ETHNICITY, LANGUAGE, SPECIALTY CARE, AND QUALITY OF DIABETES CARE

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Objective: To investigate ethnicity, language, specialty care, and quality of diabetes care in one medical center.

Methods: Retrospective review of computerized records of patients with diabetes age ≥50 years who were regularly cared for in general medicine, family practice, or diabetes clinics from 1997 to 2000. Measures of processes of care were tests for creatinine, cholesterol, hemoglobin A1C (HbA1C), and microalbumin; ophthalmologic care; and total visits. Intermediate outcomes were average systolic blood pressure (SBP) <140 mm Hg and HbA1C <8%.

Results: Among 1323 patients, test rates for creatinine, cholesterol, microalbuminuria, and HbA1C were 76.6%, 54.7%, 17.2%, 78.8%, respectively. Only 31.0% had ophthalmology visits, 57.4% had SBP <140 mm Hg, and 62.0% had HbA1C <8%. In multivariate analyses, African Americans, Asians, and Latinos received more tests and had more total visits than Whites. Intermediate outcomes were similar except that Asians were more likely (odds ratio [OR]=1.78, 95% confidence interval [CI] 1.26–2.50) to have SBP <140 mm Hg. Limited English proficient patients had more total visits (7.0) than English speakers (6.5) (P=.01). Compared to patients with only primary care, patients with a diabetes specialist had more microalbuminuria (OR 3.04, 95% CI 1.87–4.95) and HbA1C (OR 1.91, 1.12–3.26) tests, while those with both types of care were more likely to have each of the five process measures but less likely to have HbA1C <8%.

Conclusions: Quality of diabetes care was suboptimal for most patients. No ethnic disparity was seen in intermediate outcomes, which may have been achieved through more tests and visits. Combined care by primary and diabetes clinicians may be optimal. (*Ethn Dis*. 2007;17:65–71)

Key Words: Diabetes, Ethnicity, Quality of Care

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INTRODUCTION

Compared to non-Latino Whites, African Americans and Latinos have a higher prevalence of diabetes, worse glycemic control, and higher rates of complications,[1–3] while Asian Americans have a higher prevalence of diabetes after adjusting for body mass index.[4] In a health plan setting with similar access to care, ethnic minorities with diabetes had lower risks for myocardial infarctions and amputations but higher risks for renal failure.[5]

Diabetic complications are reduced when patients have controlled hypertension, treated hypercholesterolemia, glycemic control, and early treatment for early retinopathy and kidney disease.[6] The American Diabetes Association (ADA) guidelines include routine tests to monitor glucose control, complications, and co-morbid conditions.[6] Most studies of diabetic quality of care use technical processes of care, such as regular receipt of tests, and measurements of intermediate outcomes, such as glucose control. Few studies have evaluated both ethnic and language differences in quality of diabetes care.[7–10] We aimed to examine the association of language, ethnicity, and specialty care on quality of diabetes care received by older adults in general internal medicine (GIM), family practice (FP), and diabetes clinics at an academic health center. We hypothesized that limited English proficient (LEP) and non-White patients would have lower quality of care.

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METHODS

Setting

The University of California, San Francisco (UCSF) Medical Center serves a diverse population at two main sites, each with a hospital, emergency room, urgent care, and outpatient clinics; a third site provided outpatient FP and GIM care. In 2000, a total of 55,526 visits were recorded to GIM, 30,930 to FP, and 5718 to diabetes clinics. Insurance mix for these clinics was 40% managed care, 30% Medicare, 25% Medicaid, and 5% others (self-pay or fee-for-service). Clinics were connected to a computer database and received similar administrative support. Diagnostic laboratories were within a one-block walk. Ophthalmologic care was available at two sites. Attending physicians and fellows provided care at all practices. Nurse practitioners and medical residents also provided supervised care in GIM. Nearly one third of clinicians in the system were non-White, and three fourths spoke a second language.[11] Approximately 30% of visits required interpretation, but despite availability of professional interpreters, no request was made in approximately half of these visits.[11]

Medical Records

We conducted a retrospective study of the computerized medical record system (summary time oriented records, STOR) at UCSF. The institutional review board approved the protocols. At registration, patients reported their birth date, sex, ethnicity, race, and primary language.

Clinicians entered diagnoses, medications, and health information by hand to maintain STOR records. Clerks then entered the data into the electronic database. A computerized reminder system generated a healthcare maintenance checklist for each visit, and starting in 1995, the checklist for diabetes, based on ADA guidelines, was generated automatically for patients with that diagnosis. Laboratory results were linked to the database. Visits to all UCSF practices, urgent care, emergency room, and hospital admissions were linked to STOR.

Sample Eligibility

Eligible patients had diabetes and ≥50 years of age at the first visit to one of three practices (GIM, FP, and diabetes) likely to provide primary diabetes care from July 1997 to June 2000. To ensure regular care, we included patients with at least three visits to any practice during the study period. We also excluded those in the system for less than six months and those with no data for all three categories of language, ethnicity, and race.

Demographic and Clinical Data

We collected the following patient variables: age, sex, primary language, ethnicity, race, insurance coverage, and presence of seven co-morbid diagnoses (hypertension, congestive heart failure, coronary artery disease, chronic obstructive pulmonary disease, asthma, renal insufficiency, and depression) as defined by the treating clinician.

We defined five mutually exclusive ethnic groups based on race, ethnicity, and language. ''African American'' was African American or Black race with any ethnicity except Latino and any language except Spanish. ''Asian'' was Asian race with any ethnicity except Latino, and any language. Patients who reported ''other'' or no race but had an Asian primary language were classified as ''Asian.'' We defined ''Latino'' as any race with Latino ethnicity, or any race or ethnicity with a primary language of Spanish. ''White'' was White race, any ethnicity other than Latino or Russian, and any language other than Russian or Spanish. ''Other'' was defined as any patient who had a reported race, ethnicity, or language that did not fit into any of the above categories. We excluded patients whose ethnicity was Russian or primary language was Russian since many Russian patients had alternate Russian primary care clinicians not in the system.

Primary language was defined as English speakers (English as primary language) and LEP (for those with a primary language other than English). Primary health insurance was categorized as managed care for any private health maintenance organization insurance, including managed Medicare; Medicare for all remaining Medicare insurance, including those with both Medicaid and Medicare; Medicaid only; fee-for-service insurance; and other. We assigned the median household income from the 1990 US Census for each zip code to patients whose residence was in that zip code.[12] This measure has been used to estimate socioeconomic status for individual patients when using administrative datasets.[13] We categorized the primary site of care as primary care (only visits to GIM or FP), diabetes specialty care (only visits to diabetes practice), or both.

Diabetes Quality of Care Variables

We used the ADA recommendations to define quality of care.[14] In 1997, the recommendations included: 1) serum creatinine; 2) routine urinalysis followed by a test for urine microalbumin if the urinalysis were negative for protein; 3) an initial lipid panel; 4) an initial hemoglobin A1C (HbA1C); 5) annual microalbuminuria testing; 6) annual dilated eye exam; and 7) HbA1C one to two times a year.[24] Adequate glycemic control was HbA1C <8%, and blood pressure control was <130/85 mm Hg. In 2000, the ADA recommended that systolic blood pressure (SBP) control be ≤140 mm Hg even in those with only isolated systolic hypertension.[15]

We collected processes-of-care variables, defined as receipt of the following tests at least once every 12 months: serum creatinine, serum total cholesterol, urine microalbumin, and HbA1C. We used an ophthalmology visit as a proxy for a dilated eye examination. To calculate the time in the system, we computed the difference between the first and last dates within the study period for any visits or laboratory testing at UCSF. Those in the system for between 6 and 12 months were treated as if they were in the system for 12 months.

Intermediate outcome variables included SBP control, measured as the average of the last three SBP readings <140 mm Hg, and HbA1C level <8% when last checked. We also calculated the number of visits to all three practices, urgent care, and emergency rooms, as well as the number of hospital admissions every 12 months.

Data Analysis

We calculated summary statistics for all demographic and clinical variables. Using the χ^2 test, we assessed the bivariate associations between language and ethnicity with quality-of-care variables. We performed multivariate models controlling for the potential covariates (age, sex, income, insurance, number of ambulatory care visits, and co-morbid diagnoses). We used logistic regression models for the binary quality

of care outcomes. For the visit rates outcomes, we calculated unadjusted annual visit rates by language and ethnicity and used general linear models with covariates of age, sex, insurance, income, and co-morbid diagnoses to evaluate for statistically significant differences by language and ethnicity. All analyses were conducted with SAS version 8.2.[16]

RESULTS

Table 1 shows the demographic characteristics and selected co-morbid diagnoses for the 1,323 diabetic patients. These patients had been seen in at least one of the following clinics: diabetes (29.9%), family medicine (6.9%), and/or general medicine (71.7%). The age range was 50 to 95 years (mean 67.5, standard deviation [SD] 10.7). Asians (mean 69.5 years) and Latinos (69.8) were significantly older than African Americans (66.5), Whites (65.7), and "others" (64.1) ($P<.01$). English was the primary language for 67.8% of patients. Limited English proficient (LEP) patients were older (mean 71.4 years) compared to English speakers (65.6) ($P<.01$). Nearly all (96%) had health insurance. Managed care insurance was highest among Whites (44%) and lowest among African Americans (25%), while the proportion with Medicaid/Medi-Cal was highest among "others" (24.4%) and African American (19.6%) compared to Asian (9.1%), Latino (8.6%), and White (9.6%) ($P<.001$). More than half had hypertension. More than half (59.8%) received care solely in primary care, while 8.3% received care only from diabetes clinics.

No differences were seen between African Americans (mean 2.42 years), Asians (2.31), Latinos (2.38), and Whites (2.35) in time in the study. No difference was seen between English speakers and LEP patients in time in the study. The proportions of those with <12 months in the study were similar for African American (3.2%), Asian (8.5%), Latino (6.5%), White (6.6%), and "others" (11.2%) ($P=.06$) and for LEP (6.8%) and English speakers (7.0%) ($P=$nonsignificant).

Table 1. Sociodemographics and selected health characteristics of patients with diabetes, UCSF Medical Center, 1997–2000

	N (%)
Total Sample Size	1323 (100)
Age (years)	
50–64	553 (41.8)
65–74	383 (28.9)
≥75	387 (29.3)
Sex	
Female	749 (56.6)
Male	574 (43.4)
Primary language	
Cantonese/Mandarin	211 (15.9)
Spanish	92 (7.0)
Other	126 (9.5)
English	894 (67.8)
Ethnicity	
African American	230 (17.4)
Asian	454 (34.3)
Latino	143 (10.8)
White	402 (30.4)
Other*	94 (7.1)
Income	
<$25,000	145 (10.9)
$25,000–$39,999	775 (58.6)
≥$40,000+	403 (30.5)
Primary insurance	
Medicare	602 (46.2)
Medicaid	157 (12.1)
Managed care	465 (35.7)
Fee-for-service	15 (1.2)
None	55 (4.2)
Selected co-morbid diagnoses†	
Hypertension	743 (56.2)
Congestive heart failure	137 (10.4)
Coronary artery disease	280 (21.2)
Chronic obstructive pulmonary disease	67 (5.1)
Asthma	112 (8.5)
Renal failure	130 (9.8)
Depression	140 (10.6)
None of the above	380 (28.7)
Primary source of care	
Primary care (general medicine or family practice)	786 (59.8)
Diabetes specialty care	109 (8.3)
Both	420 (31.9)

* Distribution of "other" ethnicity: race (2.1% American Indian, 75.5% other, 22.3% unknown), ethnicity (81.9% non-Hispanic, 18.1% unknown), language (78.7% English, 19.2% other, 2.1% unknown

† Patients may have more than one diagnosis.

Compared to Whites, ethnic minorities were more likely to receive recommended tests but had similar intermediate outcomes.

Table 2 shows the process and intermediate outcomes by age, sex, language, and ethnicity. Results of multivariate analysis are shown in Table 3.

Latinos had the most number of visits to all three practices (average unadjusted annual visits 7.4), followed by Asians (6.8), "others" (6.8), African Americans (6.7), and Whites (6.2) ($P=.02$). African Americans had the most number of visits to the emergency room (average unadjusted annual visits 1.13), followed by Latinos (.88), Whites (.85), "others" (.82), and Asians (.62) ($P<.001$). No ethnic differences were seen in number of hospitalizations or urgent care visits. Compared to English speakers, LEP patients had more visits to all three practices (6.5 vs 7.0, $P=.01$), but similar number of visits to urgent care (.37 vs .30), emergency room (.87 vs .71), and hospital admissions (.47 vs .48).

DISCUSSION

Similar to other reports,[7,8,17] we found that many patients with regular care did not receive recommended tests at the appropriate intervals. Nearly half had inadequate blood pressure control, and one third had poor glucose control. No difference was seen in quality of care by patient language. Compared to Whites, ethnic minorities were more likely to receive recommended tests but had similar intermediate outcomes.

Prior studies of diabetes care have shown that, compared to Whites,

Table 2. Proportion of diabetic patients receiving quality care measured by processes of care and intermediate outcomes by age, sex, language and ethnicity, UCSF Medical Center, 1997–2000

	Processes of Care Variables					Intermediate Outcome Variables	
	Creatinine	Total Cholesterol	Urine Microalbumin	Ophthalmology Visit	Hemoglobin A1C	Hemoglobin A1C < 8%[1] (mean ± SD)	Systolic Blood Pressure < 140 mm Hg % (mean ± SD)
	% with at least 1 test or visit per 12 months						
Total (*N*=323)	76.6	54.7	17.2	31.0	78.8	62.0 (7.7 ± 1.6)	57.4 (137 ± 17)
Age in years (*n*)							
50–64 (553)	67.8	50.5	17.5	23.2	75.1	57.2 (7.8 ± 1.9)	67.3 (132 ± 17)
65–74 (383)	79.1	61.9	20.1	34.5	82.3	66.7 (7.6 ± 1.6)	51.1 (139 ± 17)
≥75 (387)	86.8†	53.8‡	14.0‖	38.8†	80.9§	64.2§ (7.6 ± 1.3)	49.9† (140 ± 17)
Sex (*n*)							
Women (749)	78.8	52.7	15.9	32.0	79.4	60.0 (7.8 ± 1.7)	53.3 (138 ± 18)
Men (574)	73.9§	57.3[5]	19.0‖	29.6‖	78.1‖	64.6‖ (7.5 ± 1.6)	62.8† (134 ± 16)
Language (*n*)							
Limited English proficient (429)	81.8	59.4	19.4	38.7	83.9	61.9 (7.7 ± 1.3)	56.7 (137 ± 17)
English (894)	74.2‡	52.5§	16.2‖	27.3†	76.4‡	62.1‖ (7.7 ± 1.7)	57.7‖ (137 ± 17)
Ethnicity (*n*)							
African American (230)	83.9	47.8	13.0	23.0	76.1	57.4 (8.0 ± 1.9)	50.0 (140 ± 18)
Asian (454)	76.9	61.9	20.3	38.1	83.9	64.9 (7.6 ± 1.5)	62.3 (136 ± 17)
Latino (143)	83.9	53.9	22.4	35.7	88.1	58.8 (7.7 ± 1.3)	54.6 (138 ± 17)
Others (94)	72.3	54.3	29.8	31.9	76.6	51.2 (7.9 ± 1.2)	62.6 (135 ± 16)
White (402)	70.7†	51.0‡	14.2§	25.6†	71.9†	64.9§ (7.5 ± 1.7)	55.7§ (136 ± 17)

* Result of the last hemoglobin A1C for those who had one (*N*=1214).
† *P*<.001; ‡ *P*<.01; § *P* ≤.05; ‖ *P*>.05.
P value refers to the χ^2 test of association for each outcome within each demographic variable.
SD=standard deviation.

African Americans received fewer tests,[7,18–20] while Latinos had comparable process outcomes.[21] We found a higher rate of test receipt among minorities. Potential explanations for this observation include older age among Latinos and Asians and more managed care insurance among Whites. However, the ethnic findings remained after adjusting for these factors. One possible explanation may be that White patients obtained more care outside the UCSF system. Whites and English speakers may be able to negotiate the complex healthcare system better, have multiple sites of care, and use UCSF selectively. In support of this explanation we found that Whites and English speakers had the fewest number of visits to the UCSF practices. However, minorities and non-English speakers may gravitate to language-concordant community clinicians for additional care, especially when diversity is limited at an academic center.[10] As a result, how ethnicity or language relates to differences in care outside the system is unclear.

Other explanations for our finding of higher test receipt by minorities may be a diverse physician workforce and differences in quality between places of care. When minority patients have access to regular care from clinicians who come from similar ethnic backgrounds and speak the same languages, fewer differences in the quality of care may be present. In addition, the existence of a computerized reminder of diabetes process measurements may have aided clinicians in providing quality care. Disparities in systems with multiple institutions occur when minorities disproportionately receive care at lower quality institutions.[20] Fragmentation of care may also lead to worse quality of diabetes care,[22] and ethnic minorities and LEP patients may be the first to suffer in that scenario.

Overall, our study probably underestimates the quality of care found for intermediate outcomes since we were not able to measure ''tightly linked quality,'' which includes factors such as other treatment considerations for co-morbid conditions as well as contraindications that may lead to clinical decisions that do not meet guidelines.[23] As in prior studies,[8,10,21] intermediate outcomes for LEP and English-speaking patients were similar. African Americans had worse glucose control than Whites,[18,24–26] while results have been mixed on intermediate outcomes in Latinos.[9,21,26] We found no ethnic disparity in intermediate outcomes. These outcomes may be affected by treatment intensity,[20] which

Table 3. Multivariate models for quality of care for diabetic patients, UCSF Medical Center, 1997–2000

	Processes of Care Variables*					Intermediate Outcome Variables†	
	Creatinine	**Total Cholesterol**	**Urine Microalbumin**	**Ophthalmology**	**Hemoglobin A1C**	**Hemoglobin A1C <8%**	**Systolic Blood Pressure <140 mm Hg**
	Odds Ratio (95% Confidence Intervals)‡						
Age (50–64 ref.)							
≥75	2.29 (1.47–3.54)	.92 (.66–1.30)	.71 (.44–1.12)	2.54 (1.76–3.66)	1.66 (1.08–2.54)	1.47 (1.04–2.09)	.56 (.41–.77)
65–74	1.33 (.91–1.93)	1.30 (.94–1.79)	1.14 (.77–1.70)	1.87 (1.33–2.64)	1.64 (1.09–2.46)	1.66 (1.19–2.32)	.55 (.39–.77)
Sex (Women ref.)							
Men	.93 (.69–1.23)	1.24 (.98–1.57)	1.21 (.89–1.65)	.93 (.72–1.20)	.94 (.70–1.25)	1.19 (.93–1.51)	1.31 (1.03–1.67)
Language (English ref.)							
Limited English Proficient	1.22 (.83–1.80)	.99 (.72–1.37)	1.01 (.68–1.50)	1.04 (.75–1.45)	.94 (.62–1.41)	.81 (.58–1.12)	.90 (.65–1.24)
Ethnicity (White ref.)							
African American	2.40 (1.50–3.83)	1.04 (.73–1.49)	1.34 (.80–2.25)	.93 (.62–1.40)	1.75 (1.15–2.67)	.76 (.52–1.10)	.91 (.63–1.30)
Asian	1.21 (.82–1.79)	1.60 (1.15–2.24)	1.85 (1.20–2.86)	1.77 (1.24–2.53)	2.41 (1.58–3.66)	1.04 (.73–1.47)	1.78 (1.26–2.50)
Latino	2.06 (1.15–3.69)	1.08 (.69–1.68)	1.91 (1.09–3.34)	1.49 (.93–2.38)	3.48 (1.85–6.54)	.91 (.58–1.44)	1.24 (.80–1.95)
Others	1.25 (.72–2.19)	1.30 (.80–2.11)	1.63 (.87–3.05)	1.59 (.94–2.67)	1.49 (.84–2.62)	.55 (.33–.91)	1.38 (.83–2.29)
Source of care (Primary care only ref.)							
Diabetes only	1.12 (.70–1.81)	1.13 (.74–1.73)	3.04 (1.87–4.95)	.92 (.56–1.51)	1.91 (1.12–3.26)	1.07 (.68–1.67)	.92 (.60–1.43)
Primary care and diabetes	2.68 (1.89–3.81)	2.16 (1.67–2.80)	2.31 (1.67–3.20)	1.98 (1.52–2.58)	3.82 (2.62–5.58)	.74 (.57–.96)	1.07 (.83–1.38)

* N=1295.
† N=1214 for A1C<8%, N=1275 for SBP<140 mm Hg.
‡ Adjusted for the other independent variables in the table as well as income, insurance, and selected co-morbid diagnoses.

may differ by ethnicity. The similar intermediate outcomes in our study may have been achieved through increased intensity of care for minority and LEP patients,[8] manifested in more test receipt and visits. Other factors that may affect intermediate outcomes include differences in patient preferences and patient-clinician communication. These interactions, complex even when the patient and clinician share the same cultural background and language, are more so in multicultural settings and may affect other measures of quality such as patient satisfaction or understanding, which may be different for minorities and LEP patients.

Patients who received care only from diabetes specialists had better processes of care measures than those who received only primary care, a finding shown in other studies.[27,28] Patients who had care from both had worse glucose control, which may reflect case mix.[27] However, our study was not designed to detect differences between primary and specialty care and cannot address issues with clustering and patient case mix.[29] Our study also found significant differences by age; older patients were more likely to be tested for HbA1C, to have HbA1C <8%, and to be referred to ophthalmology. However, older patients were also less likely to have SBP <140 mm Hg. These differences by age are not readily explained by adjustment for total visits and may reflect undefined clinician variation.

Our findings are from one urban center with a high density of ethnic minorities, and the results may not apply to practices with a different mix of providers or patients. We relied on the clinical, not laboratory, diagnosis of diabetes and other conditions. However, the diagnostic standards for these conditions are straightforward and based on laboratory criteria, and thus clinical and laboratory diagnoses should not differ much. Our definition

of ethnicity incorporated race, ethnicity, and language, albeit in a generally acceptable manner, and thus we were unable to address outcomes for specific languages. We were not able to measure the exposure to interpreter services or physician-patient language concordance for LEP patients. Utilization rates are the minimum, since patients may have obtained care from sources not linked to the database, and may be different for different ethnic groups. While this is possible for ophthalmology visits, emergency room visits, and hospital admissions, this would be unusual for laboratory testing. Finally, several factors (detection of protein on a routine office visit urinalysis, treatment with angiotensin-converting enzyme or angiotensin-receptor blocker drugs, and presence of established chronic kidney disease) could have led clinicians to not order microalbumin tests, and thus these results should be interpreted as a minimum rate.

Our study showed that quality of care is poor for older diabetic patients in regular care but that, encouragingly, ethnic minority groups and LEP patients had the same intermediate outcomes as Whites and English speakers. This result may have been achieved through increased intensity of care. Further research should examine other measures of quality of care and how they relate to ethnicity and language.

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