Physicians' understanding of patients' personal representations of their diabetes: Accuracy and association with self-care

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The degree of accuracy with which physicians understand their patients' views may be of central importance for promoting self-care in the majority of chronic illnesses and in type 2 diabetes in particular. The objectives of this study were to measure the accuracy of the general practitioners' understanding of the patients' views and relate it to health behavioural outcomes in patients with non-complicated type 2 diabetes. The participants in this cross-sectional study consisted of 14 clinicians and 78 of their patients from Paris, France. The predictors were levels of accuracy in understanding the patients' views derived from the illness perception questionnaire-revised (IPQ-R). The outcomes were patient-reported self-care measures. In regression models controlling for clinical and personal variables, higher accuracy on chronicity beliefs was associated with an improved diet and increased blood glucose self-testing and higher accuracy in identifying treatment control beliefs was associated with better dietary self-care. Accuracy was higher with regard to beliefs about causes, treatment control and consequences. These results suggest that accuracy may impact self-care in specific domains of illness perception but not others. The results may help identify useful avenues of communication training designed for professionals.

Keywords: diabetes; illness representation; self-care; empathic understanding; social perception

Introduction

Type 2 diabetes is associated with long-term complications including heart and renal disease. To prevent or delay complications, patients are recommended to actively practice self-care behaviours and make changes to their lifestyles, such as eating healthy food and undertaking physical exercise (ADA, 2009). Such behaviours are influenced by a wide range of psychological and social factors (Rubin & Peyrot, 2001).

Among these factors, how people view the illness appears to be particularly relevant in terms of the action they will take to cope with it (Leventhal et al., 1997). If professionals are to propose individualised action plans, promote self-care and prevent complications in the long run, these activities could benefit from an accurate perception of the patients' views, especially in chronic illnesses such as diabetes (Glasgow & Anderson, 1999). The objective of this study is to better understand the accuracy with which physicians perceive the patients' illness representations and to explore whether this perception is linked to self-care.

The theoretical background to this study is the self-regulatory model (SRM) of illness (H. Leventhal, Brissette, & E.A. Leventhal, 2003) in which individuals with chronic illness have conceptions of the illness that guide their self-regulation as they cope with illness-related stressors. The patients' beliefs (illness representation) and plans for implementing health behaviour (action plans) are the essential components of Leventhal's SRM. The core components of illness representations are beliefs about the aetiology of the illness, its symptoms and label, the personal consequences of the illness, how long it will last and the extent to which the illness is amenable to control or cure (Weinman & Petrie, 1997). Illness representations in diabetes have been explored in empirical work using self-report questionnaires and structured interviews (e.g. Griva, Myers, & Newman, 2000; Hampson, Glasgow, & Foster, 1995; Hampson, Glasgow, & Toobert, 1990; Lawson, Bundy, Lyne, & Harvey, 2004; Paschalides et al., 2004). These were able to predict a range of health-related behaviours and adaptive outcomes across illness groups (Petrie & Weinman, 1997), including care-seeking (Cameron, E.A. Leventhal, & H. Leventhal, 1993) and the self-care activities of patients with diabetes (Hampson et al., 1990, 1995). In prospective studies with diabetic patients, beliefs in treatment effectiveness predicted self-care behaviours relating to diet and exercise 4 months later (Hampson et al., 1995), while stronger beliefs in the negative consequences of diabetes and viewing diabetes as more chronic predicted self-care activities relating to diet (Searle, Norman, Thompson, & Vedhara, 2007a). These results suggest that if representational domains can be influenced in patients then it will also be possible to modify behaviours and, perhaps, improve health. The professional caregiver is in a key position to achieve this (Franks et al., 2006).

Although recent research has investigated proximities of dyads in illness perceptions, also labelled 'dyadic congruence' (Figueiras & Weinman, 2003; Heijmans, de Ridder, & Bensing, 1999; Olsen, Berg, & Wiebe, 2008; Searle, Norman, Thompson, & Vedhara, 2007b), all preceding studies focus on *congruence* or similarity, concepts that are very different from that of *accuracy*. In congruence research, the focus is on the respondent's views of the illness itself and how these views relate to the patient's views. In contrast, in the present research, we wish to focus on how the professional perceives the patient's views and whether this perception is accurate. The process of getting to know the patients involves making correct inferences about the stable and unstable personal features such as thoughts, beliefs and feelings about the illness. This resembles what has been labelled 'empathic understanding' or 'empathic accuracy', which has only recently become an area of successful investigation in the psychology of social cognition (Hall & Schmid Mast, 2007; Ickes, 1993, 1997). Moreover, previous research on illness perception has focussed on significant others' rather than on health professionals' perceptions (e.g. Olsen et al., 2008). Only recently have illness perceptions been quantitatively

compared in patient-professional dyads, but too little data is available on this (Giri, Poole, Nightingale, & Robertson, 2009).

In practice, a proportion of physicians may be unaware of the relevance of the patients' ideas and action plans for improving adherence and self-care (Horne, 1997). For example, patients do not often explicitly articulate their aversion to taking medication and even when they do, their beliefs are often not explored by professionals. This may result in misunderstandings that potentially impact health care (Britten, Stevenson, Barry, Barber, & Bradley, 2000). In diabetes care, one can hypothesise that certain patterns of illness representation may constitute a challenge to effective self-care (e.g. perceiving the illness as acute and transitory or viewing the treatment as ineffective). To deal with this, professionals may want to favour representations that will promote positive actions towards the illness. In order to do so, they will need a precise picture of the patients' views based on their ability to detect and attribute beliefs and feelings to their patients.

Unfortunately, diabetes care providers may not succeed in accurately perceiving some of their patients' core views. For example, physicians often think that patients will fear insulin and anticipate the pain associated with injections or blood tests more than patients actually do. This discrepant view may lead to the commencement of insulin treatment in type 2 diabetes being delayed or even abandoned (Nakar, Yitzhaki, Rosenberg, & Vinker, 2007). Similarly, discrepancies have been identified in patients' and professionals' perceptions of the significance of barriers to diabetes care (Simmons, Swan, Lillis, & Haar, 2007).

Although we know that patients hold strong beliefs about the nature of their physical condition and treatment (Wearden, Hynd, Smith, Davies, & Tarrier, 2006), we do not know whether these beliefs are perceived by professionals. It is also probable that professionals perceive patients' beliefs more accurately in some domains than in others. It is to be expected that chronic timelines or symptoms/complaints will be more accurately understood than explanatory causal models, since traditional medical communication focuses on defining the illness, its symptoms, diagnosis and treatment (Noble, 1998).

Although the provider–patient congruence is generally praised (Gabbay et al., 2003; Myers & Midence, 1998), we currently have no information concerning the key personal belief dimensions which must be accurately understood in order to promote self-care and, conversely, the dimensions on which accuracy is unnecessary. Identifying key domains where the correct attribution of beliefs is associated with health-relevant outcomes – such as self-care – may help professionals allocate their time and energy to relevant domains and, also, help identify specific targets for the future interventions.

To summarise, our aim in this study was to explore two main questions. First, how accurate are the practitioner's perceptions of the patients' representations of the illness? We wanted to describe how close practitioners are to their patients and to explore the differences between patients and physicians across domains of illness representation. Second, how does this accuracy of understanding relate to self-care measures? Is accuracy of equal importance across the different domains of illness representation? Answering these questions is of considerable importance when defining the objectives of future communication training. We wish to explore these issues in a coherent sample of non-complicated diabetes with no major co-morbidities since promoting self-care in such a condition is particularly challenging.

Method

Participants

Fourteen general practitioners (GPs) and 78 of their patients took part in the study. The GPs were recruited through a French professional association (CNGE, Collège National des Généralistes Enseignants). They were instructed to enrol the next 10 patients corresponding to the inclusion criteria seen over the next 30 days. A research assistant visited and informed them fully about the research and gave them 10 sets of questionnaires. Each set contained two questionnaires in separate envelopes, one to be completed by the clinician after the consultation and the other to be handed by the clinician to the patient at the end of the consultation. At the end of the inclusion time period, the research assistant visited the GP to collect the completed questionnaires. The patients were instructed to mail their questionnaires back to the research centre directly. The codes present on the envelopes made it possible to identify the two questionnaires associated with any given patient. The whole procedure was entirely anonymous, with no names being recorded at any stage of the study.

A description of the patients' and doctors' personal and clinical data is given in Table 1. Inclusion criteria for patients were (1) type 2 diabetes for more than 1 year, (2) aged under 75 years, (3) no known complication of the diabetes and (4) no major co-morbidities except high blood pressure at the time of the consultation. The sample consisted of 38 men (49%) and 40 women (51%). The patients had an average age of 65 years (range 42–75 years) and had had diabetes for 10 years (range 2–30 years).

Table 1. Sample description.

Variables	78 Patients			14 Physicians		
	n (%)	M	SD	n	M	SD
Personal and clinical						
Age		65.1	9.0		47.0	6.1
Gender						
Men	38 (49)			8		
Women	40 (51)			6		
Years of education/years of practice		9.1	4.6			
Diabetes duration (years)		10.0	8.9			
HbA$_{1C}$		7.15	1.41			
Treatment						
Oral medication	68 (87)					
Insulin	10 (13)					
Diabetes education	7 (9)					
BMI (kg m^{-2})		27.4	4.6			
Self-care (SDSCA) – Patient-rated						
Diet		4.36	1.22			
Exercise		3.31	3.25			
Blood sugar testing		2.57	2.00			
Self-care – Clinician-rated						
Visual analogue scale		4.40	1.61			

Notes: SDSCA, Summary of Diabetes Self-Care Activities questionnaire; HbA$_{1C}$, percentage of glycated haemoglobin.

The majority of the patients sampled were taking oral medication ($n = 68$, 87%) and 25 (32%) of them had high blood pressure.

The clinicians all worked in the eastern suburbs of Paris and thus represented a middle-class sample of private practices near Paris (France). They were taking part in the teaching courses for the interns in the medical faculty. Eight of them were men. On average, they had been in practice for 15 years (range 7–30 years) and their average age was 47 years (range 38–58 years). The GPs received a modest sum of money to reimburse them for one consultation for each of the patient included.

We proposed the study to 22 GPs but 8 declined because of lack of time. The study was proposed to 105 patients but 12 declined. No information is available concerning the patients who declined except that 10 were men. Ninety-three patients were included in the study. Of these, 82 mailed their questionnaires back to the research assistant. However, data was missing in four cases, which were therefore discarded. The subsequent data analyses therefore involved a sample of 78 patients and their 14 GPs. Each clinician represented between 3 and 10 patients.

Instruments and measures

Two questionnaires were drawn up to assess the socio-demographic and clinical data, illness representations and self-care behaviours. The predictors were the IPQ-R original and accuracy scores. The outcomes were self-care measures.

Personal data (patients and doctors)

For patients, this included personal data such as age, sex, height and weight, age of onset, treatment, HbA_{1C}. For doctors, this included personal data such as age, sex, number of years of practice.

Illness representations (patients and doctors)

We used the IPQ-R with instructions adapted for diabetes (IPQ-R; Moss-Morris et al., 2002). The patients were instructed to complete the original version. For the clinicians, modified instructions at the beginning of the questionnaire stated 'Your patient was asked the following questions regarding his/her diabetes. Try to think in his/her place and indicate which responses your patient gave. Do not indicate your own view of the illness but what you think your patient's view is'. Regular prompts were also included at each step of the questionnaire, e.g. in the symptoms list: 'Here is the question we asked your patient. In your opinion, which symptoms did your patient confirm?'

The IPQ-R comprises 40 items subdivided into subscales reflecting nine aspects of illness representation: identity, chronic timeline, consequences, personal control, treatment control, illness coherence, cyclical timeline and emotional consequences. In addition, explanatory beliefs are explored using 18 causes presented at the end of the questionnaire.[1] Apart from the identity dimension, subscales were scored on a 5-point scale (1 (strongly disagree) to 5 (strongly agree)). The identity dimension refers to the number of symptoms associated with the illness. The patients were asked to tick either 'Yes' or 'No' to report whether they had experienced each of 14 symptoms since the onset of diabetes (including pain, headache or fatigue) and whether the experienced symptoms were associated with the illness.

Reliabilities ranged from fair to excellent for both patients and doctors, respectively: chronic timeline 0.67 and 0.86, consequences 0.68 and 0.80, personal control 0.65 and 0.75, treatment control 0.61 and 0.63, illness coherence 0.68 and 0.81, cyclical timeline 0.65 and 0.87, emotional consequences 0.72 and 0.89.

To assess the accuracy of the clinicians' evaluations of the patients' illness representations, we developed measures of accuracy for each subscale of the IPQ-R. Various measures of congruence have been reported for the IPQ-R in the recent literature. Olsen et al. (2008) used raw differences between the subscales scores computed in each dyad. Figueiras and Weinman (2003) used a classification system based on median splits on the subscale scores to define similar or conflicting perceptions. These procedures are appropriate for assessing the congruence of different individuals' representations of the same object (e.g. the patient's illness). Although the differences between the patient and physician on a score may be informative, this measure is likely to aggregate errors of judgements on different items from the same subscale. It does not genuinely reflect the perspective-taking task the clinicians were asked to perform, i.e. trying to imagine how their patients actually responded to each item. This is why we developed a procedure to evaluate accuracy at the item level. An accurate judgement for a specific item was recorded when the clinician's code was in the same direction as the patient's: disagree, neutral or agree. Thus, each item's scoring was recoded into a three-level variable (disagree, neutral and agree) and accuracy was defined as an agreement on this recoded variable. So, if one patient coded 1 (strongly disagree), an accurate judgement of the clinician was recorded if he/she coded 1 *or* 2 (strongly disagree or disagree) but *not* 3 (neither agree nor disagree), 4 (agree) or 5 (strongly agree).

In the case of the chronic timeline, consequences, personal control, treatment control, illness coherence, cyclical timeline, emotional consequences and causes, the accuracy score was calculated as the number of items where an accurate assessment was given by the clinician divided by the number of items in the subscale. To calculate accuracy on the identity subscale, we considered the agreement percentage composed of the proportion of accurate codes (presence or absence of symptoms) given by clinicians divided by the total number of symptoms.[2] These variables are described in Table 2.

Self-care behaviours (patients)

To assess the self-care behaviours in type 2 diabetes, we used the summary of diabetes self-care activities (SDSCA) measure (Toobert, Hampson, & Glasgow, 2000). In this, respondents are asked to indicate on how many of the last 7 days they have adopted a specific behaviour. This is a widely used self-report inventory to assess the self-care activities of patients. We examined self-care activities in three main areas: Diet (five items; e.g. 'On how many of the last 7 days have you followed a healthy eating plan'), exercise (two items; e.g. 'On how many of the last 7 days have you had at least 30 min of physical activity – total minutes of continuous activity, including walking?') and blood sugar testing (two items, e.g. 'On how many days of the last 7 days did you test your blood sugar?'). The scores were obtained by averaging items within each area. Since Cronbach's alpha is sensitive to the number of items, we used inter-item correlations to determine score reliabilities (Streiner, 2003). These were all larger than 0.56. In line with previous observations showing that the SDSCA is multidimensional (Sultan, Boujut, & Hartemann, 2009;

Table 2. Description of IPQ-R scores and accuracy scores computed from IPQ-R item coding in 78 patients and their 14 physicians.

Illness representation scores (IPQ-R)	Patients		Physicians					Accuracy scores	
	M	SD	M	SD	T	r	ICC	M	SD
Identity	2.63	2.52	2.11	2.30	−1.36	0.26*	0.20	0.77	0.16
Chronicity	4.16***	0.79	4.43***	0.82	2.55*	0.32**	0.30	0.41	0.18
Consequences	2.66**	0.97	2.70**	0.79	0.31	0.13	0.12	0.47	0.23
Personal control	3.89***	0.69	3.84***	0.61	−0.48	0.01	0.01	0.43	0.24
Treatment control	3.81***	0.66	3.87***	0.52	0.66	0.20	0.33	0.47	0.23
Illness coherence	2.27*	0.98	3.33***	0.77	0.41	0.20	0.19	0.31	0.23
Timeline cyclical	3.07	1.02	2.55***	1.01	−4.07***	0.38**	0.34	0.45	0.30
Emotional consequences	2.87	1.09	2.82	1.02	−0.35	0.36**	0.33	0.43	0.27
Causes								0.51	0.18
Stress	3.39*	1.56	3.42**	1.15	0.14	0.29*	0.028		
Hereditary	3.15	1.61	3.22	1.40	0.25	0.22	0.19		
Germ	1.57***	1.00	1.49***	0.77	−0.43	−0.12	0.02		
Diet	3.54***	1.51	3.92***	0.78	2.05*	0.17	0.14		
Chance	2.32***	1.38	3.39**	1.19	5.64***	0.20	0.16		
Medical care	1.73***	1.08	1.53***	0.79	−1.27	−0.04	0.00		
Pollution	1.88***	1.14	1.86***	0.99	−0.29	−0.18	−0.11		
Behaviour	3.21	1.45	3.29**	0.86	0.43	0.11	0.11		
Mental attitude	2.25***	1.36	2.21***	1.23	−0.28	0.20	0.20		
Family problems	2.91	1.53	2.92	1.29	0.00	0.17	0.19		
Overwork	2.60*	1.48	2.59**	1.21	−0.13	0.12	0.12		
Emotional state	2.73	1.47	2.70*	1.14	−0.29	0.27*	0.27		
Ageing	3.04	1.49	3.36**	1.09	1.40	0.03	0.04		
Alcohol	1.99***	1.35	1.99***	1.17	0.07	0.16	0.23		
Smoking	1.79***	1.24	1.68***	1.11	−0.77	0.19	0.16		
Accident	1.57***	1.07	1.32***	0.73	−1.71	0.02	0.00		
Personality	2.36***	1.40	2.09***	1.20	−1.49	0.14	0.18		
Immunity	2.17***	1.31	1.66***	0.97	−2.69**	0.00	0.03		

Notes: T, student's t-test; r, Pearson's correlation; ICC, intraclass correlation coefficient. To facilitate interpretations and comparisons with the neutral value (=3), raw scores were averaged within each subscale. Significance levels attached to means refer to one-sample t-tests of comparison with the neutral point (3). Significance levels attached to t-values refer to paired t-tests for comparing scores of patients and their physicians. Accuracy scores represent the proportion of items on which accurate judgements were recorded out of the total number of items in each subscale.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Toobert et al., 2000), self-care activities relating to diet, exercise and blood sugar testing were largely independent of each other (range of r's $= 0.01$–0.34) and thus no global score was computed.

Self-care (physicians)

The clinicians were asked to answer the following question: 'In general, to what extent does the patient adopt the recommended self-care behaviours in relation to his/her diabetes?' The response format took the form of a 7 cm visual analogue scale ranging from 'not at all' (0) to 'completely' (7) and the clinicians were instructed to tick the estimated degree of self-care. This measure was used in additional analyses as a supplementary control variable (see the section 'Discussion').

This study was developed in accordance with the Société Française de Psychologie's code of conduct for human research in behavioural science. It received full Institutional Review Board approval from the CNGE ethics committee. After the research had been presented to them, all the participants gave their informed consent.

Statistical analyses

To describe illness perception dimensions and compare their level with the neutral point, we used one-sample t-tests. To compare illness perception scores in patients and physicians we used paired t-tests and Pearson's correlations. To detect differences in the accuracy scores, these were compared using GLM procedures on paired measures. This last analysis was confirmed using Friedman's non-parametric procedure for related samples. The associations between predictors and outcomes were explored through two sets of true hierarchical regression analyses. The first was performed on patients only in order to explore as to what extent illness perception subscales relate to self-care. The second focussed on the role of accuracy scores, as determined at an item level. In both sets, control variables were introduced in Block 1. The residuals from this first block were saved for further analysis. The predictors were entered individually as alternative Block 2s with the residuals as the dependent variable. Within this approach, the semi-partial correlation associated with each dimension of illness perception was determined after the contribution of the control variables had been partialled out. Regression analyses were performed on the standard scores.

Results

Preliminary results in patients

As reported in Table 2, patients reported on an average 2.6 symptoms related to their diabetes, with the most frequent symptoms being fatigue ($n = 37$, 48%), loss of strength ($n = 29$, 37%) and stiff joints ($n = 23$, 29%). One-sample t-tests comparing the subscales means with the neutral point indicated that patients viewed their diabetes as chronic and personably controllable and saw their treatment as effective in controlling the illness. They tended to report a fairly good understanding of the illness and perceived that its consequences are not major. The perceived causes of the illness were diet or eating habits, and stress. Notably, they disagreed that their

diabetes could be attributed to alcohol or poor medical care. In the regression analyses of the patients only, no illness representation subscale score was associated with blood sugar testing behaviours or exercise behaviours after adjustment for personal and clinical data (age, sex, education, diabetes duration and body mass index (BMI)). In contrast, chronicity ($\Delta R^2 = 0.096$, $p < 0.05$) and treatment control ($\Delta R^2 = 0.130$, $p < 0.01$) were associated with self-care behaviours relating to diet and regimen, with a stronger conviction of chronicity being associated with poorer self-care ($\beta = -0.309$, $p < 0.05$) and a belief in the ability of treatment to control the illness being associated with better self-care ($\beta = 0.360$, $p < 0.01$).

Accuracy of GPs' judgements

The comparisons of the patients' IPQ-R scores and the doctors' estimations of these scores are available in Table 2. GPs slightly overestimated the patients' beliefs concerning the chronicity of the illness and underestimated their belief in the cyclical aspects or unpredictability of the illness. In the case of causal attributions, they overestimated the patients' beliefs that diet, eating habits or chance may cause the illness and underestimated the fact that patients' explain their diabetes through impaired immunity. However, as argued in the section 'Method', comparisons of the subscale scores may mask the discrepancies at an individual item level.

We then compared the accuracy across the domains of illness representations. We compared the means for these scores using a GLM procedure on paired measures available in SPSS v14.[3] The significant differences between means were identified (Pillai's trace $= 0.310$, $F = 4.364$, df $= 7$, $p < 0.001$). These were confirmed using a Friedman non-parametric procedure testing the equality of mean ranks ($\chi^2 = 24.765$, $p < 0.001$). The comparisons of pairs of scores using estimated marginal means (LSD Fisher test) indicated that accuracy scores were higher for causes, treatment control and consequences than for coherence, emotional consequences, personal control and chronicity ($M_{\text{diffs}} > 0.085$, p's < 0.05). Other comparisons were insignificant. To summarise, the GPs were more accurate when considering the explanatory beliefs, the belief that treatment can help control the illness, and that the illness has social consequences.

As far as the identity dimension is concerned, the average agreement percentage was 77%, with the proportion of symptoms actually reported by patients and correctly identified by clinicians being 29%. Some symptoms were more accurately reported by clinicians: upset stomach, fatigue and loss of strength. Notably, none of the accuracy scores for any of the IPQ-R dimensions were related to the known characteristics of the physicians, including years of practice, age or gender (r's and t's non-significant p's > 0.23). To explore the statistical dependencies between the professionals and patients, we explored accuracy scores across the professionals using non-parametric Kruskal–Wallis and median tests and found no significant difference (median p-level $= 0.41$, Min $= 0.09$).[4]

Association of accuracy with health outcomes

A summary of the regression analyses is available in Table 3. Only two outcomes are reported here since no positive results were observed when predicting exercise

Table 3. Hierarchical regression analyses on clinicians' accuracy of understanding of patients' illness representations as predictor of self-care ($N = 78$).

Variable	Self-care: diet		Self-care: blood sugar testing	
	β	ΔR^2	β	ΔR^2
Block 1: Control variables		0.053		0.090
Age	0.183		0.062	
Sex	0.110		0.021	
Years of education	0.014		−0.049	
Diabetes duration	−0.053		0.033	
BMI	−0.125		0.079	
HbA_{1C}	−0.001		0.250*	
Block 2s: Clinicians' accuracy				
Identity	0.087	0.008	0.243	0.059
Chronicity	0.285*	0.081*	0.276*	0.077*
Consequences	−0.145	0.021	0.083	0.007
Personal control	0.126	0.016	0.088	0.008
Treatment control	0.260*	0.068*	0.153	0.023
Illness coherence	−0.114	0.013	−0.066	0.004
Cyclical timeline	−0.200	0.040	−0.026	0.001
Emotional consequences	0.155	0.024	−0.124	0.015
Causes	0.005	0.000	−0.081	0.007

Notes: *$p < 0.05$. Block 2s predict residuals from Block 1. Hence, ΔR^2 in Block 2s indicates the association with the variance of outcomes not accounted for by Block 1. Regressions were performed on standard scores.

behaviours from the SDSCA (self-care), with all betas being non-significant (p's > 0.21).

Concerning the prediction of self-care behaviours in terms of diet and regimen as reported by patients, no control variable from Block 1 was associated with the outcome. In Block 2, the higher accuracy scores on chronicity ($\Delta R^2 = 0.08$) and treatment control ($\Delta R^2 = 0.07$) were associated with better self-care at a higher level than the control variables. Thus, self-care (diet) was associated with the accuracy of understanding of chronicity and with control beliefs (treatment), but not with the other dimensions of the illness perception.

Regarding the prediction of self-reported blood-sugar testing behaviours, HbA_{1C} from Block 1 was related to the outcome, with higher blood glucose being associated with more frequent blood sugar testing. In Block 2, the accuracy scores on chronicity ($\Delta R^2 = 0.08$) were associated with the outcome, with higher accuracy correlating positively with better self-care. Thus, self-care (blood testing) was associated with the accuracy of understanding of chronicity, but not with the other dimensions.

In conclusion, the results observed here support the idea that the accuracy of clinicians' judgements for chronicity was associated with self-care (diet and blood glucose testing) and that accuracy for treatment control was associated with self-care (diet).

Discussion

This is the first study to examine the associations between actual understanding of the patients' illness representation and self-care in medical practice. The patients in

this sample perceived their diabetes as a chronic illness that was controllable. These representations were consistent with the recent literature on type 2 diabetes (Paschalides et al., 2004; Searle et al., 2007a). We also found that individual chronicity beliefs related negatively with self-care whereas individual beliefs about the ability of the treatment to control the illness impacted positively on this outcome.

Our primary finding was that the accuracy of the clinicians' judgement of the patients' views was more predictive of self-care behaviours than the personal and clinical data. While clinicians tended to have more accurate understanding of the patients' beliefs concerning the timeline of the illness (chronicity) or on the ability of the treatment to control the illness (treatment control), self-care behaviours tended to be more frequent for diet or blood testing. One important point is that these associations were adjusted for factors traditionally known to influence self-care or adherence, such as age or illness duration. Moreover, because it reflects good or poor diabetes status, HbA_{1C} is an item of information likely to be associated with both the accuracy of understanding (especially concerning treatment control) and self-care, and was therefore controlled here.

The clinician's ability to clearly represent the patient's view was associated with better patient self-care outcomes; however, not all domains of representation may be equally important. The accuracy of the clinician's understanding may well be more important when referring to the course and timeline of the illness, as well as to beliefs in the ability of the treatment to control diabetes, than when it relates to consequences (either social or emotional), personal understanding of the illness, beliefs concerning cyclical aspects of the illness or the causal explanation of diabetes onset. For example, this would mean that, if clinicians think that patients' beliefs concerning chronicity are stronger than they actually are (i.e. overestimating chronicity beliefs), this may have more negative consequences on diabetes management than if they make such errors on other topics such as the causes.

The idea that greater accuracy in the perception of the patient's views should lead to more effective and appropriate decision-making is closely related to Leventhal's SRM in which the first stage is the cognitive and emotional representation of a health threat via which the patient identifies the significance of this threat. The second stage is anchored in the first and concerns action plans referring to the way patients act upon illness representations (Leventhal et al., 2003). The way these stages are interlinked suggests that, for the clinician, an accurate understanding of the patient's illness representations is a necessary prerequisite for preparing effective communication on and implementation of action plans. Recent research which has manipulated the content of communication in patient–doctor consultations suggests that while it is useful for communication to include both action plans and representations, communicating about action plans while ignoring illness representations may be inappropriate (de Ridder, Theunissen, & van Dulmen, 2007; Theunissen, de Ridder, Bensing & Rutten, 2003).

Empathic understanding, as reflected by clinicians achieving a more accurate understanding of their patients' views, is related to many positive health outcomes in patients, including greater satisfaction with care, trust and adherence. For example, Theunissen et al. (2003) observed that patients greatly appreciated a discussion of their illness representations and that this induced a strong feeling of receiving support. Research and clinical observation suggest that clinical empathy has a major impact on the emotional and cognitive aspects of the consultation (Halpern, 2001; Mercer & Reynolds, 2002; Neumann et al., 2009).

The consequence of our results is that clinicians should be specifically encouraged to gain an accurate understanding of the patients' views in terms of the chronicity of the illness, its timeline and evolution and the ability of the treatment to control one's illness (i.e. effectiveness of treatment and treatment options) since these domains are associated with positive outcomes. As many authors have argued, communication during medical consultations could be a target area to help improve the accuracy of understanding: a recent systematic review of the ability of interventions to alter the interaction between the patients and the practitioners indicated that a range of approaches appeared to be effective and impacted health outcomes in 44% of the trials (whereas negative results were observed in 20% of the cases; Griffin et al., 2004). One study has shown that interventions relating to patient–provider interaction made it possible to modify the hypertensive patients' personal understanding of their illness and that this, in turn, influenced their adherence to lifestyle recommendations (Theunissen et al., 2003). In fact, explicitly considering illness representations during medical consultation results in the improvement of patient–GP communication because it enables GPs to pay more attention to the patients' concerns and psychosocial or lifestyle issues and increases satisfaction with care (de Ridder et al., 2007; Frostholm et al., 2005).

A secondary result of our research related to the accuracy of clinicians' understanding *per se*. Using the IPQ-R permitted us to systematically compare the patients' actual beliefs with the clinicians' perceptions of these beliefs. Accuracy indices based on item-by-item judgements were moderate, with most proportions being above 0.40. When comparing accuracy across domains of beliefs, accuracy was better on causes, treatment control beliefs and social consequences than on other dimensions, such as emotional consequences or illness coherence. This finding is consistent with previous research on cancer, which suggests that physicians or other health care providers usually have difficulties in identifying the patients' psychological distress or social functioning but have more accurate judgements of their physical functioning and pain (e.g. Fallowfield, Ratcliffe, Jenkins, & Saul, 2001; Sneeuw, Sprangers, & Aaronson, 2002). Although overall agreement was high on symptoms, most symptoms endorsed by the patients in the IPQ-R were only accurately identified by the clinicians less than half of the time. Interestingly, some of the symptoms were more accurately identified by clinicians – such as upset stomach, fatigue or loss of strength. To summarise, our results suggest that the accuracy of the clinicians' understanding is not uniform across the different domains of illness representation.

It is of particular interest that clinicians were more accurate in judging the patients' treatment control beliefs and at the same time that accuracy in this domain was also predictive of self-care behaviours. In this case, clinicians seem to be quite accurate in their judgement and this appears to be beneficial to their patients. In contrast, although a better accuracy was noted on causal explanations, this was not associated with self-care. These results underline the necessary domain-specific approach when discussing personal views on the illness in patient–provider relationships (Petrie, Jago, & Devcich, 2007). In further communication training programs, it could be more beneficial to focus on topics on which empathic understanding is likely to be associated with self-care behaviours such as treatment control or chronicity.

However, given the cross-sectional design of the study, it is necessary to discuss the direction of causal relationships. It is possible that the factors considered here as

the outcomes – self-care – actually influenced the accuracy of the understanding of illness representation. One possibility is that patients who exhibit less frequent self-care behaviours and worse diabetes management are considered to be 'difficult' patients who consequently generate a negative response in clinicians, which, in turn, impedes understanding. Logically, such feelings should be reflected in the clinician-rated self-care item presented in the section 'Method'. To examine this alternative explanation, we performed analyses using the same regression models to predict self-care, but this time including clinician-rated self-care as an additional control variable in the first block. We found that this had no impact on our results. Although we did not include other precise measures of clinicians' negative feelings or responses, these additional analyses suggest that the clinicians' subjective judgements of adherence (an indirect measure of the tendency to categorise patients) do not suppress the accuracy – self-care relationship.

Other limitations should also be examined. Although we found that accuracy scores did not depend on the clinician's characteristics such as his/her professional experience, we were unable to explore the impact of the length of the relationship between patient and doctor, or other characteristics associated with empathy (Barone et al., 2005). Research has shown that the history of the relationship may impact accuracy of judgement (Ickes, 1993; Marangoni, Gracia, Ickes, & Teng, 1995). Our study also included a sample distributed across a limited number of physicians. This raises the question of nested (dependent) data which may require specific analyses, for example, in the form of multilevel models. But the limited sample size of the present study prevented us from using such multilevel techniques (Goldstein, 1987). However, we observed that accuracy measures did not differ across clinicians and that the accuracy was not related to any characteristics of the clinicians available to us. Finally, the clinicians were not unaware that the patients were included in the experiment during their consultations. During the debriefing meeting, they reported that they were very interested by the specific mental task of imagining the patients' responses to the questionnaire. In some instances, it is possible that the task actually drew their attention to the patients' views of the illness and that they were therefore more focussed on the illness representations of the patients participating in the study. To evaluate this impact, we examined the relations between time and accuracy scores and found no significant association. Further research should systematically explore the effects of simple perspective-taking tasks such as this one (Kumagaï, Murphy, & Ross, 2009).

To conclude, the main findings of this study show that the accuracy of the clinicians' judgements of the patients' actual illness representations varies across the domains of representation. Accuracy was better for causes, treatment effectiveness expectations and perceived consequences than in other domains. It was possible to identify certain key domains in which accuracy was associated with self-care (i.e. timeline and controllability associated with treatment). Since self-care is central to diabetes management, an accurate understanding of illness beliefs could have an impact on health. One original aspect of this study is that it makes use of an innovative and simple perspective-taking task relating to empathic understanding that is easy to implement in clinical research. Future research should address the promotion of accurate understanding of patients' views in clinicians to help them make the right decisions and recommendations in a patient-centred approach of care.

Notes

1. These subscales map onto the five traditional dimensions of illness perception: aetiology of illness (causes), its symptoms and label (identity and coherence), the personal consequences of the illness (personal consequences and emotional consequences), how long it will last (chronic and cyclical timeline) and the extent to which it is amenable to control or cure (personal and treatment control). Full scale, scoring procedure and some relevant literature can be accessed at the website: www.uib.no/ipq/.
2. Alternatively, we used the number of symptoms correctly identified by the clinicians (i.e. symptoms that were both confirmed by patients and identified by clinicians) as a proportion of the total number of symptoms actually confirmed by the patients (i.e. positive–positive/[positive–positive + negative–positive]). Further analyses with this measure did not differ from what was observed with the agreement percentage. Since accuracy variables are count variables, it is not appropriate to calculate internal consistency (Streiner, 2003).
3. The accuracy indices are all calculated in the same way with the exception of the identity score for which full agreement on each symptom was required because the latter is a symptom count. Thus differences with identity are not meaningful.
4. For information we also indicated the values of intraclass correlation coefficient for IPQ-R scores in Table 1.

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