THE RELIABILITY OF THE DIABETES CARE PROFILE FOR AFRICAN AMERICANS

The Diabetes Care Profile (DCP) is an instrument used to assess social and psychological factors related to diabetes and its treatment. The reliability of the DCP was established in populations consisting primarily of Caucasians with type 2 diabetes. This study tests whether the DCP is a reliable instrument for African Americans with type 2 diabetes. Both African American (n = 511) and Caucasian (n = 235) patients with type 2 diabetes were recruited at six sites located in the metropolitan Detroit area. Scale reliability was calculated by Cronbach's coefficient alpha. The scale reliabilities ranged from .70 to .97 for African Americans. These reliabilities were similar to those of Caucasians, whose scale reliabilities ranged from .68 to .96. The Feldt test was used to determine differences between the reliabilities of the two patient populations. No significant differences were found. The DCP is a reliable survey instrument for African American and Caucasion patients with type 2 diabetes.

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D iabetes is a prevalent and costly disease in the United States (Rubin & Peyrot, 1992). In 1993, there were 7.8 million diagnosed cases of diabetes in the United States (National Center for Health Statistics, 1994). The cost of managing this disease is enormous. According to the 1992 National Medical Expenditure Survey, more than $100 billion is spent annually in the United States on medical care for people with diabetes (Rubin & Peyrot, 1992). Diabetes is a disease in which the body cannot use glucose properly. Diabetes is the leading cause of blindness, lower extremity amputations, and kidney disease requiring dialysis (National Diabetes Data Group, 1995). However, the Diabetes Control and Complications Trial established that some of the most serious microvascular complications of diabetes (i.e., vision loss and blindness, kidney damage, and neuropathy) can be delayed and/or prevented (Diabetes Control and Complications Trial Research Group, 1993). There are two types of diabetes: insulin-dependent diabetes mellitus, or type 1 diabetes (usually occurring in children), and non-insulin-dependent diabetes mellitus, or type 2 diabetes (usually occurring in older adults). Type 2 is the most prevalent type of diabetes and is managed through diet, exercise, pills, and/or daily insulin injections. As such, patient self-care is crucial in the treatment regime. Understanding the psychosocial factors that influence diabetes self-care behavior is an initial step in developing strategies to help prevent these debilitating complications. This is particularly important for minority populations, who are at higher risk for diabetes and its complications.

DIABETES IN AFRICAN AMERICANS

The African American population suffers from a higher incidence of diabetes and a higher rate of complications due to diabetes. The prevalence of diagnosed diabetes in African Americans has tripled during the past 30 years, with diagnosed diabetes in adults 1.4 times as frequent in African Americans as in Caucasians. A greater prevalence occurs for both African American men and African American women compared to their Caucasian counterparts. The same factors associated with diabetes in other populations are associated with the high frequency of diabetes in African American populations; these

factors include obesity, physical inactivity, insulin resistance, and genetic factors. Data on the frequency of diabetes complications in African Americans are limited, but they indicate that this population experiences considerable morbidity and an excess frequency for many diabetic complications (Tull & Roseman, 1995).

In the state of Michigan (the location of this study), African Americans are 60% more likely to have diagnosed diabetes than Caucasians. It is estimated that 66,600 African Americans in Michigan have diabetes (Michigan Department of Community Health, 1996).

HEALTH BEHAVIOR AND DIABETES

Health behavior and patient adherence to a prescribed treatment are multifaceted and complex. Nonetheless, both must be better understood if diabetes care is to improve. The social and psychological factors important in a patient's adjustment to diabetes and its treatment may influence an individual's ability and willingness to provide this self-care (Glasgow & Osteen, 1992; Rubin & Peyrot, 1992). Better understanding of the influence of these factors may result in more effective educational programs and materials.

DIABETES AND CULTURE

The reasons for the higher prevalence of type 2 diabetes and its complications in African Americans are complex and not fully understood. There is apparently an interaction among behavioral, cultural, and genetic factors; however, the relative impact each of these factors has on diabetes prevalence, health behavior, and health outcomes is not clear. African Americans are distinct in some behavioral/cultural factors important in the management of diabetes. In dietary patterns, African Americans have a lower fiber intake and a higher consumption of high-fat foods than Caucasians (Block & Lanza, 1987; Block & Subar, 1992; Borrud, McPherson, Nichaman, Pillow, & Newell, 1989). In the area of exercise, the self-reported rates of exercise are higher for young African American men than for young Caucasian men. However, as these groups age, the decline in exercise rates is greater for African American males, so that by ages 45 to 65, fewer

African American men report exercising than Caucasian men. Among women, African Americans report lower rates of exercise than Caucasians at all age levels (Schoenborn, 1988).

How people perceive their ability to control their lives or fate affects their health behavior. Members of minority groups, especially older people, have been found to exhibit a more a fatalistic or helpless attitude; that is, external factors have a great influence on their lives (Hussey & Gilliland, 1989; Parks & Newtons, 1986). In a clinic study of low-income African American patients, 69% of the sample reported having family members with diabetes. Most of the patients recalled that their relatives did not follow their self-care programs, developed complications, and eventually died of diabetes or related factors (Hopper, 1981). A more recent study of African American women with type 2 diabetes (Schocken, Declue, & Malone, 1991) found that the great majority of the women did not believe that diabetes was an illness needing attention, most thought that pills would cure the diabetes with no additional management necessary, and almost 90% believed that diabetes went away as the symptoms were relieved.

A special supplement to *Diabetes Care* concerning "Diabetes in Black Populations" stated that

> if we are ineffective in sensitizing communities and educating them about the seriousness of diabetes, and if community and cultural barriers to such efforts are not appropriately identified and accommodated (and this will take some focused well-funded research), then we will ultimately fail in attempts to curb the impact of this most debilitating disease. (Gavin & Goodwin, 1990, p. 1141)

The development and validation of assessment tools that are reliable across cultural groups is necessary to help us understand the differential impact of diabetes on diverse cultural groups. Health beliefs and health behavior are influenced by cultural and socioeconomic factors (Friedman, 1990). The relationship of culture to health beliefs and health behavior is especially important in the treatment of diabetes, which usually involves changing patterns of eating, physical activity, and other culturally embedded behaviors. If diabetes treatment recommendations are to be effective, they must be sensitive and relevant to the cultures of the people who are expected to carry them

out (Anderson et al., 1991). The Diabetes Care Profile (DCP) is an instrument that assesses the social and psychological aspects of diabetes and its management. It has been used for the most part with Caucasian patients. As we began our studies comparing and contrasting the perceptions and self-care behaviors of African Americans and Caucasians regarding diabetes, we were cautioned by our cultural consultants not to assume that the wording of items would have the same meaning for both groups. Accordingly, we could not assume that the psychometric properties of the DCP would be the same for African Americans as for Caucasians. This study was carried out to determine if the DCP would be equally reliable for African Americans and Caucasians. To further explore the appropriateness of the DCP for African Americans, we examined the mean differences of the scales as a function of ethnicity.

We also examined the impact of diabetes treatment type—that is, patients using insulin and patients not using insulin—on the DCP scale scores. Patients not using insulin have a less severe form of diabetes than patients using insulin. For example, previous studies have found that patients using insulin had higher blood glucose levels as indicated by their glycosylated hemoglobin scores, had diabetes longer, and had more than twice as many diabetes-related complications as patients who did not use insulin (Hiss, 1996; Hiss, Anderson, Hess, Stepien, & Davis, 1994). In addition, the relationship between severity of disease and quality of life for insulin users has been strongly indicated in previous studies (Anderson, Fitzgerald, Wisdom, Davis, & Hiss, 1997). We anticipated that scale scores would differ by treatment regime.

RESEARCH QUESTIONS

The study addresses the following questions:

1. Are the DCP scale scores reliable, that is, are the responses to the individual scale items internally consistent for African American and Caucasian patients with diabetes?
2. Do the DCP scale scores differ for African American and Caucasian patients with type 2 diabetes?

3. Do the DCP scale scores differ for individuals with type 2 diabetes using insulin and individuals with type 2 diabetes not using insulin?

METHODS

THE DIABETES CARE PROFILE

We collected data using the DCP, an instrument that assesses social and psychological factors related to diabetes and its treatment (Fitzgerald et al., 1996). The DCP's reliability and validity were established in two studies with separate populations, both predominately Caucasian. Cronbach's alpha coefficients for the DCP scales ranged from .60 to .95 in one population and from .66 to .94 in the other (Fitzgerald et al., 1996). The interpretation of the endpoints, the number of items, and a sample item from each scale are provided in Table 1 for 16 DCP scales. These scales assess patients' diabetes attitudes (e.g., the Positive Attitude and the Support Attitude scales), diabetes beliefs (e.g., the Importance of Care and the Long-Term Benefits scales), reported adherence to diabetes self-care (e.g., the Self-Care Adherence and the Diet Adherence scales), and the difficulties of diabetes self-care (e.g., the Medical Barriers and the Exercise Barriers scales).

SAMPLE

Participants were recruited at six sites located in the metropolitan Detroit area: a suburban endocrinology clinic, two urban endocrinology clinics, an urban diabetes clinic, a suburban private practice, and an urban diabetes educational program. Data were collected from June 1993 to January 1996. While waiting for scheduled appointments, adult clinic patients were asked if they had diabetes. Those who answered yes were asked to complete the DCP. If a participating patient's appointment began before he or she had completed the DCP, the patient was asked to finish the questionnaire at his or her convenience and mail it to the Michigan Diabetes Research and Training Center in an addressed, stamped envelope provided by our staff.

TABLE 1

Scoring and Sample Items for the Diabetes Care Profile Scales

Diabetes Care Profile Scale	Scoring Good to Poor	Number of Items	Sample Item
Control problems	1 to 5	19	During the past year, how often have you had changes in your blood sugar (too high) because you were sick or had an infection?
Social and personal factors	1 to 5	13	How often has your diabetes kept you from doing your normal daily activities during the past year?
Positive attitude	5 to 1	5	I feel satisfied with my life.
Negative attitude	1 to 5	6	I am afraid of my diabetes.
Self-care ability	5 to 1	4	I am able to keep my blood sugar in good control.
Importance of care	5 to 1	4	I think it is important for me to keep my blood sugar in good control.
Self-care adherence	5 to 1	4	I keep my blood sugar in good control.
Diet adherence	5 to 1	4	(If told to diet) How often do you follow a meal plan or diet?
Medical barriers	1 to 5	8	How often do you change the timing and/or dose of your insulin or diabetes pills because you missed an earlier dose?
Exercise barriers	1 to 5	5	How often do you have trouble getting enough exercise because you are too busy?
Monitoring barriers	1 to 5	11	When you don't test for sugar as often as you have been told, how often is it because you forgot?
Understanding management practice	5 to 1	10	How do you rate your understanding of diet and blood sugar control?
Long-term care benefits	5 to 1	5	Taking the best possible care of diabetes will delay or prevent eye problems.
Support needs	5 to 1[a]	6	I want a lot of help and support from my family and friends in following my meal plan.
Support	5 to 1	6	My family and friends help and support me a lot to follow my meal plan.
Support attitudes	5 to 1	6	My family and friends accept me and my diabetes.

a. There is no preferred score for the Support Needs Scale; the scale is an assessment (5 = *needing more support* and 1 = *needing less support*).

The overall response rate was 66%; among the six sites, the rates ranged from a low of 56% to a high of 79%. Twenty-four questionnaires were returned incomplete (less than half of the questions answered) and were not entered into the database. Twenty-five patients described themselves as other than African American or Caucasian and were excluded from the study.

Because there were few patients with insulin-dependent diabetes mellitus ($n = 17$), these patients were dropped from these analyses.

STATISTICAL METHODS

The difference between African Americans and Caucasians in age and in the number of years since their diabetes was diagnosed was evaluated by t tests. Chi-square analyses were used to evaluate differences in gender distribution, treatment type, and education.

Scale reliability was determined with Cronbach's coefficient alpha, using the standardized scores. The Feldt test (with a Bonferroni adjustment for multiple statistical tests, $p = .003$) was used to determine if the individual scale reliabilities differed between the two patient populations.

Two-way analysis of variance was used to evaluate the main effects of ethnicity, treatment type, and their interaction.

RESULTS

DEMOGRAPHICS

In this patient population, the Caucasians were older, had been diagnosed with diabetes for a longer period of time, and had more formal education than the African Americans (see Table 2).

SCALE RELIABILITIES

Scale reliabilities by patient group are presented in Table 3. The scale reliabilities for the Caucasian patients ranged from .68 to .96

TABLE 2
Demographics

	African Americans n = 511	Caucasians n = 235	p
Women	58%	56%	.62
Age (mean ± SD)	61 ± 13	64 ± 14	.01
Diabetes type and treatment			.27
Insulin dependent	2%	3%	
Noninsulin dependent using insulin	53%	46%	
Noninsulin dependent not using insulin	45%	51%	
Years since diagnosis (mean ± SD)	12 ± 9	14 ± 11	.01
12 or more years of formal education	56%	68%	.03

(with an average and standard deviation of .84 ± .09), whereas the scale reliabilities for the African American patients ranged from .70 to .97 (with the identical average and standard deviation of .84 ± .09). No significant differences were found between the reliabilities of the 16 scales, that is, no significance level ≤ .003.

SCALE SCORES BY ETHNICITY AND TREATMENT TYPE

Scale scores for African American and Caucasian patients are presented in Table 4. Scale scores by treatment type are presented in Table 5. A significant interaction effect between ethnicity and treatment type was indicated for the Control Problems Scale, the Positive Attitude Scale, and the Negative Attitude Scale. Ethnicity had a significant main effect for only three scales, Monitoring Barriers, Support, and Support Attitudes. There was no significant main effect for ethnicity for the remaining scales.

A significant main effect for treatment type was indicated for nine scales Control Problems, Social & Personal Factors, Positive Attitude, Negative Attitude, Self-Care Ability, Importance of Care, Exercise Barriers, Support Needs, and Support Attitudes. For the remaining scales, there was no significant main effect for treatment type.

TABLE 3
Scale Reliabilities (standardized item alpha)

Scale Name	African American		Caucasian		p [a]
	Alpha	(n)	Alpha	(n)	
Control problems	.89	(89)	.91	(30)	.272
Social and personal factors	.91	(365)	.91	(189)	.495
Positive attitude	.78	(444)	.82	(214)	.048
Negative attitude	.76	(418)	.79	(209)	.138
Self-care ability	.74	(459)	.78	(221)	.079
Importance of care	.94	(482)	.94	(229)	.495
Self-care adherence	.74	(427)	.77	(203)	.160
Diet adherence	.85	(301)	.85	(132)	.492
Medical barriers	.77	(321)	.83	(162)	.015
Exercise barriers	.79	(361)	.78	(189)	.352
Monitoring barriers	.80	(243)	.71	(131)	.007
Understanding management practice	.95	(283)	.93	(150)	.008
Long-term care benefits	.97	(458)	.96	(220)	.006
Support needs	.94	(317)	.94	(152)	.494
Support	.93	(324)	.92	(155)	.161
Support attitudes	.70	(416)	.68	(213)	.289

a. Feldt test.

DISCUSSION

The DCP is a reliable instrument for both African American and Caucasian patients with diabetes. The coefficient alphas were above .70 for all scales except one (.68 for Support Attitudes for the Caucasian patients). Furthermore, the reliabilities of the two patient groups were similar; no significant differences were found for the 16 scales.

Although the results of the two-way analyses of variance varied by scale, the influence of insulin use on DCP scale scores was quite consistent. For the scales of Social & Personal Factors, Self-Care Ability, Importance of Care, Exercise Barriers, and Support Needs, insulin use had a significant main effect. The scores indicate that patients with type 2 diabetes using insulin report that diabetes has a greater impact on their life, feel less able to care for their diabetes, think self-care is less important, have more barriers to exercise, and have more support needs than patients not using insulin.

TABLE 4
Diabetes Care Profile Scales Means
for Patients With Type 2 Diabetes by Ethnicity

Scale Name	African Americans Mean ± SD (n)		Caucasians Mean ± SD (n)		p^a
Control problems	1.9 ± .7	(319)	2.0 ± .6	(129)	.07[b]
Social and personal factors	2.5 ± .8	(400)	2.5 ± .8	(194)	.95
Positive attitude	3.2 ± .8	(436)	3.1 ± .8	(207)	.57[b]
Negative attitude	2.5 ± .8	(432)	2.5 ± .8	(203)	.39[b]
Self-care ability	3.1 ± .8	(430)	3.1 ± .8	(209)	.75
Importance of care	4.3 ± .7	(442)	4.3 ± .6	(211)	.80
Self-care adherence	3.2 ± .8	(441)	3.3 ± .8	(210)	.65
Diet adherence	2.9 ± .9	(360)	2.9 ± .9	(165)	.87
Medical barriers	1.3 ± .5	(313)	1.4 ± .5	(154)	.98
Exercise barriers	2.0 ± .9	(355)	2.1 ± .9	(181)	.39
Monitoring barriers	1.5 ± .6	(234)	1.4 ± .5	(124)	.05
Understanding management practice	3.4 ± .9	(304)	3.5 ± .9	(151)	.51
Long-term care benefits	4.3 ± .8	(426)	4.3 ± .7	(203)	.91
Support needs	3.5 ± 1.2	(353)	3.4 ± 1.1	(175)	.23
Support	3.7 ± 1.0	(365)	3.5 ± 1.0	(179)	< .01
Support attitudes	4.0 ± .6	(393)	3.8 ± .6	(197)	.02

a. F ratio probability for the main effect of ethnicity.
b. A significant interaction effect was indicated for ethnicity and treatment type, $p > .05$.

Overall, ethnicity was much less influential on the DCP scales. An ethnicity main effect was found for the Monitoring Barriers and the Support scales (the sole significant effect). African American patients reported having more problems monitoring their diabetes and received more support from family and friends than Caucasian patients. For the Support Attitudes Scale, a main effect was found for both treatment type and ethnicity. African American patients and patients not using insulin had more positive attitudes about their support.

Interpretation of the two-way analyses of the three DCP scales (Control Problems, Positive Attitude, and Negative Attitude) with a significant interaction effect is more complex. To better understand these interaction effects, the scale means for the four patient groups (African Americans using insulin, African Americans not using insulin, Caucasians using insulin, and Caucasians not using insulin) are

TABLE 5
Diabetes Care Profile Scale Means by Treatment Type

Scale Name	Type 2 Using Insulin		Type 2 Not Using Insulin		p^a
	Mean ± SD	(n)	Mean ± SD	(n)	
Control problems	2.0 ± .7	(243)	1.8 ± .6	(205)	< .01[b]
Social and personal factors	2.6 ± .8	(302)	2.4 ± .8	(292)	< .01
Positive attitude	3.1 ± .8	(326)	3.2 ± .8	(317)	.01[b]
Negative attitude	2.5 ± .8	(322)	2.4 ± .8	(313)	< .01[b]
Self-care ability	3.0 ± .8	(326)	3.2 ± .8	(313)	< .01
Importance of care	4.3 ± .6	(336)	4.4 ± .7	(317)	.04
Self-care adherence	3.2 ± .8	(337)	3.3 ± .8	(314)	.09
Diet adherence	2.9 ± .9	(283)	2.8 ± .8	(242)	.19
Medical barriers	1.4 ± .5	(285)	1.3 ± .5	(182)	.16
Exercise barriers	2.1 ± .9	(264)	1.9 ± .9	(272)	.01
Monitoring barriers	1.5 ± .5	(228)	1.4 ± .5	(130)	.24
Understanding management practice	3.4 ± .9	(241)	3.4 ± .9	(214)	.68
Long-term care benefits	4.3 ± .7	(323)	4.3 ± .7	(306)	.70
Support needs	3.6 ± 1.2	(274)	3.3 ± 1.1	(254)	< .01
Support	3.7 ± 1.1	(283)	3.6 ± 1.0	(261)	.13
Support attitudes	3.9 ± .6	(300)	4.0 ± .6	(290)	.04

a. F ratio probability for the main effect of treatment type.
b. A significant interaction effect was indicated for ethnicity and treatment type, $p > .05$.

displayed in Figure 1. The graph indicates that the differences in the scale scores are much more pronounced between the two Caucasian patient groups than between the two African American patient groups. Caucasians not using insulin reported having the fewest problems with control, the most positive attitudes, and the least negative attitudes about their diabetes. The reverse was reported by the Caucasians using insulin: They had the most control problems and had the least positive and the most negative attitudes about their diabetes.

The results of the two-way analyses of variance suggest that for patients with type 2 diabetes, insulin use has a greater impact socially and psychologically than does ethnic background.

The finding that the DCP is a reliable instrument for both African Americans and Caucasians also has significant implications because the development of separate survey measures for each and every cultural group with diabetes would involve a tremendous amount of
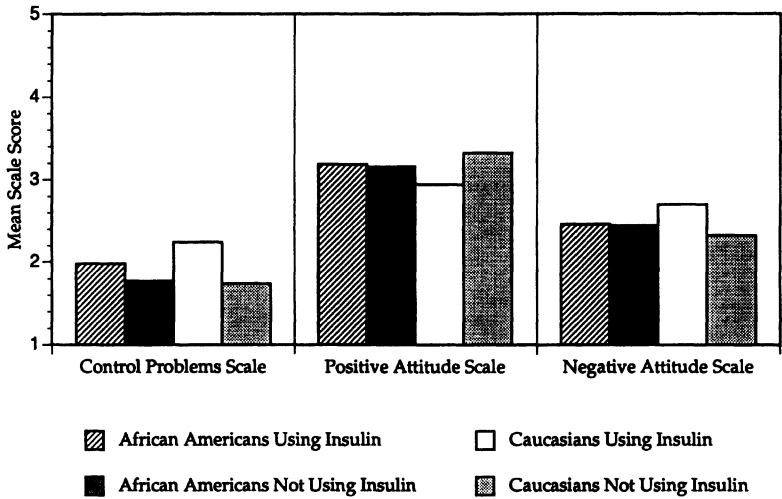
Figure 1: Diabetes Care Profile Scales With an Interaction Effect (Ethnicity × Treatment Type for Patients With Type 2 Diabetes)

time, effort, and expense; it would also preclude between-culture comparisons. These findings will have to be replicated using other instruments and other cultural groups as well.

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