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Does Physician Communication Influence Older Patients' Diabetes Self-Management and Glycemic Control? Results From the Health and Retirement Study (HRS)

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Background. Effective chronic disease self-management among older adults is crucial for improved clinical outcomes. We assessed the relative importance of two dimensions of physician communication—provision of information (PCOM) and participatory decision-making (PDM)—for older patients' diabetes self-management and glycemic control.

Methods. We conducted a national cross-sectional survey among 1588 older community-dwelling adults with diabetes (response rate: 81%). Independent associations were examined between patients' ratings of their physician's PCOM and PDM with patients' reported diabetes self-management (medication adherence, diet, exercise, blood glucose monitoring, and foot care), adjusting for patient sociodemographics, illness severity, and comorbidities. Among respondents for whom hemoglobin A1c (HbA1c) values were available ($n = 1233$), the relationship was assessed between patient self-management and HbA1c values.

Results. In separate multivariate regressions, PCOM and PDM were each associated with overall diabetes self-management ($p < .001$) and with all self-management domains ($p < .001$ in all models), with the exception of PDM not being associated with medication adherence. In models with both PCOM and PDM, PCOM alone predicted medication adherence ($p = .001$) and foot care ($p = .002$). PDM alone was associated with exercise and blood glucose monitoring (both $p < .001$) and was a stronger independent predictor than PCOM of diet. Better patient ratings of their diabetes self-management were associated with lower HbA1c values ($B = -.10$, $p = .005$).

Conclusion. Among these older adults, both their diabetes providers' provision of information and efforts to actively involve them in treatment decision-making were associated with better overall diabetes self-management. Involving older patients in setting chronic disease goals and decision-making, however, appears to be especially important for self-care areas that demand more behaviorally complex lifestyle adjustments such as exercise, diet, and blood glucose monitoring.

MANY older adults live with one or more chronic diseases and often face significant challenges, such as functional limitations and multimorbidity, in managing these conditions (1). Effective chronic disease self-management requires following medication, diet, exercise, and self-monitoring regimens, as well as coping with symptoms. In light of the difficulty many older patients face in successfully executing these tasks, it is critically important that health care providers and gerontologists develop effective ways to better support older adults' self-management of chronic disease. A growing body of research suggests that both health care providers' thoroughness of information provision (PCOM) and participatory decision-making (PDM) styles significantly influence patient self-care behaviors as well as functional and clinical outcomes (2–9). Evidence is mixed, however, about the relative importance of these two dimensions of provider communication for overall and specific areas of chronic disease self-care, especially among older patients.

In light of multiple competing demands in short office visits, it is important for providers to tailor communication to most effectively support patients' self-management. Prior studies have suggested that older patients may prefer less participatory provider styles than younger patients, preferring that providers spend more time explaining and detailing treatment recommendations rather than involving them in treatment decision-making (10–18). Yet, in light of the complexity inherent in geriatric care—especially in treating chronic diseases—integration of patients' preferences and goals into treatment plans may be particularly important for older patients with chronic diseases (19). Older patients with diabetes, for example, have been found to frame diabetes treatment goals in terms of functional outcomes (e.g., maintaining independence) rather than more narrow biomedical outcomes such as improving glycemic control (20). Failure to elicit and incorporate such goals into diabetes treatment planning may impair both patient–provider communication and patient adherence to treatment recommendations.

In a study of older diabetes patients receiving care in the Department of Veterans Affairs health system (VA), we found that shared decision-making was strongly associated with patients' overall diabetes self-management but that most of this association was due to confounding, and that physician provision of information (PCOM) was the main factor driving these associations (6). This finding, however,

could be attributable to the particular patients surveyed (predominantly male and white veterans) and not generalizable to different older populations. In addition, self-management for more complex and personal behaviors, such as diet and exercise, was not examined separately in this study. The relative importance of different communication strategies may vary depending on the behavior, with information provision potentially being more important for relatively clear-cut (albeit still potentially difficult) activities that do not require complicated behavioral changes and shared decision-making more important for more complex, often more difficult behavioral changes such as diet and exercise (6).

Accordingly, we sought to assess the relative importance of these two dimensions of physician communication in a nationally representative sample of older patients with diabetes. Specifically, we asked: (i) Is there an association between patients' assessments of PCOM and PDM with patients' reported diabetes self-management? (ii) Is PCOM or PDM more significantly associated with patients' diabetes self-management? (iii) Does the relative effect of these two dimensions of physician communication vary depending on the specific domain of diabetes self-management (e.g., medication taking, diet, exercise, blood glucose monitoring, and foot care)? Among the subsample of respondents who had completed at-home hemoglobin A1c (HbA1c) tests, we then assessed the relationship between reported diabetes self-management and HbA1c levels.

Methods

Study Population

The Health and Retirement Study (HRS) is a nationally representative, biennial longitudinal study sponsored by the National Institute on Aging and undertaken by the University of Michigan's Institute for Social Research (21). The HRS oversamples African Americans and Latinos, and gathers in-depth economic, financial, and health information from respondents. The current HRS combines five different study cohorts that were enrolled at different times since 1992. With the combining of these five cohorts, the HRS now represents the entire U.S. population $>$ 50 years of age with a national sample of $>$ 30,000 individuals (including $>$ 5000 who have died after their entry into the study).

Interviews are conducted with all HRS respondents every 2 years, either by telephone or in person, with the latter mode used preferentially for those 80 years old or older. Approximately 10% of the interviews are done with proxy informants for HRS respondents who are unable or unwilling to complete the survey interview themselves, but are willing to have someone else (most often a spouse or daughter) answer for them. (See the HRS Web site at http://hrsonline.isr.umich.edu for more information on the organization, design, and specific survey questions of the HRS.)

HRS Diabetes Mailout Survey and Home HbA1c Test

In October 2003, a supplemental survey on diabetes was sent out in two mailings to 2350 HRS respondents who reported having diabetes in the 2002 wave of the HRS. The subsamples drawn for this supplement included all racial and ethnic groups. A Spanish translation of the instrument was provided to Spanish-speaking respondents (based on language of 2002 interview). The diabetes survey included questions assessing the main components of current behavioral theoretical models for factors influencing diabetes self-management behaviors and attitudes (22–26). Respondents who completed the survey were then sent a self-administered finger-stick kit to test their HbA1c levels. Respondents received compensation of $40.00 with the first survey mailing. There was an 81% response rate (1901 completed the survey), and 1233 respondents completed at-home HbA1c kits that yielded valid assays. Black and Latino ethnicity, fewer years of formal education, lower annual household incomes, lack of insurance at the time of diagnosis of diabetes, longer duration of diabetes, current smoking status, more depressive symptoms, and lower evaluations of the quality of diabetes health care were each associated with not returning the HbA1c kit results. Because this article focuses on patient–doctor communication, we limited the sample to respondents who completed the survey themselves, excluding proxy respondents (n = 195). One hundred forty-eight respondents did not answer both of the communication questions. Accordingly, our final sample consisted of 1558 respondents. Respondents who did not answer those two questions were more likely to be women ($p < .01$), had fewer years of education ($p < .001$), were older ($p < .001$), and were less likely to be on insulin ($p < .001$) compared to those who did. Approval for the study was obtained from the University of Michigan Institutional Review Board (IRB).

Dependent Variables

The principal outcome measure was a validated scale assessing overall self-management and self-management in five separate domains (medication, diet, exercise, blood glucose monitoring, and foot care) (See Table 2). This measure was designed to reflect how well patients feel able to manage aspects of their diabetes care and has been found to be associated with HbA1c levels and other improved diabetes outcomes in prior studies (6,27,28). Respondents were asked, ''Over the past 6 months, how difficult has it been for you to do each of the following exactly as the doctor who takes care of your diabetes suggested?'' The five valid response categories ranged from ''So difficult that I couldn't do it at all'' to ''Not difficult, I got it exactly right.'' Responses were then scaled from 0 to 100 (with higher scores reflecting better self-assessed self-management). Because adherence to treatment recommendations in one domain of diabetes care does not correlate strongly with adherence in other domains (29,30), we also looked at each separate domain.

In secondary analyses, we used HbA1c levels as the dependent variable. This measure integrates control over the prior 6–8 weeks, but is heavily weighted toward glucose levels occurring over the previous 2 weeks. We used the Flexsite Diagnostics A1c at Home Test Kit (Flexsite Diagnostics, Inc., Palm Beach, FL), cleared by the U.S. Food and Drug Administration (FDA) for home use and

over-the-counter sale in 1997. It uses a sample of dried blood that the respondent mails to a central laboratory. The assay for HbA1c uses the Roche Unimate immunoassay and the Cobas Integra Analyzer calibrated to a synthetic HbA1c standard. The A1c at Home Test Kit has been evaluated against Diabetes Control and Complications Trial (DCCT) reference technology and extensively tested in the laboratory and in company-sponsored supplements to clinical trials. The manufacturer reports a test coefficient of variation (CV, measure of test precision) of $\leq$2.54% (CV $<$ 5% recommended by the American Diabetes Association).

Principal Independent Variables

The two principal independent variables were both validated scales assessing two different dimensions of provider communication: PDM styles and PCOM. To assess PDM, we used the six-item subscale assessing involvement in treatment decision-making from the validated Patient Assessment of Chronic Illness Care (PACIC) scale (31). Respondents were asked how often over the past 6 months their diabetes care providers performed any of the six behaviors listed in Table 2. The five response categories ranged from 0 (never) to 5 (very often). To assess PCOM, we used the 4-item scale from the American Board of Internal Medicine patient survey (6,32). Respondents were asked to rate the health providers who take care of their diabetes in the five areas of providing information listed in Table 2. Response categories ranged from ''Poor'' (0) to ''Excellent'' (4).

Covariates

Covariate adjustors included age (continuous), ethnicity (white, African American, Hispanic, other), gender, education (continuous), annual household income (continuous), medication regimen (no medications, oral medication only, insulin $\pm$ oral medications), years with current diabetes care provider ($<$ 1 year, 1–5 years, $>$ 5 years), years since diabetes was diagnosed (continuous), and number and severity of diabetes comorbidities measured using diabetes components of the Total Illness Burden Index, a validated scale that ranges from 0 to 100 (32,33).

Statistical Analyses

We used multivariate linear regression including all the covariate adjustors to identify separately the association of PCOM and PDM with overall diabetes self-management and self-management in the five domains. We repeated the analyses of each of the five domains using ordinal logistic regression methods with no significant changes in the results. We then used combined multivariate models that included standardized beta coefficients to assess the relative importance of PCOM and PDM in predicting overall self-management and self-management in the five domains. Next, in multivariate linear regression models adjusting for patient confounders, we assessed the association between our self-management scale and respondents' HbA1c levels. Finally, to quantify the magnitude of the association of self-reported self-management with patient HbA1c values, we constructed a linear multivariate regression model to calculate predicted scores on the overall self-management scale and HbA1c levels for the lowest and highest deciles of the scale. For these calculations we held all covariate values constant at their means. We also examined models with interaction terms between age and each of the communication variables, which revealed no significant interactions between age and either term within this older population of patients.

To avoid selection bias and inaccurate inferences from listwise deletion, we imputed covariates for which $>$ 5% of data were missing: diabetes duration and duration of time with provider (34). We ran all multivariable analyses with both imputed and nonimputed variables, and found no difference in the results with respect to our two communication variables. Regression diagnostic procedures yielded no evidence of substantive multicollinearity or calibration problems in any of the logistic models. There was no evidence of significant interactions between diabetes self-management and ethnicity, income, diabetes severity, or education, or of second-order curvilinear relationships between the scale of self-reported self-management and HbA1c levels. We performed all analyses with STATA 8 (35), using de-identified, public use data files (http://hrsonline.isr.umich.edu).

Table 1. Characteristics of Eligible Respondents ($N = 1588$)

Characteristic	Percentage %
Age, y, mean (*SD*)*	69.0 (8.65)
Diabetes duration, y, mean (*SD*)	11.8 (10.35)
Duration of provider relationship, y	
$<$ 1	13
1–5	34
$>$ 5	53
Gender	
Male	46
Ethnicity	
White	70
African American	18
Hispanic	10
Other	2
Education, y, mean (*SD*)	11.8 (3.3)
Annual household income, $, mean (*SD*)	42,444 (57,212)
Medication regimen	
No medications	15
Oral medication only	61
On insulin $\pm$ oral medications	24
Diabetes comorbidities, mean (*SD*)†	35.4 (18.7)

Notes: *Numbers in parentheses indicate *SD* from the mean score in that category.

†Severity and number of diabetes comorbidities were calculated using components of the Total Illness Burden Index, a scale ranging from 0 to 100, with 100 representing greatest severity.

SD = standard deviation.

RESULTS

Sample Characteristics

Table 1 summarizes the principal demographic and health characteristics of the 1588 respondents. Respondents' mean age was 69 years, with a mean diabetes duration of 11.8

Table 2. Description of the Main Scales Used in the Study

Variable*	Scale Domains	Scale Range	Interpretation of High Score	Mean	*SD*	α
Patient diabetes self-management	a) Taking diabetes medications b) Exercising regularly c) Adhering to eating plan d) Checking blood sugar e) Checking feet for sores/wounds	0–100	Better adherence to provider recommendations in these domains of self-management	77.0	15.5	0.71
Physician communication (PCOM)	a) Telling you everything b) Letting you know test results when promised c) Explaining treatment alternatives d) Telling you what to expect from treatment	0–100	Better provider communication	62.9	24.5	0.92
Participatory decision-making style (PDM)	a) Asked for your ideas in making treatment plan b) Given choices about treatment c) Asked to talk about your goals for your diabetes care d) Provider thought about your values/traditions when recommending treatment e) Helped to make a treatment plan that you could do in your daily life f) Helped to set a treatment goal with your provider	0–100	Increased patient involvement in decision-making and diabetes treatment plan	41.9	25.8	0.92

Notes: *Variables were standardized to a 0–100 scale; imputed data were used for missing items on the scale if respondent completed at least 50% of scale items. *SD* = standard deviation; α = Cronbach's alpha.

years. Seventy percent of respondents were white, and 54% were women. Eighty-five percent were on oral antihyperglycemic medications and/or insulin.

Relationship of Provider Style Variables to Patient Diabetes Self-Management

In multivariate linear regression models that did not include PDM, PCOM was significantly associated with overall self-management (Table 3, Model A, standardized $\beta = 0.21$, $p < .001$) and was also significantly associated with each of the separate self-management domains (Table 4). Similarly, in multivariate linear regression models that did not include PCOM, PDM was significantly associated with overall self-management (Table 3, Model B, standardized $\beta = 0.22$, $p < .001$), diet, blood glucose monitoring, foot care, and exercise, but not with taking medications (Table 4).

Relative Predictive Power of PDM and PCOM for Self-Management in Combined Multivariate Models

As shown in Table 3, Model C, when we combined PCOM and PDM in the same model, both of these dimensions of physician communication remained significantly associated with overall self-management ($p < .001$). However, the pattern of associations for PCOM and PDM varied markedly across the five self-management domains examined (Table 4). PCOM alone was independently associated with medications taking ($\beta = 0.16$, $p < .001$) and foot care ($\beta = 0.14$, $p < .001$). PDM alone was an independent predictor of exercise ($\beta = 0.14$, $p < .001$) and of blood glucose monitoring ($\beta = 0.12$, $p < .001$). Both PDM and PCOM were significantly associated with diet, but PDM was more significantly associated with diet than was PCOM ($\beta = 0.18$ vs $\beta = 0.10$, $p < .001$).

Table 3. Relationships Between Patients' Evaluation of Physician Communication (PCOM) and Participatory Decision-Making (PDM) Styles With Patients' Reported Overall Self-Management ($N = 1588$) and Subsequent Association Between Self-Management With HbA1c ($N = 1233$)*

	Dependent Variable							
	Overall Diabetes Self Management ($N = 1588$)						HbA1c ($N = 1233$)	
	Standardized β	*p* Value	Standardized β	*p* Value	Standardized β	*p* Value	Standardized β	*p* Value
Independent Variables	Model A†	($R^2 = .1667$)	Model B‡	($R^2 = .1656$)	Model C§	($R^2 = .1771$)	Model D‖	($R^2 = .1346$)
Overall diabetes self-management	—	—	—	—	—	—	−0.10	.005
PCOM	0.21	< .001	—	—	0.13	< .001	—	—
PDM	—	—	0.22	< .001	0.15	< .001	—	—

Notes: *Multivariate linear regression models, adjusting for age, diabetes duration, duration of provider relationship, gender, ethnicity, education, income, medical regimen, and diabetes comorbidities.

†Model A has overall self-management as the dependent variable, PCOM as the main independent variable. PDM is not included in the model.

‡Model B has overall self-management as the dependent variable, PDM as the main independent variable. PCOM is not included in the model.

§Model C has overall self-management as the dependent variable, and both PCOM and PDM as the main independent variables in the model.

‖Model D has A1c test values as the dependent variable, and overall self-management as the main independent variable; PCOM and PDM are not included in the model.

HbA1c = hemoglobin A1c.

Table 4. Associations Between Patients' Rating of PCOM and PDM With Their Reported Diabetes Self-Management in Five Separate Domains of Medications, Diet, Exercise, Blood Glucose Monitoring, and Foot Care ($N = 1588$)*

	Medication		Diet		Exercise		Monitoring		Foot Care	
	Standardized β	*p* Value	Standardized β	*p* Value	Standardized β	*p* Value	Standardized β	*p* Value	Standardized β	*p* Value
Model E†										
PCOM	0.13	< .001	0.20	< .001	0.11	< .001	0.13	< .001	0.15	< .001
Model F‡										
PDM	0.03	.07	0.22	< .001	0.16	< .001	0.16	< .001	0.12	< .001
Model G§										
PCOM	0.16	< .001	0.10	< .05	0.03	.34	0.06	.08	0.14	< .001
PDM	−0.04	.27	0.18	< .001	0.14	< .001	0.12	< .001	0.04	.18

Notes: R^2 values of the models with medication taking as the dependent variable were approximately 0.05, with diet as the dependent variable 0.18, with exercise as the dependent variable 0.21, with monitoring as the dependent variable 0.10, and with foot care as the dependent variable 0.05.

*Multivariate linear regression models adjusting for age, diabetes duration, duration of provider relationship, gender, ethnicity, education, income, medical regimen, and diabetes comorbidity.

†Model E shows the results of five separate regressions with each of the five domains as dependent variables and PCOM as the main independent variable, with PDM excluded from the models.

‡Model F shows the results of each of the regressions with the five domains as dependent variables and PDM as the main independent variable, with PCOM excluded from the models.

§Model G shows the results of the five regression models with both PCOM and PDM as the main independent variables.

PCOM = physician communication; PDM = participatory decision-making.

Relationship of Patients' Assessments of Their Diabetes Self-Management to Glycemic Control

Higher patient self-ratings of their diabetes self-management were significantly associated with lower HbA1c levels in bivariate analyses, and this finding persisted after adjusting for possible confounding variables ($p = .005$) (see Table 3). In analyses examining the five domains of self-management, patients' positive assessments of three domains (taking medications, monitoring blood glucose levels, and diet) were each independently and significantly ($p < .01$) associated with lower HbA1c levels. However, there was no significant independent association between patients' assessment of their exercise self-management or of their foot self-care and their HbA1c levels ($p > .4$).

Patients who rated their overall diabetes self-management in the top decile had a predicted mean HbA1c level of 7.0% (6.5–7.5). Those in the 50th percentile had a predicted mean HbA1c level of 7.3% (6.8–7.8), and those in the bottom decile had a predicted mean HbA1c level of 7.7% (7.2–8.2).

Discussion

These study findings from a national sample of older patients with diabetes build upon and extend our prior study with male veterans (6). When looked at separately and together, patients' evaluations of both PDM and PCOM were significantly associated with better overall diabetes self-management. When comparing patients' evaluations of these two provider communication strategies for separate domains of diabetes self-care, providing more information and explaining to patients why foot care and taking medications are important appear to be more important than ''sharing'' the decision. However, our study findings confirmed the hypothesis that this finding does not necessarily extend to all aspects of care, especially self-care that is more complex and personal in nature, such as diet, blood glucose monitoring, and exercise. PDM was more important than PCOM for these self-management activities. Therefore, although we found that patients' evaluations of PCOM and PDM were both strongly associated with their reported overall diabetes self-management, the relative importance of the two factors varies significantly with the specific nature of the decisions being made. In addition, this national study confirms the previous findings in the VA study of a significant association between patients' reported diabetes self-management and their glycemic control (27). The 0.7 percentage point difference in HbA1c levels between patients in the highest and lowest deciles of self-management ratings is both statistically and clinically significant (36).

Good physician communication not only provides patients with necessary understanding and tools to implement treatment recommendations but also may lead to enhanced patient trust and motivation (37–39). Effective PCOM further provides the foundation for shared decision-making. Information giving varies from simply telling someone what they need to do, to explaining to them the rationale for the advice, to exploring patient goals and preferences before providing treatment recommendations. Yet, physicians typically spend < 1 minute of a 20-minute visit discussing treatment and planning with patients, and in more than half of outpatient visits do not ask patients if they have questions (40). Several studies have documented that up to 50% of patients leave office visits without understanding what their physician told them to do (41).

The importance of developing effective strategies to improve clear provision of information on treatment recommendations has been well documented. Multiple studies have shown that when patients are more knowledgeable about their prescribed treatment regimens, they more successfully implement treatment recommendations (42,43). Especially among older patients who may have low health

literacy, strategies such as encouraging patients to repeat in their own words what was just told them (''closing the communication loop'') have been found to be effective ways to ensure patient comprehension of treatment information (44,45). Moreover, information is more powerful when it is tailored to link the recommended behaviors to the patient's health concerns, past experiences, and individual situation, as well as to explain how the recommended behaviors will affect future clinical and functional outcomes. The physician's role is to describe options and available alternatives, to explain potential side effects and complications, and to present information while encouraging the patient to do the work of interpretation. In addition, especially for older patients who are often on multiple medications and have complicated prescribed self-care regimens, verbal information on how and when to execute key medical tasks such as taking medications and monitoring blood glucose should be supplemented with clearly written instructions or clear graphical information (46).

Our study also reinforces the importance of actively involving older patients in treatment decision-making. As we found, involving patients in setting goals and decision-making may be especially important for self-care areas such as exercise, diet, and blood glucose monitoring that need to be tailored to fit into patients' different lifestyles and demand a series of relatively complex behavioral changes (47). Ideally, PDM involves presenting patients with the best available evidence; explicitly assessing patients' values, goals, and capabilities as well as conviction and level of confidence; offering options; and arriving at mutually agreed-upon treatment plans. By actively participating, patients can communicate their concerns, lifestyle, and priorities to the provider, enabling their treatment regimen to be tailored to their individual needs, values, and goals, thus maximizing the likelihood of adherence. Moreover, involving patients in the decision-making process may increase their motivation and confidence to carry out their regimens. Patients who are actively involved in setting treatment goals and strategies have a greater sense of personal control—an important prerequisite for successful self-management—and are more likely to make choices based on realistic expectations and their own values (24,48).

Prior studies have suggested that older patients prefer less participatory provider styles than younger patients do: In numerous studies, age is the only characteristic consistently associated with desire for participation in medical decision-making, with older patients expressing less desire to participate (5,11,12,14,49). A recent nationally representative survey found that older patients tended to prefer a physician-directed style of care, independent of health status (17). Similarly, other studies have found that older patients (i) are more likely to defer to physicians for decisions about treatment independent of the presence of chronic illness and (ii) participate less in decision-making. For example, Kaplan and colleagues (50) found that patients older than 75 years rated their office visits with their physician as less participatory than did younger patients. Older patients have been found to be less assertive, ask fewer questions, provide less information to their physicians, and be less likely than younger persons to challenge a physician's authority (14). Other studies have found that older patients first need to feel trust with their clinicians before discussing their own goals with them and need assistance in formulating specific behavioral goals to improve health outcomes (18).

In our study, we did not assess respondents' reported preferences to be involved in decision-making. However, several recent studies among older patients have found that even patients who report that they do not want to participate in decision-making do better when their providers encourage them to participate in making decisions (10,51). For example, Golin and colleagues (10) found that diabetes patients who were encouraged to participate more actively in diabetes care decision-making than they had reported wanting before the office visit reported significantly greater satisfaction with their care after the visit. Whereas physicians should assess the needs of individual patients and understand the role each patient wishes to play in his or her care (15), our study highlights the potential benefits from actively encouraging older patients to participate in discussions about treatment decision-making, especially in developing concrete ways to implement diet, exercise, and self-monitoring plans.

Several limitations of this study should be noted. Most important, the study was cross-sectional and thus can only suggest associations and not causality. We will need to examine outcomes in subsequent waves of the HRS to better assess possible causal relationships among the associations seen in this study. In addition, as is true of other treatment modalities, the most definitive evaluation would consist of randomized controlled trials comparing the relative effectiveness of different communication approaches. In light of the importance of patient–physician communication for treatment outcomes, rigorous empirical evidence for the relative effectiveness of different approaches is needed Moreover, although we can hypothesize why different communication strategies might be more effective for different behavioral tasks, future research is necessary to elucidate these mechanisms and to confirm or refute our hypotheses. Also, all measures were based on self-report. Accordingly, we cannot be certain whether physicians' differences in style led to better reported self-management or patients with better self-management perceived their physicians differently. Of note, however, at least one study showed that physicians' independently rated communication style during office visits corresponded with questionnaire-based patient reports of PDM (33). Finally, the most vulnerable patients (minorities, lower socioeconomic status, coexisting depression) were less likely to return their HbA1c kits. Because patients with these characteristics have worse diabetes outcomes in general, understanding how patient–provider communication affects these populations' clinical outcomes is particularly important.

Conclusion

This study, taken together with previous research on chronic disease self-management, has implications both for individual clinicians and for the organization of medical care. On an individual level, clinicians must actively seek to strengthen their skills in providing clear information to

patients on their disease and treatment options, and—especially in areas that require more complex behavioral changes—on strategies to actively engage patients in assessing their treatment options and collaboratively agreeing on specific behavioral goals and strategies. Our findings highlight that this is equally true among older patients and younger patients. To facilitate such efforts, practices need to be structured to maximize both the exchange of information and encourage patients' involvement in decision-making. Such care necessitates adequate time for office visits to allow for effective discussion and treatment goal setting, creative use of group visits and other forms of team-based care to provide for information exchange and discussion beyond the limitations of brief visits with physicians, and mechanisms to ensure adequate patient follow-up. In addition, the use of goal-setting instruments to help patients and providers formulate and achieve specific, short-term behavioral goals (e.g., action plans) can help structure goal-setting discussions and facilitate follow-up (52,53). Ideally, health care team members besides physicians would be trained to provide the more intensive support necessary to help patients set and follow-up on self-management goals. As our study suggests, such investments in enhancing both effective PCOM and PDM may yield significant improvements in older patients' chronic disease self-management. Improved self-management in turn will contribute to better disease control and improved health outcomes.

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