Patient-Reported Racial/Ethnic Healthcare Provider Discrimination and Medication Intensification in the Diabetes Study of Northern California (DISTANCE)

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BACKGROUND: Racial/ethnic minority patients are more likely to report experiences with discrimination in the healthcare setting, potentially leading to reduced access to appropriate care; however, few studies evaluate reports of discrimination with objectively measured quality of care indicators.

OBJECTIVE: To evaluate whether patient-reported racial/ethnic discrimination by healthcare providers was associated with evidence of poorer quality care measured by medication intensification.

RESEARCH DESIGN AND PARTICIPANTS: Baseline data from the Diabetes Study of Northern California (DISTANCE), a random, race-stratified sample from the Kaiser Permanente Diabetes Registry from 2005–2006, including both survey and medical record data.

MAIN MEASURES: Self-reported healthcare provider discrimination (from survey data) and medication intensification (from electronic prescription records) for poorly controlled diabetes patients (A1c $\geq 9.0\%$; systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg; low-density lipoprotein (LDL) ≥ 130 mg/dl).

KEY RESULTS: Of 10,409 eligible patients, 21% had hyperglycemia, 14% had hyperlipidemia, and 32% had hypertension. Of those with hyperglycemia, 59% had their medications intensified, along with 40% with hyperlipidemia, 33% with hypertension, and 47% in poor control of any risk factor. In adjusted log-binomial GEE models, discrimination was not associated with medication intensification [RR=0.96 (95% CI: 0.74, 1.24) for hyperglycemia, RR=1.23 (95% CI: 0.93, 1.63) for hyperlipidemia, RR=1.06 (95% CI: 0.69, 1.61) for hypertension, and RR=1.08 (95% CI: 0.88, 1.33) for the composite cohort].

CONCLUSIONS: We found no evidence that patient-reported healthcare discrimination was associated with less medication intensification. While not associated with this technical aspect of care, discrimination could still be associated with other aspects of care (e.g., patient-centeredness, communication).

KEY WORDS: diabetes; healthcare disparities; managed care; race/ethnicity; quality; discrimination.

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INTRODUCTION

“Tightly linked” measures of medication intensification (i.e., an increase in the number, class, or dose of medications in response to evidence of poor risk factor control) have been examined as quality indicators,^{1,2} and have been shown to be better predictors of intermediate health outcomes than process measures such as annual testing of hemoglobin A1c (A1c) levels, which do not correlate with health outcomes on a population level.³ Although there is strong evidence supporting current pharmacotherapy decision-making in diabetes,^{4–6} providers often underutilize these therapies.^{7–10} Lack of medication treatment intensification was recently reported in one-third to one-half of diabetes patients in Kaiser Permanente Northern California with inadequate risk factor control,¹¹ with documented differences by race/ethnicity.^{12–14}

Discrimination from healthcare providers has been hypothesized as one possible explanation for racial/ethnic disparities in healthcare quality,¹⁵ and it has been shown to be related to patient reports of poorer care.^{16–19} However, little research has linked perceptions of unfair treatment with objectively measured differences in care, especially among diabetes patients. We examined this association between patient-reported discrimination and intensification in Kaiser Permanente Northern California, which offers unique insights given the theoretically uniform access to care among those continuously enrolled in the plan. The automated electronic prescription records allowed us to evaluate prescription orders rather than more commonly used pharmacy utilization measures, which could be confounded by racial/ethnic differences in primary non-adherence (i.e., obtaining a first fill of a newly prescribed medication).²⁰

METHODS

We analyzed data from the Diabetes Study of Northern California (DISTANCE) with human subjects’ approval from

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Kaiser Permanente Northern California and the University of California, San Francisco. Completed from May 2005 to December 2006, the DISTANCE survey was a racially/ethnically stratified, random sample of Kaiser Diabetes Registry members aged 30–75, targeting 6,871 African American, 11,197 Asian, 4,233 Caucasians, 7,018 Latinos, and 11,417 members of unknown race/ethnicity, with a 62% overall response rate ($n=20,188$). Individuals were able to complete the survey in written, computer-assisted telephone interview, or web formats in English, Spanish, Chinese, or Tagalog. Further details about the survey methodology have been published elsewhere.²¹ We chose to examine a diabetes population because of their relatively frequent need for intensified pharmacotherapy and because of prior research linking perceived discrimination to worse diabetes outcomes.²²

Among this sample, we identified patients who were appropriate candidates for medication intensification. Electronic medical record information was abstracted for each respondent during the same timeframe as the survey completion (i.e., calendar year 2006 to assess cross-sectional, baseline data). Patients were excluded if they had end-stage renal disease, were older than 75 (as the decision to intensify may be more complicated), had a gap in health plan coverage, or did not respond to the discrimination item on the survey (as this was our primary exposure). After examining clinical test results, three cohorts of patients with poorly controlled cardiometabolic risk factors (not mutually exclusive) were then identified: (1) $A1c \geq 9.0\%$, (2) systolic BP ≥ 140 mmHg, and/or diastolic BP ≥ 90 mmHg (in two consecutive readings), and (3) low-density lipoprotein (LDL) ≥ 130 mg/dl. We chose higher (conservative) cutpoints to identify individuals in very poor control, as individuals not receiving intensification despite meeting the lower thresholds associated with standard clinical targets (e.g., $A1c \geq 7\%$ and LDL ≥ 100 mg/dl, and BP $\geq 130/80$ mmHg) could face a variety of treatment decisions. For example, given patient reluctance to initiate new medications and/or view these changes as punitive,²³ providers could initiate lifestyle changes rather than medication modifications among those with those with only slightly elevated risk factors. Thus, a lack of intensification at those lower clinical thresholds is not necessarily indicative of poor care, but in fact may be consistent with patient-centered care. Above-target clinical values during the 90 days after medication intensification were not examined because we considered this a titration/adjustment period to new therapy. Finally, we also created a composite cohort of individuals in poor glycemic, lipid, and/or blood pressure control to look at intensification across the conditions simultaneously.

Measures

Medication intensification was assessed during the period of 90 days after the visit in which a patient had an above-target clinical test, defined as: (1) an increase in the number of drug classes, (2) increased daily dosage of at least one ongoing medication, or (3) a switch to a medication in a different drug class. Previous studies have used slightly longer windows for assessing intensification (i.e., 6 months), but we chose 90 days

in an attempt to maximize the capture of an intensification event while minimizing misclassification of medication adjustments after altering a pharmacotherapy regimen (i.e., due to side effects, etc.). If the patient had more than one test result above target during the year, we examined the number of times they were intensified out of the total number of test results above target. In order to conservatively focus on individuals who were appropriate candidates for intensification, we also excluded individuals who were already receiving near-maximum pharmacotherapy based on previous methodology.^{11,13} Maximum therapy was defined as a filled prescription(s) in the last 2 months of 2005 or first 2 months of 2006 for: (1) insulin for hyperglycemia (as we could not identify further intensification of self-dosage), (2) high-dose statins (Atorvastatin ≥ 40 mg, Simvastatin ≥ 80 mg, or Lovastatin ≥ 80 mg) or any dose of Ezetimibe for hyperlipidemia, or (3) three classes or more of anti-hypertensives for hypertension.

The primary exposure variable was patient-reported racial/ethnic discrimination from healthcare providers, a one-item question adapted from the full Experiences of Discrimination scale:^{24,25} “In the past 12 months, how often have you felt that doctors or healthcare providers at Kaiser have treated you poorly or made you feel inferior based on your race or ethnicity?” The response categories were collapsed into any vs. none, as the very skewed distribution did not allow us to model the frequency of reporting discrimination. In addition, because this exposure was asked in the previous 12 months, it assessed discrimination around the same timeframe as the intensification outcome. Although this measure may not be as robust as multiple-item measures for capturing patient experiences of discrimination, it is likely tapping into a similar underlying construct.²⁶

The race-stratified survey design focused on the five largest ethnic groups in the population: white, black, Latino, Asian (predominantly Chinese, and also Japanese, Vietnamese, and Korean respondents), and Filipino. Filipinos were analyzed separately from the Asian respondents in patient-specific models because of their large representation in the Kaiser diabetes population and their relative heterogeneity from other Asian subgroup populations.²⁷ Other racial/ethnic groups not mentioned above (including smaller Asian subgroups such as South Asians and Pacific Islanders as well as Native Americans) were included in the Other race/ethnicity category. Additional patient variables included age, sex, education (categorized into tertiles of high school graduate or less, some college, and college graduate or more), and duration of diabetes (0–4, 5–10, and >10 years). Finally, we adjusted for co-morbidity or illness severity using the validated Diagnostic Cost Group (DxCG) index.²⁸ Each point in the DxCG risk adjustment score (calculated for each patient using ICD-9 codes) represents \$1,000 in predicted healthcare costs (i.e., a score of 2.5 corresponds to \$2,500 in predicted costs).

Statistical Analyses

All analyses were weighted to account for the survey design's non-proportional sampling, using SAS version 9.2. For each cohort (hyperglycemia, hyperlipidemia, hypertension, and

composite), we first examined the proportion of individuals reporting healthcare discrimination by the variables of interest. Although the proportion of patients reporting discrimination was low, we had 60% or higher power in all cohorts to detect a 15% difference in intensification among those reporting vs. those not reporting discrimination. Next, we ran unadjusted and adjusted generalized estimating equation (GEE) regression models to examine intensification in each cohort, clustering on primary care provider to account for any correlation of patients seeing the same primary care provider and the related provider-specific differences in intensification. Clustering was particularly important if minority patients were seeing providers at specific clinics that offered different or poorer quality of care.²⁹ We chose GEE models to account for this correlation between patients seeing the same provider as opposed to a random effects regression approach, as we were not interested in specifically modeling the provider variation in intensification. For all cohorts, we used log-binomial models specifying a binomial family, log link, and exchangeable correlation structure,³⁰ which yielded relative risks of intensification (RR) and associated 95% confidence intervals (CI). In order to utilize all available information with the full range of intensification events, the individual-level outcomes in each cohort were specified as the number of times intensified out of the total number of above-target clinical tests during the year. We adjusted for age, gender, education, race/ethnicity, duration of diabetes, and comorbidity score. Finally, we completed a sensitivity analysis to examine a potential interaction between race/ethnicity and discrimination.

RESULTS

Among all DISTANCE survey respondents, we excluded 3,188 patients because they were over 75 years of age, had a gap in coverage, had end-stage renal disease, lacked an assigned primary care provider, or who did not respond to the discrimination item on the survey (Fig. 1). Among this sample, less than a third of patients were in very poor control of their diabetes and therefore were candidates for medication intensification: 21% of individuals had poor glycemic control (hemoglobin A1c $\geq$ 9%), 14% had poor lipid control (LDL $\geq$ 130 mg/dL), and 32% had poor blood pressure control (SBP $\geq$ 140 and/or DBP $\geq$ 90 mmHg).

Missing data for the discrimination item included 12% of survey respondents who answered a short version of the survey that did not include the discrimination item (n=2,423), and those that did not answer the discrimination question on the full version of the survey (n=4,168, 53% of whom stated that they did not have a visit in the past year and skipped the question). Non-respondents to the discrimination question were more likely to report Latino, Asian, Filipino, or Other race/ethnicity, and be older with lower SES; however, there were not substantive differences in intensification by response to the discrimination item (3% absolute difference in mean proportion of tests intensified for hyperglycemia, 1% for hyperlipidemia, and 5% for hypertension, as well as a 1% difference in any intensification the composite cohort). In addition, those

Figure 1. Flowchart of cohort identification for medication treatment intensification.

excluded because of gaps in coverage ($n=2,194$) were more likely to be younger, Latino, and less educated.

Overall, about 5% of respondents in each cohort reported discrimination from healthcare providers in the past year (representing about 3% of the total Diabetes Registry population after accounting for the oversampling of racial/ethnic minorities). The unadjusted distributions of patient-reported discrimination differed across levels of the covariates (Table 1). In particular, there were significantly higher reports of healthcare discrimination among racial/ethnic minorities and younger individuals, whereas females and those with higher co-morbidity reported more discrimination without reaching statistical significance.

Finally, when examining medication intensification in each cohort, 59% of hyperglycemia patients were intensified at least once during the year, along with 40% of hyperlipidemia patients, 33% of hypertension patients, and 47% of individuals in poor control of any risk factor in the composite cohort. In both unadjusted and adjusted GEE models (Table 2) examining the number of times intensified out of total above-target tests, we detected no significant relationships between reported healthcare discrimination and intensification [adjusted RR=0.96 (95% CI: 0.74, 1.24) for hyperglycemia, adjusted RR=1.23 (95% CI: 0.93, 1.63) for hyperlipidemia, adjusted RR=1.06 (95% CI: 0.69, 1.61) for hypertension, and adjusted RR=1.08 (95% CI: 0.88, 1.33) for the composite cohort]. Patients who were Filipino and Other race/ethnicity, younger, male, and with lower co-morbidity had increased likelihood of intensification in the adjusted

models. The sensitivity analysis examining an interaction between patient race/ethnicity and discrimination was not significant and therefore not reported.

DISCUSSION

Similar to a previous study of hypertensive patients,³¹ we found no significant relationship between patient-reported healthcare provider discrimination and reduced likelihood of medication intensification to manage poor control of diabetes risk factors. Other previous studies examining discrimination in relation to diabetes care have been limited by patient self-reports of treatment or utilization of care, while our study examined provider-ordered prescriptions and therefore was not subject to confounding by patient reporting or non-adherence. Although perceived discrimination has been associated with patient reports of receiving diabetes care^{16,17} and intermediate health outcomes (including A1c levels in other settings²²), it was not related to the medication intensification offered by health medication intensification providers in this study.

Our work highlights some potential complex relationships between patient-provider interactions and intensification. Although previous research also found no association between a summary measure of discrimination and medication intensification, patients in that study who reported that their doctor looked down on them received more intensification, while patient concerns about medications and increased provider counseling were associated with less intensification.³¹ We did not measure patient perceptions about these issues in our survey, and future studies to explore this relationship between perceptions of provider interactions and treatment intensification in more depth are needed. Furthermore, while not significant, several of the associations in our study were in the opposite direction than expected (i.e., those who reported discrimination from healthcare providers receiving slightly *more* intensification than those not reporting discrimination). This would be consistent with recent evidence that patients view additional medication changes as a negative outcome such as a punishment for their poor risk factor control.²³ Relationships in which there is perceived discrimination could also be less patient-centered, with less physician elicitation of patient beliefs and barriers as well as reduced patient disclosure of their opinions. In these relationships, perhaps there is less exchange and therefore more treatment intensification, as opposed to more tempered decision-making about medication changes in more patient-centered relationships.

Also similar to previous research,^{11,13,32} we found relatively modest rates of medication intensification—59% were intensified at least once for hyperglycemia, 40% for hyperlipidemia, 33% for hypertension, and 47% in poor control of any risk factor—despite the elevated thresholds to define poor control (A1c $\geq$ 9.0%, SBP $\geq$ 140, and/or DBP $\geq$ 90 mmHg, and LDL $\geq$ 130 mg/dl). Although previous studies in this same population using pharmacy utilization data found that non-white patients were more likely to be intensified for hypertension control, but less likely to be intensified for glycemic and lipid control,^{12,13} our findings suggest that these racial/

Table 1. Patient Characteristics by Reported Healthcare Discrimination Among Those in Poor Control of at Least One Diabetes Risk Factor

	Total (N=3,067)	Not reporting discrimination (N=2,917)	Reporting discrimination (N=150)	P-value
Race/ethnicity (%)				<.0001**
White	889 (29)	887 (31)	12 (8)	
Black	657 (22)	621 (22)	36 (25)	
Latino	711 (23)	667 (23)	44 (30)	
Asian	282 (9)	268 (9)	14 (10)	
Filipino	317 (10)	287 (10)	30 (21)	
Other	169 (6)	159 (6)	10 (7)	
Age (%)				0.047*
<50	718 (24)	673 (24)	45 (31)	
50–64	1,607 (54)	1,532 (54)	75 (51)	
$\geq$ 65	665 (22)	638 (22)	27 (18)	
Gender (%)				0.15
Female	1,586 (52)	1,493 (51)	93 (62)	
Male	1,481 (48)	1,424 (49)	57 (38)	
Education (%)				0.29
$\leq$ High school	1,304 (43)	1,248 (43)	56 (38)	
Some college	855 (28)	803 (28)	52 (36)	
$\geq$ College	863 (29)	825 (29)	38 (26)	
Mean DxCG score (SD)	3.9 $\pm$ (3.8)	3.9 $\pm$ (3.8)	4.5 $\pm$ (4.4)	0.12
Duration of diabetes (%)				0.68
0–4 years	928 (31)	883 (31)	45 (32)	
5–10 years	988 (33)	948 (34)	40 (29)	
>10 years	1,036 (35)	981 (35)	55 (39)	

DxCG=diagnostic cost group co-morbidity score

Note: N and means refer to sample, but p-values reflect survey weights. Due to some missing covariate information, row values do not always add to the column totals

Table 2. GEE Models of Patient-Reported Discrimination and Medication Treatment Intensification

	Hyperglycemia cohort RR (95% CI)	Hyperlipidemia cohort RR (95% CI)	Hypertension cohort RR (95% CI)	Composite cohort RR (95% CI)
Unadjusted				
Discrimination				
No (ref)	1.0	1.0	1.0	1.0
Yes	0.91 (0.71, 1.16)	1.22 (0.91, 1.66)	1.23 (0.80, 1.88)	1.10 (0.88, 1.39)
Adjusted				
Discrimination				
No (ref)	1.0	1.0	1.0	1.0
Yes	0.96 (0.74, 1.24)	1.23 (0.93, 1.63)	1.06 (0.69, 1.61)	1.08 (0.88, 1.33)
Race/ethnicity				
White (ref)	1.0	1.0	1.0	1.0
Black	0.97 (0.84, 1.12)	0.91 (0.73, 1.14)	1.19 (0.96, 1.48)	1.09 (0.96, 1.24)
Latino	0.86 (0.74, 1.01)	0.97 (0.74, 1.27)	0.99 (0.76, 1.29)	1.05 (0.91, 1.22)
Asian	0.89 (0.71, 1.12)	0.81 (0.56, 1.17)	1.19 (0.88, 1.61)	1.09 (0.91, 1.31)
Filipino	1.06 (0.88, 1.28)	0.96 (0.64, 1.43)	1.59 (1.19, 2.12)**	1.39 (1.17, 1.65)**
Other	1.10 (0.87, 1.40)	0.74 (0.46, 1.19)	1.44 (0.89, 2.31)	1.26 (1.00, 1.59)*
Age				
<50	0.96 (0.75, 1.22)	1.12 (0.81, 1.54)	1.12 (0.81, 1.55)	1.23 (1.02, 1.48)*
50–64	1.05 (0.83, 1.32)	1.11 (0.84, 1.46)	1.26 (0.97, 1.64)	1.31 (1.12, 1.55)*
≥65 (ref)	1.0	1.0	1.0	1.0
Gender				
Male	0.96 (0.83, 1.10)	1.08 (0.87, 1.34)	1.25 (1.01, 1.54)*	1.17 (1.04, 1.33)*
Female (ref)	1.0	1.0	1.0	1.0
Education				
≤High school (ref)	1.0	1.0	1.0	1.0
Some college	1.00 (0.86, 1.18)	0.96 (0.74, 1.24)	0.98 (0.74, 1.28)	0.89 (0.76, 1.04)
≥College	1.00 (0.84, 1.20)	1.01 (0.77, 1.33)	1.06 (0.82, 1.37)	0.93 (0.79, 1.10)
Mean DxCG score (1-point change)	0.96 (0.94, 0.99)**	0.96 (0.94, 0.99)**	0.98 (0.96, 1.01)	0.96 (0.94, 0.98)**
Duration diabetes				
0–4 years	1.0	1.0	1.0	1.0
5–10 years	0.92 (0.79, 1.06)	0.91 (0.69, 1.19)	1.16 (0.90, 1.50)	0.99 (0.86, 1.15)
>10 years	0.87 (0.74, 1.03)	1.24 (0.95, 1.62)	1.12 (0.86, 1.46)	1.02 (0.87, 1.19)

*Indicates $p < 0.05$ **Indicates $p < 0.01$

"Ref" indicates the referent group when examining a categorical covariate. RR=Relative risk

ethnic differences may be attributable to factors other than perceived discrimination.

There were several limitations to note. Patients and providers may not be representative of the entire US population (as every patient was fully insured and received care in a single integrated delivery system), and therefore there may be different rates of patient-reported healthcare discrimination and/or intensification in this sample. Furthermore, we could not assess patient preferences, and there is recent evidence that some racial/ethnic minority patients are reluctant to add new therapies.^{33,34} We did not adjust for medication adherence in our models given the potential that it could be on the causal pathway between perceived discrimination and intensification. Similarly, we were not able to ascertain if providers recommended behavioral modifications, which could account for the low levels of intensification. While we had moderate sample sizes, we may have had reduced power to detect an association since a small percentage of individuals reported discrimination (i.e., a 15% difference in intensification might have been difficult to detect given that only 5% reported discrimination overall); however, the direction of the relationship appeared to be headed in the opposite direction than expected in several models. We also did not identify specific medication contraindications, such as hyperkalemia or decreased heart rate, but providers usually had

the option of intensifying to another medication class if such contraindications were present. In addition, we used a single-item measure of patient-reported discrimination, which likely underreports the true prevalence and variance in the population and could have conservatively influenced our findings.^{24,35} Patients could have been reporting discrimination from a different provider (or even other staff interactions) when responding to the questionnaire, although the majority of diabetes-related care is delivered by primary care providers within this system. Finally, there were missing survey responses, particularly for healthcare discrimination, which was in the final 30 of the 184 survey items. Thus, although reports of healthcare discrimination could have been missed for some participants, there were no other noticeable patterns suggesting non-differential response for this item compared to others in the same section of the survey (and the association with intensification should be less vulnerable to bias overall³⁶); moreover, intensification did not appear to differ by response to the discrimination question.

Within a managed care population of diabetes patients, patient-reported discrimination was not indicative of inferior care measured by decreases in prescribed medication intensification. This is consistent with previous evidence that patient ratings of interpersonal care may not corre-

spond to the technical quality of care.^{37–40} Patient reports of discrimination could still be an indicator for other problems during the medical encounter not examined, such as decreased patient trust, which can influence health outcomes through separate pathways and has been shown to be especially important for patients with diabetes.⁴¹ Patients with diabetes and other chronic conditions are typically much more dependent on their healthcare than other patients, and thus the quality of the patient-provider relationship is of great importance. Indeed, previous studies have linked perceived discrimination to lower patient-reported adherence⁴² and delays in filling prescriptions.⁴³ While we found no evidence in this diabetes population that perceived discrimination indicated inferior quality, it does not eliminate the important responsibility of healthcare systems to continue monitoring and ensuring uniform care across members.

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