Perceived Access Problems Among Patients with Diabetes in Two Public Systems of Care

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OBJECTIVE: **We examined the prevalence of access problems among public clinic patients after participating in trials of automated telephone disease management with nurse follow-up.**

DESIGN: **Randomized trial.**

SETTING: **General medicine clinics of a county health care system and a Veterans Affairs (VA) health care system.**

PARTICIPANTS: **Five hundred seventy adults with diabetes using hypoglycemic medication were enrolled and randomized; 520 (91%) provided outcome data at 12 months.**

INTERVENTION: **Biweekly automated telephone assessments with telephone follow-up by diabetes nurse educators.**

MEASUREMENTS AND MAIN RESULTS: **At follow-up, patients reported whether in the prior 6 months they had failed to obtain each of six types of health services because of a financial or nonfinancial access problem. Patients receiving the intervention were significantly less likely than patients receiving usual care to report access problems (adjusted odds ratio [AOR], 0.61; 95% confidence interval [CI], 0.43 to 0.97). The risk of reporting access problems was greater among county clinic patients than VA patients even when adjusting for their experimental condition, and socioeconomic and clinical risk factors (AOR, 1.61; 95% CI, 1.02 to 2.53). County patients were especially more likely to avoid seeking care because of a worry about the cost (AOR, 2.82; 95% CI, 1.48 to 5.37).**

CONCLUSIONS: **Many of these public sector patients with diabetes reported that they failed to obtain health services because they perceived financial and nonfinancial access problems. Automated telephone disease management calls with telephone nurse follow-up improved patients' access to care. Despite the impact of the intervention, county clinic patients were more likely than VA patients to report access problems in several areas.**

KEY WORDS: **diabetes; telephone; health services accessibility; socioeconomic factors.**
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Regular outpatient monitoring and medication management are crucial for patients with diabetes because tight glucose and blood pressure control decrease complication rates and may lengthen survival.[1–4] Even with regular outpatient visits, patients experience acute episodes of illness that require rapid and aggressive treatment to prevent permanent functional impairment or death.[5] Unfortunately, many patients fail to receive the services they need because of barriers to access.

Clinicians can use the telephone to augment in-person treatment for patients facing access barriers. Despite its demonstrated benefits in controlled trials,[6–10] telephone care is labor intensive and can be difficult to maintain in health care systems trying to cut costs by decreasing staffing levels. Automated calling systems represent a pragmatic and inexpensive means of improving telephone care programs by enhancing their ability to provide systematic, language-appropriate assessment and education services to large numbers of patients. These systems use specialized computer technology to deliver messages and collect information from patients using either their telephone's touch-tone keypad or voice-response technology. When used in a clinical context, we refer to such systems as automated telephone disease management (ATDM). Prior studies indicate that patients report reliable information during ATDM assessments[11,12]; and that ATDM services can increase vaccination rates,[13–16] improve outcomes,[17] and alleviate communication problems for individuals who cannot speak English.[18]

We conducted two randomized, controlled trials of ATDM with follow-up by nurse educators as a strategy for improving diabetes management among patients who may face barriers to health care access. We conducted the studies in public "safety-net" systems of care: a county health care system and a Veterans Affairs (VA) system.[19] Outcomes from the county clinic trial indicate that participants who received the intervention had better self-care and glycemic control after 12 months than patients receiving usual care[20] and had improvements in patient-centered outcomes such as satisfaction with care.[21] Outcomes for patients in the VA trial are currently being analyzed. Neither of these two studies was designed with the statistical power necessary to examine the intervention's impact on patients' perceptions of their access to care. Therefore, we combined the two data sets and report here the effect of the intervention on self-reported access across the two studies.

In addition to the impact of the intervention, these trials provide a unique opportunity to compare the perceived accessibility of care between patients treated in these two publicly funded health care systems. Although

similar in their mission, county and VA systems differ in their levels of funding, incentives for physicians, and organizational management. VA patients with diabetes tend to have more extensive coverage than county patients and usually receive glucose self-monitoring supplies and medications free of charge. The impact of these and other system differences on patients' perceptions regarding access problems is unknown. We compared the access to care in county and VA clinics as reported by patients with diabetes.

Socioeconomic status (SES) barriers to access, such as inadequate health insurance,[22] poverty,[23] and lack of education, are common among patients treated in county and VA systems of care. Many county patients are among the large and growing number of patients who primarily speak Spanish and cannot access services in their native language.[24] As a consequence, they may have poor health literacy[25] and experience poorer outcomes than patients who are competent in English.[26] In this study, we examined whether SES risk factors influenced patients' perceived access and the extent to which differences in the distribution of SES risk factors explained differences in perceived access between patients treated in county and VA systems of care.

METHODS

Enrollment

Patients were enrolled and randomized at the time of visits to two county clinics (both general medicine clinics) and four nearby VA clinics (three general medicine clinics and one diabetes specialty clinic) in northern California. Enrollment in the county clinic study took place between November 1996 and June 1997, and enrollment in the VA study occurred between June 1997 and February 1998. Patients in both studies were followed for 1 year. Research assistants reviewed the medical records of patients with scheduled appointments to identify adults with a diagnosis of diabetes or an active prescription for a hypoglycemic agent. We excluded patients who were more than 75 years of age; who had a diagnosed psychotic disorder, disabling sensory impairment, or life-threatening illness (e.g., class IV heart failure, obstructive pulmonary disease requiring oxygen supplementation, or lung cancer); or whose primary language was not English or Spanish. After receiving approval from a patient's physician, we administered a face-to-face structured screening interview so we could exclude people who controlled their glucose levels without hypoglycemic medication, who were diagnosed with diabetes in the previous 6 months, who planned to discontinue receiving services from the clinic within the study period, or who did not have a touch-tone telephone. Informed consent procedures were conducted according to a protocol approved by university and medical center institutional review boards.

Description of the Intervention

Patients randomized to the intervention group received ATDM calls with telephone nurse follow-up in addition to their usual care. A detailed description of the intervention components has been published.[27] The core of the service was a series of ATDM assessments designed to identify health and self-care problems between outpatient encounters. Automated telephone disease management calls consisted of hierarchically structured messages composed of statements and queries recorded in a human voice. We used a standard procedure involving translation and back-translation to produce Spanish-language versions of the ATDM messages.[28] All calls were outbound (i.e., patients received the calls) and were placed at times patients indicated were most convenient for them. Patients interacted with the ATDM computer by using the touch-tone keypad on their telephone. At the end of each assessment, patients were given the option of listening to a 30- to 60-second diabetes "health tip" as well as the option of participating in an interactive dietary education module.

Each week, the ATDM system generated assessment reports organized according to the urgency of patients' reported problems. Nurses used these reports to prioritize their patient contacts. During follow-up calls, they discussed with patients each reported problem and strategies for resolution. They also used these calls to educate patients about the importance of adhering to their medication regimens and self-care plans. Many patients reported difficulty accessing health services, and the nurses spent a considerable amount of time discussing topics such as the most effective ways to schedule appointments, obtain urgent care, or seek advice by telephone.

Data Collection

Socioeconomic status and clinical data were collected at enrollment from medical records and patient interviews. As part of their 12-month follow-up interview, patients were asked six questions regarding financial and nonfinancial access problems (Table 1). Each question was worded to include a reference to a specific access barrier (e.g., a "worry about the cost"), as well as a behavioral consequence (e.g., failure to seek urgent care) that could put the patient at risk for increased severity of illness, hospitalization, or death. The referent time frame for each question was the 6 months prior to the follow-up interview. Because of the length of the overall survey and the need to collect additional sociodemographic and clinical data on enrollees, access questions were not asked at baseline.

Statistical Analysis

In addition to examining individual access items, we constructed binary indicators of any access problems, any financial access problems, and any nonfinancial access problems. We used χ^2 statistics to test for bivariate

Table 1. Access to Care Questions

Financial problems
Obtaining medication
"During the past 6 months, was there ever a time when you needed to get medication but didn't because you were worried about the cost?"
Seeking urgent care
"Was there ever a time during the past 6 months when you needed to see a doctor for an urgent health problem but didn't because you were worried about the cost?"
Calling an ambulance
"Was there ever a time during the past 6 months when you needed to call an ambulance for yourself but you didn't because you were worried about the cost?"
Nonfinancial problems
Obtaining medication
"During the past 6 months, was there ever a time when you needed to get medication but didn't because you weren't sure how to get it?"
Going to an emergency room
"During the past 6 months, was there ever a time when you didn't go to an emergency room because you thought that they wouldn't help you?"
Seeking telephone care
"During the past 6 months, was there ever a time when you needed medical advice over the telephone, but you didn't call (e.g., because you didn't know the number or you thought you'd be put on hold)?"

associations between each access variable and patients' experimental condition (intervention vs usual care), system of care (county vs VA), and SES risk factors.

Multivariate logistic models were fit in order to increase our ability to detect intervention effects and control for confounding in the measurement of health care system differences. In selecting SES covariates, we focused on risk factors that have a directly interpretable relationship to access (e.g., inability to speak English) and that represent problems that could be addressed through a change in health care funding or delivery. Specifically, we examined patients' primary language, health insurance status, annual household income, and health literacy as indexed by patients' level of education.

To control for health status differences between county and VA patients, each logistic model also included the following five indicators: number of diabetic complications such as retinopathy, nephropathy, and neuropathy; years since initial diabetes diagnosis; self-reported glycemic control (excellent, very good, good, fair, poor); number of other chronic health problems such as hypertension, hyperlipidemia, heart failure, or history of myocardial infarction; and self-reported general health status (excellent, very good, good, fair, poor). All SES and health status control variables were retained in each multivariate model in order to achieve the greatest possible control for confounding in the measurement of health care system differences in perceived access.

RESULTS

Characteristics of Patients in the Two Systems of Care

Across both trials, 1,077 potentially eligible patients (588 county patients and 489 VA patients) were identified. Twenty-two patients were ineligible because they did not have a touch-tone telephone. A total of 255 eligible patients (24%) declined to participate, 52 (5%) were excluded at the request of their physician, and 198 (18%) were excluded for some other reason, such as needing to leave the clinic before meeting with research staff. The remaining 572 patients, including 280 county patients and 292 VA patients, were enrolled. Enrollees in the county study were somewhat more likely than nonenrollees to be female (59% vs 51%; $P = .04$) and somewhat younger on average (55 years vs 57 years; $P < .01$). The demographic characteristics of enrollees and nonenrollees in the VA study were similar. At follow-up, outcome data were collected for 248 (89%) county patients and 272 (93%) VA patients.

The mean age of completers was 57 years; 30% of completers were women. Forty-five percent of patients self-identified as Caucasian, 30% as Hispanic, 13% as African American, and 13% as Asian or some other ethnicity. At enrollment, patients had a mean glycosylated hemoglobin (HgA_{1c}) of 8% and a mean body mass index of 32. There were no differences between intervention and usual care groups at baseline with regard to age, race, gender, primary language, insurance status, income, education, or health status. However, there were a number of differences in the SES and clinical characteristics of the county and VA samples (Table 2).

Unadjusted Prevalence of Access Problems

At follow-up, a disturbing number of patients in both health care systems reported that they had failed to obtain one or more health services because of a perceived access problem (Table 3). Overall, county clinic patients were more likely to report access problems than VA patients (37% vs 23%; $P < .01$), reflecting a difference in the proportion of patients reporting financial access problems as well as nonfinancial problems. More Spanish-speaking patients (44%) reported access problems than patients in any other subgroup.

More than four times as many county patients as VA patients reported that they had failed to obtain medication because they were worried about the cost (14% vs 3%; $P < .001$), and more than twice as many failed to seek urgent care because of a cost concern (8% vs 3%; $P < .001$). In addition, more than twice as many county patients as VA patients reported that they avoided seeking care from an emergency room because they thought that they would not be helped (8% vs 3%; $P < .001$). The most common type of access problem in both systems of care was the perceived inaccessibility of medical advice by telephone.

Table 2. Baseline Characteristics of Patients in the Two Systems of Care

	County Clinics (n = 248)	VA Clinics (n = 272)
Intervention group, %		
ATDM + nurse	50.0	48.4
Usual care	50.0	51.6
Primary language*, %		
English	74.2	100.0
Spanish	25.8	0.0
Insurance status*, %		
Uninsured/Medicaid	64.9	49.5
Medicare/private	35.1	50.6
Annual income*, %		
<$15,000	76.6	52.4
≥$15,000	23.4	47.6
Education*, %		
<high school graduate	64.9	38.2
≥high school graduate	35.1	61.8
Health status indicators, mean ± SD		
Diabetes-related complications	0.9 ± 0.9	0.8 ± 1.0
Perceived diabetes control*,†	2.6 ± 1.0	3.1 ± 1.1
Years since diabetes diagnosis	9.8 ± 8.6	10.5 ± 9.8
Other chronic illnesses*	1.6 ± 1.4	2.1 ± 1.4
Perceived general health*,†	2.5 ± 1.0	2.8 ± 1.0

*P < *.001.*

†*1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.*

ATDM indicates automated telephone disease management; SD, standard deviation.

County clinic patients were nearly twice as likely as VA patients (21% vs 13%; $P = .006$) to report such problems.

Less than 3% of VA patients reported that they failed to obtain medication because they were worried about the cost despite the fact that half had neither Medicare nor private insurance, and half had annual household incomes less than $15,000. In addition, less than 4% of VA patients failed to seek urgent care or call an ambulance because of a cost concern, and less than 3% failed to go to an emergency room because they thought that they would not be helped.

More than three times as many Spanish-speaking patients as English speakers failed to obtain medication because of a financial concern (20% vs 6%; $P < .05$), seek urgent care because of a financial concern (14% vs 4%; $P < .05$), or obtain medication because they did not "know how to get it" (22% vs 7%; $P < .05$). Patients who had annual household incomes less than $15,000 were more likely than higher income patients to have avoided calling an ambulance because of a financial concern (6% vs 3%; $P < .05$), and more likely to have failed to obtain medication because they "did not know how to get it" (12% vs 3%; $P < .05$).

Multivariate Analysis of Summary Financial and Nonfinancial Access Indicators

As shown in Table 3, patients randomized to receive ATDM calls with telephone nurse follow-up were less likely than usual care patients to report failing to obtain one or more health services as the result of a perceived access problem (adjusted odds ratio [AOR], 0.61; 95% confidence interval [CI], 0.41 to 0.92). The impact of the intervention was equally great when considering financial and nonfinancial problems separately. Intervention effects were similar in the county clinic and VA subsamples.

Despite the impact of the intervention, the odds of reporting one or more access problems at follow-up was greater among county clinic patients than among VA patients (AOR, 1.61; 95% CI, 1.02 to 2.53), even when controlling for SES risk factors and health status. The difference between the two systems of care was especially pronounced in the area of financial problems (AOR, 2.82; 95% CI, 1.48 to 5.37).

Multivariate Analysis of Specific Access Problems

The magnitude of the AORs comparing the risk of access problems among intervention and usual care patients was consistent across all six areas (Table 4). The greatest intervention effects were related to obtaining medication. Intervention patients were significantly less likely than usual care patients to report failing to obtain medication because of a cost concern (AOR, 0.33) and also were less likely to report that they failed to obtain medication because they were "not sure how to get it" (AOR, 0.45). Moreover, intervention patients were less likely than usual care patients to report a problem with accessing medical advice by telephone (AOR, 0.60).

Controlling for SES risk factors and health status, county clinic patients were substantially more likely than VA patients to report that they failed to obtain medication because they were worried about the cost (AOR, 4.31) and to report that they avoided going to an emergency room because they thought that they would not be helped (AOR, 2.92). Spanish-speaking patients were substantially more likely than English-speaking patients to report that they failed to obtain medication because they were "not sure how to get it" (AOR, 4.32).

Additional Supporting Analyses

It is possible that some of the clinical control variables we used were endogenous with respect to access, i.e., that they represented problems that were a result of poor access to care and therefore inappropriate as predictors. As a check on the validity of our findings, we re-ran each model shown in Tables 3 and 4 excluding these variables (the number of diabetes-related complications, perceived diabetes control, number of other chronic illnesses, and perceived general health). Although some differences in effect sizes were found, the overall direction and statistical significance of both the intervention and system of care coefficients were maintained.

We examined the telephone contact between usual care patients and their health care systems in order to

Table 3. Multivariate Adjusted Odds Ratios of Access Problems Reported Postintervention by Patients with Diabetes in County Clinics and VA Clinics (Summary Indicators)*

	Any Problem of Either Type		Any Financial Problem		Any Nonfinancial Problem	
	%	AOR (95% CI)	%	AOR (95% CI)	%	AOR (95% CI)
Intervention Group						
ATDM + nurse	26.6	0.61 (0.41 to 0.92)	11.3	0.60 (0.35 to 1.04)	21.5	0.63 (0.41 to 0.98)
Usual care	32.4	Ref	15.1	Ref	25.7	Ref
System of care†,‡,§						
County care	36.7	1.61 (1.02 to 2.53)	19.8	2.82 (1.48 to 5.37)	28.6	1.30 (0.80 to 2.12)
VA care	23.1	Ref	7.3	Ref	19.1	Ref
Primary language†,‡,§						
Spanish	43.8	1.36 (0.72 to 2.56)	26.6	1.66 (0.78 to 3.52)	35.9	1.37 (0.70 to 2.65)
English	27.6	Ref	11.4	Ref	21.9	Ref
Insurance status†						
Uninsured/Medicaid	31.1	1.00 (0.67 to 1.51)	15.9	1.43 (0.80 to 2.53)	23.7	0.84 (0.54 to 1.31)
Medicare/private	27.6	Ref	9.8	Ref	23.6	Ref
Annual household income‡,§						
<$15,000	33.9	1.56 (0.99 to 2.45)	15.3	1.13 (0.60 to 2.12)	27.9	1.79 (1.09 to 2.96)
≥$15,000	21.8	Ref	9.6	Ref	16.0	Ref
Education						
<High school graduate	30.9	0.87 (0.57 to 1.35)	15.5	1.07 (0.59 to 1.95)	22.4	0.86 (0.54 to 1.37)
≥High school graduate	28.2	Ref	11.0	Ref	24.9	Ref

**Each model included all variables shown above as well as the following controls for severity of illness: number of diabetes-related complications, perceived diabetes control (excellent, very good, good, fair, poor), years since diabetes diagnosis, number of other chronic illnesses, and perceived general health (excellent, very good, good, fair, poor).*

†$P < .01$ *for the unadjusted comparison across groups of the proportion of patients with any access problems.*

‡$P < .01$ *for the unadjusted comparison across groups of the proportion of patients with any financial access problems.*

§$P < .01$ *for the unadjusted comparison across groups of the proportion of patients with non-financial access problems.*

AOR indicates adjusted odds ratio; 95% CI, 95% confidence interval; Ref, reference group; ATDM, automated telephone disease management.

understand in more depth whether the improvement in perceived access among intervention patients was an expected result of the increased attention and follow-up they received. On average, control patients received 4 minutes of telephone contact in the 6 months prior to their endpoint survey. Sixty-two percent never attempted to call a doctor or nurse during this period, and 71% never received such a call. Given the absence of telephone contact among usual care patients, this intervention may have been a particularly effective strategy for increasing patients' access to care.

Intervention patients in these trials had significantly improved health outcomes.[20,21] Analyses presented here suggest a link between those health improvements and changes in patients' perceptions regarding their access to care. We examined this link explicitly and found that patients reporting access problems on average had more symptoms at follow-up than patients without access problems (5.9 vs 4.4; $P < .0001$), even when controlling for baseline symptoms, intervention group, and system of care. In the county clinic sample, the average endpoint HgA_{1c} level among patients with nonfinancial access problems was higher than among patients without access problems (8.6% vs 8.1%; $P = .03$) when intervention group and baseline HgA_{1c} were controlled. When the association between specific access problems and outcomes was examined in similar multivariate analyses, perceived barriers to telephone care were consistently the most significant predictor of worse outcomes.

DISCUSSION

The single most common type of access problem among both county clinic patients and VA patients was related to the perceived inaccessibility of medical advice by telephone. In this context, we found that ATDM calls with telephone nurse follow-up improved patients' access to care. Intervention effects persisted across all six areas of problems and were similar in magnitude within the county and VA samples. This intervention could be useful to public sector providers because it is designed to improve diabetes care while allowing clinical resources to be used more effectively. Automated telephone disease management assessment data also could be used to tailor visit intervals to patients' needs in contrast to the current approach in which visit intervals are based on generic standards with modifications that reflect physicians' practice styles.[29]

Relative to patients receiving usual care, intervention patients experienced both decreases in perceived access problems as well as improvements in health outcomes. Although the direction of this relationship is unclear, it suggests that improvements in access, which were disproportionately common in the intervention group, may have been an effective mechanism for improving outcomes

Table 4. Multivariate Adjusted Odds Ratios of Specific Access Problems Reported Postintervention by Patients with Diabetes in County Clinics and VA Clinics*

	Financial Problems			Nonfinancial Problems		
	Obtaining Medication	Seeking Urgent Care	Calling an Ambulance	Obtaining Medication	Going to an Emergency Room	Seeking Telephone Care
Intervention group						
ATDM + nurse AOR	0.33	0.77	0.50	0.45	0.60	0.60
95% CI	0.16 to 0.68	0.33 to 1.77	0.21 to 1.16	0.23 to 0.89	0.26 to 1.38	0.36 to 0.98
Usual care†						
System of care						
County care AOR	4.31	2.69	1.76	0.42	2.92	1.73
95% CI	1.77 to 10.50	0.94 to 7.71	0.70 to 4.42	0.18 to 0.96	1.12 to 7.62	1.00 to 2.99
VA care†						
Primary language						
Spanish AOR	2.00	2.34	0.82	4.32	0.97	0.77
95% CI	0.83 to 4.83	0.82 to 6.69	0.22 to 3.05	1.61 to 11.61	0.26 to 3.57	0.36 to 1.65
English†						
Insurance status						
Uninsured/Medicaid AOR	1.18	1.86	1.68	1.13	1.05	1.77
95% CI	0.57 to 2.42	0.73 to 4.71	0.68 to 4.16	0.57 to 2.26	0.44 to 2.48	0.46 to 1.26
Medicare/private†						
Income						
<$15,000/year AOR	1.35	0.74	1.57	4.07	1.60	1.74
95% CI	0.59 to 3.03	0.29 to 1.91	0.57 to 4.26	1.59 to 10.39	0.58 to 4.37	0.98 to 3.09
≥$15,000†						
Education						
<High school graduate AOR	0.81	1.77	1.00	0.86	0.34	0.95
95% CI	0.37 to 1.76	0.66 to 4.72	0.41 to 2.44	0.41 to 1.81	0.13 to 0.89	0.56 to 1.61
≥High school graduate†						

**Each model included all variables shown above as well as the following controls for severity of illness: number of diabetes-related complications, perceived diabetes control (excellent, very good, good, fair, poor), years since diabetes diagnosis, number of other chronic illnesses, and perceived general health (excellent, very good, good, fair, poor). ATDM indicates automated telephone disease management; 95% CI, 95% confidence interval.*
†*Reference group.*
AOR indicates adjusted odds ratio.

such as glycemic control and symptoms. The RAND Health Insurance Experiment demonstrated definitively that when patients' financial access improves, their health outcomes improve as well.[30] Studies of medically indigent adults in California show that losing benefits can have the opposite effect.[31,32] VA studies indicate that nonfinancial access barriers, such as travel distance, can also influence chronically ill patients' use of ambulatory care[33] and may increase their mortality risk.[34,35] The results of the current study corroborate these prior findings and extend them by demonstrating that access can be improved at the clinical level without changes in the structure or financing of health care. Moreover, this study demonstrates that access problems within public systems of care affect patients differentially depending on their SES characteristics, which can mitigate or compound the effect of system-level barriers on their health.

County clinic patients were at significantly greater risk for access problems than VA patients, even when controlling for differences in SES risk factors and health status. Financial access problems were especially common among county clinic patients, and many county patients reported that they failed to obtain medication because they were worried about the cost. This is troubling given the demonstrated positive impacts of hypoglycemic and antihypertensive therapy on diabetes outcomes and the documented increase in poor outcomes among chronically ill county patients who have medication cost concerns.[36] The relatively generous medication benefits in the VA are well known to patients familiar with both health care systems. VA medication benefits are a primary reason eligible patients transfer their care to the VA[37] and that many low income, non-VA eligible spouses of VA patients would switch to VA care if that were possible.[38] Differences in the availability of subsidized medications also may explain why county clinic patients in these studies were less satisfied with their care than were VA patients and were particularly less satisfied with their access to

care.[39] Policy makers should consider the potential benefits of increasing the availability of financial supports that would allow more indigent patients with diabetes in county systems of care to purchase medication.

Spanish-speaking patients were more likely to report access problems than patients in any other subgroup, and 44% of these patients reported at least one access problem. These findings should encourage providers and payers to reassess the importance of translation services and lead innovators to develop efficient and effective ways to increase the availability of language-appropriate care. Moreover, these findings highlight the importance of training monolingual English clinicians in Spanish and recruiting a greater number of bilingual-bicultural individuals into the health professions.

It is important to note that these data represent patients' *perceptions* of access problems. The relationship between such perceptions and measurable gaps in services is an understudied area of health services research.[40] However, even if these perceptions were inaccurate, they are important because they led patients to make decisions that could have had serious or even deadly consequences. For some health services, changing patients' perceptions regarding service accessibility may be as important as changing the health care system itself.

Access questions were asked only at follow-up. Although intervention and control patients had similar baseline characteristics, we cannot rule out the possibility that random assignment resulted in a lower baseline prevalence of access problems in the intervention group and an artifactual intervention effect. As shown in Table 2, county and VA patients differed in terms of demographic and clinical factors that could influence their perceptions regarding access to care. Although we made a significant effort to control for confounding in the multivariate analyses, residual confounding may contribute to the county versus VA relative risk estimates.

Patients in these trials were enrolled at the time of visits to outpatient clinics, a setting in which patients with better access to ambulatory care are overrepresented. Examination of utilization databases suggested that serious problems existed even among these relatively well-connected patients. For example, large numbers of both county clinic patients (43%) and VA patients (51%) were seen in an emergency department during the year prior to their enrollment. During this same period, most county and VA patients had no visits or appointments to podiatry clinics (79% and 51%, respectively), ophthalmology clinics (62% and 60%, respectively), or diabetes education classes (84% and 66%, respectively). A random sampling of diabetes patients in each system of care likely would result in higher levels of perceived access barriers.

The generalizability of this study should be carefully considered since it was conducted using data from one county and one VA health care system. Nevertheless, the issues addressed in this study are common in the treatment of chronically ill patients, and therefore interventions such as this may have broader applications. Many chronically ill patients face the daunting task of adhering to multiple medication regimens, monitoring themselves for changes in health status, and communicating effectively with their clinicians. The intervention evaluated in this study addresses these issues by increasing patients' support between regular in-person visits and providing an alternative when such visits are missed due to financial or nonfinancial access barriers. As public care health systems struggle to treat growing numbers of chronically ill patients with increasingly constrained budgets, information about the cost-effectiveness of interventions such as this will become critically important.

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