The Short-Term Impact of a Continuing Medical Education Program on Providers' Attitudes Toward Treating Diabetes

LISA K. SHARP, PHD
MARTIN S. LIPSKY, MD

OBJECTIVE — The objective of this study was to evaluate the short-term impact of a 7-h type 2 diabetes continuing medical education (CME) program. Outcomes included a measure of health care providers' diabetes knowledge and the Diabetes Attitude Scale (DAS), a validated measure of attitudes toward diabetes.

RESEARCH DESIGN AND METHODS — A CME program on type 2 diabetes was presented by an expert panel in Chicago during November 1998. A before–after trial with pre- and postintervention measurements of diabetes knowledge and attitudes toward diabetes was administered as part of the program. A convenience sample of the 129 health care providers in attendance resulted in 91 (71%) completed pre- and postintervention surveys.

RESULTS — Within-subjects analysis revealed increases in knowledge and more favorable attitudes toward diabetes after the program. Between-subjects analysis revealed that attitude changes differed for physicians as compared with allied health care providers.

CONCLUSIONS — A CME program was associated with an increase in knowledge of diabetes and more favorable attitudes toward diabetes as measured by the DAS. The DAS changes were subtly different for the physician group as compared with the allied health care provider group. These results suggest that the DAS can be a useful instrument for measuring the short-term impact of educational interventions.

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Diabetes is the seventh leading reason for visits to primary care health settings (1) and is an important cause of morbidity and mortality (2). It is estimated that close to $100 billion is spent annually in the U.S. on diabetic health care (3). In an attempt to standardize and improve treatment of diabetes, the American Diabetes Association (ADA) and other health agencies have recommended guidelines for treating patients with diabetes (4). Studies indicate that health care providers fall far short of translating these guidelines into clinical practice (5–10) despite documented evidence that improved glycemic control and other clinical interventions can improve outcomes for patients with diabetes (11,12).

Designed to update and disseminate new information to clinicians, continuing medical education (CME) is one potential mechanism for closing the gap between evidence-supported practice and those practices actually taking place (13). Outcome research on CME programs generally indicates that they effectively increase participants' knowledge (14). However, there is little evidence that traditional CME programs change physician behavior (14). One possible explanation is that virtually no research has explored attitude change as an outcome measure for CME. In health care delivery for a disease like diabetes, attitudes appear to be particularly important and may be a better predictor than knowledge for physician behavior (15).

The theory of reasoned action (16) provides a framework for understanding why attitudes are such a critical factor. The theory of reasoned action posits that attitudes toward a behavior mediate knowledge and action (16). To illustrate, a health care provider may know that tight glycemic control will lessen the risk of diabetes complications. However, prior experiences with nonadherent patients, poor success in motivating patients to change behaviors, and a lack of confidence in one's ability to effect behavioral change may foster unfavorable attitudes toward treating diabetes. In such a case, the provider is unlikely to adhere to guidelines or to pursue tight glycemic control despite knowing the benefit of lower HbA_{1c}.

Exploring the impact of a CME program on attitudes toward treating diabetes should provide initial insight into the relationship between CME and diabetic care. Specifically, this study sought *1*) to examine whether health care providers report short-term attitude change after a CME program and *2*) to compare the various attitudes of physicians and allied health care providers attending a CME program on diabetes.

RESEARCH DESIGN AND METHODS

— A multicomponent CME program on type 2 diabetes was conducted in Chicago during November 1998. A total of 129 health care providers throughout Illinois, Indiana, and Wisconsin attended the CME program in response to mailed brochures, and complete data were collected from 91 (71%) of the participants.

From the Department of Family Medicine, Northwestern University Medical School, Chicago, Illinois.
Address correspondence and reprint requests to Lisa K. Sharp, PhD, Department of Family Medicine, Northwestern University Medical School, Morton Building 1-658, 303 East Chicago Ave., Chicago, IL 60611. E-mail: l-sharp@nwu.edu.
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Abbreviations: ADA, American Diabetes Association; CME, continuing medical education; DAS, Diabetes Attitude Scale; NDEI, National Diabetes Education Initiative.
A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

Table 1—*Comparison of sample demographics by physician versus allied providers*

Demographics	Physicians	Allied providers
Sex*		
Female	23	31
Male	33	3
Years in practice†	22.0 ± 11.0	9.2 ± 10.8
Outpatients seen per week†	80.0 ± 39.0	37.0 ± 34.0
Hours in outpatient office per week†	31.6 ± 12.2	23.0 ± 19.4
Number of patients seen per week with type 1 diabetes†	6.1 ± 6.2	2.6 ± 4.0
Number of patients seen per week with type 2 diabetes	15.4 ± 14.5	15.3 ± 17.0
Patient population treated		
Pediatrics (<19 years old) (%)	15	11
Adults (19–65 years old) (%)	52	45
Geriatrics (>65 years old) (%)	33	44

Data are means ± SD or %. *One physician failed to identify sex. †$P \leq 0.05$.

The program, certified for 7 h of CME credit, was provided by the National Diabetes Education Initiative (NDEI) of Physicians World Communications Group. The curriculum was developed by a group of physicians and educators specializing in diabetology, endocrinology, and primary care. Five members of the NDEI National Faculty presented the program, which was composed of five 30-min didactic presentations with 10-min interactive question-and-answer periods after each presentation, two 30-min problem-focused small group learning experiences, and a 45-min lunch. Institutional review board approval was obtained before initiation of this study.

Attendees were approached for participation as they registered. No incentives were offered in exchange for participation. Consenting participants completed and returned a demographic and prestudy questionnaire before entering the seminar room. The poststudy questionnaire was collected at the end of the CME program. Total time to complete pre- and poststudy measures was ~30 and 15 min, respectively.

Diabetes knowledge was assessed by the extent to which participants agreed with seven treatment-related statements. The statements were drawn from published literature and ADA guidelines. Responses were based on a 5-point Likert scale ranging from 1 to 5 (strongly disagree to strongly agree).

Attitudes toward diabetes and patients with diabetes were measured using the Diabetes Attitude Scale (DAS) (17), which was administered before and after the intervention. The DAS is a 31-item self-report instrument empirically derived using the Delphi process (18) and a national panel of 17 diabetes experts (17,18). The DAS has a Cronbach α reliability of 0.78 (17) and comprises eight scales measuring attitudes

Table 2—*Comparison of preintervention and postintervention knowledge scores for the entire sample and by groups*

Knowledge question	Entire sample (n = 89)	Physicians (n = 55)			Allied providers (n = 34)		
	Change	Preintervention	Postintervention	Change	Preintervention	Postintervention	Change
1. All oral agents used to treat type 2 diabetes are equally effective.	0.4 ± 1.3	2.3 ± 1.0	2.6 ± 1.1	0.3 ± 1.1	2.1 ± 0.9	2.5 ± 1.4	0.4 ± 1.6
2. Diabetes is a progressive disease that requires increasing numbers of therapies or doses of agents to control it over time.	0.7 ± 1.2*	3.7 ± 1.1	4.3 ± 0.9	0.5 ± 1.2*	3.3 ± 1.3	4.3 ± 0.6	1.0 ± 1.2*
3. It is not important for people with diabetes to maintain HbA_{1c} levels of ≤7%.	−0.4 ± 1.7	2.3 ± 1.4	2.1 ± 1.5	−0.2 ± 1.6	2.2 ± 1.4	1.6 ± 1.1	−0.6 ± 1.9
4. Clinicians should not be concerned about insulin-resistant patients since they do not have frank diabetes.	−0.1 ± 1.0	1.8 ± 0.9	1.8 ± 1.1	−0.1 ± 1.2	1.4 ± 0.5	1.3 ± 0.5	−0.1 ± 0.4
5. It is better for the patient's long-term health to allow glucose to rise with age rather than increase dosages or numbers of agents.	−0.2 ± 0.9	1.9 ± 0.8	1.7 ± 1.0	−0.1 ± 1.0	1.9 ± 0.8	1.6 ± 0.7	−0.3 ± 0.9
6. The progressive worsening of type 2 diabetes over time (as the patient ages) cannot be avoided.	0.3 ± 1. 0	2.4 ± 1.1	2.5 ± 1.3	0.1 ± 1.2	2.4 ± 1.0	2.9 ± 1.2	0.5 ± 1.6
7. Insulin-sensitizing oral agents offer significant advantages to patients with type 2 diabetes when used alone or in combination with sulfonylureas or insulin.	0.3 ± 0.9†	4.0 ± 0.9	4.4 ± 0.7	0.3 ± 1.0	4.2 ± 0.5	4.4 ± 0.7	0.2 ± 0.7

Data are means ± SD. *$P \leq 0.001$ for change from preintervention to postintervention scores. †$P \leq 0.005$ for change from preintervention to postintervention scores.

Table 3—*Comparison of preintervention and postintervention DAS scores for physicians and allied health care providers*

	Physicians (n = 57)			Allied providers (n = 34)		
DAS Scale	Preintervention	Postintervention	Change	Preintervention	Postintervention	Change
Special training	4.39 ± 0.46*	4.55 ± 0.47	0.15 ± 0.30†	4.72 ± 0.28*	4.76 ± 0.35	0.04 ± 0.29
Control/complications	4.43 ± 0.52	4.71 ± 0.38	0.27 ± 0.52†	4.42 ± 0.57	4.75 ± 0.38	0.32 ± 0.43†
Patient autonomy	2.77 ± 0.82*	3.28 ± 0.82‡	0.53 ± 0.93†	3.61 ± 0.79*	4.07 ± 0.72‡	0.47 ± 0.59†
Compliance	2.37 ± 0.81*	2.34 ± 0.80‡	−0.02 ± 0.57	3.39 ± 0.76*	3.39 ± 0.90‡	0.00 ± 0.64
Team care	4.10 ± 0.71	4.32 ± 0.70‡	0.19 ± 0.72	4.42 ± 0.52	4.68 ± 0.42‡	0.30 ± 0.57†
NIDDM	3.04 ± 0.58	3.21 ± 0.61	0.13 ± 0.66	3.19 ± 0.49	3.40 ± 0.50	0.20 ± 0.59
Difficult to treat	3.32 ± 0.86	3.28 ± 0.74	−0.02 ± 0.78	3.09 ± 0.68	3.01 ± 0.66	−0.08 ± 0.57
Outpatient education	3.43 ± 0.84	3.43 ± 0.86	0.03 ± 0.74	3.47 ± 0.78	3.51 ± 0.85	−0.03 ± 0.84

Data are means ± SD. *$P \leq 0.005$ for differences in preintervention scores of physicians versus nonphysicians. †$P \leq 0.001$ for change from preintervention to postintervention scores. ‡$P \leq 0.006$ for differences in postintervention scores of physicians versus nonphysicians.

in the areas of *1*) special training (i.e., counseling and communication skills), *2*) control/complications (i.e., importance of tight glucose control), *3*) patient autonomy (i.e., patient as decision maker), *4*) compliance (i.e., commitment of patient), *5*) team care (i.e., efficacy of team care), *6*) NIDDM (i.e., seriousness of type 2 diabetes), *7*) difficult to treat (i.e., frustration with treating diabetes), and *8*) outpatient education (i.e., setting for patient education). Responses are based on a 5-point Likert scale ranging from 1 to 5 (strongly disagree to strongly agree). The DAS has been shown to be sensitive to attitude change in medical students after special training on diabetes (19).

Nonparametric statistics were used because of the distribution of the data. The within-subjects analysis included a Wilcoxon's signed-rank test of two-related samples on the pre- and poststudy measures. A between-group analysis included the Mann-Whitney *U* test for independent samples to compare physicians and allied health care providers. The probability cutoff level for detecting significance was set at $\alpha \leq 0.006$ based on a Bonferroni correction for multiple comparisons given an initial $\alpha \leq 0.05$.

RESULTS

Sample and practice characteristics

Both the pre- and poststudy questionnaires were completed by 91 (71%) of the 129 health care providers in attendance. Table 1 lists the sample characteristics grouped by physicians and allied health care providers. The allied providers consisted of nurse practitioners (21%), physician assistants (10%), nurses (5%), and other (2%).

The number of patients with type 1 diabetes seen by the providers differed significantly. Physicians reported seeing an average of 6.1 ± 6.2 (SD) patients with type 1 diabetes per week, and allied health care providers reported seeing an average of 2.6 ± 4.0 per week. Physicians and allied health care providers reported seeing similar numbers of patients with type 2 diabetes. The number of people with diabetes seen per week was not related to preintervention attitudes toward diabetes for either group.

Prestudy and poststudy analyses of knowledge

As shown in Table 2, the within-subjects analyses detected significant mean differences on two diabetes knowledge questions: *1*) diabetes is a progressive disease that requires increasing numbers of therapies or doses of agents to control it over time ($P \leq 0.001$), and *2*) insulin-sensitizing oral agents offer significant advantages to patients with type 2 diabetes when used alone or in combination with sulfonylureas or insulin ($P < 0.005$).

Prestudy and poststudy analyses of attitudes

The within-subjects analyses identified significant differences on four DAS scales: special training ($P < 0.001$), patient autonomy ($P < 0.001$), team care ($P < 0.001$), and control/complications ($P < 0.001$). As shown in Table 3, before the intervention physicians had lower scores than allied health care providers on three scales: special training ($P < 0.001$), patient autonomy ($P < 0.001$), and compliance ($P < 0.001$). Despite the physicians' initial lower scores, both groups experienced similar amounts of attitude change after the intervention on all eight scales. Physicians' DAS scores after the intervention remained lower than allied health care providers on three scales: patient autonomy ($P < 0.001$), compliance ($P < 0.001$), and team care ($P < 0.005$).

Discussion

Overall, the CME program was associated with improved scores on the knowledge and attitude questionnaires. The results suggest that CME programs may be an effective means of altering health care providers' attitudes toward treating diabetes in the short term. Attitude change differed in subtle ways for physicians compared with the allied health care providers. Both groups reported significant attitude change toward the need to control serum glucose (i.e., control/complications scale) and accepting the patient as an active part of treatment (i.e., patient autonomy scale). However, physicians reported more change in their attitudes toward communication and counseling skills in patient care (i.e., special training scale), whereas allied health care providers reported strengthened attitudes toward the need for collaborative team care of patients (i.e., team care scale).

Consistent with other studies (20), physicians' reported less favorable attitudes than allied providers on three scales prior to the CME program: *1*) special training scale, *2*) patient autonomy scale, and *3*) compliance scale. After the intervention, physicians and allied health care providers continued to differ on scales measuring patient autonomy and compliance. However, they more closely agreed on the need for special training in communication and counseling skills. Allied health care providers believed more strongly in the need for team care of people with diabetes. These findings may have important implications for the doctor-patient relationship and particular relevance for the treatment of diabetes.

Studies suggest glycemic control in patients with diabetes can be significantly improved by increasing patient involvement in medical decisions and improving doctor-patient communication (21,22). Documenting that a CME program can alter attitudes reflective of these issues gives optimism that improved clinical outcomes for patients with diabetes might follow.

CONCLUSIONS — The results of this study are limited in several ways. First, the sample was selected from a single CME program, possibly resulting in selection bias. Compared with an earlier study (18), it appears that physicians in our sample reported significantly less favorable attitudes at baseline on three scales—patient autonomy, compliance, and NIDDM—and allied health care providers in our sample reported less favorable attitudes on the NIDDM scale. These differences in attitudes between the two studies may relate to the fact that the earlier study sampled health care providers who were members of diabetes associations and likely specialized in diabetes. Most of our sample worked in primary care settings; therefore, the results likely reflect the attitudes of nonspecialists.

Second, this study measured short-term changes in attitudes with no long-term follow-up to measure if changes persisted. However, documenting a short-term change in attitudes was a critical first step. A national study is currently underway to replicate this pilot study and to measure the long-term impact of CME.

In conclusion, this study documents the potential for CME to effect short-term attitude change. Attitudes play a critical role in the process of behavior change according to the theory of reasoned action (16). However, further study is needed to document the long-term effect of CME programs in terms of attitudes and behavior change.

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References

1. Marsland DW, Wood M, Mayo F: Content of family practice: Part I. Rank order of diagnoses by frequency. Part II. Diagnoses by disease category and age/sex distribution. *J Fam Pract* 3:37–68, 1976
2. NIDDK: *Diabetes Statistics*. Washington, DC, U.S. Govt Printing Office, 1998 (NIH publ. no. 98-3926)
3. American Diabetes Association: Economic consequences of diabetes mellitus in the US in 1997. *Diabetes Care* 21:296–309, 1998
4. American Diabetes Association: Standards of medical care for patients with diabetes mellitus. *Diabetes Care* 21 (Suppl. 1):S23–S31, 1998
5. Fain JA, Melkus GD: Nurse practitioner practice patterns based on standards of medical care for patients with diabetes. *Diabetes Care* 17:879–881, 1994
6. Weiner JP, Parente ST, Garnick DW, Fowles J, Lawthers AG, Palmer RH: Variation in office-based quality: a claims-based profile of care provided to Medicare patients with diabetes. *JAMA* 273:1503–1508, 1995
7. Tuttleman M, Lipsett L, Harris MI: Attitudes and behaviors of primary care physicians regarding tight control of blood glucose in IDDM patients. *Diabetes Care* 16:765–772, 1993
8. Kenny SJ, Smith PJ, Goldschmid MG: Survey of physicians practice behaviors related to diabetes mellitus in the United States. *Diabetes Care* 16:1507–1510, 1993
9. Jacques CHM, Jones RL, Houts P, Bauer LC, Dwyer KM, Lynch JC, Casale TSM: Reported practice behaviors for medical care of patients with diabetes mellitus by primary-care physicians in Pennsylvania. *Diabetes Care* 14:712–717, 1991
10. Lawler FH, Viviani N: Patient and physician perspectives regarding treatment of diabetes: compliance with practice guidelines. *J Fam Prac* 44:369–373, 1997
11. Diabetes Control and Complications Trial Research Group: The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 329:997–986, 1993
12. Ohkubo Y, Kishikawa H, Araki E, Miyata T, Isami S, Motoyoshi S, Kojima Y, Furuyoshi N, Shichiri M: Intensive insulin therapy prevents the progression of diabetic microvascular complications in Japanese patients with non-insulin-dependent diabetes mellitus: a randomized prospective 6-year study. *Diabetes Res Clin Pract* 28:103–117, 1995
13. Nowlen PM: *A New Approach to Continuing Education for Business and the Professions*. New York, Collier Macmillan, 1988
14. Davis DA, Thomson MA, Oxman AD, Haynes B: Evidence for the effectiveness of CME: a review of 50 randomized controlled trials. *JAMA* 268:1111–1117, 1992
15. Weinberger M, Cohen SJ, Massuca SA: The role of physicians' knowledge and attitudes in effective diabetes management. *Soc Sci Med* 19:965–969, 1984
16. Ajzen I, Fishbein M: Attitude-behavior relations: a theoretical analysis and review of empirical research. *Psych Bull* 84:888–918, 1977
17. Anderson RM, Donnelly MB, Gressard CP, Dedrick RF: Development of diabetes attitude scale for health-care professionals. *Diabetes Care* 12:120–127, 1989
18. Donnelly MB, Anderson RM: The role related attitudes of physicians, nurses, and dieticians in the treatment of diabetes. *Diabetes Care* 28:175–179, 1990
19. Anderson RM, Donnelly MB, Gorenflo DW, Funnell MM, Sheets KJ: Influencing the attitudes of medical students towards diabetes: results of a controlled study. *Diabetes Care* 16:503–505, 1993
20. Anderson RM, Donnelly MB, Davis WK: Controversial beliefs about diabetes and its care. *Diabetes Care* 15:859–863, 1992
21. Greenfield S, Kaplan SH, Ware SE, Yano EM, Frank HJL: Patients' participation inmedical care: effects on blood sugar control and quality of life in diabetes. *J Gen Intern Med* 3:448–457, 1988
22. Uhlmann RF, Inui TS, Pecoraro RE, Carter WB: Relationship of patient request fulfillment to compliance, glycemic control, and other health care outcomes in insulin-dependent diabetes. *J Gen Intern Med* 3: 458–463, 1988