Rural/Urban Differences in Access to and Utilization of Services Among People in Alabama with Sickle Cell Disease

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SYNOPSIS

Objective. This study examined relationships between socioeconomic factors and the geographic distribution of 662 cases of sickle cell disease in Alabama in 1999–2001.

Methods. Measures of community distress, physical functioning, and medical problems were used in analyzing utilization differences between individuals with sickle cell disease living in urban and rural areas.

Results. Utilization of comprehensive sickle cells disease services was lower for individuals with sickle cell disease living in rural areas than for those living in urban areas. Rural clients reported significantly more limitations than urban clients on several measures of physical functioning. The results also suggest that utilization of services was higher for those with more medical problems and those who lived in high distress areas, although these findings did not meet the criterion for statistical significance.

Conclusions. Conclusions based on statistical evidence that geographic location and socioeconomic factors relate to significantly different health care service experience bear important implications for medical and health care support systems, especially on the community level.

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Sickle cell disease (SCD) is an autosomal recessive disorder characterized by the production of abnormal hemoglobin and sickle-shaped erythrocytes. In the United States, 95% of all SCD cases occur in people identified as black or African American.[1] SCD is the most common genetic disorder in this population group; the national incidence is 1 in every 400 live African American births.[1] In Alabama, the incidence is 1 in 425.[2] There are approximately 2,700 individuals with SCD in Alabama.[2,3] Individuals with SCD are at risk for unexpected, intermittent, and at times life-threatening complications (i.e., pain, joint necrosis, and major organ damage)[4] and psychosocial adjustment problems.[5–9] Primary research addressing risk factors associated with SCD has focused predominantly on the biomedical (e.g., cell biology) and bioclinical (e.g., various treatment regimens) areas.[10] This research has led not only to better morbidity and treatment outcomes but also to the recognition of the need for comprehensive management strategies addressing both biomedical and psychosocial issues.[11]

In stark contrast to the major emphasis on biomedical and bioclinical research, studies of either programmatic (aggregate) or client (individual) level health service delivery issues are almost nonexistent.[12] It is also unfortunate that very little is known about the lives of people with SCD outside of the medical setting and, more important, how geographic distribution and socioeconomic differentials affect their access to health care. It has been argued that due to the type, scope, and nature of their condition, as well as the availability of community and medical care resources, people with SCD have the potential of receiving adequate care of reasonable quality.[5,11] However, it has also been argued that due to the interaction of race, class, history, research emphasis, and the changing medical care system, access to timely, quality care is inconsistent, especially for adults.[13,14] Due to a dearth of empirical research aimed at examining these arguments, key questions of effectiveness, availability, access, differential outcomes, and use of programs and services affecting the quality of life for these individuals remain unanswered.

As a first step in addressing this lack of knowledge, this article will highlight findings from the Alabama SCD Registry Project that examine the urban-rural dichotomy of health and human services access and utilization for individuals with SCD. The purpose of the present study was to answer the following research question: What is the relationship between urban/rural disparities for individuals with SCD in Alabama and differences in *(a)* socioeconomic/community distress, (*b*) health status (including physical functioning and medical problems) and (*c*) access to and utilization of health and human services? For analytic simplicity, the article is divided into three main components: an analysis of the selected socioeconomic and self-reported health experiences of individuals with SCD categorized by geographic location will first be presented, followed by the results of the examination of the study's research question. Last, implications for the delivery of public health and related services to people with SCD in Alabama, as well as in other states with similar population characteristics, will be discussed. The research question and analytical methods of this study are based on previous published research by two of the present authors.[15]

SCD in Alabama

A large number of the state's one million African American citizens, including many of those with SCD,[3,16] live in rural counties in which residents do not have regular access to clinicians, other multidisciplinary providers, or to the state's major medical centers. Given that more than 20% of the black population in Alabama lives below the federal poverty level,[17] care is often episodic and dispensed by providers who may not be familiar with the contemporary treatment for chronic conditions such as SCD.[2,3]

Tertiary care and community-based medical and health centers serve about 85% of all individuals with SCD in the state of Alabama.[2,3] Most individuals served are children younger than age 18.[2,3] The Sickle Cell Disease Association of Alabama, Inc. (SCDAAI) has seven community-based centers funded by the state to provide screening and education, counseling, social support, and other services (including home and hospital visiting as well as career and student assistance) to clients. In addition to these community-based programs, there are four major tertiary medical centers that serve both children and adults with SCD. These medical centers, located in urban areas, provide consultation and ongoing comprehensive medical and psychosocial management services for people with SCD. Only two of these centers have adult programs; both are located in Birmingham, the largest city in the state. The four major medical centers have SCD programs and have working relationships with the SCDAAI.

Sickle cell client experience

Most of the linked health and human services programs in Alabama for people with SCD (including SCDAAI programs and programs at the four major medical centers) serve children younger than the age of 18 and their families (e.g., the Child Service Coordination Program). This makes it difficult for adults to find knowledgeable and willing practitioners to meet their medical and psychosocial needs. The lack of well-funded and coordinated programs for adults with any chronic conditions has left disparities in access to and use of community resources. Because all of the comprehensive SCD centers are in urban areas, these inequities are pronounced for adults with SCD living in rural areas. Furthermore, SCDAAI data indicate that 86% of visits to these centers in 1999–2001 were for acute exacerbations or chronic care, not comprehensive care, suggesting that routine health maintenance takes place mostly in the respective communities of these adults.

However, it is well known that the availability of health care resources in rural areas of the U.S. is limited.[18] Because of geographic (physical distance) and socio-organizational (who the person sees upon entry into the system) characteristics of the health care service system, entrance into the system for individuals with SCD who live in rural areas may not be "reachable, obtainable, or affordable."[19,20] An estimated 45% of adults with SCD in Alabama live in rural areas.[2] Limited access and affordability may affect the rural client's actual use of services, service expectations, and willingness to contact service providers to assist with a specific biopsychosocial need.[15] The role of SCD programs in Alabama is to minimize the known disparities in availability, access, and utilization (realized access). However, from the client's perspective, it is unclear as to what impact these programs may have in reducing disparities between rural and urban clients.

METHODS

Data for this study came from the Alabama SCD Registry Project. The major purpose of the Registry is to maintain key epidemiologic, sociodemographic, and health care and social service access and use data on people with SCD in Alabama that can be used in planning clinical care, case management, advocacy, and research. The database contains self-reported demographic, medical history, and services information on active clients (those seen within the last two years) of SCDAAI and collaborating tertiary care centers. As of March 2002, the Registry contained baseline face-to-face and/or phone interview data on 662 individuals. These interviews were conducted using a multi-format questionnaire specifically designed for the Registry project and the present study. Consent for participation was obtained from individuals or their legal guardians, and each interviewee was assigned a confidential identification algorithm for privacy and confidentiality purposes. Trained staff at the collaborating sites conducted interviews to assure respect for clients and cultural and linguistic competence. Based on the active case list of the SCDAAI (which includes individuals seen within a two-year period) and the four tertiary care centers, the database represents approximately 53% of the entire estimated population of individuals with SCD in Alabama (2,700 individuals).[2,3] This study used cross-sectional data from the baseline intake interviews.

ZIP Codes of residence were available for 100% of the study population ($N = 662$). Because limited socioeconomic data were available from the intake forms or other sources, the socioeconomic status of individuals was measured indirectly by means of a Community Distress Index (CDI) using 1990 U.S. Census data.[15] When individual-level data are not available, Census data can be a valuable proxy for socioeconomic characteristics.[21–24] Calculation of the CDI is explained later in this section.

In order to examine the urban-rural dichotomy, data were also categorized by urban and rural areas. The U.S. Census reports the number of individuals considered as urban dwellers by census tracts but not by ZIP Codes. For this study, geographic information system (GIS) software was used to categorize urban vs. rural ZIP Code areas; an area was considered urban when 55% or more of its population were classified as urban. Client ZIP Code of residence and SCD center locations were geographically identified, mapped, and coded as urban or rural through the use of GIS.[15] Utilization of services was expected to be higher or lower depending on the distance of clinics from clients. Clinic distance from a client was measured using the GIS software.

Community distress

An index was developed to identify the socioeconomic condition of each ZIP Code area in which clients lived using a combination of socioeconomic characteristics of the black population living in that area.[16] Five variables were considered to develop the CDI: (*a*) percent of black population living in households with incomes below the federal poverty level, (*b*) percent of black residents ages >25 years who did not go beyond 12th grade education, (*c*) percent of black residents ages ≥ 16 years not in labor force, (*d*) percent of black residents ages ≥ 16 years unemployed, and (*e*) per capita income of black residents.

Developing a single index from several different distress indicators gives a comprehensive profile of the socioeconomic condition of the population of a particular area that may be used for comparison across areas of interest.[25] Each variable was coded into categories that represented low, medium, or high distress conditions (Figure 1). The CDI was calculated by adding scores for the five socioeconomic indices, so that a higher CDI score would signify worse socioeconomic conditions among the black population in that area.

Physical functioning

To determine the extent to which SCD affects day-to-day suffering, a 10-item Physical Functioning Scale (PF-10), a subscale of the Medical Outcomes Study scale, was used.[26] This extended Activities for Daily Living scale consists of 10 validated items that assess the extent to which SCD limits typical daily activities.[26] The items are Likert scale 3-point items (i.e., SCD does not limit at all, limits a little, or limits a lot, with does not limit at all equal to a score of 1). (See Figure 2.) A physical function score was formed by averaging non-missing items and then transforming the score to a 10-to-30 scale in which higher scores indicated better functioning.

Medical problems

As part of the baseline interview, self-reported information on the presence and frequency of lifetime experiences of medical problems (e.g., pain episodes), procedures (e.g., surgeries), infections (e.g., osteomyelitis), and other conditions (e.g., aseptic necrosis of the hips) was collected. To determine the extent to which these experiences affect the life of people with SCD, a Medical Problem Index was developed. Based on anecdotal and clinical information about the experiences of people with SCD,[4,27,28] the most common types of experiences (Figure 3) were identified and coded as present (coded as "1") or not present (coded as "0") and weighted by count or frequency of occurrence (e.g., number of episodes of infections).

Utilization

The Utilization of Services measure (UTS) is a ratio that describes for each ZIP Code the estimated number of people with SCD and the total number of clients who sought services from any of the available comprehensive clinics. In other words, utilization of services is the ratio of expected disease in a ZIP Code and the actual number of clients seeking services in that ZIP Code. Expected number of SCD clients in a ZIP Code was calculated by multiplying the gene frequency of SCD in Alabama (1/425, or 0.0024) among

Figure 1. Community Distress Index: measures

Variable	*Definition*	*Coding*
Poverty	Percent of black residents living in households with incomes below federal poverty level	High = ≥31% (= 4) Medium = 21%–30% (= 3) Low = 11%–20% (= 2) Very low = ≤10% (= 1)
Education	Percentage of black residents ages ≥25 years with no education beyond high school	High = ≥34% (= 3) Medium = 26%–33% (= 2) Low = 0–25% (= 1)
Not in labor force	Percent of black residents ages ≥16 years not in the labor force	High = ≥32% (= 4) Medium = 21%–31% (= 3) Low = 11%–20% (= 2) Very low = 0–10% (= 1)
Unemployment	Percent of black residents ages ≥16 years unemployed	High = ≥8% (= 3) Medium = 4%–7% (= 2) Low = 0–3% (= 1)
Income	Per capita income of black residents	Very low = <$4,000 (= 4) Low = $4,001–$7,300 (= 3) Medium = $7,301–$11,999 (= 2) High = ≥$12,000 (= 1)
Community Distress Index	Higher index means worse socioeconomic condition as indicated by the above five variables (Range = 0–18)	High distress = ≥14 Medium distress = 9–13 Low distress = 0–8

Figure 2. Physical Functioning Scale: measures

Variable	*Coding*
Be moderately active	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Climb several flights of stairs	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Climb one flight of stairs	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Participate in active sports[a]	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Lift or carry groceries	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Bend, kneel, or stoop	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Walk more than one mile	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Walk several blocks	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Walk one block	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Bathe or dress	Yes, limited a lot = 1; Yes, limited a little = 2; No, not limited at all = 3
Physical Functioning Scale	Low = 10–13; Moderate = 14–20; High = 21–30

[a] Age ≥8 years.

the black population[2] by the number of black residents in the ZIP Code area.

RESULTS

Client population profile: the urban-rural continuum
A wide disparity in socioeconomic conditions was observed between urban and rural clients (Table 1). Seventy-one percent of the clients in the study population lived in urban areas (468 clients), while 29% (194) lived in the rural parts of Alabama. The larger representation of individuals living in urban areas is due to the geographic concentration of the SCD population in those areas. The mean age for urban clients was 18 years, while for rural clients the mean age was 16; this difference was not significant. Clients in urban areas lived in relatively more prosperous neighborhoods; median family income for the ZIP Code areas in which urban clients lived was $21,600, compared with $19,100 for rural clients (p=0.0016). Black per capita income for areas in which urban clients lived was almost $1,800 higher than for rural clients (p=0.0001). Higher income for blacks in urban areas is reflected by a more educated black population compared to black rural counterparts. Urban clients lived in areas in which, on average, 80% of blacks who were 25 years of age and older had a high school diploma, compared with 71% in rural areas (p=0.0001). Furthermore, the percentage of the black population living in poverty was 40% in rural areas, compared with 31% in urban areas (p=0.0001) (Table 1).

The relative distress of rural clients is further exacerbated by a high percentage of the population ≥16 years of age not in the labor force—32% in rural areas, compared with 26% in urban areas (p=0.0001). The Community Distress Index clearly reflects poorer socioeconomic status for rural clients—58% of rural clients lived in ZIP Code areas that were in the high distress range, compared with only 30% of urban clients (p=0.0001). Eleven percent of urban clients lived in low-distress areas, in contrast to only 2% of rural clients (p=0.0001). These statistics reveal a disparity in socioeconomic conditions between urban and rural SCD clients, highlighting the fact that rural clients were worse off or in more hardship than their urban counterparts.

Physical functioning
The extent that health problems affected daily activities of patients 8 years of age and older was assessed. The analysis showed a significant difference with respect to being "moderately active" (p=0.031). Forty-eight percent of urban clients were not at all restricted in their activity, compared with only 34% of rural clients. A significant difference was also detected with respect to "climbing one flight of stairs" (p=0.007). Sixty-eight percent of urban clients were "not limited," while only 53% of rural clients reported being "not

Figure 3. Medical Problem Index: measures

Event Group	*Type of Event*	*Coding*
Problem	1. Acute chest syndrome/pneumonia 2. Painful episode requiring hospitalization	(1) Yes = 1; No or don't know = 0 (2) Number of episodes: A = 1 episode (= 1); B = more than 5 episodes (= 2) Problem Index = [chest (1) × (2)] + [pain (1) × (2)]
Condition	1. Asceptic necrosis of hips 2. Asceptic necrosis of shoulders 3. Gallstones 4. Eye problems related to SCD	(1) Yes = 1; No or don't know = 0 Condition Index = [hips + shoulders + gallstones + eye]
Infection	1. Osteomyelitis 2. Pyelonephritis	(1) Yes = 1; No or don't know = 0 (2) Number of episodes: A = 1 episode (= 1); B = 2 or more episodes (= 2) Infection Index = [os (1) × (2)] + [py (1) × (2)]
Procedure	1. Surgery: cholecystectomy 2. Surgery: splenectomy	(1)Yes = 1; No or don't know = 0 Procedure Index = [cho + spl]
Medical Problem Index	—	Medical Problem Index = [Problem Index + Condition Index + Infection Index + Procedure Index] Range: None = 0; Low = 1–4; Medium = 5–8; High = ≥9

limited." Third, there was a significant difference in walking one block (p=0.035). Seventy percent of urban clients were "not limited" in walking one block, while only 57% of rural clients felt unrestricted. While no other significant differences were found, it is notable that there was a sharp difference between clients' ability to walk one block and more than one block for both groups. While 70% of urban clients felt unrestricted at one block, only 45% felt unrestricted at several blocks. Similarly, 57% of rural clients felt unrestricted at one block, compared with 39% for several blocks. Furthermore, there was a similar drop from climbing one flight of stairs to climbing several flights, down 25% in urban clients and 16% in rural clients.

Medical problems

The Medical Problem Index is a measure of medical problems that affect the life of patients with SCD. The average levels on the Medical Problem Index were 2.26 for urban areas and 2.38 for rural areas; the difference was not statistically significant. However, the mean number of medical problems consistently increased in accordance with patient age. Within each age group, patients from both areas experienced a similar degree of life difficulty caused by medical problems.

Utilization

The UTS describes for each ZIP Code a ratio of the total number of people who are estimated to have the disease (based on a prevalence of 1/425 black residents of Alabama) and the total number who sought services in any of the available comprehensive clinics during the study period, August 1999 through March 2002. Compared with rural areas, urban areas had a higher level of utilization of services.

Regression analysis was used to model the relationship between utilization of services and patient profile. For each ZIP Code, utilization of services (UTS), mean CDI score (mCDI), mean PF-10 score (mPFM), age-weighted mean Medical Problem Index score (mMPI), and mean of distance from nearest medical facility in miles (mDISTANCE) were calculated. The dependent variable was the UTS measure; the independent variables included mCDI, mPFM, mMPI,

Table 1. Profile of study sample (*N* = 662 clients)

	Urban (n = 468)		*Rural (n = 194)*	
Variable	*Percent*	*SD*	*Percent*	*SD*
Mean age (years)	18	14.3	16.0	13.8
Characteristics of ZIP Code area[a]				
Percent of black residents living in households with incomes below federal poverty level	31.0	12.27	40.0	13.1
Percent of black residents ages ≥25 years without education beyond high school	21.0	7.73	29.0	7.2
Percent of black residents ages ≥16 years who were high school graduates	13.6	3.22	14.0	4.4
Percent of black residents ages ≥16 years unemployed	5.3	1.53	4.8	2.3
Percent of black residents ages ≥16 years not in the labor force	26.0	7.24	32.0	7.44
Per capita annual income of black residents (dollars)	7,400	2,070	5,600	1,615
Median annual household income (dollars)	21,600	7,660	19,100	6,680
Community Distress Index	11.97	2.29	13.58	1.73
Medical Problem Index	2.26	2.27	2.38	2.08
Utilization of Services measure	4.81	5.71	2.63	2.55

[a] Mean across all urban or rural ZIP Code areas in which patients lived.

mDISTANCE, and an area (urban 0; rural 1) indicator (AREA). The model for utilization of services can be expressed as follows:

$$UTS_1 = a + \text{ß}_1(CDI) + \text{ß}_2(PFM) + \text{ß}_3(MPI) + \text{ß}_4(Distance) + \text{ß}_5(Area)$$

$$UTS = -3.656 + 0.3354{*}mCDI + 0.122{*}mPFM - 0.001{*}\ mMPI - 0.022{*}mDISTANCE + 2.16{*}AREA.$$

The regression results show that spatial location of clients clearly affects utilization of services. Utilization of services is predicted to be higher for clients from rural areas ($\text{ß}_5 = 2.16$); clients from rural areas are more likely to utilize services in SCD clinics than clients from urban areas. As predicted, the analysis further reveals that utilization of services is likely to decrease with decreasing socioeconomic conditions. Therefore, rural clients will likely use fewer services than urban clients.

As seen from the low physical functioning coefficient, level of limitations may not be as important in predicting utilization as clients' socioeconomic condition or rural-urban area (Table 2).

Table 2. Correlation coefficients

Index	*Community Distress Index*	*Medical Problem Index*	*Physical Functioning Scale*	*Client age*	*Urban/rural*
Community Distress Index	—	0.132	0.379	0.002[a]	0[a]
Medical Problem Index[b]	0.132	—	0[a]	0[a]	0.531
Physical Functioning Scale	0.379	0[a]	—	0[a]	0.079
Client age	0.002[a]	0[a]	0[a]	—	0.122
Urban/rural	0[a]	0.531	0.079	0.122	—

[a] Correlation is significant at p=0.002 (2-tailed).

[b] Adjusted for client age.

DISCUSSION

Analyses of the socioeconomic context of individuals with SCD living in rural and urban areas reveal that notably significant differences exist. In terms of income, educational attainment, and poverty, those in rural settings fared worse than those in an urban milieu. We found that rural clients reported significantly more limitations on several measures of physical functioning and were less likely to employ health care services.

The relationships found among community distress and physical functioning bear important implications for the public health community. For the SCD population in Alabama, issues involving health care service and delivery can be brought to the forefront of program planners' and decision makers' agendas. Research shows that both access to care and care outcomes continue to be affected by such variables as socioeconomic status, race, and place of residence.[29,30]

Challenges in rural areas have been compounded in recent years by the increasing income and employment disparities that exist between urban and rural settings.[31–34] People in urban areas generally have access to more if not better public services, including health care services, than their rural counterparts. As suggested by this study, socioeconomic factors influence clients' access to health care. People in high distress situations are likely to lack the supportive resources that are needed to improve their health status.[35,36] Indeed, it has been argued that rural minorities are among the most medically understudied and underserved of all population groups in the country.[37,38]

The limited availability of medical and health care as well as other systems of support for adult clients need to be addressed, especially community-based health care. These findings should be of particular interest to the state-level SCD program in Alabama and to other states with large rural populations. Enhanced support for all individuals with SCD and other chronic conditions, particularly those in rural areas, is critical.

Higher utilization of services could be a reflection of a limited supply of providers in particular areas. For example, a provider in a rural region, serving multiple jurisdictions, may see a disproportionate number of patients due to the unavailability of comparable providers in that region; hence higher utilization would be expected. Furthermore, high utilization of services for rural clients indicates that, despite their poor socioeconomic and health status, they attend SCD clinics in urban areas.

Results of the model, although not statistically significant, suggest that utilization of services was higher for those with more medical problems and those who lived in high distress areas.

Finally, the inverse relationship between weighted medical problem levels and utilization of services, although nonsignificant, implies that clients who have relatively more medical problems tend to avoid seeking services or have more limited access to services. However, as seen from the low physical functioning coefficient, physical functioning level may not be as important as clients' socioeconomic condition or urban-rural area in influencing utilization of services. This may be the result of reporting bias in that parents or guardians generally report physical functioning for children.

This study had several weaknesses. The use of surrogate measures, such as ZIP Code, to represent socioeconomic status is one limitation. Given the difficulty of obtaining valid income data, the study used ZIP Code as a proxy, which may not accurately reflect the status of the individuals included in the study. An-

Table 3. Regression results: Utilization of Services model

Variable	*Mean*	*SD*	*Coefficient (β)*	*t-value*	*p-value*
Community Distress Index	12.71	2.48	0.354[a] (β_1)	2.58	0.011
Physical Functioning Scale	16.73	4.61	0.122 (β_2)	1.51	0.132
Medical Problem Index	53.58	59.07	−0.001 (β_3)	−0.19	0.849
Distance from clinic	24.69	21.68	−0.022 (β_4)	−1.32	0.189
Urban vs. rural area	0.51	0.50	2.169[b] (β_5)	2.99	0.003
Utilization of Services measure	3.76	4.59	— —	—	—

NOTE: $R^2 = 0.110$; $F = 3.57$ (p=0.004); n = 149; df = 148.

[a] Coefficient significant at p=0.01.

[b] Coefficient significant at p=0.003.

SD = standard deviation

other limitation relates to the dearth of theoretical models and frameworks for the analysis of social factors and health. Social epidemiology continues to gain support as the relationship between social factors and health outcomes becomes better understood, but measurement sophistication is still lacking.[21]

Future research will be able to expand on the insights gained from this investigation to pursue a more in-depth exploration of the relationship between distance, availability, and sociocultural issues, relative to utilization. Considering that this study is only the second to examine utilization of SCD services based on urban and rural locale,[15] it is important to consider the following: First, comparisons to a standard utilization rate for SCD patients in a rural setting cannot be made due to a lack of comparative data from more than one state. Second, that the lower utilization of health care services among individuals with SCD living in rural areas may have been due to scarcity of resources must be considered as only one of several alternative explanations of our findings. Although typically rural clients have access to fewer resources than people living in rural areas, issues specific to Alabama's rural population—such as lack of transportation or an "as-needed" orientation to health care seeking—could also be influential and are worthy of additional consideration.

This study highlights the need for continued systematic examination of the relationships between social epidemiologic factors, treatment, and support opportunities relative to physical indicators for individuals with chronic conditions such as SCD.[39]

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