the impact of this impatient relationship to temporality on adherence to medication and HbA1c level in type 2 diabetic patients.

Methods. – An observational, cross-sectional monocenter study in 90 patients consulting for a health check-up at a Center for Preventive Medicine. We used questionnaires assessing adherence to medication, impatience in a fictive monetary choice (preferring a smaller amount now to a higher amount later) and in daily life situations, foresight, locus of control, and social deprivation.

Results. – Impatience in the monetary choice was associated with non-adherence to medication (P = 0.005). In a multivariate logistic regression model, the risk of observing HbA1c ≥ 7% was associated with a long duration of diabetes (OR 5.2, CI 1.7–15.7, P = 0.003), monetary impatience (OR = 5.1, CI 1.7–15.4, P = 0.004), a high “chance and other people” score of the locus of control (OR = 5.1, CI 1.7–15.7, P = 0.004), a suboptimal foresight (OR 3.9, CI 1.2–12.0, P = 0.02). A decision-tree analysis (CHAID algorithm) showed that in this cohort of 90 patients, the 11 people who were adherent to medication, patient in the monetary scenario, had optimal foresight, and gave importance neither to chance nor to other people, had all HbA1c below 7%.

Conclusion. – An impatient relationship to temporality was found associated with non-adherence to medication and uncontrolled HbA1c in type 2 diabetic patients. Treatment strategies for chronic diseases should be tailored according to this novel dimension of psychology.

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Keywords: Impatience; Foresight; Adherence; Social deprivation; Locus of control; Monetary choice; Temporal horizon; Clinical myopia; Type 2 diabetes

Résumé

L’impatience des patients est un déterminant indépendant d’un mauvais équilibre du diabète.

Buts. – Certains individus ont une préférence pour le présent plutôt que pour le futur. Nous avons étudié l’impact d’une relation impatiente à la temporalité sur l’observance de la prise médicamenteuse et le taux d’HbA1c chez des patients atteints de diabète de type 2.

Méthodes. – Il s’agit d’une étude observationnelle, transversale, monocentrique, réalisée chez 90 patients consultant pour un bilan dans un Centre d’examens de santé. Elle a utilisé des questionnaires évaluant l’observance de la prise médicamenteuse, l’impatience lors d’un choix monétaire fictif (entre une petite somme maintenant ou une grande somme plus tard) et dans la vie courante, la prévoyance, le locus de contrôle, et le niveau de précarité.

Résultats. – Une réponse impatiente lors du choix monétaire était associée à la non observance de la prise médicamenteuse (P = 0.005). Dans un modèle de régression logistique multivariée, le risque relatif d’observer un taux d’HbA1c ≥ 7 % était associé à la durée du diabète (RR 5,2 ; IC à 95 % 1,7–15,7, P = 0,003), l’impatience dans le choix monétaire (RR = 5,1 ; 1,7–15,4, P = 0,004), un score élevé « chance et autres personnes » du locus de contrôle (RR = 5,1 ; 1,7–15,7, P = 0,004), une prévoyance non optimale (RR 3,9 ; 1,2–12,0, P = 0,02). Une analyse par arbre décisionnel (algorithme CHAID) a montré que dans cette cohorte de 90 patients, les 11 personnes qui étaient observantes pour leurs médicaments, patients dans le choix monétaire, qui avaient une prévoyance optimale, et ne donnaient d’importance ni à la chance ni aux autres, avaient toutes un taux d’HbA1c inférieur à 7 %.

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Some people are more prompt than others to take a smaller-sooner reward rather than a larger-later one [1]. In this regard, these “impatient” individuals would choose to receive 500 euros now rather than 1500 euros in one year [2]. Recent data using functional MRI suggested the competing interventions of the prefrontal cortex and limbic system during the choice between a delayed and an early reward, respectively [3]. A recent study showed that adolescents give a more “impatient” answer than adults in this kind of monetary-choice scenario, and the reduction in impulsive choice observed with increasing age was shown to be associated to a maturation of the connection between different brain areas involved in time discounting [4]. There is also evidence that time preference may have a genetic basis, involving genes coding for enzymes controlling the metabolism of dopamine and serotonin [5].

Recently, we proposed that patients’ non-adherence in chronic diseases may be at least partly owing to this fact that some individuals have a preference for the present, rather than for the future [6]: indeed, “impatient” patients may have intrinsic difficulties to make sustained efforts that are related to long-term therapies. For instance, these patients would prefer the short-term “pleasure” of smoking a cigarette rather than the long-term beneficial health improvement of tobacco abstinence. However, until now, testing the relationship between temporality and adherence to medication has been non-conclusive [7]. The aim of this study was to determine whether time preference is a determinant of adherence to medication and metabolic control in type 2 diabetic patients, in association with diabetes duration and known psychological determinants, such as the locus of control [8] and social deprivation status [9].

1. Research design and methods

1.1. Participants

This study was approved by the University Ethical Review Board. It was conducted in individuals consulting for a health check-up at the Center for Preventive Medicine of the Caisse Primaire d’Assurance Maladie (a State-governed HMO) Seine-Saint-Denis in Bobigny (France). Patients suffering from type 2 diabetes for at least 5 years, treated with oral antidiabetic agents, able to understand the questionnaires, and who gave their informed consent to participate in an inquiry aimed to comprehend the reasons for non-adherence, were eligible. In this Center for Preventive Medicine, 32% of patients have major difficulties in understanding French and come without any interpreter. In general, 25% of patients have a psychosocial-oriented interview.

This Center sees 10,000 individuals per year, 8% of them having type 1 or type 2 diabetes. Theoretically, this would imply that approximately out of 20 diabetic patients seen per week, 5 would be potentially able to participate. Actually, only 93 patients agreed to participate during the inclusion period (March 2006 to May 2007), while we had expected to recruit 200 patients. Answers to some questionnaires were incomplete in three patients, who were not included in the statistical analysis.

1.2. Questionnaires

Six questionnaires were administered in this study. For patients who were unable to read, a nurse’s help was sought, the duration of the interview being around 45 min.

The relation of patients to temporality was assessed by three questionnaires. First, they were presented with a fictive monetary choice of receiving 500 € immediately, 800 € six months later, or 1500 € in one year’s time. Impatience was defined by the fact that a subject did not opt for the later (one year) gain (among patients, only four of them opted to wait six months). Second, the patients were asked to answer a four-item questionnaire testing their level of impatience in daily life (Appendix A). For example: at the post-office, are you willing to wait if more than 10 persons are already waiting to be served? Individuals were considered to be impatient in this questionnaire if they declared that they would not accept to wait in at least two of these four situations. Third, a “foresight” questionnaire consisting of five questions was employed (Appendix B). For example: do you monitor your weight on a regular basis? We hypothesized that two or more answers consistent with a lack of foresight (Appendix C) would suggest a suboptimal capacity of projection into the future.

Three questionnaires were also used to determine the patients’ adherence to medication, locus of control, and social deprivation status:

- the “adherence questionnaire” (Appendix C) was a five-item questionnaire derived from the questionnaire initially described by Girerd et al. in the field of hypertension [10]. For example: did you omit taking medication this morning? The patients were considered as non-adherent if they gave a positive answer to at least three questions;
- the “locus of control questionnaire” adapted to chronic diseases (Form C) consisted of 18 questions, making it possible to give a score to four possible loci (the individual’s perception about the underlying cause of his/her life): internal, other people, doctor, and chance [11]. The patients were considered to give importance to “chance” and “other people” if the scores were >12 and >14, respectively; we also considered a combined “other people” and “chance” score with a 27 threshold;
- the “EPICES questionnaire” determined the level of social deprivation. It consisted of 11 questions with different weights. A score of greater or equal to 30.18 is considered to
reveal high social deprivation [12]. As the consultants were living in an area with a high rate of social deprivation, 76% of them were found to be socially deprived.

Therefore, in this study, we used a more severe threshold of 40.20. The EPICES questionnaire is available in French on the Internet [13]. Finally, HbA1c level was determined the day of the visit of the patients to the Center for Preventive Medicine.

1.3. Statistics

SPSS and IBM Modeler software were used for statistical analysis. Descriptive data (percentages, mean ± SD) were analyzed using χ² statistics and non-parametric Mann-Whitney U test. Furthermore, multivariate logistic regression analysis was employed to determine the independent predictors of HbA1c. In this latter analysis, adherence to medication was not considered because all the nine non-adherent patients had uncontrolled HbA1c. To manage this statistical instance, we performed decision tree analyses, using CHAID algorithm. We first constructed a tree using as discriminative variables adherence to medication, together with the four variables who were independent predictors of HbA1c in the logistic regression analysis. We let the program run without imposing an a priori order. A second tree, in which adherence to medication and the answer to the monetary choice were imposed as the two first discriminative variables, was also constructed.

2. Results

2.1. Characteristics of patients

Patients’ characteristics were identical in male (n = 54) and female (n = 36) patients who fully completed the questionnaires, with regard to age (59 ± 4 vs. 59 ± 4 years), diabetes duration (11 ± 6 vs. 13 ± 7 years), and HbA1c level (7.7 ± 1.6 vs. 7.6 ± 2.1%, respectively). 21.1% of patients were unable to read French, and 64.5% of them left the school before the age of 12.

As shown on Table 1, among the 90 patients, 56 had an uncontrolled HbA1c level (>7%) and 51 patients had diabetes for more than 10 years. According to the criteria defined above, 51 patients were considered as impatient in the monetary-choice scenario, 37 did not have an optimal foresight and nine were classified as non-adherent. In their answers to the locus of control questionnaire, 71 patients gave high importance to "chance" and 21 to "other people", and 60 patients had a high (>27) combined "chance and other people" score. Also, 52 patients were considered to be socially deprived.

Finally, 36 patients gave at least two impatient answers in the four-item daily-life impatience questionnaire.

2.2. Interrelations between the questionnaires

Giving at least three patient’s answers to the daily-life impatience questionnaire was associated with a patient answer in the monetary-choice scenario: among the 54 "patient in the daily life" individuals, 30 (56%) accepted to wait for one year for 1500 €, while only 9 out of the 36 people (25%) who gave at least two impatient answers did it (χ², P = 0.008). Furthermore, none of the nine non-adherent patients opted to wait for one year for the 1500 € (P = 0.005), and seven gave two or more negative answers to the five-item "foresight" questionnaire (P = 0.027). Furthermore, individuals who had a high "chance" score also had a high "other people" score in the locus of control questionnaire (P = 0.005).

No other association was observed between the questionnaires. Individuals with a high EPICES social-deprivation score did not seem more impatient: in the four-item questionnaire assessing impatience in daily life, these individuals did not give more often at least two impatient answers (P = 0.107), and did not opt more often not to wait for one year for the largest amount of money (P = 0.08). In addition, there was no association between the monetary and foresight questionnaires. Furthermore, we did not observe any association between education level and the answers to any of the questionnaires.

2.3. Determinants of HbA1c

As expected, diabetes duration was significantly associated with the risk of having uncontrolled HbA1c (P = 0.003) (Table 1). We found that an impatient answer to the monetary choice (not waiting for one year for the 1500 €, and preferring to take 500 € immediately or 800 € in 6 months from now) was more frequently associated with poor metabolic control (P = 0.011). Similarly, the percentage of patients out of control was higher among those who gave at least two answers suggesting a lack of foresight in the "foresight" questionnaire (P = 0.016).

Table 1 also shows that patients who were classified as non-adherent to medications always had an uncontrolled level of HbA1c (P = 0.011). Patients with high "chance", "other people", or combined "chance and other people" locus of control score, more often had an HbA1c level ≥ 7% (P = 0.021, 0.005, and 0.001, respectively). Finally, patients with a high social deprivation EPICES score (40.20) also more often had uncontrolled diabetes (P = 0.024). Table 1 shows also the different oddsratios of observing uncontrolled HbA1c level in an univariate logistic regression analysis. In a logistic regression multivariate analysis, four factors, namely a long duration of diabetes (P = 0.003), impatience in the monetary choice (P = 0.004), a suboptimal foresight (P = 0.020), and a high combined "chance and other people score" (P = 0.004) were independent predictors of poor diabetes control. The sensitivity of this model was 93% (HbA1c ≥ 7%) and specificity valued 56% (HbA1c < 7%). The overall rate of correct classification was 79%.

In this analysis, adherence to medication was not considered because all the nine non-adherent patients had uncontrolled HbA1c. To manage this overlap between the variables, decision trees were constructed using CHAID algorithm, including the answer to the adherence questionnaire together with the four independent variables of the logistic regression model. Fig. 1 illustrates the decision tree proposed by the CHAID algorithm when no a priori choice was made for the first discriminative variable. The program chose the answer to the locus of control
Table 1: Determinants of HbA1c.

<table>
<thead>
<tr>
<th>Determinant</th>
<th>HbA1c &lt; 7%a (n = 34)</th>
<th>HbA1c ≥ 7%a (n = 56)</th>
<th>P</th>
<th>Univariate logistic regression analysis</th>
<th>Multivariate analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes duration</td>
<td></td>
<td></td>
<td></td>
<td>HbA1c ≥ 7%b</td>
<td></td>
</tr>
<tr>
<td>&lt; 10 years (n = 39)</td>
<td>56</td>
<td>44</td>
<td>0.003</td>
<td>4.2 (1.7–10.4) P = 0.002</td>
<td>5.2 (1.7–15.7) P = 0.003</td>
</tr>
<tr>
<td>≥ 10 years (n = 51)</td>
<td>23</td>
<td>77</td>
<td></td>
<td>3.4 (1.4–8.3) P = 0.007</td>
<td>5.1 (1.7–15.4) P = 0.004</td>
</tr>
<tr>
<td>Waiting one year for 1500 €</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n = 39)</td>
<td>54</td>
<td>46</td>
<td></td>
<td>3.5 (1.3–9.0) P = 0.010</td>
<td>3.9 (1.2–12.0) P = 0.020</td>
</tr>
<tr>
<td>No (n = 51)</td>
<td>25</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>“Foresight” questionnaire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt; 2 lack of foresight answers (n = 53)</td>
<td>49</td>
<td>51</td>
<td>0.016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 2 lack of foresight answers (n = 37)</td>
<td>22</td>
<td>78</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>“Adherence” questionnaire</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>≥ 3 No (n = 81)</td>
<td>42</td>
<td>58</td>
<td>0.011c</td>
<td></td>
<td></td>
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<tr>
<td>&lt; 3 No (n = 9)</td>
<td>0</td>
<td>100</td>
<td></td>
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<tr>
<td>Locus of control questionnaire</td>
<td></td>
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<tr>
<td>“Chance” score</td>
<td></td>
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<tr>
<td>≤ 12 (n = 19)</td>
<td>63</td>
<td>37</td>
<td>0.021</td>
<td>3.8 (1.3–11.0) P = 0.013</td>
<td></td>
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<tr>
<td>&gt; 12 (n = 71)</td>
<td>31</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>“People” score</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>≤ 14 (n = 69)</td>
<td>46</td>
<td>54</td>
<td>0.005</td>
<td>8.2 (1.8–38.0) P = 0.007</td>
<td></td>
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<tr>
<td>&gt; 14 (n = 21)</td>
<td>9</td>
<td>91</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>“Chance + other people” score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 27 (n = 30)</td>
<td>63</td>
<td>37</td>
<td>0.001</td>
<td>5.2 (2.0–13.3) P = 0.001</td>
<td>5.1 (1.7–15.7) P = 0.004</td>
</tr>
<tr>
<td>&gt; 27 (n = 60)</td>
<td>25</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Deprivation EPICES questionnaire</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Score ≤ 40.20 (n = 38)</td>
<td>53</td>
<td>47</td>
<td>0.024</td>
<td>3.0 (1.2–7.3) P = 0.014</td>
<td></td>
</tr>
<tr>
<td>Score &gt; 40.20 (n = 52)</td>
<td>27</td>
<td>73</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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a Data are given in % (e.g., first line, 56 + 44 = 100%: 56 and 44 mean that among the 39 patients with a diabetes duration < 10 years, 56 and 44% have HbA1c < 7% and ≥ 7%, respectively).

b Data are odds-ratios (range) and significance.
c Fisher’s exact test.

In order to take into account the fact that the nine non-adherent patients all had HbA1c ≥ 7% and to test our hypothesis that impatience in the monetary choice scenario is an important predictive factor of metabolic control, we constructed a second tree in which these two variables were considered at the two first places. The new decision tree proposed by the algorithm is shown in Fig. 2. In this tree, the five variables were found to be associated to diabetes control. For this last model, the sensitivity was 79.4% and specificity valued 79.0%. Here, the overall rate of classification was 79.2%. As can be seen, in this cohort of 90 patients, the 11 individuals who were adherent to medication, patient in the monetary scenario, had optimal foresight, and did not give importance either to chance or other people, had always HbA1c below 7%. Interestingly, the distribution of diabetes duration in these 11 patients was equilibrated (five having a diabetes duration less than 10 years). The social deprivation score was higher than 40.20 in three patients (five had a score higher than 30.17). On the other hand, among the nine non-adherent patients who all had HbA1c ≥ 7%, only three had an EPICES score ≥ 40.20, and six had a duration of diabetes less than 10 years.

3. Discussion

This study provides the evidence that a preference for immediate gratification, assessed through a simple monetary scenario (i.e., refusing to wait longer for a higher amount of money):

- is associated with a poor adherence to medication in type 2 diabetic patients;
- represents in a multivariate analysis an independent determinant of having HbA1c out of target, with an odds ratio comparable to that of diabetes duration.

We also observed that individuals who did not give consistent positive answers to a questionnaire assessing their foresight were at risk of poor diabetes control. Furthermore, decision-tree analysis yielded another statistical evidence of the fact that non-adherence to medication, an impatient answer to the monetary choice, a high “chance and other people” score of the locus questionnaire as the first discriminative variable. In this decision tree, adherence to medication did not appear as a discriminative variable. The performance of this model was similar to that of the logistic regression model: the sensitivity of the model was 96% and specificity valued 56%. The overall rate of correct classification was 78%.
of control and suboptimal foresight represent together with diabetes duration significant determinants of diabetes control. Thus, this study, first, confirmed the influence of known determinants of HbA1c: diabetes duration [14], patient adherence to medication [15] and the locus of control [8]. Secondly, it points out the importance of patients’ relationship to temporality.

Quite surprisingly, we did not observe in this study the known independent associations between social deprivation and HbA1c [9] or adherence [16]. Furthermore, there was no clear association between social deprivation and impatience, assessed by the four-item daily life questionnaire ($P = 0.107$) or the monetary choice ($P = 0.082$). This absence of association was observed whichever the threshold used to define deprivation, 30.18, 40.20 or 60.00 (data not shown). It may be due to the fact that social deprivation was very common in this cohort of patients. Incidentally, no difference in discount rate was observed in response to real and hypothetical monetary choices [17].

3.1. Strength of the study

The main finding of this study, i.e. the association between impatience in a fictive monetary choice and adherence to medication and diabetes control was based on the answer to a simple question. This finding is novel. Indeed, impatience, i.e., a high discounting rate determined during a monetary choice, had been observed in patients with different kinds of addictions [18], in depressive patients [19], and recently, in obese women [20] and in adolescents [4]. However, so far, attempts to apply this concept to health problems such as the lack of vaccination against influenza, or non-adherence to antihypertensive or cholesterol-lowering medications, had been negative [7].

3.2. Weakness of the study

This study presents several limitations:

- one limitation of this study is that the daily life impatience and foresight questionnaires have not been validated, and hence, any conclusion based on them must be considered with caution;
- a second weakness of the study is that only 93 patients accepted to participate in the study over the inclusion period, while we had expected to recruit approx 200 patients. The main explanation might have been the length of the interview. Therefore, we cannot rule out an effect of impatience itself on the refusal to participate in the study;
it would have been helpful to have more information on the psychological characteristics of the sample such as other diabetes related health beliefs, or the presence of depressive or anxiety symptoms, as these may be confounders explaining the observed association between impatience and HbA1c. A high discount rate in the monetary choice (a stigma of impatience) was recently demonstrated in depression [19];
• we miss data on the presence of complications, which might also per se influence the patients’ adherence and impatience.

4. Conclusion: a room for impatience in a biopsychosocial model of diabetes control

A recent study investigating adherence with respect to seven chronic diseases found that young age was a strong predictor of non-adherence to medication in six of the diseases, including type 2 diabetes [21]. It is rather appealing to explain this finding by hypothesizing that in chronic diseases, intertemporal choices between a “smaller-sooner” and a “larger-later” reward (one of them being the choice between non-adherence and adherence behaviors) need to be made day-after-day on a longer-term basis in younger patients, increasing the risk of non-persistence to therapy.

Indeed, we observed that the nine non-adherent patients not only gave always an impatient answer to the monetary choice, but seemed for seven of them to be also impatient in their answer to the questionnaire exploring their long-term foresight ($P=0.027$). This is consistent with the hypothesis that “patience” in a monetary intertemporal choice may only be the short-term aspect of a more general psychological construct, described as “temporal horizon” [22]. Furthermore, the answer to the monetary choice was consistent ($P=0.008$) with other questions exploring the impulsivity in different daily life situations (such as waiting at the post office, or in a restaurant, etc.). This implies that the simple monetary choice used in this study may be relevant to explore patience in individuals when they are confronted to “intertemporal” choices.
We suggest therefore that data presented herein may be relevant for understanding non-adherence to long term therapies in any chronic diseases, which represents a major issue in contemporary medicine [23]. Indeed, this study is consistent with the general hypothesis that non-adherence in chronic diseases can be described as “clinical myopia” [24]: impatient-patients give the priority to the present while doctors use expected value, and this asymmetric discounting may lead to patients’ poor adherence [25]. This concept may be especially relevant in the case of social deprivation, as people who live in any form of uncertainty may rationally opt for short-term benefits and, therefore, be non-adherent to long-term therapies [6]. Therefore, treatment strategies for chronic diseases should be tailored according to this novel dimension of psychology.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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Details of contributors: G.R. designed the study, researched data and wrote the manuscript. A.M. researched data, contributed to the discussion and reviewed the manuscript. This study formed the material for his Graduate Report in Biostatistics “La qualité du suivi des diabétiques de type 2: une responsabilité partagée entre le patient et le professionnel de santé?” (CNAM Paris), December 2009. C.P. researched data and contributed to the discussion. This study formed the material of her MD Thesis “Vers une typologie du risque en santé dans une maladie chronique” (University Paris 13), November 2008. H.B., R.C. and H. L. C. contributed to the discussion and reviewed the manuscript.

Ethics approval of the study was obtained from The Institutional Review Board, CEERG GHU Nord # IRB00006477. Participants gave informed consent before taking part to the study.

Appendix A. Four-item “impatience in the daily life” questionnaire

i) At the post-office, are you willing to wait if more than 10 persons are already waiting to be served?
ii) Do you wait on the telephone when you hear a recorded message saying “don’t hang up, an operator is going to take you on-line”?
iii) When buying a household electrical appliance, you chose one, but the salesman says that it is necessary to order it: do you take another one at once?
iv) You are delighted to go to your favorite restaurant, but you would have to wait for 20 minutes: do you look for another restaurant?

Appendix B. Five-item “foresight” questionnaire: an answer “No” to questions i, ii, iv and v, and an answer “Yes” to question ii would be considered a lack of foresight

i) Do you monitor your weight on a regular basis?
ii) Do you smoke?
iii) Do you fasten your seatbelt when seated in the rear of a car?
iv) Do you exercise on a regular basis?
v) Do you have a dental follow-up?

Appendix C. Five-item “adherence” questionnaire

i) Did you omit taking your medication this morning?
ii) Have you been out of drugs since the last visit to the doctor?
iii) Did you take your medication with delay in the last days?
iv) Sometimes, don’t you take your medication because you feel that the treatment is more harmful than beneficial?
v) Do you think that you have too many pills to take?

References


