Emergency Department Utilization Among Hispanic and African-American Under-Served Patients with Type 2 Diabetes

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Objective: To examine emergency department (ED) use among a sample of 349 low-income Hispanic and African-American patients with type 2 diabetes. The study used a theoretical model to conceptualize health services utilization as the end product of predisposing, enabling, and need-for-care characteristics.

Design: Cross-sectional sampling of consecutive subjects with diabetes attending 7 inner-city clinics that provide primary medical care to low-income residents in South Central Los Angeles.

Participants: Three hundred and forty-nine patients (Hispanics [67.3%] and African Americans [32.7%]) with type 2 diabetes.

Results: Thirty-two percent of this sample reported one or more visits to the ED for medical care within the 12-month period prior to the interviews. Moreover, 11.5% of the patients reported visiting the ED more than once and 4.6% of the patients admitted visiting the ED more than 2 times within the same 12-month period. In a staged path analysis, ED use was significantly predicted by the predisposing variables of younger age, female gender, African-American ethnicity, and less education as well as the enabling variable of ability to pay. In addition, the need variables of insulin injection and number of diabetes-related complications were also significantly related to ED utilization.

Conclusions: Emergency department (ED) utilization is considered to be closely linked to a patient's need-for-care characteristics. However, our study shows that the predisposing characteristics of participants with diabetes explained about the same amount of variance as need-for-care characteristics. The higher-than-anticipated importance of predisposing characteristics suggest that intervention strategies, which specifically target patients with these characteristics, should be a part of any broad approach to reducing ED use among patients with type 2 diabetes. (*Ethn Dis*. 2003;13:369–375)

Key Words: Emergency Services, Utilization, Minority, Diabetes

Introduction

The care of US patients with diabetes is associated with a substantially higher intensity of health service utilization and cost than that of most patients.[1–3] In 1997 alone, this total cost was estimated to exceed 98.2 billion dollars.[4] In fact, diabetes-related care accounts for more than 5.8% of the total healthcare costs of citizens in the United States.[5] Emergency department (ED) visits by patients with diabetes may significantly contribute to the overall healthcare cost burden. For example, a study conducted in a county ED setting concluded that patients with diabetes had significantly higher median ED costs and hospital admission rates when compared to non-diabetic controls.[6] These data underscore the need to examine factors related to the patterns of ED utilization in this population so that health professionals can intervene and eventually reduce healthcare expenditures and ED utilization.

In the general US population, ED visits have risen by 14% over the last few years, resulting in an estimated 102.8 million visits (37.8 per 100 person).[7] For patients with diabetes, the rate of ED visits is more than 2 times higher than the general population,[3] with one recent study finding that Medicare beneficiaries with diabetes were 1.7 times more likely to visit an ED once and 3 times more likely to visit an ED more than 3 times compared to non-diabetic beneficiaries.[8] In 1996, about 14% of persons with diabetes had a diabetes-related ED visit.[7] Studies in the United Kingdom also show high ED utilization among patients with diabetes. Goyder and colleagues[9] noted that when trauma visits were excluded, patients with diabetes visited the ED more frequently for both diabetes-related and non-diabetes related medical conditions than the general population. In addition, Holmwood and colleagues[10] noted that 7% of all ED visits over a 3-month period were by patients with diabetes. Thirty-two percent of these visits were directly related to the care of diabetes or its complications.

A recent CDC report suggests that age is a significant determinant related to ED use by patients with diabetes. This report demonstrated that the highest rates of ED usage were among young patients (<45 years old).[7] Researchers have identified several other factors related to increased ED use by patients with diabetes. For example, poor glycemic control, higher number of complications, and more reported problems with self-care were found to increase ED visits among patients with diabetes.[11] A study by Chin and colleagues[12] found that African-American Medicare recipients with diabetes were more likely to visit the ED when compared to their White counterparts. Highest rates of ED use were found among African-American females and those patients who were less educated. However, other studies in non-diabetic populations do not support race as a significant determinant of ED use when other socioeconomic and demographic variables are taken into account.[13–15]

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Diabetes is becoming more common in the United States. In 2000, 17.0 million people (6.2% of the population) had diabetes.[16,17] Approximately 800,000 new cases of diabetes are diagnosed each year.[17] Between 1980 and 1996, the number of persons with diagnosed diabetes increased by 2.7 million. The rate of increase in the age-adjusted prevalence has been highest among minority populations.[17] Several studies have documented the high prevalence rate of diabetes among Hispanic community.[18–22] In 2000, 2.0 million (10.2%) of all Hispanic/Latino Americans had diabetes.[16] On average, Hispanic/Latino Americans are 1.9 times more likely to have diabetes than non-Hispanic Whites of similar age.[16] In addition, mortality due to diabetes is also twice as high among the Hispanic community as it is for non-Hispanic Whites.[23]

In 2000, 2.8 million (13.0%) of all African Americans had diabetes, and on average, African Americans are 2.0 times more likely to have diabetes than non-Hispanic Whites of similar age.[16] African Americans are at increased risk for complications, such as lower-extremity amputations and kidney disease, as a result of diabetes.[24–26] End-stage renal disease is twice as high in African Americans compared to their counterpart Caucasians.[27] In addition, death rates for people with diabetes are 27% higher in the African-American population compared to the Caucasian population.[28]

Given the high prevalence and severity of diabetes among Hispanics and African Americans, it is surprising how little is known about correlates of diabetes-related healthcare utilizations, particularly ED visits among this segment of our population. The objective of this study was to apply a well-known theoretical model of health services utilization to an inner-city population of African-American and Hispanic primary care patients with type 2 diabetes in an attempt to identify factors related to ED use. This information would be useful to all healthcare professionals who seek to address the problem and develop effective interventions to reduce diabetes related healthcare costs.

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THEORETICAL MODEL

The health services utilization framework developed by Andersen and colleagues[29,30] has been widely used for investigating health services utilization among minority populations.[31–39] This model conceptualizes healthcare utilization as the end product of a complex pattern of interactions between predisposing, enabling, and need-for-care characteristics. Predisposing characteristics exist prior to the onset of illness and include those characteristics that describe the propensity of individuals to use healthcare services. These propensities are characterized by demographic, social structural, and health belief variables.

The second component of the behavioral framework, the enabling characteristics, refers to the individual's ability to use healthcare services should the need arise. The enabling component contains familial and community resources that make health services available to the individual for use. Having private health insurance or a Medicaid or Medicare card are examples of enabling factors.[40]

Although the predisposing and enabling components are necessary conditions for use of health services, they are not sufficient. To use healthcare services, the individual must perceive some illness. Need-for-care characteristics are the most immediate cause of the use of health services. They involve both perceived and evaluated health status. Measures of perceived illness may include the symptoms individuals experience, self-reported health status, and side effects or complications of medical conditions/procedures. Evaluated health measures are actual health problems that the individual is experiencing and those that have been clinically identified or judged by health practitioners.[41] Anderson[29] argued that logical expectations of the model are that perceived need will better help us to understand care-seeking behavior, whereas evaluated need will be more closely related to the type and amount of treatment that will be provided after a patient has presented to a medical care provider.

METHODS

Subjects

Patients with diabetes who entered 7 primary care clinics in the South Central Los Angeles area for routine care were invited to participate in the study. The sites included 3 county clinics and 4 managed care clinics, all of which served low-income minority patients. Study personnel screened patients with type 2 diabetes for study eligibility while waiting for their routine medical office visits. All patients, 18 years of age and older, with clinically diagnosed type 2 diabetes were eligible for inclusion in the study. Screening for the study began on October 1, 1998. This study used data from 349 Hispanic and African-American subjects with type 2 diabetes. Ninety-three percent of the eligible sub-

jects agreed to be interviewed. The most common reason given for non-participation was inadequate time. Informed consent of all eligible subjects was obtained in writing following the policies and procedures specified by the King/Drew Medical Center's Committee for the Protection of Human Rights. Interviews were administered by trained bilingual research assistants and took approximately 30–40 minutes to complete. Questionnaires were available in English and Spanish.

Summary of sample characteristics of Hispanic and African-American diabetic persons (*N*=349)

Variables	Mean (%)	SD
Predisposing characteristics		
Age (range=20–89 years)	53.3	9.49
Male	(35.2)	0.48
Education (range=0–16 years)	7.9	4.66
Ethnicity		
African Americans	(32.7)	0.47
Hispanic	(67.3)	—
Alcohol use (range=0–3)	0.27	0.62
Abstain (0)	(81.1)	—
Light (1)	(11.7)	—
Moderate (2)	(6.0)	—
Heavy (3)	(1.1)	—
Enabling characteristics		
Insurance (payment)		
ATP (ability to pay)	(51.6)	0.50
Years in USA (range=1–70 years)	30.08	18.41
Need characteristics		
Injects insulin	(20.3)	0.40
Duration of diabetes (range=1–31 years)	7.9	6.37
Diabetes-related complications (range 0–4)	0.58	0.87
Number of chronic conditions (NCC) (range 0–5)	1.4	1.12
Compliance with medication (range 0–4)	3.6	1.03
HgA_{ic}(glucose) (range 5–19.80)	10.54	2.75
ED services use		
Number of ER used within last 12 months (range 1–15 times)	.58	1.41
No ER use	(68.5)	—
ER used once	(20.1)	—
ER used more than once	(11.5)	—

MEASUREMENT

Predisposing Characteristics

The distribution of predisposing characteristics used as predictors of ED utilization among our sample of African-American and Hispanic patients with diabetes is displayed in Table 1. There were 5 predisposing characteristics measured: age, gender, education, ethnicity, and alcohol usage. Gender and ethnicity were coded dichotomously, with male coded as 1 and female coded as 0, and African-American coded as 1 and Hispanics coded as 2. Age and education were continuous variables using the actual number of years. Alcohol use was coded 0 to 3 (0 = abstain, 1 = light, 2 = moderate, 3 = heavy).

Enabling Characteristics

The distribution of the 2 enabling characteristics measured is also listed in Table 1. One of the variables addresses the issue of participation in a health-related public assistance program. This variable is a dichotomous indicator of whether the subject participated in the ATP program (ability to pay) or enrolled in Medicare, MediCal, or General Relief Program (GRP). The ATP program is a county-funded program that allows qualified low-income participants to pay for medical services using a sliding scale to adjust monthly payments to the patient's income level. The GRP is another county-funded public assistance program that covers all medical charges for qualified low-income county residents. The second enabling characteristic was the number of years in the United States. Our study followed the Wolinsky and Johnson report[40] and did not include the variable of income as an enabling characteristic. As with most surveys, the problem with income data is the large number of non-responses. Wolinsky and Johnson[40] documented that omitting respondents without income data produced biased estimates of the other parameters and the most appropriate strategy was to delete income from analysis.

Need-for-Care Characteristics

The first 2 measures of the need-for-care are dichotomous variables indicating whether or not the respondents are injecting insulin and whether or not s/he has been diagnosed with diabetes-related complication(s). The next measure of need for care is the number of other chronic conditions that have been diagnosed by a physician (hypertension, high blood cholesterol, arthritis, angina, stroke, or cancer). The next measure of the need for care is a scaled variable assessing the level of compliance with medication for diabetes. The compliances with drug regimen (insulin injection and oral medication) was assessed with 2 questions modified from the "Summary of Diabetes Self-Care Questionnaire" developed by Toobert and Glasgow.[42] Participants were asked to report how often they took more/less diabetes medication than prescribed for them within the last 30 days. In addition, the average of the last 2–3 readings (as available) of the Hemoglobin A_{1c} (for last 12 months) was calculated from the participants' medical records.

Emergency room (ER) use was as-

sessed by asking "how many times did you go to ER in the last 12 months?" Because the use of emergency room services was highly skewed with most responses either 0 or 1, we scaled the variable from 0–2 with 2 representing 2 or more visits.

ANALYSIS

The model was analyzed using the EQS structural equations program using a path analytic approach.[43] Structural equation models compare a proposed hypothetical model explicating relationships in the data with a set of actual data. The closeness of the variance-covariance matrix implied by the hypothetical model to the empirical variance-covariance matrix is evaluated through various goodness of fit indexes. Fit indexes used included the maximum likelihood chi-square value and the comparative fit index (CFI). The CFI indicates the proportion of improvement in the overall fit of the hypothesized model relative to a null model in which all covariances between variables are zero. Values approaching .95 or greater are desirable for the CFI.[44]

The contributions of each theoretical domain to the variance explained in ER usage, as well as the influences among all of the predictors, can be examined using this technique. Initially the need variables predicted the outcome measure, then the enabling variables were staged in. Last, we included the predisposing characteristics.

RESULTS

Demographics

Summary distributions of the dependent variable, ED utilization(s) within a 12-month period prior to the interviews, and the independent variables are shown in Table 1. The mean age of study participants was 53 years (range=20–89 years of age). The majority were female (64.8%). Only 31.6% of the sample were currently married. The mean education was 7.9 years, with 51.9% of the subjects indicating that they had no formal education beyond 8th grade. More than 35% reported completing high school. The ethnicity of the participants was Hispanic 67.3% and African-American 32.7%. Twenty percent of study subjects had immigrated to this country within the last 10 years. Eighty-five percent of study participants were unemployed at the time of their interview. Fifty-two percent paid for healthcare services through the County of Los Angeles "Ability to Pay" (ATP) program. Only 2.6% and 6.6% of the sample reported being enrolled in Medicare and MediCal, respectively. In addition, more than 38% were enrolled in GRP. In addition to a monthly stipend, qualified residents receive full medical coverage at county-affiliated health centers or hospitals. Table 1 displays the means, percentages, standard deviations, and ranges of the demographic variables and other selected variables employed in this study.

Emergency Department (ED) Utilization

Thirty-two percent of this sample asserted that they had utilized the ED services within the 12-month period prior to the interviews. While 20% and 6.9% reported using ED once and twice, respectively, only 4.6% of subjects admitted that they had been in the ED more than 2 times within the 12 months.

Our data shows that fit indexes in the covariance path analysis were excellent: (χ[42, N=349]=32.06, CFI=1.00; P=.87). Significant regression paths in the path analysis are reported in Figure 1. Variables from each domain of the Andersen healthcare utilization model were influential in ED usage. The need variables were staged in first and explained 6% of the variance in ER usage. Need variables that were significant included the number of diabetes-related complications and insulin injection. Enabling variables added very little variance to the model (1%) and only ATP was a significant predictor. The predisposing variables explained a further 5% of the variance in ER use. Several of the predisposing variables were significant predictors including lower age, African-American ethnicity, less education, and being female. These associations were significant independently because significant covariances among the predictors accounted for relationships that existed among them. The covariances among the independent predictors are depicted in Figure 1. For readability, covariances among the residuals of the enabling and need variables are not shown.

In addition to the prediction of ER use, there were other interesting relationships in the model. For instance, lower age and less education predicted higher glucose readings. Hispanic ethnicity predicted a greater number of diabetes-related complications. It is interesting that more alcohol use tended to be associated with fewer complications. It could be that patients with more complications wisely avoid alcohol as it could exacerbate their medical problems further. Those reporting enrollment in Medicare/MediCal or GRP (compared with enrolment in ATP program) were more likely to need to inject insulin. Similarly, less-educated individuals and African Americans were more likely to report insulin injection. Enrollment in GRP, Medicare/MediCal programs, greater age, and African-American ethnicity also predicted the number of chronic conditions reported by the patients. Those reporting more alcohol use also reported poorer compliance with their medication regimens. Younger patients, females, and Hispanics were more likely to be enrolled in ATP program.

DISCUSSION

Persistent underutilization of appropriate medical services among the mi-

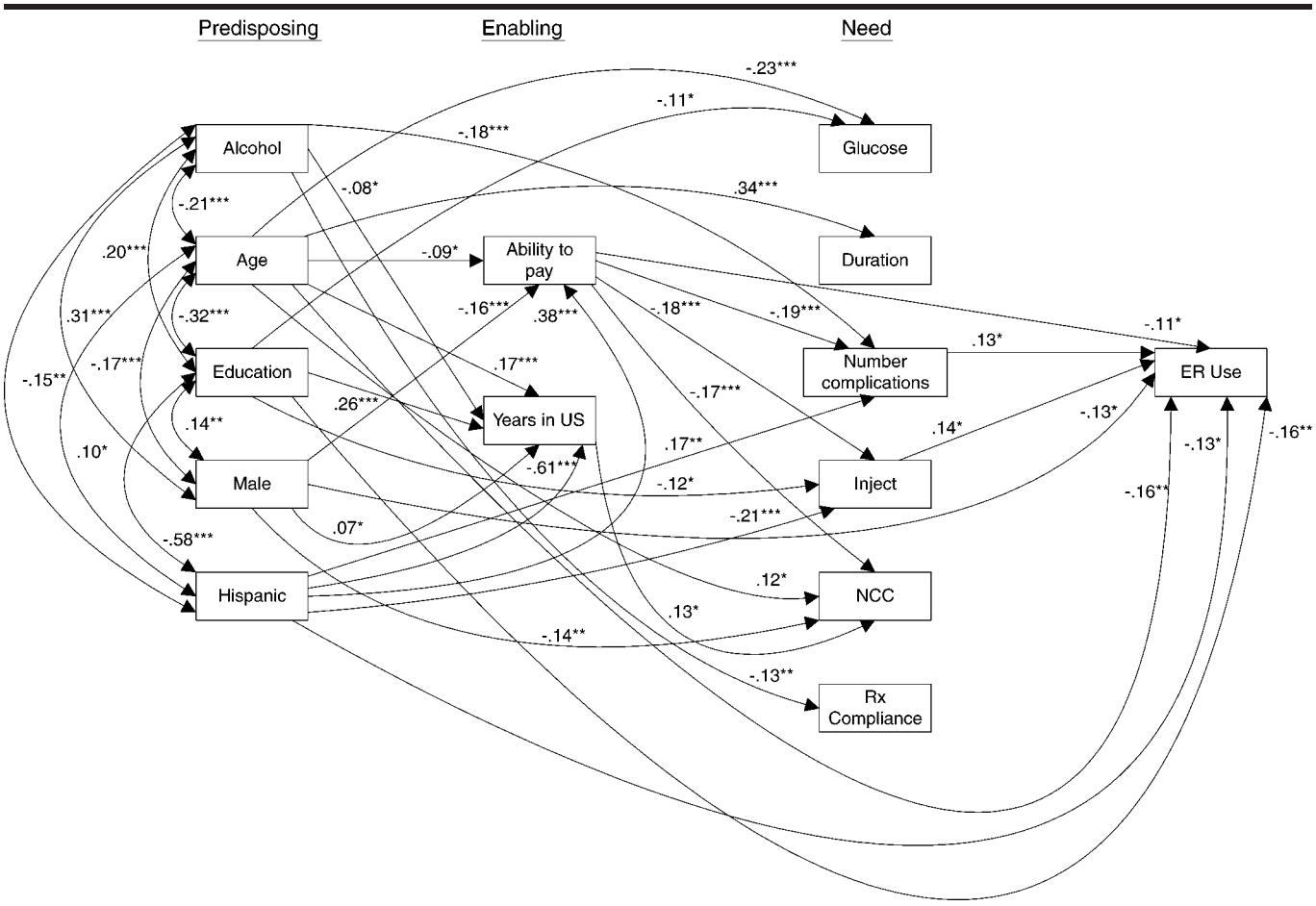

Fig 1. Path model depicting significant predictors of emergency room use using the Andersen healthcare utilization model (NCC=number of chronic conditions, *$P<.05$; **$P<.01$; ***$P<.001$)

nority patients is a well-documented but poorly understood phenomenon. The significance of this study is that it examines ED service utilization among a sample of 349 Hispanic and African-American persons with type 2 diabetes selected randomly from 7 primary care clinics in the South Central Los Angeles area. An interesting theme to emerge from these analyses involves the relative dominance of predisposing characteristics (age, gender, educational level, and ethnicity) on ED utilization. About one-half of the variance explained by the model is accounted for by these aforementioned predisposing characteristics.

Emergency department (ED) utilization is usually considered more nondiscretionary than outpatient office visits to a primary care physician. That is, most would consider the need-for-care as the most important driving factor, which predisposes the patient toward the ED vs outpatient clinic visits. However, our study does not support this assertion. In fact, despite the introduction of 6 measures of the need-for-care (number of chronic illnesses, insulin injection, diabetes-related complications, HgA_{1c}, duration of the disease, and compliance with medication), predisposing characteristics explained about the same amount of variance. Only the number of diabetes-related complications and the need for insulin injection significantly predicted ED use. Moreover, the relative lack of importance of need-for-care characteristics suggests that our study subjects may tend to use the ED as a substitute for regular primary care office visits. Therefore, this study provides further support for the notion that access to acceptable outpatient primary medical care for minority patients remains a major problem. This may be significantly related to structural and financial factors, personal experiences with our healthcare system, and/or other predisposing factors.[45] Similar results were found in another study using the Andersen model among disadvantaged individuals who were homeless.[46]

Among predisposing characteristics, younger age, lower educational level, female gender, and African-American ethnicity were all significant predictors of higher ED utilization in our study of patients with diabetes. These findings are almost identical to those of Chin

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and colleagues[12] who studied a similar population of low-income patients on Medicare. Further studies are needed to elucidate the specific factors underlying these findings. Patient education related to the availability and methods of access to outpatient primary care services may be needed and should be tailored to the patient's educational levels. Programs to improve awareness and access to primary care services, including those that target the young or female patients with type 2 diabetes, may need to be created. Among African Americans, long-standing cultural beliefs, attitudes, and practices cannot be ruled out as significant contributors. If this is the case, it is conceivable that targeted, culturally sensitive, intervention programs could be developed to address the problem.

Regarding the impact of enabling characteristics on healthcare service utilization, our data indicate that Hispanics and African Americans with diabetes and on ATP are less likely to use ED than those with GRP or Medicare/MediCal. The ATP program is, by nature, designed to improve access to all levels of healthcare services among low-income patients. However, changes to the programs to encourage outpatient primary care utilization may be in order. In addition, program administrators should explore other systems-related factors that encourage ED use over primary care clinics in those patients that are not experiencing true medical emergencies. These factors may include clinic issues such as: provider availability and expertise; waiting times; transportation; and staff courtesy, among others. A possible practical solution would be the establishment of an urgent care unit affiliated with the outpatient primary care facilities.

Our data show that 67% of our Hispanic and 25% of African-American subjects did not have health insurance or general relief and paid for healthcare services through the ATP program. The Third National Health and Nutrition Examination Survey revealed that there are significant racial and ethnic differences in health insurance coverage for adults with diabetes in the United States.[47] A greater proportion of non-Hispanic Whites with diabetes (91%) and African Americans with diabetes (89%) than Mexican Americans with diabetes (66%) had health insurance among the 20- to 64-year-old age group. Whether these racial and ethnic disparities influence access to care, quality of care, or health outcomes for people with diabetes needs more study.[48]

Our study's results must be interpreted with caution because of the following study limitations. First, interpretation of the findings is limited by the cross-sectional nature of the study. Second, self-report measures rely on the recall of the respondents and are therefore subject to error. This may be particularly true in reporting the number of frequent ED users. In addition, the results of this study could only be generalized to Hispanic and African-American patients who use public clinics for diabetes care. There may be many more lower income Hispanic and African-American persons with diabetes who go only to the ER and bypass the clinics all together. Despite these limitations, we believe that this study adds significantly to the growing body of data on correlates of ED use among under-served minority patients with type 2 diabetes. Finally, a more refined instrument of the need-for-care characteristics is needed to challenge the dominance of predisposing and the enabling factor of ability to pay. For example, an inclusion of acute illness, as well as accidental injuries, may increase the explanatory power of need-for-care characteristics.

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