

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 was 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.

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There 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 χ^2 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. 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

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Table 1—Knowledge and beliefs about diabetes and its management

	Using insulin (%)	Not using insulin (%)	P	Mean A1C		P
				Belief present (%)	Belief absent (%)	
Disease knowledge and beliefs						
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*

* $P < 0.05$.

(odds ratio 2.3 [95% CI 1.0–5.2]) to believe that they have diabetes only when the glucose levels are high. Insulin users were more likely (2.9 [1.2–7.9]) to report being able to feel high glucose levels and to report that diabetes significantly disrupted their social life (4.2 [1.2–14.0]) but less likely to report believing that their doctor can cure diabetes (0.4 [0.2–0.9]). Patients taking oral medications were more likely to believe that the consequences of diabetes are limited (4.7 [1.6–13.4]) and to report that diabetes significantly disrupted their social life (7.8 [2.2–27.7]) but less likely to believe that it is not important to take medication when glucose levels are normal (0.3 [0.1–0.8]). Patients with higher A1C (per unit increase) were more likely to report feeling little control over their diabetes (1.3 [1.0–1.6]), to report believing that their doctor can cure diabetes (1.3 [1.1–1.7]), to consider a glucose level up to ≤ 200 mg/dl within normal limits (1.3 [1.0–1.7]), to believe that it is not important to take medication when the glucose levels are normal (1.3 [1.0–1.6]), and to believe that their diabetes medications were hard to take (1.4 [1.1–1.8]). Women were more likely to report that diabetes significantly disrupted their social life (2.3 [1.0–5.3]).

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 also 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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