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Karter, Andrew
Parker, Melissa
Heisler, Michele
et al.

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Communication and Medication Adherence: The Diabetes Study of Northern California

Neda Ratanawongsa, MD, MPH[1], **Andrew J. Karter, PhD**[2,3], **Melissa M. Parker, MS**[2], **Courtney R. Lyles, PhD**[1], **Michele Heisler, MD, MPH**[4], **Howard H. Moffet, MPH**[2], **Nancy Adler, PhD**[5], **E. Margaret Warton, MPH**[2], and **Dean Schillinger, MD**[1,6]

[1]General Internal Medicine and UCSF Center for Vulnerable Populations at San Francisco General Hospital and Trauma Center, University of California, San Francisco, CA

[2]Division of Research, Kaiser Permanente, Oakland, CA

[3]Department of Epidemiology, School of Public Health & Community Health, University of Washington, Seattle, WA

[4]University of Michigan and Ann Arbor Veterans Affairs Health Care System, Ann Arbor, MI

[5]UCSF Center for Health and Community, San Francisco, CA, USA

[6]California Diabetes Program, California Department of Public Health, Sacramento, CA

Abstract

Background—Poor medication adherence contributes to poor cardiometabolic control and diabetes outcomes. Studies linking patient-provider communication to adherence often use self-reported adherence and have not explored differences across communication domains or therapeutic indications.

Methods—To investigate associations between patient communication ratings and cardiometabolic medication adherence, we conducted a cross-sectional analysis of 9,377 patients

Corresponding Author and Reprint Requests: Neda Ratanawongsa, MD, MPH, Assistant Professor of Medicine, Division of General Internal Medicine, UCSF Center for Vulnerable Populations at San Francisco General Hospital and Trauma Center 1001 Potrero Avenue, Box 1364, San Francisco CA 94110, Phone: 415-206-3188, Fax: 415-206-5586, ratanawongsan@medsfgh.ucsf.edu.

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in the Diabetes Study of Northern California (DISTANCE), a race-stratified, random sample of Kaiser Permanente survey respondents. Eligible participants received ≥1 oral hypoglycemic, lipid-lowering, or anti-hypertensive medication in the 12 months preceding the survey. Communication was measured with a 4-item Consumer Assessment of Healthcare Providers and Systems Survey (CAHPS) score and 4 items from the Trust in Physicians and Interpersonal Processes of Care instruments. Poor adherence was >20% continuous medication gap for ongoing medications. Using modified least squares regression, we calculated differences in poor adherence prevalence for a 10-point decrease in CAHPS score and comparing higher vs. lower communication ratings on other items, adjusting for necessary sociodemographic and medical confounders derived from a directed acyclic graph.

Results—In this cohort, 30% had poor cardiometabolic medication adherence. For each 10-point decrease in CAHPS score, the adjusted prevalence of poor adherence increased by 0.9% (p=0.01). Compared with patients offering higher ratings, patients who gave lower ratings for providers' involving patients in decisions, understanding patients' problems with treatment, and eliciting confidence and trust were more likely to have poor adherence, with absolute differences of 4% (p=0.04), 5% (p=0.02) and 6% (p=0.03), respectively. Associations between communication and adherence were somewhat larger for hypoglycemic medications than other medications.

Conclusions—Poor communication ratings were independently associated with objectively measured inadequate cardiometabolic medication adherence, particularly for oral hypoglycemic medications. Future studies should investigate whether improving communication skills among clinicians with poorer patient communication ratings could improve their patients' cardiometabolic medication adherence and outcomes.

Introduction

Persons with diabetes are at high risk for cardiovascular morbidity and mortality. Hypoglycemic, anti-hypertensive, and lipid-lowering medications are important tools for reducing cardiovascular risk in people with diabetes.[1] Poor adherence to medications contributes significantly to suboptimal cardiometabolic control and poor clinical outcomes.[2–5]

One proposed strategy for enhancing medication adherence is improving patient-provider communication.[6] Systematic reviews suggest that patient and provider communication behaviors affect the quality of information exchange and of primary care relationships.[7–9] In the short term, patient-centered communication can enhance patient trust and may enable clinicians to incorporate patient preferences, needs, and values into treatment decisions.[7,10] Both patient trust and shared decision-making may then increase patient treatment adherence, ultimately improving patient outcomes.[7] Thus, the IOM designated patient-centeredness as a core measure for health care quality,[10] and validated metrics of provider communication are increasingly available for individual clinicians and health systems.[11–13]

Prior research has suggested that collaborative communication is associated with better adherence.[14–16] However, research using self-reported medication adherence measures may overestimate adherence across sociodemographic characteristics (e.g., cultural differences in social desirability).[17–20] Also, research using self-report measures for both communication and adherence may be affected by endogeneity bias; e.g., depression could be associated with poor patient perceptions of both communication and their own adherence.[21–24] In addition, although shared decision-making and trust may each affect adherence,[7,14,25] validated instruments to measure these aspects of communication could yield insights about their relative importance. Finally, because patients' beliefs about medication benefits and side effects can differ across therapeutic indications, the importance of communication to patient adherence could differ for specific types of medications.[26,27]

This study investigated whether patient assessments of provider communication were associated with objective measures of poor adherence for cardiometabolic medications using pharmacy utilization data among a diverse sample of fully-insured persons with diabetes. We hypothesized that poorer patient ratings of overall communication, shared decision-making, and trust would be associated with poor adherence to cardiometabolic medications.

Methods

We analyzed data from the Diabetes Study of Northern California (DISTANCE) Survey, conducted May 2005 to December 2006 among a racially and ethnically stratified sample of 20,188 Kaiser Permanente Northern California patients with diabetes aged 30–75 years (response rate 62%).[28] Respondents completed the written or web survey in English or via telephone interviews offered in English, Spanish, Chinese, or Tagalog.[28]

For this analysis (Figure 1), eligible participants: answered questions about patient-provider communication (not included in the Short Version of the DISTANCE survey), reported having a primary care provider (PCP), and were dispensed ≥1 oral hypoglycemic, anti-hypertensive, or lipid-lowering medications in the 12 months preceding the survey. We excluded subjects who changed PCP, lacked continuous pharmacy benefits, or had insufficient dispensing (<2 fills) of medications to calculate adherence.

This study was approved by Institutional Review Boards of Kaiser Permanente Northern California and the University of California, San Francisco.

Measures

The primary exposures were key domains for patient-reported quality of patient-provider communication (Table 2):

- Overall communication quality: 4 items on the provider communication subscale of the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey.[11] We modified “explain things in a way that was easy to understand” to “explain things (directly or through an interpreter) in a way you could understand” to capture the experiences of non English-speaking patients. The Cronbach’s alpha for internal consistency of this modified scale was 0.80.
- Shared decision-making: 2 items from the Interpersonal Processes of Care Instrument (IPC).[29] We modified “did doctors ask if you would have any problems following what they recommended” to “did your personal physician seem to understand the kinds of problems you have in carrying out recommended treatments.”
- Trust: 2 items from the Trust in Physicians Scale (TIPS).[30,31]

Response options for both the IPC and TIPS items were modified to match the 4-point CAHPS scale options of “never,” “sometimes,” “usually” and “always” during the preceding 12 months. Respondents could indicate that they had no visits or no problems for the IPC items.

We calculated a summary CAHPS score (range 0 – 100, with 100 reflecting more positive experiences) by linearly transforming and then averaging CAHPS responses.[32–34] Due to space limitations, the survey included four single-item questions from the full IPC and TIPS instruments; thus, we examined these 4 items separately, dichotomized at “always” / “usually” vs. “sometimes” / “never,” a common cut-off for patient communication ratings.[11]

The primary outcome was poor refill adherence measured by the continuous medication gap (CMG), a well-established measure of secondary adherence (adherence among ongoing users) using pharmacy data.[35,36] CMG sums the proportion of days without sufficient medication supply across refill intervals between the first pharmacy dispensing during the measurement period and the last dispensing before censoring or the end of the measurement period, if that occurs first. For patients taking > 1 drug in the same therapeutic class, the proportion of time without medications is calculated individually for each therapeutic class and then a summary measure is created for each drug class.[35,36] We use a modified approach that accounts for stockpiling medications using a timeforward algorithm.[37] Because pharmacy utilization data did not provide insulin fixed days supply based on prescribed dosing, we excluded insulin prescription refills.

For each subject, we calculated CMG for all indications combined and separately (CMG for antihypertensives only, lipid-lowering meds only, and diabetes meds only).[35,36] We classified respondents as poorly adherent when they had no medication supply >20% of the observation time and adherent when medications were available for 80% or more of the time.[5,35,36]

We assessed socio-demographic and medical characteristics using survey and medical record data,[28] including: age, sex, self-reported race/ethnicity, educational attainment, English proficiency,[38–40] functional health literacy,[41,42] income, depression,[43] external locus of control,[44] and conscientiousness.[45–47] We also calculated the Deyo version of the Charlson comorbidity index using a 2-year pre-baseline capture for the diagnostic and procedure codes[48,49] and co-payment requirements, defining higher co-payments for generic drugs (> $10), brand drugs (> $30), and outpatient visits (>$20).

Statistical Analysis

Our modeling was guided by a directed acyclic graph (DAG), which depicts causal relationships between measured variables in the analysis (Figure 2). DAGs help avoid errors caused by confounding, blocking (adjustment for a variable on a causal pathway between exposure and outcome), and colliding (adjusting for variables affected by both exposure and outcome, leading to spurious associations).[50,51] We reviewed existing literature and theory about causal relationships and temporal ordering among patient, provider, relationship, and system variables that could affect the relationship between communication and medication adherence.[7,8,52–60] We used established rules for determining the necessary covariates to estimate the direct effect of communication on medication adherence (Figure 2). A sensitivity analysis including number of medications for chronic conditions did not affect the point estimates for our analyses, suggesting that this variable's exclusion based on the DAG was correct.

We weighted all multivariable analyses by the inverse of the non-proportional sampling fractions for each race/ethnic group to account for the stratified sampling design. We also addressed survey non-response bias using the Horvitz–Thompson approach, modeling the probability of response to the DISTANCE survey and creating individual weights (reciprocal of the probability of the observed response) for all multivariable models.[61] Using modified least squares regression,[62] we calculated the mean absolute prevalence of poor refill adherence for respondents with CAHPS scores of 100 and the unadjusted and adjusted change in prevalence with CAHPS as a continuous predictor. For the other communication items, we calculated the mean absolute prevalence of poor refill adherence for respondents with poorer vs. better communication ratings and calculated unadjusted and adjusted prevalence differences. We also calculated the unadjusted and adjusted relative risk (RR) of poor refill adherence for those with higher vs. lower communication ratings using Modified Poisson regression.[63]

Results

Participants

Among 9,377 eligible respondents, 7,303 were prescribed hypoglycemic medications, 7,052 were prescribed lipid-lowering medications, and 7,967 were prescribed anti-hypertensives (Figure 1). The average age was 59.5 years (SD 9.8), and 52% were women. One quarter (27%) were Caucasian, 19% African-American, 16% Latino, 12% Asian, 11% Filipino, and 11% multiracial (Table 1). Thirty-five percent earned <$50,000 per year, 42% had high school or less educational attainment, and 38% had limited health literacy. Forty-four percent had Charlson index scores ≥2, and 45% had hemoglobin A1c >7.0%. Patients were dispensed an average of 5.2 (SD 2.5) cardiometabolic medications (excluding insulin) and had seen their PCPs for 6.2 years on average (SD 4.4).

Ratings of the Quality of Communication with Clinicians

CAHPS scores were skewed, with 77% of respondents having the maximum score of 100. Low ratings were given by patients for providers involving patients in making decisions (20%), eliciting confidence and trust (11%), understanding patients' problems carrying out recommended treatments (11%), putting patients' needs first (12%), and showing respect (7%) (Table 2).

Differences in Medication Adherence

Overall, 30% of respondents had poor adherence to their cardiometabolic medication regimens (CMG >20% for regimens of ≥1 cardiometabolic medication). Poor adherence was observed in 20%, 21% and 25% of patients for anti-hypertensive, lipid-lowering, and oral hypoglycemic medications respectively.

The mean absolute prevalence of poor refill adherence for all cardiometabolic medications combined was 27% (95% CI 25%–29%) for patients with CAHPS scores of 100. For each 10-point decrease in CAHPS score, the unadjusted prevalence of poor refill adherence increased by 1.6% (95% CI 0.9%–2.3%). Poor adherence for all cardiometabolic medications combined was associated with lower patient ratings on each IPC and TIPS item (unadjusted absolute differences ranging 8%–11%, all $p<0.01$) (Table 3). Compared with patients reporting higher ratings, the unadjusted RR of poor cardiometabolic refill adherence for patients with lower communication ratings ranged from 1.16 to 1.36 (all $p<0.01$).

After adjusting for potential confounders, the prevalence of poor refill adherence increased by 0.9% (95% CI 0.2%–1.7%) for each 10-point decrease in CAHPS score. Compared with patients offering higher ratings, patients who gave lower ratings for providers' involving patients in decisions, understanding patients' problems with treatment, and eliciting confidence and trust were more likely to have poor adherence, with absolute differences of 4% (95% CI 0%–7%, p=0.04), 5% (95% CI 1%–10%, p=0.02) and 6% (95% CI 1%–11%, p=0.03), respectively. Those with lower communication ratings had higher adjusted RR of poor cardiometabolic refill adherence (adjusted RR 1.07 – 1.16, $p<0.05$ except p=0.09 for involving patients in decisions).

When examined separately by therapeutic indication, all communication items were associated with poor adherence in unadjusted analyses (data not shown). In adjusted analyses for oral hypoglycemic medications, CAHPS score and involvement in decision-making were not associated with poor adherence. Low ratings for understanding problems with treatment, putting patient's needs first, and trust were associated with poor adherence for oral hypoglycemic medications, with adjusted differences of 6% (95% CI 1%–11%, p=0.02), 5% (95% CI 1%–11%, p= 0.03) and 7% (95% CI 1%–13%, p=0.01), respectively

(data not shown). For lipid-lowering medications, only CAHPS score was associated with poor adherence (0.8% increase in prevalence of poor adherence per 10-point decrease in CAHPS score, 95% CI 0%–1.6%, p=0.04). None of the communication items were associated with poor refill adherence for blood pressure medications.

Discussion

In this study of a racially and ethnically diverse primary care population with diabetes, patient perceptions of poorer communication with their providers were associated with higher prevalence of poor secondary adherence to cardiometabolic medications. These findings are consistent with prior studies about aspects of patient-provider communication and medication adherence in diabetes and other chronic medical conditions.[14–16,64–66] In a cross-sectional diabetes study, older patients' evaluations of how well their physicians provided information on their illness and treatment were associated with patient self-reported medication-taking behaviors.[14] A study in the Kaiser Permanente population found that a greater proportion of patients who failed to initiate insulin felt that their health care providers inadequately explained the risks and benefits of insulin, compared to those who initiated insulin. [67] Another Kaiser Permanente study found that language concordance for Spanish-speaking patients and race concordance for African-Americans were associated with higher rates of cardiometabolic adherence, although it did not assess patient ratings of communication directly.[64]

This study adds to this literature in a number of ways. First, unlike most prior studies, we used a validated, objective measure of secondary medication adherence – pharmacy utilization for medication refills – to demonstrate an association with patient ratings of provider communication.[35,36] Self-reported medication adherence has varying concordance with objective measures of adherence and may be subject to social desirability bias.[19,68] A systematic review found that self-reported adherence was highly concordant with claims data in only 5 out of 11 applicable studies.[19] Also, sociodemographic characteristics such as gender and education have been associated with differences in the degree of patient over-reporting of adherence.[20]

Second, our findings suggest modest differences in the associations between patient ratings of communication and medication adherence across therapeutic indications. Oral hypoglycemic medications had both higher rates of poor refill adherence and somewhat stronger associations with patient-provider communication in adjusted analyses, compared with lipid-lowering and antihypertensive medications. The complexity, side effects, or perceived benefits of oral hypoglycemics may make patient adherence more "sensitive" to the contributions of patient-provider communication. A focus group study of oral diabetes medication initiation and intensification found that patients viewed medication initiation as "evidence of personal failure and an increased burden" and viewed medication intensification as increasing their risk of diabetes-related complications, preferring de-escalation as their primary treatment goal.[69] Similar mixed-methods studies to explore how persons with diabetes perceive different medications could offer patient-centered insights on health beliefs influence medication adherence and whether their relationships with providers influence adherence differently.

Medication adherence is associated with better cardiometabolic control and reduced morbidity and mortality among those with diabetes at highest risk for cardiovascular events.[2–5,70] Our findings support proposed pathways from patient-centered communication, trust, and shared decision-making to medication adherence.[7] Patient-centered communication behaviors are core strategies by which clinicians engender patient trust, which enhances patient adherence by promoting self-efficacy and moderating the negative

effects of financial barriers to adherence.[14,25,66,71] Patient-centered communication also allows clinicians to activate and engage patients in self-management through collaborative goal-setting and action planning, which can improves diabetes self-care, medication adherence, and ultimately cardiometabolic control.[72–75]

Patient-centered communication may also foster shared decision-making about medications. Clinicians often fail to predict inadequate medication adherence,[6,76,77] which may represent passive disagreement to clinicians' prescribing decisions. Patient-centered communication may allow acknowledgement and reconciliation of the different ways patients and clinicians view medication risks and benefits.[67,69,78–80] Skilled clinicians may also facilitate patient disclosure of non-adherence, allowing problem-solving such as adjusting regimens causing side effects or involving patients' significant others.[80]

Overall, our results suggest patients' communication ratings are modestly predictive of inadequate medication adherence, with adjusted absolute prevalence differences of 4%–6% and relative risk differences of 7%–16%. The largest differences in adherence occurred between ratings of "usually" and "sometimes," suggesting a conceptually meaningful difference in patients' perceptions at this cut-off. It is unclear to what extent patient-provider communication is modifiable, and if so, whether improvements in a given provider's communication will lead to improved adherence among that provider's patients. Cooper et al developed an intensive training program using personalized feedback from videotaped simulations of patient encounters to enhance clinicians' skills in patient engagement, activation, and empowerment. While the training was associated with greater improvements in patient report of physicians' participatory decision-making and patient involvement in care, it was not associated with improvements in patient anti-hypertensive medication adherence or blood pressure control.[6] Based on our findings, it is possible that targeting clinicians with poorer patient communication ratings or focusing on specific skills related to shared decision-making and trust for hypoglycemic medications may offer higher yields.

This study has limitations. First, patient ratings of provider communication may be subject to recall bias. Second, CMG is only one measure for adherence to medications and excludes those who are not ongoing users.[5] Because discontinuation is assumed to occur after the last dispensing and stockpiled medications have been exhausted, person-time is censored and poor refill adherence after discontinuation is not captured by CMG. CMG also does not evaluate early stages of adherence for newly prescribed medications (primary nonadherence). However, CMG remains the most valid measure of adherence to chronic medications and should have good correlation with other measures in an integrated health care delivery system that includes its own pharmacies.[5,17,18,35,36] Third, due to limitations of available pharmacy data, we were unable to measure insulin adherence, an important outcome given challenges with insulin initiation and adherence.[67,78] Fourth, the cohort excludes patients who changed providers, a group which may include members who rated their providers' communication more poorly. Fifth, our findings from this cross-sectional analysis may be due to unmeasured confounding or reverse causation (e.g., poor patient adherence to medications leading to challenging conversations with providers). Our analysis is strengthened by capturing and adjusting for several potential confounders from existing literature, but given the complex interrelationships between communication, adherence, medication intensification, and cardiometabolic outcomes, future prospective, mixed-methods observational studies using rigorous causal analytic methods would be valuable. Sixth, the study cohort was a fully insured population receiving care in an integrated health delivery system and findings may not be generalizable to other patient populations (e.g., the uninsured). However this population provides a reasonable model of expectations if and when the Affordable Care Act is fully implemented.[81] Concerns for confounding by some systemic and financial barriers to adherence are reduced in this insured population with

continuous prescription medication coverage, and this study is strengthened by the study population's diversity, including 73% non-white minorities and 42% with high school education or less. Finally, although this study focuses on patient ratings of providers, interventions to promote adherence should also consider empowering patients to communicate more effectively with clinicians, e.g., by disclosing their desires not to start or intensify medications before they are prescribed.[6,79,82]

In summary, poor patient ratings of provider communication were independently associated with objectively measured, inadequate cardiometabolic medication adherence, particularly for oral hypoglycemic medications. Future studies should investigate whether targeting communication interventions for clinicians or health systems with poorer patient communication ratings may improve medication adherence and ultimately clinical outcomes.

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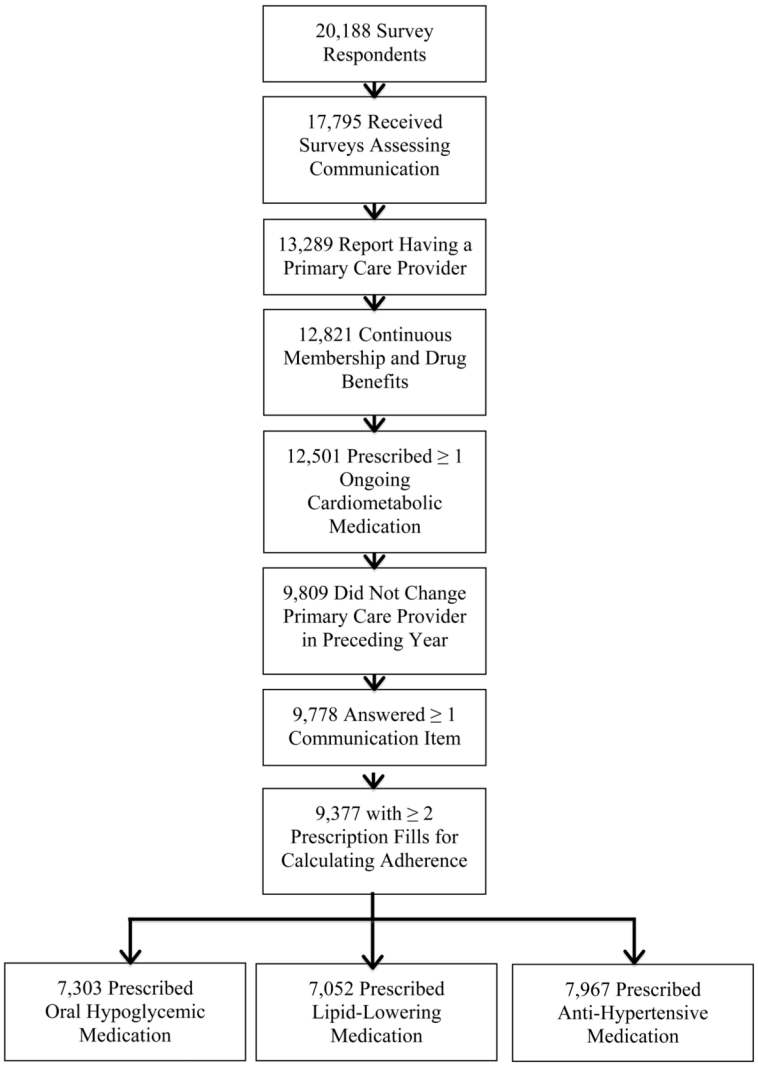

Figure 1.
Cohort identification of patients with diabetes who completed patient-provider communication ratings survey and were prescribed at least 1 cardiometabolic medication.

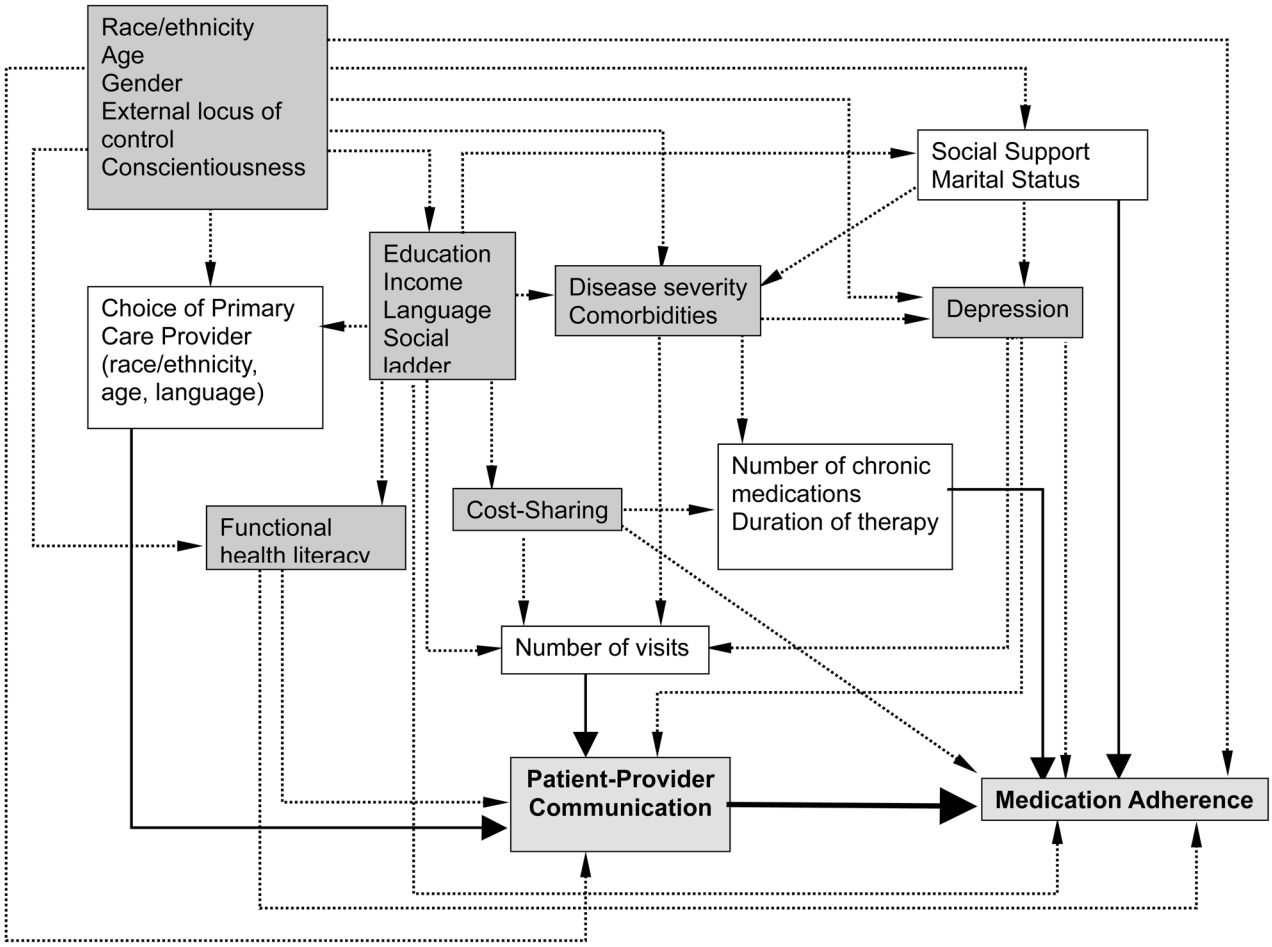

Figure 2.

Directed acyclic graph. Using established rules, adjusting only for shaded covariates was necessary to estimate the direct effect of communication on adherence. Dashed arrows indicate causal relationships blocked by adjustment. No unblocked pathways (solid arrows) remain between communication and adherence.

Table 1

Characteristics of a cohort of patients with diabetes prescribed at least one cardiometabolic medication (N=9,377)

Age, mean (SD)	59.5 (9.8)
Female, n (%)	4530 (51.7)
Race/ethnicity, n (%)	
Caucasian	2565 (27.4)
African-American	1740 (18.6)
Latino	1509 (16.1)
Asian	1119 (11.9)
Filipino	1018 (10.9)
Multiracial	1027 (11.0)
Other/unknown	399 (4.3)
Married, n (%)	6551 (70.4)
Income %	
<$25,000	1431 (6.9)
$25,000–49,999	2393 (28.3)
$50,000–79,999	2219 (26.3)
$80,000	2411 (28.5)
Generic drug copay > $10, n (%)	135 (1.4)
Brand drug copay > $30, n (%)	530 (5.7)
Outpatient visit copay >$20, n (%)	9377 (7.4)
Educational Attainment, n (%)	
No degree	1224 (13.3)
High school/GED	2641 (28.7)
Some college	2407 (26.1)
College graduate	2940 (31.9)
Limited Health Literacy, n (%)	3567 (38.1)
Limited English Proficiency, written or spoken, %	648 (7.0)
Depression, n (%)	
Mild	1894 (22.8)
Moderate to Severe	1070 (12.9)
Low sense of personal control, n (%)	1050 (11.4)
Conscientiousness, n (%)	7579 (81.6)
Charlson index, n (%)	
<1	4198 (44.8)
1 to <2	2943 (31.4)

2 to <3	1119 (11.9)
≥ 3	1117 (11.9)
Hemoglobin A1c >7.0%, n (%)	4212 (44.9)
Systolic blood pressure >130mm Hg, n (%)	4044 (43.1)
Diastolic blood pressure >80mm Hg, n (%)	2018 (21.5)
Low-density lipoprotein ≥100 mg/dl, n (%)	2794 (29.8)
Insulin Use (Pre-Baseline), n (%)	2199 (23.5)
Number of medications, mean (SD)	5.2 (2.5)
Cardiometabolic medications	4.5 (1.8)
Diabetes medications	1.6 (0.9)
Lipid-lowering medications	0.9 (0.5)
Hypertension medications	2.0 (1.3)
Years with Primary Care Provider, mean (SD)	6.2 (4.4)

Table 2

Patient ratings of the quality of communication with clinicians in a cohort of patients with diabetes prescribed at least one cardiometabolic medication (N=9,377)

Question: In the last 12 months, how often …	Never, %	Sometimes, %	Usually, %	Always, %	Not applicable*, %	Missing, %
Did doctors or health care providers listen carefully to you?†	1.0	8.0	20.1	61.5		9.5
Did doctors or health care providers explain things (directly or through an interpreter) in a way you could understand?†	4.7	5.5	16.0	64.3		9.4
Did doctors or health care providers show respect for what you had to say?†	1.2	5.8	17.7	65.5		9.8
Did doctors or health care providers spend enough time with you?†	2.1	10.1	25.1	53.0		9.7
Did your personal physician involve you in making decisions about your care as much you wanted?‡	6.5	13.0	22.0	48.6	6.3	3.7
Did your personal physician seem to understand the kinds of problems you have in carrying out recommended treatments? ‡	2.8	7.7	19.0	47.0	15.2	8.3
Have you felt confidence and trust in your personal physician?§	1.5	6.1	16.5	69.3		6.7
Did you feel that your personal physician was putting your medical needs above all other considerations when treating your medical problems?§	5.7	6.2	18.0	60.4		9.7

*Respondents answered that they did not have any problems or any visits in the past 12 months.

† Adapted from Consumer Assessment of Healthcare Providers and Systems (CAHPS)[11]

‡ Adapted from the Interpersonal Processes of Care Instrument[29]

§ Adapted from the Trust in Physicians Scale[30,31]

Table 3

Differences in prevalence of poor refill adherence for any cardiometabolic medication, by ratings of communication with clinicians in a cohort of patients with diabetes (n=9,377)

	Mean Absolute Prevalence Rate of Poor Refill Adherence for CAHPS Score 100[*] (95% CI)		**Unadjusted Prevalence Difference per 10-point decrease in CAHPS score[*]**	**p-value[*]**	**Adjusted Prevalence Difference per 10-point decrease in CAHPS score [*†]**	**p-value [*†]**
CAHPS Score	27% (25 – 29)		1.6% (0.9 – 2.3)	<0.01	0.9% (0.2 – 1.7)	0.01
	Mean Absolute Prevalence Rates of Poor Refill Adherence[*] (95% CI)					
	Lower Ratings[‡]	**Higher Ratings[§]**	**Unadjusted Prevalence Difference[*]**	**p-value[*]**	**Adjusted Prevalence Difference[†*]**	**p-value [*†]**
Involved you in decisions[//]	35% (32–38)	27% (26–29)	8% (4–11)	<0.01	4% (0–7)	0.04
Understood your problems with treatment[//]	38% (33–42)	27% (25–28)	11% (6–15)	<0.01	5% (1–10)	0.02
Put your needs first[¶]	37% (33–41)	28% (27–30)	8% (4–13)	<0.01	4% (−1 – 8)	0.09
Confidence / trust in PCP[¶]	39% (34–44)	28% (27–29)	11% (6–16)	<0.01	6% (1–11)	0.03

[*] Weighted to account for the survey design's non-proportional sampling as well as survey non-response.

[†] Adjusted for age, sex, race/ethnicity, educational attainment, English proficiency, functional health literacy, income, prescription and outpatient co-payment requirements, depression, Charlson index, external locus of control, and conscientiousness

[‡] "Never" or "sometimes"

[§] "Usually" or "always"

[//] Adapted from the Interpersonal Processes of Care Instrument[29]

[¶] Adapted from the Trust in Physicians Scale[30,31]