Original Science

Demographic, Health and Diabetes Self-management Correlates of Medical Skepticism Among Rural Older Adults

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Abstract

This study examines the demographic, health, and diabetes self-management correlates of medical skepticism among an ethnically diverse sample of older (>60 years) rural adults. Participants (n=564) received a hemoglobin A1c (A1c) test and completed a survey including measures of diabetes management behaviors and the four-item medical skepticism scale. Significant associations were observed between medical skepticism and demographic and health characteristics; overall greater medical skepticism was associated with lower A1c values. In multivariate analysis, overall medical skepticism scores were inversely associated with participating in diabetes education classes and positively associated with participating in exercise sessions. Two of the four individual medical skepticism items were associated with diabetes management: diabetes class participation and exercising and eating > 5 daily servings of fruits and vegetables. This study shows that a brief medical skepticism tool may be useful in clinical and research settings in assessing the degree to which older adults with diabetes adhere to diabetes management.

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Despite the availability of evidence-based clinical guidelines and diabetes self-management educational programs, most diabetes patients do not achieve appropriate management goals, creating challenges in addressing the tremendous and ever-growing burden of diabetes.[1-5] How an individual views the health care system and the uncertainty of the effectiveness of the care they receive can potentially influence their willingness to engage in diabetes management. Those with higher levels of uncertainty in the effectiveness of care may require additional educational efforts to understand how medical care can help them manage their diabetes.[6]

Medical skepticism is defined as doubt in the ability of conventional health care or medicine to change health status.[7] Astin has suggested that skepticism about conventional medical care may contribute to the growing use of alternative forms of care in the U.S., including complementary and alternative medicine.[8] Previous studies have painted a somewhat complex picture of the association between medical skepticism and overall health, showing on the one hand that medical skepticism is associated with higher overall self-rated health, but also with less use of and lower

satisfaction with conventional medical care, higher rates of unhealthy behaviors, and overall mortality.[9-13]

Inherent in the study of medical skepticism is the challenge associated with measuring this complex construct in a manner that is both accurate and succinct. Fischella and colleagues,[7] using a framework similar to the Andersen-Newman behavioral health model,[14] created a four-question instrument that is generally used to estimate medical skepticism in various populations, and its association with preventive care and satisfaction with care.

There is to our knowledge no literature on the association between medical skepticism and diabetes management. Given the significant public health burden of diabetes, and the need for a high degree of self-care and health care provider management to achieve the goals of optimal diabetes outcomes, this condition lends itself well to explore this association. This study examines this relationship in a diverse sample of older rural adults with diabetes, a population with limited access to health care and significant diabetes disparities.[15-18]

Method

Participants

Data for this analysis are from a larger study of the beliefs and attitudes of an ethnically diverse (white, African-American, American Indian) sample of rural community-dwelling older adults with diabetes from south central North Carolina.[19] Inclusion criteria were age >60 years and having had a diabetes diagnosis for at least two years. Participants (N=564) were recruited from community sites (e.g., congregate meal sites, senior centers, churches, etc.) using a site-based sampling procedure.[20] The study was approved by the Institutional Review Board of the authors' institution, and signed informed consent was obtained from all study participants.

Study Measures

Demographic and health information was collected by self-report or personal observation, including age (60 – 74, >75), race (white, African-American, American Indian), sex, education (less than high school, at least a high school diploma), marital status (currently married or not married), number of chronic conditions (< 3, >3), and migration status (always lived in the South, or lived some portion of their life outside the South). Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared and classified as obese or not (<30 kg/m2, >30.0 kg/m2).

Diabetes management was assessed using the diabetes module of the CDC Behavioral Risk Factor Surveillance System (BRFSS) 21 and three questions from the 11-item Summary of Diabetes Self-Care (SDSC)22. Data collected included self-reported frequency of blood glucose self-monitoring (monitors blood glucose at least once per day), self-foot checks (checks own feet for sores at least once per week) and health care provider foot checks (doctor checks feet at least once a year), A1c tests (doctor performs A1c test at least 4 times a year), eye examinations (doctor performs dilated eye exam at least once a year), adherence to diet (eats five or more servings of fruits and vegetables a day) and physical activity (30 minutes per day for 5 days a week, and participates in a specific exercise session at least five times per week) recommendations; and, participation in a diabetes education class at any time. Glycemic control (A1c) was assessed by collecting a finger stick blood sample and using the procedures for the handheld Bayer A1cNow+ machine[23] and dichotomized as <7% or >7%.

The primary predictor variable for this analysis was medical skepticism, which was assessed with four items used in the Medical Expenditure Survey.[6,7] The items include: (Question 1 – "Overcome Illness") "I can overcome illness without the help from a medically trained professional"; (Question 2 – "Home Remedies") "Home remedies are often better than drugs prescribed by a doctor;" (Question 3 – "Individual Behavior") "It is individual behavior that determines how soon an individual gets well;" and, (Question 4 – "Understand Health") "I understand my health better than most doctors." Response options for the items range from strongly disagree (1) to strongly agree (5), and were totaled for a summary score of 4 – 20, with higher scores indicative of higher levels of skepticism. The scale showed weak internal consistency

in this sample (α = 0.54) so, as in previous studies using this scale,[6, 12] including our own research in this population,[24] both total summary score and the score of individual questions were used.

Data Analysis

Analysis of variance (ANOVA) was used for bivariate associations between demographic and health characteristics and mean medical skepticism scores for each question and the summary medical skepticism scores. Logistic regression was used to assess associations of overall medical skepticism scores and responses to individual questions as the independent variables and diabetes self-management characteristics as dependent variables. Each model was adjusted for age, race, sex, education, marital status, migration status, and number of chronic diseases. The Type I error rate was fixed at .05. All computations were performed with SAS 9.2 software (SAS Institute, Cary, NC).

Table 1: Bivariate Associations between Demographic and Health Characteristics and Responses to Medical Skepticism Questions and Summary Scores (Mean+SD)

	Can overcome illness without help (MS1)	Home remedies better than drugs (MS2)	Own behavior determines health (MS3)	Understands own health better (MS4)	Summary Score
Age group					
60 – 74 years	2.2 (1.0)	2.7 (1.0)	3.7 (0.8)	3.1 (1.1)	11.7 (2.6)
≥75 years	2.3 (1.1)	2.9 (1.0)	3.6 (0.8)	3.2 (1.1)	11.9 (2.5)
Sex					
Male	2.2 (1.0)	**2.6 (0.9)****	3.6 (0.9)	3.0 (1.1)	**11.4 (2.6)***
Female	2.3 (1.1)	**2.9 (1.0)**	3.7 (0.8	2.1 (1.0)	**11.9 (2.5)**
Ethnicity					
White	2.3 (1.0)	**2.7 (1.0)***	3.6 (0.8)	3.1 (1.1)	11.6 (2.4)
African American	2.3 (1.1)	**2.8 (1.0)**	3.7 (0.8)	3.2 (1.1)	11.9 (2.6)
American Indian	2.2 (1.0)	**3.0 (1.0)**	3.7 (0.8)	3.0 (1.0)	11.7 (2.7)
High school graduate					
Yes	2.2 (1.0)	2.7 (1.0)	3.7 (0.8)	**3.0 (1.1)***	**11.6 (2.6)***
No	2.3 (1.0)	2.9 (1.0)	3.6 (0.7)	**3.2 (1.0)**	**12.0 (2.5)**
Currently married					
Yes	2.2 (1.0)	**2.7 (1.0)***	3.6 (0.8)	3.0 (1.1)	11.5 (2.5)
No	2.3 (1.1)	**2.9 (1.0)**	3.7 (0.8)	3.1 (1.1)	12.0 (2.6)
Always lived in the South					
Yes	2.3 (1.1)	**2.9 (1.0)****	3.7 (0.8)	**3.2 (1.1)***	12.0 (2.6)*
No	2.1 (1.0)	**2.6 (0.9)**	3.7 (0.9)	**2.9 (1.1)**	11.3 (2.5)
Obese					
Yes	2.3 (1.0)	2.7 (1.0)	3.6 (0.8)	3.1 (1.1)	11.7 (2.5)
No	2.2 (1.0)	2.8 (1.0)	3.7 (0.8)	3.1 (1.1)	11.8 (2.6)
Chronic health conditions					
< 3	**2.2 (1.0)****	2.7 (1.0)	3.7 (0.8)	**3.0 (1.1)***	11.6 (2.6)*
≥3	**2.4 (1.0)**	2.9 (1.0)	3.6 (0.8)	**3.3 (1.1)**	12.2 (2.4)
Glycemic control (A1c %)					
<7%	2.3 (1.0)	**2.9 (1.0)****	**3.7 (0.8)***	3.1 (1.1)	**12.0 (2.6)***
≥7%	2.2 (1.0)	**2.6 (1.0)**	**3.6 (0.8)**	3.1 (1.1)	**11.5 (2.5)**

*p value <0.05 for bivariate comparisons using ANOVA / t-test.
**p value <0.01 for bivariate comparisons using ANOVA / t-test.
All significant comparisons are bolded.

Results

The mean overall medical skepticism score was 11.7 (+2.6). In bivariate analyses (Table 1), correlates of higher overall medical skepticism scores included: female sex, lower formal education, living outside the South, having >3 chronic diseases, and having an A1c level <7%. For the "Overcome Illness" item, scores were significantly higher for those with >3 versus those with <3 chronic diseases. For the "Home Remedies" items, scores were significantly higher for women than men, American Indians relative to African-Americans and whites, unmarried compared to married persons, persons who have always lived in the South versus those who spent some time outside the South, and those with an A1c <7% versus those with an A1c >7%. For "Individual Behavior", scores were higher for those with an A1c <7% versus those with an A1c >7%. For the "Understand Health" item, agreement was higher for those with less than a high school education compared to those with at least a high school education, for those who had always lived in the South compared to those who spent some time outside the South, and for those with >3 chronic diseases compared to <3 chronic diseases.

Table 2: Multivariate Associations Among Medical Skepticism and Diabetes Management Factors

	Can overcome illness without help (MS1)	Home remedies better than drugs (MS2)	Own behavior determines health (MS3)	Understands own health better (MS4)	Summary Score
Outcome	Odds Ratio (95% Confidence Interval)				
Personal Care					
Monitors blood glucose (at least 1x/day)	1.06 (0.84 – 1.34)	0.97 (0.76 – 1.24)	0.99 (0.75 – 1.31)	1.21 (0.97 – 1.52)	1.07 (0.98– 1.16)
Checks feet for sores (at least 1x/week)	0.93 (0.74 – 1.18)	1.06 (0.83 – 1.35)	1.27 (0.98 – 1.66)	1.01 (0.80 – 1.26)	1.04 (0.95 – 1.13)
Eats five or more servings of fruits and vegetables per day (at least 5x/week)	0.78 (0.65 – 0.94)	**1.35 (1.11 – 1.64)**	1.04 (0.83 – 1.30)	0.92 (0.77 – 1.11)	0.99 (0.92 – 1.06)
Exercises at least 30 minutes per day (at least 5x/week)	0.98 (0.80 – 1.21)	1.33 (1.08 – 1.66)	1.22 (0.94 – 1.59)	0.88 (0.72 – 1.09)	1.06 (0.98 – 1.15)
Participates in specific exercise session (at least 5x/week)	**1.25 (1.00 – 1.57)**	1.22 (0.95 – 1.57)	1.26 (0.93 – 1.72)	0.82 (0.64 – 1.04)	**1.09 (1.00 – 1.19)**
Medical Care					
Doctor checks feet for sores (at least once per year)	0.91 (0.73 – 1.14)	0.92 (0.72 – 1.16)	1.17 (0.90 – 1.53)	0.98 (0.78 – 1.23)	0.97 (0.89 – 1.06)
Doctor performs A1c test (at least 4x/year)	0.89 (0.66 – 1.20)	1.10 (0.80 – 1.53)	1.35 (0.96 – 1.90)	0.91 (0.67 – 1.22)	1.01 (0.90 – 1.14)
Doctor performs dilated eye exam (at least once/year)	0.83 (0.67 – 1.02)	1.03 (0.82 – 1.29)	1.10 (0.85 – 1.43)	0.95 (0.77 – 1.18)	0.96 (0.88 – 1.03)
Participated in diabetes class (yes)	0.86 (0.71 – 1.05)	0.72 (0.59 – 0.88)	0.94 (0.75 – 1.18)	1.19 (0.99 – 1.43)	0.92 (0.86 – 0.99)

All significant associations are bolded.

For the "Overcome Illness" item, mean scores were higher for those who adhered to physical activity recommendations. Conversely, scores were higher for those not receiving dilated eye exams, those not adhering to dietary recommendations for fruit and vegetable consumption, and those not participating in diabetes self-management classes. The mean score for the "Home Remedies" item was higher among those who did not participate in diabetes self-management classes. The mean score for the "Individual Behavior" item were higher among those reporting doing regular self-foot checks. The mean score for the "Understand Health" item was higher for those reporting checking blood glucose at least once per day.

In multivariate analyses (Table 2), overall medical skepticism scores were inversely associated with participating in diabetes self-management classes and with participating in at least five specific exercise sessions per week. Mean scores for the "Overcome Illness" item was positively associated with participating in at least five specific exercise sessions per week, and inversely associated with eating > 5 daily servings of fruits and vegetables a day. Mean scores for the "Home Remedies" item was positively associated with exercising at least 30 minutes for 5 days per week and eating > 5 daily servings of fruits and vegetables a day, and negatively associated with participating in diabetes self-management classes.

Discussion

In this study of rural older adults, we observed some associations between medical skepticism and demographic and health characteristics, and with diabetes management. While there are limited data on the demographic correlates of medical skepticism, Fischella and colleagues[7] showed that medical skepticism was associated with younger age, white race, lower income, and less education, the latter result being similar to our findings. It is not surprising that there is a

positive association between skepticism and poorer health, although the association of higher skepticism and lower A1c is puzzling. There may be some overlay between these latter two characteristics; that is, those with more chronic health conditions may be more likely to have frequent interaction with health care providers, leading to greater monitoring of health indicators, including A1c.

While overall medical skepticism scores were only positively associated with participating in specific exercise sessions, there were some associations with individual MS questions. The finding of a positive association between medical skepticism and participating in healthy behaviors is contradictory to the findings of Fischella and colleagues.[7] In their analysis of data from adult respondents >25 years of age in the 1987 National Medical Expenditure Survey, medical skepticism was inversely associated with engaging in healthy behaviors and adhering to preventive care guidelines. Differences in the age groups between this study and ours, and our focus on participants with diabetes — who may be more acutely aware of the behavioral consequences associated with diabetes management — might explain the conflicting findings.

Our study has some limitations. First, we relied on self-reported demographic, health, and diabetes management characteristics. Second, we used a fairly short measure of medical skepticism that does not appear to have been validated among rural older adults. In addition, some of the significant associations observed might only reflect a chance relationship rather than a true association. Finally, this was an analysis of cross-sectional data, which limits our ability to adequately address temporality. However, this study has several strengths, including a large, diverse sample of rural older adults with diabetes, validated measures of diabetes management, including glycemic control, and a focus on the relationship between medical skepticism and diabetes management, which has yet to be explored.

Implications/Relevance for Educators

Diabetes self-management education and regular interaction with the health care provider team are important components in achieving the goals of reducing the risks of diabetes-related complications and reducing health care costs. Patients who have participated in formal diabetes education are more likely to engage in preventive care practices.[25-26] Nonetheless, many diabetes patients do not participate in diabetes management education and do not adhere to diabetes self-management guidelines.[1-5] Perceptions of diabetes patients regarding the health care system and the effectiveness of the care they are or should be receiving may underlie these trends. The present study showed that participants with higher levels of medical skepticism had lower rates of reported participating in diabetes self-management classes. Thus, providers should particularly encourage patients who are more skeptical about the health care they receive (or that is available) regarding the benefits of regular care for diabetes management.

The pattern of associations seen between medical skepticism and diabetes management in this study may indicate that some practices such as eating fruits and vegetables, exercising, and checking one's blood glucose levels may be performed by patients with diabetes to avoid interacting with the health care system. However, this premise is contrary to our finding of an inverse association between medical skepticism and participation in diabetes self-management classes, where many older adults would have learned about the importance of these healthy behaviors. This contradiction may reflect a lack of availability of formal diabetes education programs in these communities, or the feeling that these older adults receive their education regarding diabetes management from other sources (e.g., family, friends, media, caregivers) and can manage their diabetes without formal educational intervention. Since this pattern was not systemic across the diabetes management behaviors, and since there was a suggestion that medical skepticism is inversely associated with A1c, further research is needed to explore the relationship between attitudes toward the health care system and diabetes management practices.

This brief medical skepticism scale may provide a quick assessment of this construct in the clinical setting, although, as demonstrated in our study, there may be concerns with the validity to adequately measure this construct in some populations. Further exploration is needed to more fully understand the relationship between perceptions toward

the health care system and diabetes management in this population, given their vulnerability to the negative impacts of this disease, including the measures most appropriate to assess this construct. Also, given our relatively narrow focus on rural older African-Americans, American Indians and whites, additional research is needed to expand this investigation to other populations with significant diabetes disparities.

References:

1. Grant, R.W., & Meigs, J. B. (2006). Overcoming barriers to evidence-based diabetes care. Curr Diabetes Rev, 2, 261–269.
2. Harris, C. D., Pan, L., & Mukhtar, Q. (2010). Changes in receiving preventive care services among US adults with diabetes, 1997-2007. Prev Chronic Dis, 7, 1–5.
3. Centers for Disease Control and Prevention. Prevalence of receiving multiple preventive-care services among adults with diabetes — United States, 2002-2004. (2005). MMWR Morb Mortal Wkly Rep, 54, 1130-1133.
4. Centers for Disease Control and Prevention. Preventive care services among persons with diabetes — United States, 1995 and 2001. (2002). MMWR Morb Mortal Wkly Rep, 51, 965-969.
5. Kuo, S., Fleming, B., Gittings, Han L. F., Geiss, L. S., Engelgau, M. M., & Roman, S. H. (2005). Trends in care practices and outcomes among Medicare beneficiaries with diabetes. Am J Prev Med, 29, 396-403.
6. Borders, T. F., Rohrer, J. E., Xu, K. T., & Smith, D. R. (2004). Older person's evaluation of health care: The effects of medical skepticism and worry about health. Health Serv Res, 39, 35–52.
7. Fiscella, K., Franks, P., & Clancy, C. M. (1998). Skepticism toward medical care and health care utilization. Med Care, 36, 180–189.
8. Astin JA. (1998). Why patients use complementary and alternative medicine: results of a national study. JAMA, 279:1548–53.
9. Callahan, L. F., Freburger, J. K., Mielenz, T. J., & Wiley-Exley, E. K. (2008). Medical skepticism and the use of complementary and alternative health care providers by patients followed by rheumatologists. J Clin Rheumatol,14, 143–147.
10. Fiscella, K., Franks, P., Clancy, C. M., Doescher, M. P., & Banthin, J. S. (1999). Does skepticism towards medical care predict mortality? Med Care, 37, 409–414.
11. Rohrer, J. E., & Borders, T. F. (2004). Healthy skepticism. Prev Med, 39, 1234–1237.
12. Wiley-Exley, E. K., Mielenz, T. J., Norton, E. C., & Callahan, L. F. (2007). Complementary and alternative medicine use in musculosketetal disorders: Does medical skepticism matter? Open Rheumatol J, 1, 5–11.
13. Jerant A, Fenton JJ, Bertakis KD, Franks P. (2014). Satisfaction with health care providers and preventive care adherence: a national study. Med Care, 52:78 – 85.
14. Anderson RM. (1995). Revisiting the behavioral model and access to medical care: Does it matter? J Health Soc Behav, 36:1.
15. Bell, R. A., Quandt, S. A., Arcury, T. A., Snively, B. M, Stafford, J. M., Smith, S. L., & Skelly, A. H. (2005). Primary and specialty medical care among ethnically diverse, older rural adults with type 2 diabetes: The ELDER Diabetes Study. J Rural Health, 21, 198-205.
16. Heisler, M., Smith, D. M, Hayward, R. A, Krein, S. L, & Kerr, E. A. (2003). Racial disparities in diabetes care processes, outcomes, and treatment intensity. Med Care, 41, 1221–1232.
17. Coon, P., & Zulkowski, K. (2002). Adherence to American Diabetes Association standards of care by rural health care providers. Diabetes Care, 25, 2224-2229.
18. Dansky, K. H., & Dirani, R. (1998). The use of health care services by people with diabetes in rural areas. J Rural Health, 14, 129-137.
19. Grzywacz, J. G., Arcury, T. A., Ip, E. H., Chapman, C., Kirk, J. K., Bell, R. A., & Quandt, S.A. (2011). Older adults' common sense models of diabetes. Am J Health Behav, 35, 318-333.
20. Arcury, T. A., & Quandt, S. A. (1999) Participant recruitment for qualitative research: A site-based approach to community research in complex societies. Human Org, 58, 128-133.
21. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. Available at: http://www.cdc.gov/brfss/.
22. Toobert, D. J., Hampson, S. E., & Glasgow, R. E. (2000). The summary of diabetes self-care activities measure: results from 7 studies and a revised scale. Diabetes Care, 23, 943-950.
23. Bode, B. W., Irvin, B. R., Pierce, J. A., Allen, M., & Clark, A. L. (2007). Advances in Hemoglobin A1c point of care technology. J Diabetes Sci Technol., 1, 405-441.
24. Bell, R. A., Grzywacz, J. G., Quandt, S. A., et al. (2013). Medical skepticism and complementary therapy use among older rural African Americans and Whites. J Health Care Poor Underserved, 24:777 - 787.
25. Duncan, I., Birkmeyer, C., Coughlin, S., Li, Q. E., Sherr, D., & Boren, S. (2009). Assessing the value of diabetes education. Diabetes Educ, 35, 752–760.
26. Strine, T. W., Okoro, C. A., Chapman, D. P., Beckles, G. L., Balluz, L., & Mokdad, A.H. (2005). The impact of formal diabetes education on the preventive health practices and behaviors of persons with type 2 diabetes. Prev Med, 79–84.