Misconceptions About Diabetes and Its Management Among Low-Income Minorities With Diabetes

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OBJECTIVE — To determine diabetic patients’ knowledge and beliefs about the disease and medications that could hinder optimal disease management.

RESEARCH DESIGN AND METHODS — A cross-sectional survey of 151 type 2 diabetic patients characterizing diabetes knowledge and beliefs about the disease and medications conducted.

RESULTS — Mean diabetes duration was 13 years. Over half of the patients (56%) believed that normal glucose is ≤ 200 mg/dl, 54% reported being able to feel when blood glucose levels are high, 36% thought that they will not always have diabetes, 29% thought that their doctor will cure them of diabetes, one in four (23%) said there is no need to take diabetes medications when glucose levels are normal, and 12% believed they have diabetes only when glucose levels are high.

CONCLUSIONS — Diabetes knowledge and beliefs inconsistent with a chronic disease model of diabetes were prevalent in this sample. Suboptimal knowledge and beliefs are potentially modifiable and are logical targets for educational interventions to improve diabetes self-management.

Here has been growing interest in understanding how patient beliefs about their disease and its treatment affect disease management (1–3). The purpose of this study was to identify suboptimal disease, medication, and monitoring knowledge and beliefs that may be a barrier to effective self-management among inner-city diabetic patients.

RESEARCH DESIGN AND METHODS — Study participants were recruited (response rate 87%) through the computerized registration system at a large general medicine clinic in New York City during 2007. All English- or Spanish-speaking adults with type 2 diabetes for > 6 months treated with medication were eligible. Sociodemographic factors, diabetes history, and comorbidities were self-reported, whereas A1C was ascertained using electronic medical record review. In a face-to-face interview, beliefs about the chronicity, cause, consequences, and controllability of diabetes were measured based on self-regulation theory and the Brief Illness Perception Questionnaire (2, 4). Medication beliefs were assessed using five items adapted from the Beliefs about Medicines Questionnaire (5). Additional questions assessed difficulty in taking diabetes medications, perceptions of low and high glucose, and familiarity with the A1C test.

Analysis
The χ² tests were used to identify demographic and medical characteristics associated with beliefs regarding disease and medication. Logistic regression was used to determine predictors of such beliefs after multivariable adjustment for characteristics with at least one statistically significant association in univariate analysis.

RESULTS — The 151 study subjects were predominantly Latino (58%) and African American (34%), with low income (89% <$30,000 per year). Participants had long-standing diabetes (mean 13 years), and 55% were using insulin. Mean A1C was 7.6%, although 25% had an A1C > 8.5%.

Knowledge and beliefs
Misconceptions about diabetes were common. Twelve percent of the sample believed that they have diabetes only when their glucose levels are high, and 36% said that they will not always have diabetes. More than half (56%) thought that the glucose levels are not high until they reach > 200 mg/dl, and 42% thought that a glucose level of 110 mg/dl is too low. Over half of the participants (54%) thought that they can feel when the glucose levels are high, and 29% expected a doctor to cure them of diabetes. Nearly half (49%) thought that the consequences of diabetes are minimal, that they have little control over diabetes, and that diabetes has few symptoms. Only one-third (37%) of subjects had heard of the A1C test. Among these patients, only 18% knew the recommended target A1C. Twenty-three percent thought that they do not need to take medication if blood glucose levels are normal. Thirty-nine percent were very worried about side effects of their diabetes medications, 16% were worried about becoming addicted to them, and 18% said that they were hard to take.

Predictors of knowledge and beliefs
Insulin use and higher mean A1C were associated with several suboptimal disease and medication beliefs (Table 1). The univariate testing demonstrated that insulin use, mean A1C, oral diabetes medication use, sex, and education had at least one significant relationship to a poor disease or medication belief. In a multivariable-adjusted model including these covariates, participants with less than a high school education were more likely...
Patient misconceptions about diabetes

Table 1—Knowledge and beliefs about diabetes and its management

| Disease knowledge and beliefs                                      | Using insulin (%) | Not using insulin (%) | P   | Belief present (%) | Belief absent (%) | P     |
|-------------------------------------------------------------------|-------------------|-----------------------|-----|-------------------|------------------|-------|
| Have diabetes only when glucose is high                           | 12                | 12                    | 0.94| 8.1               | 7.6              | 0.11  |
| Can feel when glucose is high                                     | 62                | 45*                   | 0.03| 7.9               | 7.3              | 0.03* |
| Will not always have diabetes                                     | 32                | 42                    | 0.19| 7.6               | 7.6              | 0.53  |
| Consequences of diabetes are low                                  | 43                | 55                    | 0.13| 7.4               | 7.9              | 0.05* |
| Have low control over diabetes                                    | 51                | 48                    | 0.73| 7.9               | 7.3              | 0.01* |
| Symptoms of diabetes are minimal                                  | 48                | 51                    | 0.70| 7.6               | 7.5              | 0.17  |
| Diabetes significantly interferes with social life                | 27                | 30                    | 0.63| 7.7               | 7.6              | 0.32  |
| Doctor will cure diabetes                                         | 24                | 35                    | 0.16| 8.1               | 7.4              | 0.02* |
| Glucose is high only when >200 mg/dl                              | 61                | 51                    | 0.21| 8.0               | 7.2              | <0.01*|
| Glucose is low when <110 mg/dl                                    | 56                | 59                    | 0.69| 7.7               | 7.5              | 0.19  |
| Treatment knowledge and beliefs                                    |                   |                       |     |                   |                  |       |
| Not important to take medication when glucose is normal           | 28                | 17                    | 0.12| 8.1               | 7.5              | 0.02* |
| Have heard of A1C test                                            | 43                | 29                    | 0.07| 7.9               | 7.5              | 0.09  |
| Worried about side effects of diabetes medications                | 40                | 38                    | 0.80| 7.9               | 7.4              | 0.03* |
| Worried about addiction to diabetes medications                   | 13                | 19                    | 0.36| 7.8               | 7.6              | 0.27  |
| Diabetes medications are hard to take                             | 24                | 10*                   | 0.02| 8.4               | 7.4              | <0.01*|

*P < 0.05

Disease knowledge and beliefs

Conclusions — Our findings demonstrate that patients with diabetes, despite having long-standing disease and regular outpatient diabetes care, frequently hold beliefs regarding disease and medication that are inconsistent with a chronic disease model of diabetes. Insulin use and worse A1C levels were associated with higher rates of several of these beliefs, as were female sex, lower education levels, and oral medication use, suggesting a potential need for additional attention when treating diabetic patients with these characteristics. The newly observed misconceptions and related predictors may represent important opportunities for targeting barriers to successful diabetes management.

Furthermore, patients displayed unrealistic expectations of treatment, as exemplified by the finding that one-third expected their doctor to cure them of diabetes. Most of the patients were unaware of the A1C test. Equally troubling is the fact that half of the patients thought that a glucose level up to 200 mg/dl is normal, and 42% stated that the glucose level up to 110 mg/dl is too low. These frequent misconceptions may be even more prevalent and have a greater effect in populations with more limited access to care and more poorly controlled A1C levels than those observed in this population.

Diabetes is a complex disease that involves monitoring of multiple indexes, assessment of risk factors, and, frequently, multiple medications. As noted in other studies, misconceptions and inadequate knowledge represent significant barriers to effective management (6–8). However, there has been limited research examining how behavioral theory–driven assessments of patients’ knowledge and beliefs about the disease and its treatment relate to successful diabetes management, particularly among inner-city adults with long-standing diabetes.

In summary, we found that disease and medication beliefs inconsistent with a chronic disease model of diabetes were common among urban minorities with diabetes despite long-standing disease and regular medical care. These misconceptions may be logical targets for interventions to improve diabetes self-management in lower-income, minority populations.

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References

1. Halm EA, Mora P, Leventhal H: No symptoms, no asthma: the acute episodic disease belief is associated with poor self-management among inner-city adults
with persistent asthma. *Chest* 129:573–580, 2006

2. Leventhal H, Diefenbach M, Leventhal E: Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognit Ther Res* 16:143–163, 1992

3. Horne R, Weinman J: Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *J Psychosom Res* 47:555–567, 1999

4. Broadbent E, Petrie KJ, Main J, Weinman J: The Brief Illness Perception Questionnaire. *J Psychosom Res* 60:631–637, 2006

5. Horne R, Weinman J, Hankins M: The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol Health* 14:1–24, 1999

6. Searle A, Wetherell MA, Campbell R, Dayan C, Weinman J, Vedhara K: Do patients' beliefs about type 2 diabetes differ in accordance with complications: an investigation into diabetic foot ulceration and retinopathy. *Int J Behav Med* 15:173–179, 2008

7. Aikens JE, Piette JD: Diabetic patients' medication underuse, illness outcomes, and beliefs about antihyperglycemic and antihypertensive treatments. *Diabetes Care* 32:19–24, 2009

8. Lawson VL, Bundy C, Lyne PA, Harvey JN: Using the IPQ and PMDI to predict regular diabetes care-seeking among patients with Type 1 diabetes. *Br J Health Psychol* 9:241–252, 2004