Change in Metabolic Control and Functional Status After Hospitalization

Impact of Patient Activation Intervention in Diabetic Patients

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Objective: To determine whether a short intervention to enhance patient information seeking and decision making during hospitalization results in improved metabolic control and functional status in patients with diabetes mellitus. Research Design and Methods: A randomized clinical trial was conducted in which control patients received a comprehensive 3-day evaluation and educational program, whereas experimental patients received a 45-min patient activation intervention and a 1-h self-administered booster in addition to the program. Metabolic control and functional status were measured at baseline and 4 mo postdischarge. Results: During their discharge discussions, experimental patients asked significantly more questions than control patients (7.4 vs. 3.0, $P < .001$) and 4 mo later reported significantly fewer physical limitations in activities of daily living than the control group ($P = 0.02$). Improvement in metabolic control was statistically significant only for experimental patients ($P = 0.02$), although their glycosylated hemoglobin levels were not significantly lower than control patients' at follow-up. The intervention did not diminish physician satisfaction with patient interactions, although it may have increased physician frustration with responsibilities that competed with patient care. Conclusions: These results suggest that the addition of a patient activation intervention to a comprehensive diabetes management program may substantially enhance physical functioning among adults with diabetes mellitus. ***Diabetes Care*** **14:881–89, 1991**

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Studies of doctor-patient communication demonstrate that physicians and patients follow particular conversational "rules" regarding information exchange during medical visits: physicians identify most of the topics discussed and patients raise comparatively few (1,2). Recognizing that these rules limit the patient's ability to pursue issues of personal relevance, health educators have developed and tested interventions to increase patient participation in the visit (3–5). Carefully controlled clinical trials in outpatient settings with patients treated for ulcers (5), hypertension (6), diabetes (7), and breast cancer (8) demonstrate that increasing patient participation in the visit results in subsequent improvements in biological and psychosocial outcomes. In patients with diabetes, Greenfield et al. (7) demonstrated that 20-min patient activation interventions before clinic visits resulted in an average 1.5% decrease in glycosylated hemoglobin levels and a significant reduction in functional limitations an average of 3 mo postintervention.

Although encouraging, previous studies have left important questions unanswered. First, it is unclear whether the critical ingredient in activation is increased patient information seeking or participation in decision making. It is important to know whether the two components are differentially effective, not only for the design of a parsimonious intervention, but also because patient preferences for involvement in these two areas differ dramatically (9). Second, previous studies have not identified the mechanisms that account for the improvements in metabolic control and functional status. Of particular interest is whether activated patients demonstrate increased comprehension and recall of physician recommendations or whether the improvements are independent of outcomes traditionally viewed as important (10). Third, previous studies have not mea-

sured the impact of increased patient participation on the physician's satisfaction with the encounter. If physicians view patient activation as an impediment to efficient care, there is less likelihood that these interventions could be disseminated. Fourth, because all patient activation research has been conducted in outpatient settings, little is known about how the different organizational characteristics in inpatient units affect the intervention's efficacy.

This investigation addressed these four questions by examining the impact of a patient activation intervention specifically modified for use during a 3- to 4-day hospital admission, testing its effects on both immediate outcomes and longer-term changes in health status.

RESEARCH DESIGN AND METHODS

The study was undertaken in the Clinical Research Center of Washington University during a comprehensive 3.5-day evaluation and treatment program for adult insulin-dependent diabetic and non-insulin-dependent diabetic patients as part of the Diabetes Research and Training Center's model patient care demonstration unit. In the model demonstration unit, a multidisciplinary team of physicians, nurses, and dietitians specializing in diabetes provides comprehensive evaluation and individual/group education to patients from many states across the country. At admission, physicians obtain an extensive medical history and perform a physical examination and battery of tests to evaluate the metabolic control and status of major organ systems commonly affected by diabetes. A certified diabetes nurse educator completes a psychosocial evaluation and conducts group teaching sessions to cover special learning needs, such as accurate blood glucose monitoring. A dietitian reviews diet histories and helps formulate meal plans. All members of the health-care team meet together to coordinate individual assessments. Before discharge, a physician holds an individual consultation with each patient to discuss findings and to make specific recommendations for subsequent care.

Patients admitted to the unit were considered eligible for this study if they *1*) were diagnosed with no life-threatening physical condition or acute psychiatric problem, *2*) had an initial glycosylated hemoglobin level >8 and received a recommendation to improve metabolic control from the treatment team, *3*) were not on an insulin-infusion pump, *4*) had the capacity to read and understand the study questionnaires and educational material, and *5*) indicated it was feasible for them to return to the unit 4 mo postdischarge for a 30-min visit.

The investigation was described to patients and physicians as a study to understand more about how physicians and patients talk to each other when a patient is hospitalized for diabetes. Patients were asked to complete two questionnaires, to permit their admission and discharge discussion with the physician to be audiotaped, and to return for an outpatient visit 4 mo postdischarge in exchange for a gift package of diabetes supplies. Physicians were asked to permit their admission and discharge discussions to be audiotaped and to complete a short questionnaire after each patient's discharge. Physicians remained masked as to which patients would be receiving the intervention and which were serving as control subjects.

Patients were randomly assigned to the intervention group by week of admission to avoid contamination between experimental and control patients who would have otherwise had a chance to interact with each other on the unit. The principal investigator selected intervention and control weeks without knowledge of the identity of patients scheduled for admission. Patients randomized to the experimental group received a two-part intervention adapted from Greenfield and Kaplan (5,6), Greenfield et al. (7), and Kaplan et al. (8). The first component is a 45-min individual session between the nurse and patient the day before the patient is discharged to discuss two dimensions of patient participation in medical care: information seeking and decision making. The nurse reviews the physician's admission notes and laboratory values with the patient and then introduces a decision tree, which diagrams treatment choices in managing various problems related to diabetes. The nurse elicits examples where patients have taken active roles in influencing the course of their care with positive results and examples of past difficulties in communicating with physicians. Common obstacles to active patient participation and strategies to overcome these obstacles are discussed. The nurse closes the session by requesting that patients write down questions for the physician and suggesting that they review the decision diagram to identify treatment decisions they would like to influence.

The second component of the intervention is a 1-h instructional package the patient independently completes at home before his/her next outpatient visit, which addresses the skills introduced in the earlier intervention session. The learning package includes a self-assessment of three question-asking skills patients can use to effectively communicate with their physicians: question construction, question introduction, and question clarification. The self-assessment is followed by three modules that teach each of the skills. The first module contains worksheets to assist patients in formulating questions for their next outpatient visit. The other two modules contain audiotaped segments of a simulated medical visit, demonstrating question introduction and clarification skills, followed by a role play exercise where patients are asked to write down what they would say at particular points in the visit if they were the patient on the audiotape. (Excerpts from the booster on question introduction are included in Appendix 1.) Before the trial began, the package was piloted and revised to ensure that patients understood the

exercises and could complete them successfully. Except for eight duplicate worksheets that they were instructed to mail back, patients kept the learning package, which contained additional worksheets for subsequent outpatient visits.

Patients completed an instrument at admission that collected sociodemographic, health status, and treatment regimen information (11).

Another self-administered instrument, completed at admission and at 4-mo follow-up, provided the patient's assessment of his or her physical and psychological functioning to monitor clinically meaningful changes in the patient's daily living. Questions measuring physical functioning asked how much difficulty subjects had in the past month with 12 activities of daily living, including getting out of a chair, walking several blocks, completing grocery shopping, and managing to clean house. Ten questions measuring psychological functioning asked how much of the time during the past month subjects had felt nervous, depressed, isolated, and irritable. Subjects could score between 0% (minimum functioning) and 100% (maximum functioning) on the physical and psychological subscales. The questionnaire has been construct validated with other health status measures in a population of primary-care patients, including patients with diabetes (12). Internal consistency was 0.96 for the physical functioning subscale and 0.91 for the psychological functioning subscale.

Metabolic control, or the average blood glucose level over the past 8–12 wk, was assessed by a glycosylated hemoglobin assay. This affinity chromatography method is not affected by hemoglobin variants and has a coefficient of variation of 5% and a normal range in nondiabetic subjects of 4.4–6.3% (13). Glycosylated hemoglobin values <8% are interpreted as excellent control, signifying average blood glucose levels <8.4 mM (150 mg/dl), and correspond to HbA_{1c} values <6.7%, as measured in the Diabetes Control and Complications Trial (14).

The frequency of patient information-seeking and decision-making behaviors was determined for all audiotapes of admission and discharge discussions with the following process. First, the principal investigator developed operational definitions for patient information seeking and decision making. Patient information seeking was defined as the frequency of all patient-introduced questions, excluding bids for clarification. Bids for clarification were defined as questions that patients add on to physicians' previous discourse in an attempt to understand information the physician has just relayed; they are conceptually viewed as a marker of communication problems (3,15). Patient decision making was defined as the frequency of patient requests, patient disagreements, and patient interruption of physician to change topic. Second, the authors of the article identified examples of patient information seeking and decision making from their clinical experience. Third, to demonstrate that these patient behaviors could be reliably rated, two of the authors coded 15 randomly selected audiotapes of discharge discussions and demonstrated that in ≥80% of the audiotapes they agreed (±1) on the number of patient questions, requests, interruptions to change topic, and disagreements with the physician. Fourth, one of two coders proceeded to code the remaining discharge audiotapes and all admission audiotapes for these indicators of patient participation. These data were combined with the same coder's estimates of patient information seeking and decision making for the 15 audiotapes coded as part of the reliability analysis. Finally, the coder categorized each patient question in the admission and discharge discussion into one of eight categories: tests and test results, subsequent appointments, medications, diabetes disease process, self-care behavior, insurance/finances, physician's personal life, and other.

Immediately before discharge, patients completed a 17-item patient satisfaction scale consisting of 7 multiple-choice items widely used in previous research (16,17) and 10 Likert scale items from the Society of General Internal Medicine's Collaborative Study on Communication Dynamics (18). Internal consistency for the 17 items in this sample was 0.86. The scale was scored so that high scores indicated greater satisfaction.

Patients completed an eight-item five-point scale at discharge that measured their perceptions of specific doctor-patient behaviors that occurred during hospitalization. The study used two subscales (patient information seeking and patient decision making) of a scale that had been previously construct validated with conceptually overlapping health attitudinal scales and correlated with a reduction in patient concerns (19). Internal consistency was 0.73 for the patient information subscale in the sample and 0.67 for patient decision making. The subscales were scored so that high scores indicated greater perceived involvement.

Patient recall of medication and self-care recommendations was assessed immediately before discharge. Patients were asked to list the type of insulin or oral agent prescribed in addition to the schedule and amount. They also listed recommendations regarding blood glucose monitoring frequency and daily calorie intake. Pilot testing indicated that recommendations regarding exercise were not charted consistently enough to determine what recommendation was actually made. The diabetes nurse specialist (masked to the patient's responses) reviewed the chart at discharge and completed a parallel instrument, which was used to judge the accuracy of patient responses.

Because patients were participating in a larger longitudinal study, physicians systematically recorded the results of the examination and testing, noting whether patients had symptoms of proliferative retinopathy and peripheral neuropathy.

For patients taking insulin at admission, the total number of units of insulin the patient reported taking each day before the hospitalization was compared with the

number of units prescribed at discharge. Patients were categorized as *1*) decrease of >20%, *2*) decrease of ≤20%, *3*) no change, *4*) increase of ≤20%, and *5*) increase of >20%, including patients who were advised to start insulin during hospitalization.

Physician satisfaction with the patient's hospitalization was measured the day of discharge by adapting 15 five-point encounter-specific items from the Shore and Franks (20) measure. Nine items measured interpersonal satisfaction and 6 items measured satisfaction with the context of care. Interpersonal satisfaction items asked physicians to judge whether they were emotionally comfortable, satisfied, disappointed, frustrated, and appreciated in their interactions with each patient. Contextual satisfaction asked physicians to judge the degree to which they felt too busy, noticed other things were on their mind, were having a terrible day, or felt things were going smoothly. Both subscales were scored so that high scores indicated greater satisfaction. Internal consistency was 0.91 for interpersonal satisfaction and 0.68 for contextual satisfaction.

Sample size and power calculations. Because previous studies had shown that the intervention had a stronger effect on improving functional status than it did in enhancing metabolic control, power calculations were performed to determine the sample size needed to demonstrate the effect of the intervention on metabolic control posthospitalization (7). A sample size of 30 subjects/group was chosen after power analysis indicated 28 subjects/group provided an 80% probability of detecting a 1.5% difference in glycosylated hemoglobin levels at follow-up between experimental and control patients, which previous tests of the intervention had demonstrated (7).

TABLE 1
Characteristics of patients recruited into study

	Control (n = 31)	Experimental (n = 30)
Sociodemographic characteristics		
Age (yr)	40.6 ± 13.6	40.0 ± 16.2
Education (yr)	12.8 ± 2.2	13.5 ± 2.0
Women (%)	63.3	56.7
Employed outside home (%)	54.8	50.0
Health status characteristics		
Diagnosed before age 30 yr (%)	54.8	62.1
Insulin therapy (%)	90.3	86.7
Oral therapy (%)	12.9	13.3
Percent ≥20% ideal body weight	64.5	40.0
Mean baseline glycosylated hemoglobin	13.6 ± 3.6	13.1 ± 3.4
Proliferative retinopathy (%)	16.1	34.5
Peripheral neuropathy (%)	54.8	42.9
Mean functional status		
Physical	86.6 ± 20.1	90.6 ± 15.2
Psychological	71.6 ± 17.2	75.5 ± 13.6
Hospitalization characteristics		
Mean number of questions patient asked physician during admission interview	2.2 ± 4.2	1.5 ± 1.5
Mean admission interview length (min)	32.4 ± 18.9	32.1 ± 18.2
Previously admitted (%)	80.0	73.1
Patients whose insulin was increased (%)	55.0	43.5

Values are means ± SD.

RESULTS

Sixty-one of 67 patients who met eligibility criteria for the study agreed to participate. Patients randomized into the experimental and control groups did not significantly differ in any sociodemographic, health status, or hospitalization characteristic summarized in Table 1. Most patients had one or more diabetes-related complications relevant to their physical functioning; nearly half had symptoms of peripheral neuropathy, and a quarter had proliferative retinopathy. Seventy-three percent had been previously admitted to the model demonstration unit, indicating that most had already had exposure to multidisciplinary educational efforts. Compared with diabetes registry patients hospitalized during the same period who were not recruited into the study, subjects had significantly higher glycosylated hemoglobin values (13.2 vs. 12%, $P < 0.05$) and were significantly younger (40.6 vs. 46.3 yr, $P < 0.03$). There were no significant differences in education and sex.

All physicians of patients recruited into the study agreed to participate. Twenty-two physicians participated, including endocrinology fellows and internal medicine residents. Post hoc questioning indicated that physicians remained masked to the intervention: only 2 of 22 physicians identified the study-involved patient question asking.

Does intervention result in more active patient participation during discharge discussions? Because of irregular physician schedules, 85% of the 61 admission discussions (n = 52) and 69% of the discharge discussions (n = 42) were successfully audiotaped. There was no significant difference in whether the admission or discharge discussion was audiotaped between experimental and control groups. There was also no significant difference between experimental and control groups in the number of questions asked during the admission interview with the physician or interview length; all three decision-making behaviors were too infrequent in the intake interview to code. In examining the 37 patients whose admission and discharge discussions were audiotaped, experimental patients asked significantly more questions at discharge than control patients (7.8 vs. 3.1). This difference is highly significant, with analysis of covariance controlling for the number of questions the patient asked at admission (F = 18.41, $P < 0.001$). This

increase in total questioning reflected the additional questions experimental patients asked about the disease process and test results (3.8 in the experimental group vs. 1.4 in the control group, $P < 0.002$). Questions regarding medication and self-care were comparable in both groups (2.2 questions in experimental group vs. 1.1 in control group, $P > 0.10$). There was a trend for experimental patients to demonstrate more decision-making behaviors in the discharge interview than control patients (2.4 vs. 0.9, respectively, $P = 0.08$). Not surprisingly, discharge discussions between patients and physicians were significantly longer in the experimental than control group (14 vs. 9.1 min, $P < 0.05$). Experimental and control patients reported no significant difference in their involvement in information seeking or decision making at discharge.

Does intervention affect recall and satisfaction? The intervention did not significantly enhance patient recall of discharge recommendations for diabetes medicines, blood glucose monitoring, or calorie intake. Recommendations for insulin and oral medications were correctly recalled by 61.7% of the patients. The frequency of blood glucose monitoring was correctly recalled by 83.3% of the patients and calorie intake by 88.6%. A single recall measure was created to discriminate between subjects who had perfect recall of recommendations regarding diabetes medication, blood gluose monitoring, and calorie intake (57.4%) from patients who made a recall error (42.6%) in one or more area. χ^2 Analysis indicated that there was no difference between experimental and control subjects on this composite measure of recall.

In contrast to much of the research in outpatient settings, patients expressed a considerable range of satisfaction about their hospitalization (mean ± SD 26.4 ± 7.5, range 18–59). It was, however, not significantly related to their experimental condition in unpaired t testing (27.4 vs. 25.5 in experimental and control patients, respectively, $P > 0.10$).

Physicians completed encounter-specific satisfaction questionnaires for 59 of 61 patients in the study, allowing the investigators to compare physician satisfaction between 28 experimental and 31 control encounters. Physicians seeing experimental patients reported identical scores as those seeing control patients on interpersonal satisfaction. There was a trend ($P = 0.09$) for physicians seeing experimental patients to report more dissatisfaction with the context of care than physicians seeing control patients.

Does intervention affect functional status and metabolic control 4 mo postdischarge? Fifty of 61 patients (82%) returned for follow-up 4 mo postdischarge. The dropout rate did not differ between the experimental and control groups, and dropouts did not differ from those who returned on any sociodemographic, health, or communication characteristics (Table 1). Estimates of metabolic control were not available for 2 of 50 patients who returned for follow-up due to errors in processing; however, additional data on metabolic control were collected for 4 patients who failed to return for follow-up. These 4 patients had laboratory records of a glycosylated hemoglobin value taken as part of their outpatient care ±1 mo of their scheduled follow-up.

Paired t tests indicated that the experimental group's decrease in glycosylated hemoglobin values from 13 to 11.8% was statistically significant ($t = 2.46$, $P < 0.02$), whereas the decrease in the control group's glycosylated hemoglobin values from 13.5 to 12.4% was not. However, the analysis of covariance comparing between-group differences adjusted for baseline values was not significant (Table 2).

To examine whether the intervention improved physical and emotional functional status, the investigators used analysis of covariance to compare mean follow-up differences between experimental and control groups adjusted for baseline scores on each measure. These analyses indicated that experimental patients reported significantly better physical functioning than control patients ($F = 5.63$, $P = 0.02$). The patient activation intervention adapted for the hospital setting did not appear to affect psychological functioning at 4-mo follow-up.

Additional analyses were conducted to determine

TABLE 2
Effect of intervention on metabolic control and functional status at 4-mo follow-up

	Experimental (n = 23)		Control (n = 29)		
	Baseline	Follow-up	Baseline	Follow-up	F*
Glycosylated hemoglobin	13.0 ± 3.5	11.8 ± 3.0†	13.5 ± 3.6	12.4 ± 3.3	0.25 (df = 2,49)
Functional status					
Physical functioning	89.5 ± 16.7	94.0 ± 12.3	85.4 ± 20.9	84.9 ± 20.7	5.63 (df = 2,44)‡
Psychological functioning	77.9 ± 12.7	76.9 ± 16.5	71.5 ± 16.8	73.2 ± 17.9	0.36 (df = 2,44)

Data are means ± SD.

*F values from analyses of covariance are reported for mean differences between experimental and control groups after intervention adjusted for scores on each measure before intervention.

†Experimental group's follow-up values significantly lower than baseline levels by paired t test, $P = 0.02$.

‡Experimental group significantly higher than control group at follow-up by analysis of covariance, $P = 0.02$.

TABLE 3
Patient predictors of glycosylated hemoglobin level at baseline and 4 mo postdischarge

	Baseline	Follow-up*
Sociodemographic characteristics		
Age	−0.19	−0.18
Education	−0.18	0.02
Sex	SIG†	NS
Hours employed outside home	0.22‡	0.15
Health characteristics at baseline		
Diagnosis before age 30 yr	SIG§	NS
Body mass index	0.04	0.35‖
Functional status		
Physical	−0.31¶	−0.01
Psychological	−0.39‖	0.03
Hospitalization characteristics		
Number of diabetes questions patient asked during discharge**	−0.24	−0.28‡
Perceived information seeking	0.10	−0.30¶
Number of decision-making behaviors patient displayed during discharge**	−0.16	0.02
Perceived decision making	−0.10	0.07
Patient recall of treatment recommendations	NS	NS
Patient satisfaction with hospitalization	0.03	−0.18
Change in insulin dose††	0.32¶	0.01

*Correlations between baseline predictors and 4-mo outcomes have controlled for variance due to baseline glycosylated hemoglobin level.
†Women had higher baseline glycosylated hemoglobin values than men by unpaired t test (14.1 vs. 12.1%, $P = 0.02$).
§Patients diagnosed after age 30 yr had significantly lower glycosylated hemoglobin levels at baseline by unpaired t test (12 vs. 14.3%, $P = 0.006$).
**Correlations based on 35 because not all patients were audiotaped.
††Correlations based on 43 due to missing data.
†$P < 0.10$, ¶$P < 0.05$, ‖$P < 0.01$.

baseline predictors of metabolic control at admission and at 4 mo postdischarge (Table 3). Because baseline glycosylated hemoglobin levels were strongly correlated with 4-mo levels ($r = 0.67$, $P < 0.001$), partial correlations controlling for baseline levels were calculated to examine continuous predictors of long-term metabolic control. Parallel analyses were conducted to explore dichotomous sociodemographic, health, and hospitalization characteristics, with the use of analysis of covariance to control for baseline glycosylated hemoglobin levels.

These analyses indicated that the strongest predictors of initial glycosylated hemoglobin levels were patient reports of their physical ($P = 0.05$) and psychological ($P = 0.005$) functional status over the past month. In addition, women had significantly higher initial glycosylated hemoglobin values than men at admission (14.1 vs. 12.1%, $P = 0.02$). Patients diagnosed after age 30 yr had significantly lower glycosylated hemoglobin levels than patients diagnosed earlier (12 vs. 14.3%, $P = 0.01$).

Significant predictors of metabolic control at 4 mo shift dramatically. Heavier patients demonstrate worse metabolic control ($P < 0.01$). Patients who perceive that they were successful in question asking during hospitalization also show improved metabolic control at follow-up ($P = 0.05$). Insulin change was nonsignificantly related to glycosylated hemoglobin levels at 4 mo.

CONCLUSIONS

This controlled clinical trial demonstrates that a patient activation intervention adapted for use in the hospital setting resulted in improved physical functioning among patients with diabetes 4 mo after discharge. These findings corroborate improvements in functional status after patient activation reported by Kaplan and Greenfield (5,6), Greenfield et al. (7), and Kaplan et al. (8) in diabetes, ulcer, hypertension, and breast cancer outpatients. Improved functional status is a clinically important outcome particularly in diabetes, where longitudinal community studies have demonstrated that after controlling for disease severity, the impact of diabetes on day-to-day functioning is one of the strongest predictors of 5-yr survival (21).

The experimental group showed significant improvements in their metabolic control at follow-up, whereas the control group did not. Experimental patients' 1.2% improvement in metabolic control at 4 mo compares favorably with the 1.9% improvement in patients randomized to intensive therapy in the Diabetes Control and Complications Trial demonstrated at 3 mo (22). However, because between-group differences at follow-up were not significant, this improvement cannot be solely attributed to the intervention. The improvement in the control group (although not significant) did diminish the power of the study to find a difference, a design problem other investigators have not encountered in patient activation research where control patients demonstrated worse metabolic control over time.

These findings have important implications for further research and clinical application. First, the data suggest that successful information seeking in this population is more strongly related to subsequent metabolic control than patient decision making. If future investigators replicate these findings, a shorter intervention focused on question asking might be more effective in improving outcomes.

Second, we were unable to find evidence that activated patients were more successful in recalling their treatment recommendations, suggesting that the functional status improvements did not result from increased patient understanding of professional advice. Further

conceptualization of alternative visit outcomes appears warranted if we are to better understand how patient activation impacts subsequent health status.

Third, proponents of patient activation who meet with skepticism should be encouraged that physicians did not report less satisfaction with their interactions with activated patients. The intervention may have increased physician frustration over competing responsibilities, because providers spent additional time with actively participating patients.

Fourth, perhaps most important, the characteristics of the health-care setting clearly modify the effect of the intervention. In an outpatient setting, experimental patients do not ask significantly more questions, and their visits are of comparable length (7). In a hospital setting where patients are treated by a multidisciplinary team, experimental patients ask the physician significantly more questions, and their discharge discussions average 5 min longer. Not only does the setting appear to influence the number of questions activated patients ask, but it also influences the type of questions they introduce. Experimental patients in this study made significantly more inquiries about the technical aspects of diabetes. The information they received apparently provided them with the perspective to reassess the impact of the disease on their physical functioning. However, experimental patients did not ask significantly more questions about medication or self-care. The intervention encouraged patients to ask questions that the physician could answer with an extensive knowledge of the clinical features of their disease and a very limited knowledge of their personal situation. This suggests that the intervention translated for use in the teaching hospital setting may not have resulted in experimental patients receiving better targeted information than the control group about how to achieve metabolic control.

The results of this study suggest that future investigations of patient activation develop a component of the intervention to increase patient questioning about medication and self-care behavior to maximize the intervention's effect on subsequent metabolic control. A second area for further investigation is the development of a component to increase meaningful doctor-patient discussion about emotional issues related to diabetes, particularly because of the strong relationship between psychological functioning and initial levels of metabolic control. The intervention, as we implemented it, resulted in patients asking few if any questions in this area, despite their reports of considerable distress. A third area to investigate in larger samples is whether patient activation interventions are differentially effective in women and men.

Creative incorporation of patient activation in ongoing diabetes education programs across various settings can provide patients the skills and encouragement to direct the discussion during the medical visit to problems they are experiencing when they manage their disease day to day. The incorporation of patient activation interventions into inpatient diabetes education programs is clearly warranted given the results of this study and others (5–8). In addition, experimental studies have already demonstrated that these interventions are also effective in outpatient settings (7). The self-instruction program tested in this study (Feeling Better About Your Medical Visit) can be easily disseminated to patients participating in outpatient diabetes education programs. Diabetes educators can also distribute worksheets from the package (or worksheets that they design locally) to assist patients in formulating questions before each visit.

The authors acknowledge several limitations regarding the study. First, the small sample size, necessitated by the need for extensive data collection, limited the power of the study and may have resulted in erroneously concluding that relationships do not exist when in fact they do, particularly regarding metabolic control. The second limitation is that because of research demands, we chose a setting where patients entered the hospital on an elective (rather than emergency) basis under the care of a physician in training (rather than their regular physician). Although this limitation makes it unwise to generalize our conclusions across all hospital settings, the findings are probably most relevant for hospital admissions where diabetic patients receive extensive testing. Without actively participating in their medical care, these patients run the risk of misinterpreting test results to conclude they have more extensive physical limitations than they may.

In summary, this study is a promising demonstration that a short intervention added to a comprehensive diabetes education program results in improved functional status 4 mo after discharge. Increased emphasis on patient question asking about medication and self-care may be needed for patient activation to further improve metabolic control in inpatient settings.

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APPENDIX 1
Excerpts from self-administered patient activation booster: question introduction

	How much of the time do you do this?					
	All	Most	Good bit	Some	Little	None
Do you ask the doctor to suggest a good time to ask questions during the visit?	6	5	4	3	2	1
Do you tell the doctor beforehand you have a certain number of questions to discuss?	6	5	4	3	2	1
Do you repeat your question if the doctor doesn't answer you the first time?	6	5	4	3	2	1
Do you mentally check to make sure you have asked everything you want to know while there is still time left to ask questions?	6	5	4	3	2	1

If your total score is >20 on these 4 questions, you have developed a special talent in getting the doctor to address your individual concerns during the visit. You recognize that you generally will not accomplish your goals for the medical visit unless you directly tell the doctor what those goals are. Scoring high in this area probably means you do well in preparing your questions. Check to make sure you also score high on Getting Better Answers, because asking the doctor questions that come up on the spur of the moment sometimes flusters even the best-prepared patient. The person who scores low on this section may have good questions but fails to ask them. This happens because there is no "best time" in the visit to introduce questions. This confusion makes people afraid of interrupting the doctor when they want to know something. People who are good at introducing their questions tell us that the approaches explained in Getting Your Questions Asked work well for them.

EXCERPTS FROM ROLE PLAY

Getting doctors to address your individual concerns during the visit takes practice before it feels natural. To help you practice, we have created a tape of imaginary conversation between doctors and patients.

Visit 1 is a conversation where a patient uses some tried and true ways to ask his doctor some questions. In visit 2, we ask you to pretend you are the person talking to the doctor. At specific points during the visit, we ask you to stop the tape recorder and write down what you think the best response is. We have created a conversation where there are no right or wrong answers, although some choices may get a better result than others. Use the style that you think would work best for you. We prepared Getting Your Questions Asked—What's Your Line? on the next page for you to write down word for word what you would say at these particular points in the visit.

Visit 3 is another conversation between a doctor and patient. Note that this patient has a little harder time because his questions are tougher and the doctor does not give him much of a chance. Visit 4 is your turn to talk to this doctor (we have all seen somebody like him). Again, we ask you to pretend you are a patient of his with a hard question to ask. During visit 4, we ask that you stop the tape recorder at particular points in the visit and write down what you think the best response is.

Get a pen or sharp pencil and turn the page to Getting Questions Asked—What's Your Line? to record your answers during visit 2. Get comfortable, turn on the tape, and you are ready to begin.

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