A High Level of Patient Activation Is Observed But Unrelated to Glycemic Control Among Adults With Type 2 Diabetes

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Abstract

Objective. To measure patient activation and its relationship to glycemic control among adults with type 2 diabetes who had not participated in a formal diabetes self-management education program as a baseline assessment for tailoring diabetes education in a primary care setting.

Research design and methods. Patient activation was assessed in a stratified, cross-sectional study of adults with controlled (n = 21) and uncontrolled (n = 27) type 2 diabetes, who were receiving primary care at a unique family practice center of Baylor Health Care System in Dallas, Tex.

Results. The mean patient activation was 66.0 (95% confidence interval [CI] 60.8–71.2) among patients with uncontrolled diabetes and 63.7 (55.9–71.5) among those with controlled diabetes (P = 0.607). A significant association was observed between the self-management behavior score and activation among patients whose glycemia was under control (ρ = 0.73, P = 0.01) as well as among patients with uncontrolled glycemia (ρ = 0.48, $P < 0.001$).

Conclusions. Although activation is correlated with self-management and may be important in tailored patient-centered approaches to improving diabetes care outcomes, the highest stage of activation may be necessary to achieve glycemic control. These findings reinforce the importance of conducting prerequisite needs assessments so diabetes educators are able to tailor their educational interventions to individual patients' needs and readiness to take action.

Today's health care practice extols the importance of shared decision making between providers and patients in developing regimens of care that fit patients' values, beliefs, and preferences as well as their stage of readiness to make the changes necessary to manage their condition.[1] This patient-centered approach is exemplified by diabetes self-management education (DSME) programs[2,3] and is more commonly referred to as empowerment. Empowerment is defined as ". . . helping the patient discover and develop the inherent capacity to be responsible for one's own life."[4,5] DSME programs have the implicit or explicit goal of empowering patients to realize their inherent abilities to effectively self-manage, make better informed decisions as actively engaged diabetes care team members, and, as a result, achieve sustainable glycemic control. Embedded in the measure of empowerment are two key domains of effective self-management: personal expertise about diabetes and psychosocial skills necessary to develop successful self-help plans.[6]

Although sharing common domains of empowerment as well as encompassing the broader concept of patient-centeredness, the newer patient activation measurement (PAM) focuses on patients' self-confidence and abilities to effectively self-manage.[7] PAM measures patients' knowledge, skills, and confidence to self-manage their health and suggests that people with chronic illnesses progress

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through four levels of activation en route to becoming effective self-managers.[7] Patient activation (PA) has been shown to be related to certain self-management behaviors,[8] A1C knowledge,[8] and A1C testing frequency.[8,9] A baseline assessment of PA among patients receiving diabetes care may provide additional information to better tailor diabetes education to maximize patients' ability to effectively self-manage.[7]

Guided by the thesis that patients are self-activated to take action to better self-manage, we measured PA and its relationship to glycemic control among adults with type 2 diabetes who have not participated in a formal diabetes education program. We conducted this cross-sectional study as a baseline assessment of patients' behavioral attributes for planning diabetes care improvements in a local primary care setting. Baseline assessment of patients' ability and readiness for self-initiated action is a prerequisite starting point for developing and implementing any patient-centered approach to improve self-care with the aim of achieving sustainable behavioral and metabolic outcomes for people with diabetes.

Research Design and Methods

In a stratified cross-sectional baseline assessment of individual behavioral factors influential in tailoring patient-centered approaches to improving diabetes care, we assessed patient activation[10] among adults with controlled or uncontrolled type 2 diabetes who were receiving primary care at a local private clinic. This family practice center of eight primary care physicians within Baylor Health Care System has a unique history of participating in diabetes care quality improvement initiatives and a health care culture focused on seeking best-practice solutions. Physicians and nurses counsel and educate patients about their conditions, although no formal diabetes education program has been established at this center. All physicians routinely provide diabetes care, although the percentages of their respective patient load with diabetes may vary.

Patients who were eligible for this study were adults ≥ 18 years of age with a diagnosis of type 2 diabetes (ICD-9 code 250.0–259.9)[11] and a known metabolic control status (i.e., controlled or uncontrolled glycemia via A1C). The practice manager identified six to eight patients from each physician's panel who met these criteria and were sequentially scheduled for diabetes care follow-up visits during the period from July through November 2007: three to four patients with a most recent A1C > 7% (uncontrolled diabetes) and three to four with a most recent A1C ≤ 7% (controlled diabetes). Clinical staff assisted in recruiting study participants by reviewing electronic health records and patient appointment schedules to identify eligible patients in advance of their office visits. Eligible patients were recruited during their scheduled visits to the clinic.

The research staff was responsible for subject recruitment and for obtaining informed consent from patients before study participation. Patients who agreed to participate were provided a private place to read and sign the informed consent form, complete the questionnaire, and ask any questions they had regarding the study or the questionnaire. Patients who did not agree to participate or chose to withdraw at any time during the survey process after agreeing to participate were instructed to return all materials to the research staff member, and their information was excluded from the study.

We assessed PA in this stratified sample of patients who completed the self-administered questionnaire. PA was included as a subscale of this questionnaire and captured by the 13-item Patient Activation Measure-13 (PAM-13) instrument that was developed and validated by Hibbard et al.[10]

Self-management behavior and behavioral readiness to make the changes necessary for active diabetes self-care were assessed by a unique 13-item subscale based on the widely accepted transtheoretical model (TTM) of stages of readiness for behavioral change.[12] This readiness for self-management scale was designed as a measure to capture where patients are (i.e., their stage of change), regarding readiness to actively make the changes necessary to effectively manage their diabetes. The scale adopted, with some modification, items validated in the Confidence in Diabetes Self-Management Scale,[13] the revised Self-Confidence Inventory,[14] and the Summary of Diabetes Self-Care.[15].

These consensus items of self-management were contextualized to diabetes care using the TTM as a model to assess change over the preceding 3–12 months. The items included active management of blood glucose, medication adherence, appointment keeping, physical activity, foot and eye exams, healthy eating, stress, and social support. Each of the 13 items in the self-management summary score was given equal weight and scored from 1 to 5 across the five stages of behavioral readiness: pre-contemplation (1), contemplation (2), preparation (3), action (4), and maintenance (5).

In analysis, to account for the stratified selection of study participants, conditional logistic regression[16] was used to assess the associations between PA and glycemic control and between self-management and glycemic control. Correlation between PAM-13 and self-management summary scores was also evaluated using Spearman's ρ.[17]

Results

Sixty-six eligible adult patients with type 2 diabetes were approached for participation in this pilot study; 48 (72.7%) completed the questionnaire. The response rate was higher in the group of eligible patients with uncontrolled diabetes; 27 of 33 patients (81.8%) completed the questionnaire, compared to 21 of 33 patients (63.6%) in the group with controlled diabetes. About 70.7% of the study participants (n = 48) had some college education, 66.7% were < 65 years of age, and 14.6% identified themselves as non-white.

In measuring PA in this primary care population of adults with type 2 diabetes (Table 1), we found that the mean PAM-13 score was 66.0 (95% confidence interval [CI] 60.8–71.2) among those with uncontrolled

Table 1. Patient Activation and Glycemic Control, by Patient Characteristics, Among Adults With Type 2 Diabetes

Glycemic Status			Mean PAM Score (95% CI)	*P* value
Uncontrolled (A1C > 7%)	(*n* = 27)		66.0 (60.8–71.2)	0.607
Controlled (A1C ≤ 7%)	(*n* = 21)		63.7 (55.9–71.5)	
		Patient Characteristics		
Uncontrolled	Age (years)	< 65 (82.6%)	64.8 (59.3–70.3)	0.232
		≥ 65 (17.4%)	73.4 (43.7–100)	
	Education	≤ High school (26.1%)	76.0 (58.1–93.9)	0.121
		Some college (73.9%)	62.8 (58.0–67.6)	
	Sex	Female (45.8%)	67.7 (56.7–78.7)	0.501
		Male (54.2%)	64.0 (58.5–69.6)	
	Race	Non-white (17.4%) White (82.6%)	65.9 (40.1–91.6) 66.4 (60.3–72.4)	0.945
	Marital status	Married (76.0%)	68.2 (61.9–74.5)	0.353
		Not married (24.0%)	62.3 (47.9–76.7)	
	Insulin use	No (57.7%)	67.1 (58.7–75.4)	0.612
		Yes (42.3%)	64.3 (56.9–71.7)	
Controlled	Age (years)	< 65 (44.4%)	68.4 (57.4–79.3)	0.197
		≥ 65 (55.6%)	57.6 (43.8–71.4)	
	Education	≤ High school (33.3%)	53.3 (36.2–70.4)	0.117
		Some college (66.7%)	66.9 (56.4–77.4)	
	Sex	Female (38.9%)	57.0 (42.3–71.8)	0.307
		Male (61.1%)	65.8 (53.7–77.8)	
	Race	Non-white (17.6%)	70.1 (32.9–100)	0.370
		White (82.4%)	59.8 (49.4–70.1)	
	Marital status	Married (75.0%)	62.7 (52.7–72.6)	0.443
		Not married (25.0%)	69.7 (50.6–88.8)	
	Insulin use	No (95.2%)	64.3 (56.2–72.4)	0.530
		Yes (4.8%)	(NA, NA)*	

**Unable to calculate CI; only one patient (i.e., no variance).*

diabetes and 63.7 (55.9–71.5) among those with controlled diabetes (*P* = 0.607), based on a theoretical point scale of 0–100. We found no statistically significant differences in the PAM-13 score by age, sex, education, marital status, or use of insulin. The mean self-management score among patients with uncontrolled and controlled diabetes was 4.4 (4.1–4.6) and 4.4 (95% CI 4.1–4.7), respectively, based on the highest possible score of 5.0 (Table 2).

In logistic regression analyses, we found no statistically significant association between the PAM-13 score (as a continuous variable) and glycemic control (odds ratio [OR] 0.99, 95% CI 0.94–1.03). We also observed no statistically significant association observed between self-management behavior (a continuous variable) and glycemic control (OR 0.99, 95% CI 0.39–2.50). A significant association was observed between the self-management behavior summary score and the PAM-13 score among adults with controlled type 2 diabetes (ρ = 0.73, *P* = 0.01) as well as among patients with uncon-

Table 2. Patient Self-Management and Glycemic Control, by Patient Characteristics, Among Adults With Type 2 Diabetes

Glycemic Status		Mean SM Score* (95% CI)†	*P*-value
Uncontrolled (A1C > 7%)	(*n* = 27)	4.4 (4.1–4.6)	0.978
Controlled (A1C ≤ 7%)	(*n* = 21)	4.4(4.1–4.7)	

**SM, self-management: a summary score of active management of blood glucose, medication adherence, keeping appointments, being physical active, foot and eye exams, health eating, stress, and social support.*
†CI, Confidence interval

trolled type 2 diabetes (ρ = 0.48, $P < 0.001$).

Conclusions

We observed a high level of activation in a primary care environment of well-educated adults with type 2 diabetes who had not participated in a formal program for diabetes self-management. This high level of activation was also similar across patient demographic and medical characteristics. We observed no significant association between PA and glycemic control; the point estimates of activation and confidence intervals among controlled and uncontrolled patients were nearly identical. The self-management summary score also revealed a high level of active self-management. It, too, was not associated with glycemic control status.

We also observed a significant, direct correlation between the summary self-management behavior score and PA. The strong correlation observed between diabetes self-management and activation is consistent with a previous study that found activation to be related to self-management behaviors.[8] However, that study, in a predominately African-American and uninsured population, did not find PA to be associated with glycemic control.[8] Furthermore, in a quasi-experimental intervention in a private diabetes management center, health coaching based on patients' stage of activation did not significantly improve glycemic control.[7]

Our current findings indicate that this patient population is taking action toward effective diabetes self-management. That is, the patients were at stage 3 (PAM-13 score of 55.2–67.0) of a four-stage progression toward activation.[18] Stage-3 activation means that the patients are taking action but may lack the confidence and skills to support their self-management behaviors.[18]

The summary self-management behavior measurement, based on the stage-of-change-readiness model, also indicated that the patient population was made up of active self-managers, irrespective of glycemic control status. Because no differences in activation by glycemic control were observed, the findings suggest that the highest stage of activation may be necessary to achieve glycemic control for some patients.[17] The highest stage of patient activation according to PAM-13 is behavior adoption, wherein patients are able to consistently maintain behavior modification even under difficult circumstances.[17] Similarly, the highest stage in the change-readiness model is maintenance, which characterizes patients who have been able to maintain self-management behavior over the long term for at least 6 months.[12]

Although activation may have some relationship to achieving diabetes control status, it alone is not sufficient in this regard. Other behavioral attributes that are not captured by PAM-13 or the self-management measure may also be important to controlling glycemia. Attributes not captured by either measure in this study are motivation and resolution of ambivalence for sustainable behavior change.[19]

Intrinsic motivation is a prerequisite for sustainable individual behaviors.[20] Furthermore, behavioral approaches that target intrinsic motivation support patients through the multi-domain exploration of willingness, readiness, and confidence for behavioral change and in the resolution of ambivalence to change behaviors.[20] Although motivation was not measured in this study, it is reasonable to assume some level of motivation in this study population since the patients are active self-managers.

One may also infer, based on the study findings, that the patients with type 2 diabetes have not achieved resolution of ambivalence. The resolution of ambivalence may be necessary to achieve the highest stage of activation or the highest stage of readiness and subsequent sustainable behavior change.

The study findings reinforce the importance of patient assessment as a prerequisite to tailoring self-management educational interventions to patients' individual needs and readiness to take action.[21] A particularly relevant take-home message from the findings is that patients come to formal DSME programs at different levels of activation and desire to change their behavior. Obviously, the educational and skills-development needs of activated patients would be more advanced than those of patients with a low level of activation. In this regard, conducting patient needs assessments would improve the delivery efficiency of DSME programs and, most likely, improve such programs' effectiveness. Knowing patients' stage of activation, diabetes educators can tailor appropriate plans of action with patients and are better equipped to address patients' psychosocial needs, facilitate their self-management, and optimize their attainment of desired goals and metabolic control.

The basic question alluded to above (i.e., how to apply patient assessment findings to program planning and delivery aimed to improve glycemic control for people with type 2 diabetes) remains to be answered. The current findings suggest that the answer will be complex because neither a high level of PA nor active self-management behavior was suffi-

cient to distinguish between patients with controlled or uncontrolled diabetes.

It would, of course, be desirable for planned interventions to maintain a high level of self-management behavior among patients who participate. However, an intervention program would be challenged to identify ways to maximize PA to its highest stage of adoption because there is not a clear path to the behavioral adoption stage.[7,9] On the other hand, approaches for facilitating intrinsic motivation for change and resolving ambivalence to behavioral change (e.g., motivational interviewing) are becoming increasingly popular in the diabetes care behavioral field as evidence-based, effective means of counseling for long-term outcomes.[19]

DSME programs are not standalone components of diabetes care and must also be well integrated within the primary care component to achieve sustainable glycemic control. The failure to achieve glycemic control is primarily explained by inadequate self-care, ineffective medical management, or some aspects of both.[22]

Within the context of these two domains of self-care and medical management, the American Diabetes Association changed its position on standard diabetes care practice in 2006 and now recommends that the oral hypoglycemic medication metformin be initiated in all patients with type 2 diabetes at disease diagnosis concurrent with appropriate lifestyle modifications, as long as there are no contraindications to medication prescription.[23] However, there are many medication prescribing and management problems in primary care. The failure to intensify medication (i.e., increase dose or number of medications during office visits) for people with diabetes is one of the most important contributors to suboptimal diabetes medical management.[24,25] Moreover, because determinants of patients' nonadherent behavior to prescribed medications are poorly understood, it is not surprising that the many interventions intended to improve medication adherence are not predictably effective, and those that may be are only modestly effective at best.[26] Perhaps greater emphasis by diabetes educators to address medication adherence problems and improve patients' skills at communicating with their primary care providers would be warranted.

Finally, the required complex interventions of diabetes care involve initiative on the part of primary care providers, DMSE providers, and patients themselves.[24] Complex interventions include the combination of more convenient care, information, counseling, reminders, self-monitoring, reinforcement, family therapy, and other forms of supervision and attention. An evolving consensus opinion consistent with the need for complex interventions is that successful efforts to control glycemia should focus on enhancing self-efficacy to improve coping, communication, and control of daily life; increasing motivation for behavior change; and facilitating a plan of action according to the individual needs, preferences, and social and community contextual factors that influence individual behavior.[27] The standards for DSME programs[21] are cornerstones to glycemic control as long as they *1*) are based on the assessed needs of individuals with diabetes, *2*) advance individual knowledge and skills in making informed decisions that facilitate self-initiated, directed behavioral change, and *3*) focus on behavioral factors that are most likely to achieve sustained self-care practices.

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