Illness and Treatment Perceptions Are Associated With Adherence to Medications, Diet, and Exercise in Diabetic Patients

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OBJECTIVE—To investigate diabetic patients' perceptions of illness and treatments, and explore relationships to adherence and blood glucose control.

RESEARCH DESIGN AND METHODS—Forty-nine type 1 and one hundred and eight type 2 diabetic patients completed questionnaires assessing illness perceptions, treatment beliefs, and adherence to medications, diet, and exercise. Blood glucose control was assessed from blood tests.

RESULTS—Patients rated medication more important than diet and exercise, and reported higher adherence to medications. Insulin was perceived as more helpful for diabetes, while antihypertensives and cholesterol medication were perceived more helpful for preventing heart problems. Perceptions were associated with adherence to insulin, cholesterol and antihypertensive medications, exercise, and diet. Blood glucose control in type 1 diabetic patients was associated with insulin adherence and perceived personal control, and in type 2 diabetic patients to being prescribed insulin or antihypertensives, and perceived personal control.

CONCLUSIONS—Patients hold specific mental models about diabetes treatments, which are associated with adherence.

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Nonadherence to medication and lifestyle regimes in diabetes is associated with increased hospitalizations and mortality (1), yet many patients fail to adhere to treatment recommendations (2). Recently, illness perceptions have been associated with adherence to diet and exercise recommendations, blood glucose monitoring, clinic attendance, and blood glucose levels (HbA_{1c}) (3). Specific treatment perceptions (e.g., the effectiveness of diet or exercise) are more predictive of adherence to specific behaviors than combined treatment perception scales (4). This study extends previous research by investigating diabetic patients' perceptions of specific medications (including insulin, blood pressure medication, and cholesterol medication) and the relationship of these to adherence and blood glucose control.

RESEARCH DESIGN AND METHODS

This cross-sectional study was completed at an outpatient diabetes clinic in Auckland, New Zealand. Inclusion criteria were a diagnosis of diabetes, age >16 years, and English speaking. The study included 157 patients (93% of those approached): 49 type 1 patients (49% male, mean age 43.20, ± 20.57) and 108 type 2 patients (58% male, mean age 58.03, ± 11.27).

Questionnaires included the Brief Illness Perception Questionnaire (5), a valid and reliable scale (developed with patient groups, including diabetic patients) that assessed patients' perceptions of diabetes timeline (how long diabetes will continue), consequences, identity (symptoms), personal control over diabetes, treatment control (helpfulness of treatment), emotional responses, concern, and illness coherence, using single items. The treatment control item was adapted as per published instructions to assess perceived helpfulness of each specific treatment component (insulin, blood pressure pills, cholesterol pills, diet, and exercise) separately for diabetes and for preventing heart disease. One question asked patients to rank three treatment modalities (take medications as prescribed regularly, exercise regularly, manage diet well) in the order of importance for controlling diabetes. Adherence is difficult to measure in diabetes research (6). Adherence assessment was adapted from Griva et al. (7); participants were asked how often they followed their doctor's recommendations for taking insulin, blood pressure, and cholesterol medications, exercise, and diet, with response categories from "All of the time" to "None of the time." Similar to the original paper, associations between reported insulin adherence and HbA_{1c}, and Cronbach's α of 0.88 support the measure's validity.

RESULTS

—Both type 1 and type 2 patients ranked medication as significantly more important than diet or exercise for controlling diabetes ($P < 0.001$) (Fig. 1). Patients prescribed insulin rated it more helpful for diabetes than both diet and exercise, and rated exercise more helpful than diet management ($P < 0.001$). Blood pressure pills and cholesterol pills were seen as more helpful for preventing heart problems than for diabetes ($P < 0.01$), while insulin was seen as more helpful for diabetes ($P < 0.001$) among patients prescribed these medications. Both diet and exercise were

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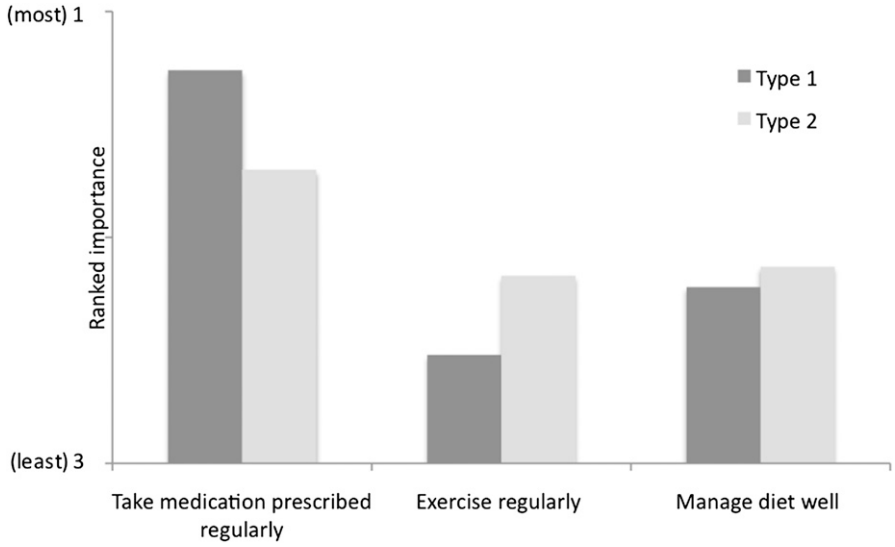

Figure 1—*Mean ranking of importance of each aspect of treatment by type 1 and type 2 diabetic patients.*

rated as helpful for diabetes as for preventing heart disease.

Sixty-seven of seventy-eight patients (86%) prescribed insulin reported they were adherent all the time; they had lower ratings of the consequences of diabetes and higher perceptions of personal control than less adherent patients ($P < 0.05$). Sixty-two of seventy-three patients (85%) prescribed antihypertensives reported complete adherence; they reported lower perceptions of consequences ($P < 0.001$), fewer symptoms ($P < 0.05$), and lower distress ($P < 0.01$) than those less adherent. Fifty-one of sixty-one patients (90%) prescribed cholesterol pills reported complete adherence; there were no significant differences in perceptions between these and less adherent patients.

Of the total sample, 22% reported complete adherence to diet recommendations. Dietary adherence was associated with perceptions of fewer consequences ($r = -0.22$, $P < 0.01$), higher personal control ($r = 0.34$, $P < 0.001$), higher treatment control ($r = 0.20$, $P < 0.05$), fewer symptoms ($r = -0.28$, $P < 0.001$), lower emotional representations ($r = -0.24$, $P < 0.05$), and the belief that diet management could help diabetes ($r = 0.23$, $P < 0.01$). Of the total sample, 17% reported complete adherence to exercise regimes. Exercise adherence was associated with higher perceptions of personal control ($r = 0.20$, $P < 0.05$), illness coherence ($r = 0.18$, $P < 0.05$), perceptions that exercise could help diabetes ($r = 0.30$, $P < 0.001$) and prevent heart problems ($r = 0.21$, $P < 0.05$).

A multiple regression with type 1 diabetic patients found insulin adherence explained 24% of the variance in HbA_{1c}; personal control and identity explained an additional 15%, $F(3,33) = 6.46$, $P = 0.002$. Higher adherence and perceived personal control were related to better blood glucose control. For type 2 diabetic patients, being prescribed insulin and blood pressure medication explained 19% of the variation in HbA_{1c}; the addition of consequences and perceived control explained a further 6%; $F(4,97) = 7.80$, $P < 0.001$. Not being prescribed insulin, being prescribed blood pressure pills, and higher perceived personal control were related to better blood glucose control.

CONCLUSIONS—This study increases our understanding of patients' medication perceptions. Patients ranked medication as the most important component of their treatment for diabetes; they rated insulin more helpful for diabetes than both diet and exercise. This was consistent with higher self-reported adherence for every medication compared with diet and exercise. Insulin, antihypertensives, and cholesterol medication were seen as differentially helpful for diabetes and for preventing heart disease, indicating that patients hold specific beliefs about each medication type in ways that make intuitive sense.

Medication adherence was associated with lower perceived consequences of diabetes, higher personal control, lower distress, and fewer symptoms. Consistent with previous research, exercise and diet adherence were related to specific beliefs about the helpfulness of exercise and diet, respectively (4). There was no evidence that specific medication beliefs were linked to adherence to specific medications. However, only a portion of the sample was prescribed each medication, so the power to detect differences in perceptions between adherent and nonadherent patients was reduced. Future research should recruit a larger sample to further investigate associations between adherence and specific medication beliefs.

The results suggest that in clinical practice adherence may be improved by altering patients' illness and treatment perceptions. Interventions to change illness perceptions have been shown to improve outcomes in heart attack patients and their spouses (8–10). The first intervention trial to investigate the effects of changing illness perceptions in poorly controlled diabetic patients is underway (11).

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References

1. Ho PM, Rumsfeld JS, Masoudi FA, et al. Effect of medication nonadherence on hospitalization and mortality among patients with diabetes mellitus. Arch Intern Med 2006;166:1836–1841
2. Cramer JA. A systematic review of adherence with medications for diabetes. Diabetes Care 2004;27:1218–1224
3. Harvey JN, Lawson VL. The importance of health belief models in determining self-care behaviour in diabetes. Diabet Med 2009;26:5–13
4. Glasgow RE, Hampson SE, Strycker LA, Ruggiero L. Personal-model beliefs and social-environmental barriers related to diabetes self-management. Diabetes Care 1997;20:556–561
5. Broadbent E, Petrie KJ, Main J, Weinman J. The brief illness perception questionnaire. J Psychosom Res 2006;60:631–637
6. McNabb WL. Adherence in diabetes: can we define it and can we measure it? Diabetes Care 1997;20:215–218
7. Griva K, Myers LB, Newman S. Illness perceptions and self efficacy beliefs in

adolescents and young adults with insulin dependent diabetes mellitus. Psychol Health 2000;15:733–750
8. Broadbent E, Ellis CJ, Thomas J, Gamble G, Petrie KJ. Can an illness perception intervention reduce illness anxiety in spouses of myocardial infarction patients? A randomized controlled trial. J Psychosom Res 2009a;67:11–15
9. Broadbent E, Ellis CJ, Thomas J, Gamble G, Petrie KJ. Further development of an illness perception intervention for myocardial infarction patients: a randomized controlled trial. J Psychosom Res 2009b; 67:17–23
10. Petrie KJ, Cameron LD, Ellis CJ, Buick D, Weinman J. Changing illness perceptions after myocardial infarction: an early intervention randomized controlled trial. Psychosom Med 2002;64:580–586
11. Keogh KM, White P, Smith SM, McGilloway S, O'Dowd T, Gibney J. Changing illness perceptions in patients with poorly controlled type 2 diabetes, a randomised controlled trial of a family-based intervention: protocol and pilot study. BMC Fam Pract 2007;8:36