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Association of Patient-Physician Language Concordance and Glycemic Control for Limited-English Proficiency Latinos With Type 2 Diabetes

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IMPORTANCE Providing culturally competent care to the growing number of limited-English proficiency (LEP) Latinos with diabetes in the United States is challenging.

OBJECTIVE To evaluate changes in risk factor control among LEP Latinos with diabetes who switched from language-discordant (English-only) primary care physicians (PCPs) to language-concordant (Spanish-speaking) PCPs or vice versa.

DESIGN, SETTING, AND PARTICIPANTS This pre-post, difference-in-differences study selected 1605 adult patients with diabetes who self-identified as Latino, whose preferred language was Spanish, and who switched PCPs between January 1, 2007, and December 31, 2013. Study participants were members of the Kaiser Permanente Northern California health care system (an integrated health care delivery system with access to bilingual PCPs and/or professional interpreter services). Spanish-speaking and English-only PCPs were identified by self-report or utilization data.

EXPOSURES Change in patient-PCP language concordance after switching PCPs.

MAIN OUTCOMES AND MEASURES Glycemic control (glycated hemoglobin [HbA_{1c}] < 8%), poor glycemic control (HbA_{1c} > 9%), low-density-lipoprotein (LDL) control (LDL < 100 mg/dL), and systolic blood pressure (SBP) control (SBP < 140 mm Hg).

RESULTS Overall, 1605 LEP Latino adults with diabetes (mean [SD] age, 60.5 [13.1] years) were included in this study, and there was a significant net improvement in glycemic and LDL control among patients who switched from language-discordant PCPs to concordant PCPs relative to those who switched from one discordant PCP to another discordant PCP. After adjustment and accounting for secular trends, the prevalence of glycemic control increased by 10% (95% CI, 2% to 17%; $P = .01$), poor glycemic control decreased by 4% (95% CI, −10% to 2%; $P = .16$) and LDL control increased by 9% (95% CI, 1% to 17%; $P = .03$). No significant changes were observed in SBP control. Prevalence of LDL control increased 15% (95% CI, 7% to 24%; $P < .001$) among LEP Latinos who switched from concordant to discordant PCPs. Risk factor control did not worsen following a PCP switch in any group.

CONCLUSIONS AND RELEVANCE We observed significant improvements in glycemic control among LEP Latino patients with diabetes who switched from language-discordant to concordant PCPs. Facilitating language-concordant care may be a strategy for diabetes management among LEP Latinos.

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Thirty percent to 40% of the more than 50 million Latinos in the United States speak English less than "very well" and may have limited English proficiency (LEP).[1,2] For LEP Latinos seen by primary care physicians (PCPs) who do not speak Spanish, language discordance may impede delivery of culturally competent health care.[3-5] Patients with language-concordant PCPs have potentially better communication, interpersonal process of care, patient-centeredness, trust, and satisfaction with quality of care.[6-11] However, the effectiveness of matching LEP patients to language-concordant PCPs to improve health outcomes or reduce health inequalities has not been evaluated to our knowledge and will unlikely be studied in a randomized trial due to ethical and legal constraints.

Among patients with diabetes, LEP Latinos have higher rates of poor glycemic control than English-speaking Latinos or whites, but this inequality might be mitigated by care from Spanish-speaking (ie, language-concordant) PCPs.[12] In an integrated health care system with access to interpreter services, we previously reported[12] that LEP Latinos with language-concordant PCPs had lower rates of poor glycemic control compared with LEP Latinos with English-only PCPs (16% vs 28%). LEP Latinos with language-concordant PCPs have been found to have better adherence to cardiometabolic medications than those with discordant PCPs.[13] However, causal inferences from such cross-sectional studies are limited by the inability to establish that the exposure (ie, language barriers) preceded the outcome of interest (ie, health outcomes).

We used a natural experiment to examine changes in glycemic, lipid, and systolic blood pressure control among patients with diabetes who switched PCPs, focusing on LEP Latinos who switched from English-only (discordant) PCPs to Spanish-speaking (concordant) PCPs (and vice versa) compared with other PCP switches.

Key Points

Question Does glycemic control improve for limited–English proficiency (LEP) Latinos with diabetes who switch from English-only to Spanish-speaking primary care physicians (PCPs)?

Findings In this pre-post comparative study of 1605 LEP Latino patients with diabetes who switched PCPs, it was found that there was a significant 10% increase in the proportion of patients with glycemic control among those who switched from an English-only to a Spanish-speaking PCP compared with those who switched from one English-only PCP to another.

Meaning Facilitating language-concordant care may be an effective strategy for diabetes management among LEP Latinos with diabetes.

Methods

Study Setting and Cohort Construction

Kaiser Permanente Northern California (KPNC) provides care to approximately 3.9 million members in Northern California. Professional interpreter services are available at all medical facilities and departments, including the pharmacy and laboratory; some facilities offer clinics staffed with bilingual PCPs and employees and many written materials are available in Spanish.

Eligible study participants were adults from the KPNC Diabetes Registry,[14] who self-identified as Latino, whose preferred language was Spanish, and who switched PCPs at least once. Patients were identified as LEP if Spanish was indicated as their preferred spoken language in the KPNC electronic medical record.

There were 3511 patients who: (1) switched PCPs between January 1, 2007 and December 31, 2013; (2) were empaneled with both the preswitch and postswitch PCP for at least 12 months; and (3) had continuous membership and prescription drug benefits. The switch date was the administrative start date (ie, date of empanelment) with a new PCP and marked the end of care with the previous PCP. We excluded 525 patients who did not have at least 1 outpatient visit with each PCP and excluded 1381 for whom we lacked Spanish proficiency data for either the preswitch or postswitch PCP. This left a cohort of 1605 participants (1760 PCP switches).

Primary care physicians were identified as Spanish speaking if they self-reported "high" fluency in Spanish[15,16] or there was evidence from utilization data that the PCP delivered care in Spanish without the aid of interpreters. Self-report data came from the KPNC human resources department, which inquired about language proficiency at the time of hire or, secondarily, a PCP language research survey administered in 2012.[17]

In the absence of self-report, we relied on utilization data that identified encounters with bilingual PCPs. If a PCP had 5 or more visits with LEP Latinos during the year and at least 80% of those visits were coded "in-language care provided from bilingual physician," then the PCP was categorized as Spanish speaking. If no visits were coded in that way, then the PCP was categorized as English only (ie, did not speak Spanish). Primary care physicians who did not fall into either category were classified as missing Spanish language proficiency. We conducted a sensitivity analysis among PCPs for whom we had both self-reported Spanish fluency (assumed to be gold standard) as well as utilization data and found that this algorithm had 93% sensitivity and 91% specificity. Of the 1498 PCPs who cared for the 3511 eligible patients, we identified Spanish language proficiency for 1044 (44% from self-report and 56% from utilization data); 160 PCPs (15%) were Spanish speaking and 884 (85%) were English only.

Each LEP patient was classified as having either a language-concordant (ie, bilingual, Spanish-speaking) PCP or language-discordant (ie, English-only) PCP during the preswitch and postswitch periods. The KPNC and University of California, San Francisco, institutional review boards approved this study, waiving written informed consent.

Exposures

The exposure of interest was a change in language concordance as a result of switching PCPs (ie, from discordant to concordant or from concordant to discordant). LEP Latinos who experienced a change in PCP language concordance were compared with reference patients made up of LEP Latinos who

switched PCPs with no change in concordance (ie, from discordant to discordant or from concordant to concordant).

Outcomes

We collected each patient's glycated hemoglobin (HbA_{1c}), low-density lipoprotein (LDL), and systolic blood pressure (SBP) at 2 time points: the last recorded value prior to the switch date and the last value within 12 months postswitch. The mean time between the pre and post measures was approximately 1 year. These continuous measures were categorized using recognized cut-points based on the Healthcare Effectiveness Data and Information Set (HEDIS) and American Diabetes Association guidelines: glycemic control (HbA_{1c} < 8%), poor glycemic control (HbA_{1c} > 9%), LDL control (LDL < 100 mg/dL), and systolic blood pressure control (SBP < 140 mm Hg).[18,19]

Covariates

Data were collected from the KPNC electronic medical records and administrative databases. Patient demographics were self-reported in the electronic medical record. Primary care physician age, sex and race/ethnicity came from the human resources database. The reason for each PCP switch was obtained from the administrative database, and we categorized these as: administrative (eg, PCP changed medical facility or left health plan), language or communication issues (eg, member language preference), other member requests (eg, member desired same PCP as family), or unknown. We calculated the previously validated neighborhood deprivation index,[20] a contextual measure of socioeconomic status, by linking each patient's geocoded residential address to census tract level socioeconomic indicators from the 2010 American Community Survey.

Statistical Analysis

We used a difference-in-differences framework to study how changes in patient-PCP language concordance impacted the change in risk factors preswitch to postswitch. The difference-in-differences method is a quasi-experimental approach that measures the change in an outcome due to an intervention and/or exposure (first difference), after subtracting the background change (second difference; eg, owing to secular trends or discontinuity in care due to switching irrespective of language concordance).[21,22] Difference-in-differences rests on the counterfactual assumption; namely, if LEP Latinos who switched from discordant to concordant PCPs had instead switched to other discordant PCPs, we assume that the changes in their clinical measures would be similar to the changes observed in the reference group (ie, LEP Latinos who did not change concordance status). To adjust for case mix imbalances between exposure and reference groups, we included patient characteristics (ie, age, sex and socioeconomic status) as well as PCP characteristics (ie, age, sex, and race/ethnicity), and the year and the reason for the PCP switch as fixed effects.

Our repeated measures data had a hierarchical structure. Some patients switched PCPs more than once and all patients were nested within PCPs (ie, multiple patients were empaneled with each PCP). We specified hierarchical linear mixed models to estimate the net difference-in-differences effect. Both patient and PCP were specified as random effects in random intercept models to account for nonindependence of the residual error and to correctly adjust the variance estimates. We also conducted 3 sensitivity analyses. We modeled changes in glycemic control after excluding 121 patients whose preswitch and postswitch measures were less than 90 days apart since HbA_{1c} measures average plasma glucose levels during the prior 3 to 4 months. We also ran the models in the subset of patients who switched PCPs due to administrative changes only; this restricted the analysis to patients who were less vulnerable to self-selection bias because they did not initiate the PCP switch on their own. In the third sensitivity analysis, we required a "wash-out" period after the switch (ie, only using postswitch measures that were at least 30 days after the first in-person visit with the postswitch PCP), to ensure that the postswitch measure was collected after the patient had established a relationship with the new PCP.

For unadjusted comparisons, χ^2 statistics were used for categorical variables, and analysis of variance (ANOVA) or *t* tests were used for continuous variables. The difference-in-differences models were run using mixed models; the significance of the difference-in-differences parameter estimate was based on the *t* distribution. The level of significance was set at .05.

Results

The cohort consisted of 1605 LEP Latinos. Before switching, 46% of the LEP Latinos were empaneled with a concordant PCP and 54% with a discordant PCP; 59% of LEP Latinos with concordant PCPs switched to another concordant PCP, while 48% of LEP Latinos with discordant PCPs switched to a concordant PCP. LEP Latinos with discordant PCPs who switched to concordant PCPs were more likely to have changed due to language or communication issues than patients who switched to another discordant PCP (30% vs 9%, respectively). These 2 groups were similar in regards to demographics and baseline risk factor control (**Table 1**). LEP Latinos with concordant PCPs who switched to discordant PCPs had better rates of preswitch LDL and SBP control than patients who switched to another concordant PCP. However, these 2 groups were mostly similar in regards to demographics and there were no differences in the prevalence of preswitch glycemic control. Spanish-speaking PCPs were more likely to identify as Latino (51%) than English-only PCPs (2%) but were similar in terms of sex (54% female) and age (29% ≥ 45 years old).

Most groups experienced slight improvements in the prevalence of glycemic control (HbA_{1c} < 8%) and poor glycemic control (HbA_{1c} > 9%) in the year after switching PCPs regardless of the change in language concordance (**Figure 1**). However, the largest improvement was observed among LEP Latinos who switched from discordant to concordant PCPs; glycemic control increased 11% (from 63% to 74%) while poor glycemic control decreased 7% (from 20% to 13%). In adjusted difference-in-differences models, there was a 10% (95% CI, 2% to 17%; *P* = .01) net increase in the prevalence of good glycemic control and a −4% (95% CI, −10% to 2%; *P* = .16) net decrease in the prevalence of poor control among

Table 1. Characteristics of 1605 LEP Latino Patients With Diabetes Who Switched PCPs Stratified by Patient-PCP Language Concordance Preswitch and Postswitch[a]

Characteristic	No. (%) of Participants				
	LD to LC (n = 418)	LD to LD (n = 445)	LC to LD (n = 301)	LC to LC (n = 441)	All (n = 1605)
Patient Characteristics					
Age, y[b,c]					
<45	35 (8)	54 (12)	49 (16)	41 (9)	179 (11)
45-64	221 (53)	216 (49)	136 (45)	229 (52)	802 (50)
65-74	100 (24)	81 (18)	66 (22)	92 (21)	339 (21)
>75	62 (15)	94 (21)	50 (17)	79 (18)	285 (18)
Female	226 (54)	225 (51)	176 (58)	260 (59)	887 (55)
Neighborhood deprivation index quartile					
Q1 (least deprived)	35 (8)	40 (9)	28 (9)	26 (6)	129 (8)
Q2	77 (19)	72 (16)	53 (18)	81 (19)	283 (18)
Q3	131 (32)	140 (32)	94 (32)	118 (27)	483 (30)
Q4 (most deprived)	172 (41)	189 (43)	123 (41)	211 (48)	695 (44)
Years empaneled with preswitch PCP, mean (SD)[c]	4.6 (3.9)	4.7 (3.4)	4.4 (2.9)	5.0 (3.4)	4.7 (3.5)
Year of PCP switch[c]					
2007	59 (14)	61 (14)	21 (7)	27 (6)	168 (10)
2008	46 (11)	48 (11)	25 (8)	37 (8)	156 (10)
2009	41 (10)	66 (15)	35 (12)	32 (7)	174 (11)
2010	65 (16)	58 (13)	39 (13)	30 (7)	192 (12)
2011	58 (14)	67 (15)	74 (25)	92 (21)	291 (18)
2012	67 (16)	67 (15)	67 (22)	112 (25)	313 (20)
2013	82 (20)	78 (18)	40 (13)	111 (25)	311 (19)
Reason for PCP switch[b,d]					
Administrative change	120 (29)	203 (46)	174 (58)	229 (52)	726 (45)
Language or communication issue	124 (30)	38 (9)	12 (4)	28 (6)	202 (13)
Other member request	62 (15)	61 (14)	40 (13)	54 (12)	217 (14)
Unknown	112 (27)	143 (32)	75 (25)	130 (29)	460 (29)
Preswitch PCP Characteristics					
Race/ethnicity[b,c]					
Asian	170 (41)	237 (53)	50 (17)	61 (14)	518 (32)
Black	20 (5)	32 (7)	2 (1)	3 (1)	57 (4)
Hispanic	34 (8)	20 (4)	206 (68)	278 (63)	538 (34)
White non-Hispanic	161 (39)	130 (29)	41 (14)	87 (20)	419 (26)
Other/unknown	33 (8)	26 (6)	2 (1)	12 (3)	73 (5)
Age, y					
<45	222 (53)	250 (56)	146 (49)	212 (48)	830 (52)
45-64	191 (46)	194 (44)	150 (50)	225 (51)	760 (47)
>65	5 (1)	1 (<1)	5 (2)	4 (1)	15 (1)
Female[b]	223 (53)	199 (45)	165 (55)	268 (61)	855 (53)
Preswitch clinical measures					
Glycemic control (HbA_{1c} <8%)	256 (63)	287 (69)	200 (70)	291 (68)	1034 (67)
Poor glycemic control (HbA1c >9%)	85 (21)	69 (17)	46 (16)	77 (18)	277 (18)
LDL control (<100 mg/dL)[c]	259 (65)	286 (69)	187 (66)	318 (76)	1050 (69)
SBP control (<140 mm Hg)[c]	312 (78)	341 (81)	227 (77)	365 (84)	1245 (80)

Abbreviations: HbA_{1c}, glycated hemoglobin; KPNC, Kaiser Permanente Northern California; LC, language concordant; LD, language discordant; LDL, low-density lipoprotein; LEP, limited English proficiency; PCP, primary care physician; SBP, systolic blood pressure.

[a] For patients who switched PCPs more than once (n = 142), data from the first PCP switch were used. *P* values from χ^2 statistics for categorical variables and ANOVA (*F* test statistics) for continuous variables. Missing data includes neighborhood deprivation index (n = 15), HbA_{1c} (n = 69), LDL (n = 90), SBP (n = 58).

[b] $P < .05$ for LD-LC vs LD-LD.

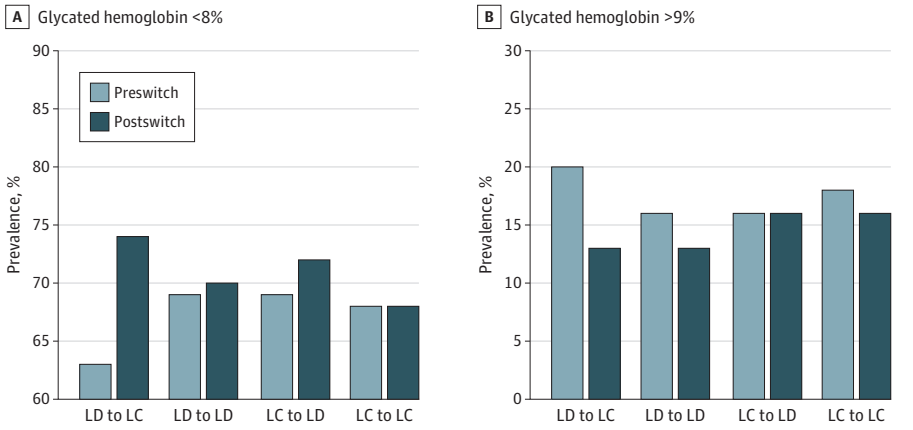
[c] $P < .05$ for LC-LD vs LC-LC.

[d] Administrative change includes PCP leaving KPNC or changing medical facilities or schedule. Other member requests include change due to location or sex preference or due to concerns about PCP care or accessibility.

LEP patients switching from discordant to concordant PCPs (**Table 2**). When modeled as a continuous outcome, the change in mean HbA_{1c} was −0.22 (95% CI, −0.45 to 0.01; $P = .06$; data not shown). Among LEP patients who switched from a concordant to a discordant PCP, there were no significant changes in the prevalence of glycemic control or poor glycemic control. Results did not change substantively in a sensitivity analysis that excluded patients with preswitch and postswitch HbA_{1c} measures that were less than 90 days apart (data not shown).

Low-density lipoprotein cholesterol and SBP also improved following a PCP switch for most groups (**Figure 2**). In

Figure 1. Glycated Hemoglobin Levels in LEP Latino Patients With Diabetes Before and After Switching Primary Care Physicians



Language concordance between patient and PCP before (preswitch) and after (postswitch) switching PCPs is shown along the x-axis. For example, the LD to LC group consists of patients with a language-discordant PCP preswitch and a language-concordant PCP postswitch. The prevalence (unadjusted) of glycated hemoglobin levels before and after switching PCPs is shown along the y-axis. LC indicates language concordant; LD, language discordant; LEP, limited English proficiency; PCP, primary care physician.

Table 2. Difference-in-Differences Estimates of the Net Change in Prevalence of Risk Factor Control Among 1605 LEP Latino Patients Who Switched PCPs From Adjusted Mixed Models[a,b,c]

Outcome	DID Estimate, % (95% CI)[a]			
	LD to LC (Relative LD to LD)[d]	*P* Value	LC to LD (Relative to LC to LC)[e]	*P* Value
HbA_{1c}				
<8%	10 (2 to 17)	.01	4 (−3 to 11)	.24
>9%	−4 (−10 to 2)	.16	2 (−4 to 8)	.53
LDL < 100 mg/dL	9 (1 to 17)	.03	15 (7 to 24)	<.001
SBP < 140 mm Hg	4 (−3 to 11)	.25	6 (−1 to 13)	.07

Abbreviations: DID, difference-in-differences; HbA1c, glycated hemoglobin; LDL, low-density lipoprotein; LC, language concordant; LD, language discordant; LEP, limited English proficiency; PCP, primary care physician; SBP, systolic blood pressure.

[a] Difference-in-differences models estimate the adjusted, absolute change in the prevalence of the outcome among patients experiencing a change in language concordance status with their PCPs (ie, discordant to concordant switches or concordant to discordant switches) after subtracting the expected (background) changes observed in those patients who switched PCPs but language concordance status remained unchanged (ie, from discordant to discordant or concordant to concordant) (reference groups).

[b] Includes 1760 PCP switches made by 1605 patients.

[c] Fixed effects included patient-PCP language concordance status, patient sex and age, neighborhood deprivation index, year of PCP switch, reason for PCP switch, and PCP sex, age, and race. Patient and PCP were modeled as random effects.

[d] LEP Latinos who switched from one language-discordant PCP to another language-discordant PCP were used as the reference group.

[e] LEP Latinos who switched from one language-concordant PCP to another language-concordant PCP were used as the reference group.

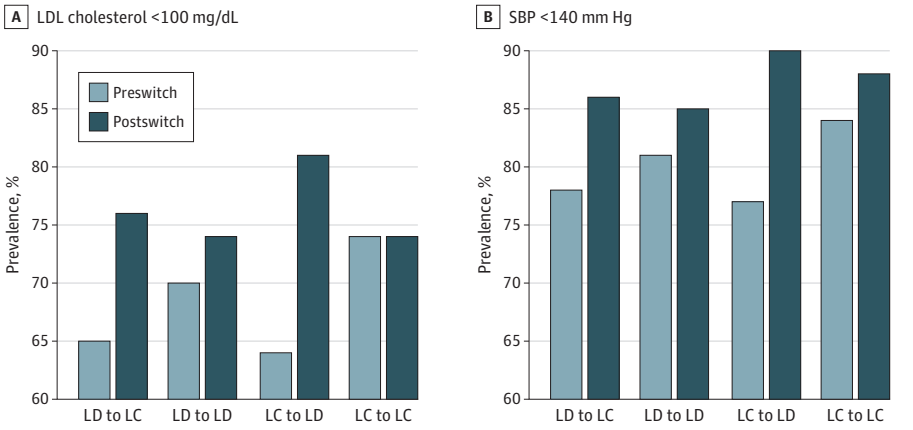
adjusted difference-in-differences models, the prevalence of LDL control (LDL < 100 mg/dL) increased by 9% (95% CI, 1% to 17%; *P* = .03) among LEP patients switching from a discordant to concordant PCP and by 15% (95% CI, 7% to 24%; *P* < .001) among LEP patients switching from a concordant to discordant PCP. Mean LDL decreased by 6.1 mg/dL (95% CI, −11.4 to −0.8; *P* = .02) in the latter group but not the former. We did not find evidence of significant differences in changes in SBP control by concordance status.

There were qualitatively similar effect sizes in the subset of patients who switched PCPs due to administrative changes, but the estimates were not statistically significant: 11% (95% CI, 2% to 24%; *P* = .08), 8% (95% CI, −5% to 22%; *P* = .24) and 11% (95% CI, −3% to 14%; *P* = .23) net increases for glycemic, LDL and SBP control, respectively among LEP Latinos switching from discordant to concordant PCPs; a mean drop of 0.27% points (*P* = .17) in HbA_{1c} was also observed. Among LEP Latinos switching from concordant to discordant PCPs, there was a 24% (95% CI, 12% to 35%; *P* < .001) net increase in LDL control and nonsignificant changes of 9% (95% CI, −1% to 18%; *P* = .07) and 11% (95% CI, −2% to 24%; *P* = .11) in the prevalence of glycemic and systolic blood pressure control, respectively. The sensitivity analyses that required a "wash-out" period after the switch also generated qualitatively similar results as the main models, but the 9% increase in the prevalence of LDL control among LEP patients who switched from discordant to concordant PCPs was no longer significant (*P* = .08; data not shown).

Discussion

In this study of LEP Latino diabetes patients cared for in a large, integrated health care delivery system, those who switched from language-discordant (ie, English-only) PCPs to language-

Figure 2. LDL Cholesterol and SBP in LEP Latino Patients With Diabetes Before and After Switching Primary Care Physicians



Language concordance between patient and PCP before (preswitch) and after (postswitch) switching PCPs is shown along the x-axis. For example, the LD to LC group consists of patients with a language-discordant PCP preswitch and a language-concordant PCP postswitch. The prevalence (unadjusted) of LDL cholesterol and SBP levels before and after switching PCPs is shown along the y-axis. LC indicates language concordant; LD, language discordant; LDL, low-density lipoprotein; LEP, limited English proficiency; PCP, primary care physician; SBP, systolic blood pressure.

concordant (ie, bilingual, Spanish-speaking) PCPs experienced a 10% increase in the prevalence of glycemic control after accounting for changes observed among LEP patients switching from one language-discordant PCP to another. There was no significant change in SBP control, and overall, we found no deleterious effects on any of the 3 clinical outcomes following any PCP switch, including for those patients switching from concordant to discordant PCPs. Unexpectedly, we also observed an increase in the prevalence of good LDL control among those switching from concordant to discordant PCPs. To our knowledge, this is the first report to use a longitudinal, quasi-experimental study design to examine the impact of changes in language concordance on risk factor control among LEP Latinos with diabetes.

We found clinically meaningful effects with respect to improvement in glycemic control. These findings are generally consistent with those from a study of Latino youth with type 1 diabetes that found a 0.5 point decrease in mean HbA_{1c} in the year after joining a Spanish language clinic.[23] We found a 0.22 point decrease in mean HbA_{1c} following a switch to a language-concordant PCP. Improvements in risk factor control after switching to a language-concordant PCP were previously documented in a small cohort of Russian immigrants with diabetes.[24] While not a randomized clinical trial, our difference-in-differences study design has strong causal validity. As health plans and regulatory agencies strive to improve population health and reduce disparities, it is noteworthy that a 10% improvement in prevalence of HbA_{1c} less than 8% among language-discordant LEP Latinos was achieved by simply switching PCPs and without the creation of costly new programs; in short, it suggests a practical strategy for improving HEDIS measures for glycemic control in settings with relatively large numbers of Spanish-speaking PCPs.[25]

There are a few possible explanations for our findings. Latino patients with concordant PCPs were previously shown to be twice as likely to receive counseling about diet and exercise as Latino patients with discordant PCPs.[26] LEP patients switching to concordant PCPs may find it easier to discuss diet and exercise recommendations or complex treatments compared with using interpreters. Patients with concordant PCPs might communicate using secure messaging in their preferred language, thus facilitating dialogue between office visits. Language concordance might be a proxy for a mutual cultural affinity, facilitating rapport, and communication.[27] Finally, patients often resist initiating insulin when recommended, and better communication with Spanish-speaking PCPs might ease the concerns of LEP patients.[28]

Similar to LEP patients who changed from discordant to concordant PCPs, those who changed from concordant to discordant PCPs experienced improvements in LDL control. The effect sizes in both groups were of the same order of magnitude with overlapping 95% CIs. While the results in the discordant to concordant group support our hypothesis that improved communication leads to better clinical outcomes, it is difficult to apply this logic to the concordant to discordant group. Rather, we suspect that some other closely linked but unmeasured aspect of care improved (eg, patient satisfaction or trust in PCP) despite switching to a language-discordant PCP. The KPNC health plan, a setting with uniform access to professional translation services and electronic medical records that integrate pharmacy, laboratory, specialty and primary care services, provides good continuity of care following a PCP switch; even among Spanish-speaking LEP patients switching to discordant PCPs.

Our quasi-experimental, differences-in-differences study design provides stronger evidence of causality than previous cross-sectional studies and minimizes potential confounding from measured and unmeasured risk factors because it uses each individual as his or her own control. We ran sensitivity analyses among patients whose PCP switch was initiated administratively. This restricted the analysis to patients who were less vulnerable to self-selection bias because they did not initiate the PCP switch on their own, resembling a natural experiment. In this sensitivity analysis, we found qualitatively similar effect sizes. Some of the estimates were no longer statistically significant due to the reduced sample size and loss of power. These consistent findings assuage concerns about observational self-selection bias.

Limitations

Some limitations should be mentioned. These results may underestimate the effect of language barriers in populations with fewer bilingual PCPs or less comprehensive interpreter services. While professional interpreter services were available at all KPNC facilities, we cannot verify the extent of their use. Underuse has been documented in other settings with uniform availability of such services.[29-31] We could not determine Spanish language proficiency for 30% of KPNC PCPs; these PCPs and their patient panels were excluded from the study. Although excluded PCPs were more likely to be non-Hispanic, and excluded patients were more likely female, excluded and included patients were similar with respect to age, neighborhood level socioeconomic status, baseline risk factor control and pre-post changes in glycemic control, LDL levels, and SBP. Thus, we believe that the exclusions introduced no systematic bias. We could not verify that LEP patients with concordant PCPs were communicating with their PCPs in Spanish. Latinos preferring to speak Spanish but proficient in English may have been misclassified as LEP. We compared our administrative measure with self-report of LEP on the DISTANCE survey[6,12,32] and estimated this misclassification rate to be about 20%. However, this misclassification is likely nondifferential with respect to the direction of switch and PCP concordance, thus biasing the findings toward the null and making the estimates conservative. Lacking an objective measure of PCP fluency in Spanish, we relied on PCP self-report or utilization data recording bilingual care delivery, and misclassification is possible. The majority of the literature concurs that self-report at the high end of the scale is an acceptable proxy in the absence of formal testing,[15,17,33] and therefore we only categorized PCPs who self-reported "high" fluency as Spanish speaking. There are limitations to using utilization data to categorize PCP Spanish fluency as these do not directly measure proficiency level. However, the utilization data clearly state that the PCP is bilingual, and these data are used for HEDIS reporting purposes. The high sensitivity (93%) and specificity (91%) of this measure provide reassurance that misclassification is minimal. Moreover, misclassifying PCPs would likely bias our results toward the null.

Conclusions

We found improvements in the prevalence of glycemic control among LEP Latinos with diabetes who switched from a language-discordant PCP to a language-concordant PCP after accounting for expected background changes. There was no evidence of harm after switching from concordant to discordant PCPs, and in the case of LDL control, these switches also resulted in improvement. There are several compelling nonclinical reasons for providing language-concordant care when possible, including increased patient satisfaction and facilitating communication. Our study suggests that health systems caring for LEP Latinos with diabetes may also improve glycemic control by facilitating language-concordant care, even if it means switching PCPs.

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