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Ethnic Differences in Elders' Home Remedy Use: Sociostructural Explanations

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Abstract

Objective: To determine if ethnic differences in elders' use of home remedies are explained by structured inequalities. *Method:* Dichotomous indicators of “food” and “other” home remedies were obtained from a randomly selected cohort of older adults with diabetes (N=701). Analyses evaluated if differences in availability of care, economic hardship, and health status explained ethnic differences in home remedy use. *Results:* Differences in residential location, discretionary money, and health partially explained greater home remedy use among Black and Native American elders relative to whites. *Conclusions:* Ethnic differences in elders' use of home remedies are not largely attributed to socially structured inequalities.

Keywords

home remedies; older adults; health maintenance; ethnicity; culture

Older adults rely heavily on home remedies in the day-to-day management of their health. Home remedies, which previous research has categorized into 2 broad categories representing either food home remedies (eg, use of teas or baking soda for health purposes) or other home remedies (eg, use of over-the-counter ointments and plant-based substances such as aloe), are frequently used by elders to manage chronic diseases and to respond to signs of illness or disease.¹⁻⁹ For example, drawing on health diary data, Stoller and colleagues⁸ reported that food products such as fruit juice and bran flakes are commonly used by older adults to prevent and treat signs of constipation or urinary difficulties and that over-the-counter products such as liniments and salves are frequently used to relieve muscle and joint pain. Similarly, Arcury and colleagues² reported that 40-50% of older adults use food preparations such as honey and vinegar and over 75% of elders use ointments and creams for health purposes. Home remedies are a salient component of older adults' overall approach to health self-management or behaviors undertaken to prevent the onset of illness and to treat illness episodes.^{9,10}

Home remedies, although widely used among the elderly, are used more heavily by members of ethnic minority groups than by whites. Studies not restricted to older adults find that Blacks are over 3 times more likely to report any use of home remedies and more frequent use than are whites.^{11,12} Among older adults, Najm and colleagues¹³ reported that a greater percentage of Hispanic than non-Hispanic white elders report using home remedies. Arcury and colleagues² found that food home remedies were reported by fewer whites than Blacks and Native Americans and that there were few differences in home remedy use between Blacks and Native Americans. Despite different methodologies and ethnic comparisons, the results of these studies consistently indicate that use of home remedies is more common among ethnic minority than white elders, and there is little difference in home remedy use among minority elders. However, it remains unclear why use of home remedies is more common among minority elders.

The health disparities literature, which draws attention to race and ethnicity as bases for sociostructural inequality, provides one possible set of explanations for ethnic differences in home remedy.¹⁴ The first inequality focuses on the relative availability of conventional health care. Members of minority groups frequently live in areas with fewer primary health care providers and need to travel greater distances to receive health services.¹⁵ Ethnic minority elders also have greater difficulty obtaining conventional health care.¹⁶ The "availability" hypothesis argues that ethnic minority elders may have little choice but to rely on home remedies to treat or manage ailments when conventional care is less available. Racial and ethnic differences in economic hardship are the second inequality that may shape differential use of home remedies. Rates of poverty are nearly 3 times greater among racial and ethnic minority elders in contrast to white elders.¹⁷ The "economic hardship" hypothesis argues that use of home remedies is one way that ethnic minority elders can stretch their limited financial resources.¹⁸ Finally, the relatively greater burden of disease among minority elders could account for their greater use of home remedies. Minority older adults experience more debilitating chronic conditions such as arthritis for which conventional care offers little relief.¹⁹ The "health inequalities" hypothesis argues that minority adults may seek additional approaches to treatment such as home remedies to manage the additional burden of their chronic conditions.

The Current Study

The goal of this study was to determine why home remedy use is more common among ethnic minority elders. We sought to accomplish this goal by examining 3 explanations derived from the health disparities literature and using data from a randomly selected sample of rural dwelling adults with diabetes. Although there are limits to the generalizability of results obtained from this sample, there is little reason to believe that findings from this sample are

irrelevant to the broader population. Previous research has not explicitly examined rural versus urban differences in use of home remedies among older adults; nonetheless, home remedies have been found to be common among both urban and rural dwelling older adults.^{2,7,8} This suggests that use of home remedies is not an artifact of rural culture. Next, ethnic differences in availability of care, economic hardship, and poor health transcend geographic and regional boundaries, but they are concentrated in some rural areas,²⁰ suggesting that these rural environments provide a rich context for examining sources of ethnic differences in use of home remedies. Finally, the widespread use of home remedies among older adults, coupled with the facts that 4 out of 5 older adults have at least one chronic condition,¹⁷ one in 7 older adults have diabetes,²¹ and the average elder has 2 or more distinct chronic conditions,²² suggests that the factors shaping use of home remedies by older adults with diabetes are similar to those of older adults without diabetes.

Research focusing on home remedies and explaining ethnic differences in home remedies is needed. Despite evidence clearly suggesting that older adults rely heavily on home remedies for health self-management, very little research has systematically documented the types of remedies being used and the health effects of these remedies. Research is needed that documents the home remedies being used by elders and the factors that influence their use. Results from this type of research would help health professionals better understand older adults' self-care, identify remedies that may have deleterious consequences, and offer insight into ways of shaping other forms of self-care among older adults. Research focused on ethnic differences in home remedies offers insight into the broader domain of self-care and could be used to inform health education programs targeting other self-management behaviors that are less common among ethnic elders, such as adherence to heart-disease treatment regimens and cholesterol control.^{23,24}

In summary, evidence suggests that home remedies are a central component of older adults' overall approach to health self-management. A greater proportion of ethnic minority than white elders use home remedies, but it remains unclear why more ethnic minority elders use home remedies. The goal of this study was to develop a better understanding of ethnic differences in home remedy use among older adults. We sought to accomplish this goal by examining 3 explanations derived from the health disparities literature, and determining whether the availability of conventional care, economic hardship, or health inequalities best explained ethnic differences in home remedy use in a large, ethnically diverse sample of older adults.

METHOD

Design

Data come from the ELDER (Evaluating Long-term Diabetes Self-management Among Elder Rural Adults) study. ELDER was a population-based cross-sectional survey designed to evaluate differences in the self-care strategies, including the use of home remedies and other complementary and alternative therapies, of rural adults aged ≥ 65 years with diagnosed diabetes. Participants were randomly selected from 2 largely rural counties in central North Carolina with a high proportion of ethnic minorities. The study was approved by the institutional review board of Wake Forest University School of Medicine.

ELDER recruited a random sample of community-dwelling older adults with diabetes, including Blacks (117 men, 103 women), Native Americans (89, 92), and whites (149, 148). Older adults of Hispanic ethnicity were not included in this study because they represent a very small segment of the elderly population in North Carolina. The sampling frame was Medicare claims records. Inclusion criteria were (a) residence in the 2 study counties, (b) at least 2 outpatient claims for diabetes (ICD-9 250) in 1998-2000, (c) age greater than or equal to 65 years, (d) English speaking, and (e) physical and mental ability to participate in the survey.

Random samples of men and women were selected. An interviewer contacted each participant to confirm diabetes status and ethnicity, and assess eligibility and willingness to participate in the study. Calculations indicated that 82 individuals were required in each gender/ethnic group to produce 80% power to detect meaningful differences in the study's primary outcome (ie, HbA1c), as well as sufficient power to detect between-group differences in self-care behaviors that contribute to glycemic control such as exercise and diet.

Of the 1222 persons contacted, 313 were disqualified when initially contacted for recruitment because they reported that they did not have diabetes (n=118), lived out of study counties (n=51), lived in a nursing home (n=84), were less than 65 years of age (n=2), did not speak English (n=1), failed mini-mental state exam (n=5), or were deceased (n=52). We were unable to assess the eligibility of an additional 122 persons because a surrogate refused their participation in the study (n=48), reported they were physically (n=8) or mentally (n=14) unable to respond to eligibility questions, or reported that they could not be located (n=52). For those who met the eligibility criteria at initial recruitment, 86 were not interviewed because they refused participation (n=74), or study staff determined that the participant was physically (n=6) or mentally (n=6) unable to participate at the time the interview was attempted. The final sample included 701 individuals. The overall response rate for eligible participants was 89% (701/787). Three participants were excluded from this analysis because they did not fit the 3 ethnic categories.

Measures

All measures were constructed from items obtained during participant in-home interviews conducted from May through October 2002. Interviews were completed in approximately 1.5 hours, and information was collected on personal and health characteristics, diabetes self-care behaviors, and use of a variety of CAM modalities, as well as formal and informal support.

Dependent variables—We constructed 2 dichotomous measures representing any use of food home remedies and any use of other home remedies in the past year. The measures were constructed from a list of 15 home remedies documented in previous research.^{2-4,8,25} Older adults were presented with each of the 15 remedies and asked if they had used the item within the past 12 months for health purposes. If respondents reported any use of honey, lemon, vinegar, garlic, baking soda, yeast, teas, or whiskey for health purposes in the past year, they were coded 1 for having used food home remedies. If respondents reported any use of tobacco, WD-40, Epsom salts, salves (eg, Bag Balm), liniments (eg, Bengay), kerosene, or Vick's VapoRub for health purposes in the past year, they were coded 1 for having used other home remedies.

Independent variables—Participant ethnicity was a mutually exclusive categorical variable representing Black, white, and Native American. We constructed 5 variables representing availability to conventional care, including (a) a dichotomous indicator of living greater than 30 minutes from a primary care provider; (b) a categorical variable reflecting quartiles of road distance to primary care provider (<5 miles, 5-9 miles, 10-17 miles, and >17 miles); (c) a categorical variable reflecting quartiles of road distance to diabetes education location (same categories described earlier); (d) a dichotomous indicator of whether the participant lived on a road with a paved surface; and (e) a categorical variable characterizing the participant's residential location in terms of “in town,” “near town,” or “open country.” The time to primary care provider was based on a single item asking, “How much time does it usually take you to get your primary doctor's office?” Response categories ranged from less than 5 minutes to 60 minutes or more. Individuals who did not have a primary doctor were coded zero. The remaining “availability to conventional care” variables were based on

interviewer calculations (eg, “road distance to primary care provider”) or observation (eg, “residential location”).

Five measures of economic hardship were constructed from self-reports including (a) a dichotomous indicator of Medicaid receipt; (b) a dichotomous indicator of supplemental private insurance; (c) a categorical indicator of annual household income (ie, <\$10,000, \$10-14,999, \$15,000-24,999, and \geq \$25,000); (d) an indicator of financial hardship constructed from a single question asking, “How well does the amount of money you have take care of your needs?” with response options ranging from 1 = very well to 4 = poorly; and (e) an indicator of discretionary money constructed from a single question asking, “Do you have enough money left over to treat yourself after the bills are paid?” with response options ranging from 1 = rarely/never to 4 = always/usually. The household earnings question had substantial missing data. All individuals with missing values on household earnings were categorized as “missing income” and were included as a separate contrast in the analyses. Previous research suggests that coding for missing yields unbiased parameter estimates and is preferable to other common methods of handling missing data.²⁶

Health inequality was assessed with 4 variables. Number of chronic conditions was created by summing dichotomous responses to a series of 12 questions about discrete chronic conditions (eg, asthma, blood pressure, arthritis), and whether a doctor ever told the respondent that he or she had the condition. Number of years with diabetes was created from a single question asking when the respondent was first told by a health care professional that he or she had diabetes. Functional impairment was assessed with the 10-item Medical Outcomes Study Physical Functioning Measure.²⁷ The Respondents were asked whether they are limited a lot, limited a little, or not limited in a range of activities including vigorous activities, moderate activities, climbing steps, walking, and bathing or dressing. Finally, pain severity was constructed from a single item asking, “During the past 4 weeks, how much did pain interfere with your normal work, including both work outside the home and housework?” with response options ranging from 1 = not at all to 5 extremely.

Covariates—Gender (female=1, male=0), marital status (ie, currently married = 1 versus not currently married = 0), and education (less than high school, high school or equivalent, and at least some college) were controlled in the multivariate analyses.

Analyses

The analyses for this study proceeded in a 3-step fashion.²⁸ First we examined the bivariate association of each home remedy outcome with each of the posited independent variables by ethnicity. Independent variables that were not associated with ethnicity were not considered viable mediators of the ethnicity-home remedy association. In the second step we fit a complete model that included all indicators of all 3 sets of possible mediators. In the third step, 3 separate models were fit whereby indicators of availability of care, economic hardship, and health inequalities respectively were backed out of the model as a block. We backed presumed mediators out of the full model, as opposed to taking a model-building approach whereby blocks of variables are systematically added, to ensure that apparent changes in parameter estimates could be attributed to focal mediator variables as opposed to poorly specified models. By backing blocks of variables out of the full model in separate steps, we can evaluate how ethnic differences in the use of home remedies would change if presumed mediators reflecting availability of care, economic hardship, and health disparities respectively were added to a partial model. To ascertain how much of the difference in each of the home remedy outcomes was “explained” by each set of mediators, we calculated the percentage change in the ethnicity parameter estimates using the following formula: $(\ln[\text{Odds Ratio}]_{\text{reduced model}} - \ln[\text{Odds Ratio}]_{\text{full model}}) / \ln[\text{Odds Ratio}]_{\text{reduced model}}$.

RESULTS

The majority of older adults reported using one or more food home remedies or other home remedies for health purposes in the past 12 months (Table 1). There were significant ethnic differences in the use of home remedies such that a greater proportion of Black and Native American than white elders used both food and other home remedies. The unadjusted odds of using food and other home remedies respectively was 1.90 (95% CI = 1.33 – 2.70) and 2.29 (95% CI = 1.60 – 3.28) times greater among Black than white elders and 1.99 (95% CI = 1.36 – 2.89) and 2.61 (95% CI = 1.78 – 3.85) times greater among Native American than white elders for food and other home remedies respectively. The odds of using either type of home remedy did not differ between Black and Native American elders.

Bivariate analyses revealed that educational attainment and several indicators of availability of care, economic hardship, and health all differed by ethnicity. Black and Native American elders had less education than white elders. Whereas white elders were evenly distributed across the quartiles of distance to a diabetes education center, Blacks were disproportionately represented in the top quartile of distance from a diabetes center, and Native Americans were overrepresented in the third quartile. More Native Americans lived on unpaved roads and in open country, whereas more Blacks lived in town and on a paved road. Fewer whites received Medicaid and more had supplemental health insurance, whereas more Blacks and Native Americans received Medicaid and fewer had supplemental insurance. Earnings were lower for Black and Native American than white elders, and Blacks differed from whites in terms of financial hardship and discretionary money. Finally, Native American elders reported more chronic conditions than Blacks did, and Blacks reported a greater functional impairment than whites did.

Black and Native American elders had over 77% greater odds than whites of reporting use of food home remedies for health purposes in the past year, controlling for age, education, gender, and all the proposed mediators (Table 2, Model 1). Several mediators were independently associated with use of food home remedies. The odds of using food home remedies were 52% greater among individuals living in the open country in contrast to those living near town. The odds of using a food home remedy decreased as financial hardship increased and level of discretionary money increased. Whereas an increase in the number of chronic conditions was associated with an increase in the odds of using a food home remedy, an increase in functional impairment was associated with a decrease in the odds of using a food home remedy for health purposes. In comparison with the unadjusted odds ratios reported in the bivariate analyses, once all of the possible mediators were included in the model, ethnic differences in use of food home remedies between Blacks and whites increased by 12% ($\ln[1.90] - \ln[2.05]/\ln[1.90]$), and differences between Native American and whites decreased by 17% ($\ln[1.99] - \ln[1.77]/\ln[1.99]$).

Controlling for age, education, gender, and all of the proposed mediators, Black elders had nearly 3 times greater odds than whites of using other home remedies for health purposes, and Native American elders had nearly 2 times greater odds than whites of using these remedies (Table 3, Model 1). The odds of using other home remedies were over 2 times greater among individuals living in the open country in contrast to those living near town and 50% greater (trend level) among elders living in town than those living near town. Elders with household earnings between \$10,000 and \$14,999 had over twice the odds of using other home remedies than did individuals whose household earnings were greater than \$25,000. Independent of earnings, the odds of using other home remedies decreased as financial hardship increased. Both an increase in the number of chronic conditions and an increased in pain severity were independently associated with an increase in the odds of using other home remedies. In comparison with the odds ratios reported in the bivariate analyses, once all of the possible

mediators were included in the model, ethnic differences in use of other home remedies between Blacks and whites increased by 24.7% ($\ln[2.29] - \ln[2.81]/\ln[2.29]$) and differences between Native American and whites decreased by 35.3% ($\ln[2.61] - \ln[1.86]/\ln[2.61]$).

Analyses provided limited and mixed support for attributing ethnic differences in the use of home remedies among elders to ethnic differences in availability of care, economic hardship, or health inequalities (Table 4). Variables reflective of socially structured inequalities reduced or accounted for between 10% and 16% of the differences in food and other home remedies between Native American and white elders. By contrast, differences in home remedy use between Black and white elders increased from 3% to 30% in 4 of 6 models after accounting for variables indicative of social inequalities. Approximately 12% and 3% of the differences between Black and white elders in the use of food and other home remedies could be attributed to differences in economic hardship and availability of care.

DISCUSSION

Home remedies are a central and consistent part of how older adults self-manage their health.⁸⁻¹⁰ Despite their widespread use among older adults, very little research has examined the factors shaping use of home remedies. Using data from a randomly selected sample of rural-dwelling adults with diabetes, we found that the majority of older adults use some type of home remedy for health purposes. Like previous studies, we found that nearly one half of white elders use home remedies and that home remedy use was substantially greater among elders of ethnic minority groups.^{2,13} The magnitude of the associations in the current study was similar to those reported earlier, suggesting that ethnic differences in home remedy use among older adults are robust.

The results of this study contribute to a better understanding of ethnic differences in home remedy use. Structured inequalities related to availability of conventional care and economic hardship explained, at best, small amounts of the ethnic differences in home remedy use. Greater use of food home remedies and other home remedies by Native American and Black elders in contrast to whites, respectively, was attenuated once availability of care variables, particularly residential location, were controlled. Although these results must be interpreted with caution due to relatively poor precision in the estimates, they do suggest that access to agents used in self-care is important, but in different ways. For Native Americans, who are overrepresented in the “open country” category, less access to over-the-counter medications may promote greater reliance on food home remedies because products such as lemon, tea, and vinegar are common household items. By contrast, for Blacks, who were overrepresented in the “in town” category, convenient access to drug stores or large retailers may promote greater use of other home remedies such as salves and liniments. These interpretations are further supported by our results indicating that differences in economic hardship attenuated ethnic differences in food home remedies. In light of recent analyses of the 2002 National Health Interview Survey indicating that individuals with greater financial hardship are more likely to seek alternative therapies,¹⁸ our results suggest that Black and Native American elders may use home remedies to stretch their discretionary money. Collectively, this evidence suggests that convenient access to low-cost treatments may partially shape ethnic differences in home remedy use among elders.

Second, ethnic differences in health status among older adults cannot account for differences in home remedy use. Our results indicated that ethnic differences in food home remedies became larger rather than smaller once differences in health status were controlled. These apparent suppression effects appear to be attributed to functional impairment, which was greater among Black and Native American elders relative to whites, and inversely associated with use of food home remedies. However, a greater number of chronic conditions was

associated with greater odds of using both food home remedies and other home remedies, and elevated pain severity was associated with greater use of other home remedies. These findings suggest that home remedies are used by elders as one component of their health self-management and that they may provide elders with some relief because differences in health status mask rather than explain ethnic differences in home remedy use.^{2,3,8} These results also highlight situations where use of home remedies is likely so that health professionals can ask patients about their use of home remedies to ensure that they are not interfering with conventional therapies or treatments.

Finally, 2 additional interrelated findings emerge from this analysis. Overall it is noteworthy that sociostructural variables – sometimes referred to as enabling factors for use of health services²⁹ – explained very little of the ethnic differences in home remedy use among elders. It is also noteworthy, however, that variables indicative of structured inequalities acted in different ways in explaining ethnic variation in home remedy use depending upon specific ethnic comparisons. Approximately 20-35% of the difference in home remedy use between Native Americans and whites was explained by availability of care, economic hardship, and health disparities combined. By contrast, differences in home remedy use between Blacks and whites were largely masked or suppressed by sociostructural inequalities such that, once they were controlled, ethnic differences in home remedy use became larger rather than smaller. Collectively, this evidence suggests that factors other than structured inequalities contribute to ethnic differences in home remedy use among older adults.

The relative inability of variables indicative of structured inequalities to explain ethnic differences in home remedy use suggests that cultural factors likely play an important role in explaining older adults use of home remedies. Astin³⁰ argued that people use alternative self-care therapies “that are congruent with their own values, beliefs, and philosophical orientations toward health and life” (p. 1548). If this holds true for home remedies, as one specific set of alternative self-care activities, it would suggest that ethnic differences in beliefs about the meaning of illness, appropriate approaches for health management, and individual responsibility for health may explain why Black and Native American elders are more likely to use home remedies than are white elders. Results from studies of younger adults report that Blacks view conventional medical treatments less favorably than whites do and that Blacks believe more strongly than whites that home remedies are a viable form of treatment for minor ailments.^{31,32}

Future research should examine cultural explanations for ethnic differences in home remedy use and their use in adults' overall approach to health self-management. There are at least 2 strands of research that could be pursued. First, research should delineate whether ethnic differences in beliefs about home remedies and conventional treatments exist among older adults and evaluate if they explain differences in home remedy use. Second, research should document how current ethnic differences in home remedy use reflect differences in culture change. Presumably, before advances in conventional medicine, beliefs and behaviors related to home remedies were similar across ethnic groups because there were few alternatives. If this presumption is accurate, then current ethnic differences in use of home remedies reflect differences in rates of culture change with a more pronounced weakening in the affinity for home remedies among whites than for Blacks or Native Americans.

The findings of this study must be interpreted and evaluated in light of its limitations. First, these analyses were based on cross-sectional data; consequently, we cannot make causal inferences. The limitations of cross-sectional data are exacerbated in studies of older adults because it is quite possible current home remedy use is an artifact of health disparities earlier in the life course related to availability of care, economic hardship, or health inequalities. Second, although we contend that rural older adults with diabetes are not substantially different

from older adults in general with regard to their use of home remedies, the results from our sample drawn from 2 counties in rural North Carolina cannot be generalized to all older adults. Next, although some of the parameter estimates reflective of ethnic differences in home remedy use fluctuated by as much as 35% across the models, we cannot conclude that the estimates “changed” or that ethnic differences were “explained” because all estimates were within the confidence intervals of the estimates obtained for the fully specified model. Finally, comparisons of ethnic differences in home remedy use across models should be made with caution because each model has a different error term which may affect the stability of the parameter estimates for ethnicity.

The results of this study provide a better understanding of ethnic differences in home remedy use among older adults. Home remedy use is widespread among older adults regardless of ethnicity, suggesting that older adults find some benefit in these practices and that they play an important role in elders' overall strategy for health management. Higher use of home remedies among ethnic minorities may be partially attributed to differential access to low-cost alternatives for managing chronic conditions of aging; however, our results largely suggest that structured inequalities related to availability of conventional care, economic hardship, and health are relatively unimportant factors in explaining ethnic differences in home remedies, particularly among older Blacks. The persistence of ethnic differences in home remedies after controlling for structured inequalities and previous research documenting ethnic differences in beliefs about the efficacy of home and remedies and conventional health care for managing health threats suggest that cultural explanations likely hold more promise for explaining ethnic differences in home remedy use among older adults.

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Table 1
Descriptive Statistics for Some Remedies and Independent Variables by Ethnicity

	Total % (n) M (SD)	White % (n) M (SD)	Black% % (n) M (SD)	Native American % (n) M (SD)
Home Remedy Use				
Food home remedies (χ^2)	52.7 (367)	43.2 (128)	59.1 (130)	60.2 (109)
Other home remedies (χ^2)	57.2 (399)	44.8 (133)	65.0 (143)	67.9 (123)
Demographics				
Age				
65 – 74	57.1 (398)	56.6 (168)	56.4 (124)	58.6 (106)
75 – 84	38.5 (269)	38.4 (114)	40.5 (89)	36.5 (66)
85+	4.4 (31)	5.1 (15)	3.2 (7)	5.0 (9)
Education (χ^2)				
Less than 8 th grade	40.6 (284)	27.3 (81)	42.5 (93)	60.8 (110)
9 th to 11 th grade	24.3 (169)	21.9 (65)	29.2 (64)	22.1 (40)
High school graduate or GED	21.0 (145)	27.3 (81)	19.6 (43)	11.6 (21)
Greater than high school	14.1 (99)	23.6 (70)	8.7 (19)	5.5 (10)
Availability of Care				
>30 minutes to health care provider	25.7 (178)	26.3 (78)	26.5 (58)	23.6 (42)
Distance to primary provider				
Less than 5 miles (low quartile)	26.3 (188)	24.9 (74)	32.7 (72)	23.2 (42)
5 to 9 miles (2 nd quartile)	26.5 (185)	25.6 (76)	23.6 (52)	31.5 (57)
10 to 17 miles (3 rd quartile)	21.4 (149)	21.2 (63)	20.9 (46)	22.1 (40)
Greater than 17 miles (top quartile)	25.2 (176)	28.3 (84)	22.7 (50)	23.2 (42)
Distance to diabetes education location (χ^2)				
Less than 5 miles (low quartile)	24.1 (168)	26.3 (78)	24.6 (54)	19.9 (36)
5 to 10 miles (2 nd quartile)	24.4 (170)	23.6 (70)	23.6 (52)	26.5 (48)
10 to 17 miles (3 rd quartile)	27.8 (194)	25.9 (77)	22.3 (49)	37.6 (68)
Greater than 17 miles (top quartile)	23.8 (166)	24.2 (72)	29.6 (65)	16.0 (29)
Rurality				
Live on a road w/ a paved surface (χ^2)	81.0 (563)	82.1 (243)	84.9 (185)	74.6 (135)
Residential location (χ^2)				
In town	39.6 (275)	40.5 (120)	50.0 (109)	25.4 (46)
Near town	19.7 (137)	24.0 (71)	20.2 (44)	12.2 (22)
Open country	40.7 (283)	35.5 (105)	29.8 (65)	62.4 (113)
Economic Hardship				
Medicaid receipt (χ^2)	33.8 (236)	16.8 (50)	40.9 (90)	53.1 (96)
Supplemental private insurance (χ^2)	43.6 (304)	66.6 (197)	27.7 (61)	25.4 (46)
Household income (χ^2)				
<\$10,000	35.9 (230)	20.9 (58)	47.7 (94)	47.3 (78)
\$10,000 to \$14,999	21.4 (137)	19.4 (54)	19.3 (38)	27.3 (45)
\$15,000 to \$24,999	20.8 (133)	27.3 (76)	18.8 (37)	12.1 (20)
≥\$25,000	21.9 (140)	32.4 (90)	14.2 (28)	13.3 (22)
Financial hardship ^a	2.58 (1.09)	2.45 (1.04)	2.79 (1.09) ^c	2.55 (1.16)
Discretionary money ^a	2.31 (1.09)	2.62 (1.16)	1.97 (1.01) ^c	2.19 (1.07) ^c
Health Inequality				
Number of chronic conditions ^a	4.69 (2.13)	4.61 (2.18)	4.31 (1.98)	5.28 (2.22) ^{bc}
Years w/diabetes ^a	13.01 (10.62)	12.56 (10.55)	14.25 (11.48)	12.21 (9.58)
Level of functional impairment ^a	21.80 (6.23)	20.67 (6.45)	22.09 (6.35) ^c	23.29 (5.69) ^c
Pain severity ^a	2.46 (1.31)	2.33 (1.29)	2.39 (1.31)	2.74 (1.35) ^c

Note. Estimates obtained from the ELDER data.

χ^2 refers to significant differences (P<.05) by ethnicity in categorical variables as determined by chi-square tests

^a signifies reported values are means and standard deviations

^b signifies significant mean difference (P<.05) in contrast to Blacks

^c signifies significant mean difference (P<.05) in contrast to whites

Table 2
Estimated Association of Indicators of Ethnicity, Availability of Care, Economic Hardship, and Health Disparities With Use of Food Home Remedies

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Ethnicity				
White	Reference	Reference	Reference	Reference
Black	2.05*** (1.35 – 3.10)	2.01*** (1.34 – 3.02)	2.27*** (1.51 – 3.29)	1.89*** (1.27 – 2.83)
Native American	1.77** (1.13 – 2.77)	1.90** (1.24 – 2.92)	1.93** (1.26 – 2.96)	1.75** (1.13 – 2.72)
Availability of Care				
Distance to diabetes education				
< than 5 miles (low quartile)	Reference		Reference	Reference
5 to 9 miles (2 nd quartile)	0.86 (0.53 – 1.40)		0.80 (0.50 – 1.31)	0.82 (0.50 – 1.33)
10 to 17 miles (3 rd quartile)	0.91 (0.56 – 1.47)		0.82 (0.51 – 1.30)	0.87 (0.54 – 1.40)
> than 17 miles (top quartile)	1.15 (0.69 – 1.91)		1.08 (0.66 – 1.77)	1.07 (0.65 – 1.76)
Rurality				
Live on a road w/ paved surface	1.11 (0.71 – 1.74)		1.13 (0.73 – 1.74)	1.13 (0.73 – 1.75)
Residential location				
Near town	Reference		Reference	Reference
In town	0.94 (0.60 – 1.50)		0.89 (0.57 – 1.41)	0.97 (0.62 – 1.53)
Open country	1.52 [†] (0.96 – 2.40)		1.45 [†] (0.92 – 2.27)	1.56 [†] (0.99 – 2.43)
Economic Hardship				
Medicaid receipt	0.84 (0.54 – 1.31)	0.83 (0.53 – 1.29)		0.85 (0.55 – 1.31)
Supplemental private insurance	0.87 (0.57 – 1.32)	0.88 (0.58 – 1.33)		0.97 (0.64 – 1.46)
Household income				
Missing	1.37 (0.65 – 2.88)	1.34 (0.65 – 2.78)		1.12 (0.55 – 2.29)
<\$10,000	1.20 (0.65 – 2.23)	1.24 (0.67 – 2.28)		1.22 (0.66 – 2.24)
\$10,000 to \$14,999	0.92 (0.51 – 1.66)	0.98 (0.54 – 1.75)		0.89 (0.50 – 1.60)
\$15,000 to \$24,999	1.00 (0.59 – 1.70)	1.04 (0.62 – 1.77)		0.98 (0.58 – 1.65)
≥\$25,000	Reference	Reference		Reference
Financial hardship	0.75** (0.63 – 0.90)	0.75*** (0.63 – 0.89)		0.77** (0.64 – 0.91)
Discretionary money	0.82* (0.67 – 0.99)	0.81* (0.67 – 0.99)		0.83 [†] (0.69 – 1.00)
Health Inequality				
Number of chronic conditions	1.10* (1.01 – 1.19)	1.11* (1.02 – 1.20)	1.09* (1.01 – 1.19)	
Years w/diabetes	0.99 (0.98 – 1.01)	1.00 (0.98 – 1.01)	0.99 (0.98 – 1.01)	
Level of functional impairment	0.95*** (0.92 – 0.98)	0.95*** (0.92 – 0.98)	0.95*** (0.92 – 0.98)	
Pain severity	1.14 (0.98 – 1.33)	1.14 [†] (0.98 – 1.32)	1.11 (0.96 – 1.28)	
-2 Log likelihood	889.27	902.05	906.94	909.50
% Correctly predicted observations	66.3	64.9	65.3	64.3

Note. Estimates obtained from the ELDER data. Gender, marital status, and education are included as covariates in all models

[†] P<.10

* P<.05

** P<.01

*** P<.001 (2-tailed)

Table 3
 Estimated Association of Indicators of Ethnicity, Availability of Care, Economic Hardship, and Health Disparities With Use of Other Home Remedies

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Ethnicity				
White	Reference	Reference	Reference	Reference
Black	2.81*** (1.82–4.34)	2.89*** (1.88–4.43)	2.59*** (1.73–3.88)	2.20*** (1.46–3.30)
Native American	1.86** (1.17–2.97)	2.10*** (1.34–3.30)	1.97** (1.27–3.07)	1.99** (1.27–3.13)
Availability of Care				
Distance to diabetes education				
< than 5 miles (low quartile)	Reference		Reference	Reference
5 to 9 miles (2 nd quartile)	0.96 (0.57–1.61)		0.92 (0.56–1.53)	0.88 (0.54–1.45)
10 to 17 miles (3 rd quartile)	0.87 (0.52–1.43)		0.77 (0.47–1.26)	0.78 (0.48–1.27)
> than 17 miles (top quartile)	0.91 (0.54–1.55)		0.86 (0.52–1.44)	0.79 (0.48–1.31)
Rurality				
Live on a road w/ paved surface	1.22 (0.77–1.94)		1.28 (0.81–2.02)	1.27 (0.82–1.99)
Residential location				
Near town	Reference		Reference	Reference
In town	1.50 [†] (0.93–2.42)		1.45 (0.91–2.32)	1.43 (0.91–2.27)
Open country	2.03*** (1.26–3.27)		2.07*** (1.30–3.31)	2.00*** (1.27–3.15)
Economic Hardship				
Medicaid receipt	1.17 (0.74–1.88)	1.15 (0.73–1.82)		1.33 (0.85–2.08)
Supplemental private insurance	1.02 (0.66–1.57)	1.00 (0.65–1.53)		1.06 (0.70–1.60)
Household income				
Missing	1.29 (0.60–2.75)	1.38 (0.65–2.90)		1.00 (0.49–2.06)
< \$10,000	1.66 (0.88–3.16)	1.70 (0.90–3.21)		1.57 (0.85–2.91)
\$10,000 to \$14,999	2.04* (1.10–3.77)	2.09* (1.14–3.83)		1.82* (1.01–3.30)
\$15,000 to \$24,999	1.47 (0.85–2.54)	1.51 (0.88–2.59)		1.38 (0.82–2.34)
≥ \$25,000	Reference	Reference		Reference
Financial hardship	0.81* (0.67–0.97)	0.81* (0.68–0.97)		0.87 (0.73–1.04)
Discretionary money	1.15 (0.94–1.41)	1.15 (0.94–1.40)		1.06 (0.87–1.28)
Health Inequality				
Number of chronic conditions	1.23*** (1.12–1.35)	1.24*** (1.14–1.36)	1.22*** (1.12–1.34)	
Years w/diabetes	0.99 (0.98–1.01)	0.99 (0.98–1.01)	0.99 (0.98–1.01)	
Level of functional impairment	0.98 (0.95–1.01)	0.98 (0.95–1.01)	0.98 (0.94–1.01)	
Pain severity	1.35*** (1.15–1.58)	1.32*** (1.13–1.55)	1.29*** (1.11–1.50)	
–2 Log likelihood	829.09	841.58	849.53	883.47
% Correctly predicted observations	72.0	71.1	70.4	66.5

Note. Estimates obtained from the ELDER data. Gender, marital status, and education are included as covariates in all models

[†] P<.10

* P<.05

** P<.01

*** P<.001 (2-tailed)

Table 4

Percentage Change in Estimated Differences Between Black and Native American in Contrast to White Elders in their Use of Food Home Remedies and Other Home Remedies After Accounting for Socio-Structural Inequalities

	Availability of Care		Economic Hardship		Health Disparities	
	FHR	OHR	FHR	OHR	FHR	OHR
Blacks	+2.8	-2.6	-12.4	+8.6	+12.8	+31.0
Native Americans	-11.0	-16.4	-13.2	-8.5	+2.0	-9.8

Note. FHR = Food Home Remedy, OHR = Other Home Remedy