Influence of Race, Ethnicity and Social Determinants of Health on Diabetes Outcomes

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ABSTRACT

Background: There is strong evidence that race, ethnicity and social determinants of health significantly influence outcomes for patients with diabetes. A better understanding of the mechanisms of these relationships or associations would improve development of cost-effective, culturally tailored programs for patients with diabetes.

Methods: This article reviews the current state of the literature on the influence of race and ethnicity and social determinants of health on process of care, quality of care and outcomes for diabetes, with particular emphasis on the rural South to give an overview of the state of the literature.

Results: The literature review shows that racial or ethnic differences in the clinical outcomes for diabetes, including glycemic, blood pressure (BP) and lipid control, continue to persist. In addition, the literature review shows that the role of social determinants of health on outcomes, and the possible role these determinants play in disparities have largely been ignored. Psychosocial factors, such as self-efficacy, depression, social support and perceived stress, show consistent associations with self-care, quality of life and glycemic control. Neighborhood factors, such as food insecurity, social cohesion and neighborhood esthetics have been associated with glycemic control. Perceived discrimination has also been associated with self-care and the psychological component of quality of life.

Conclusion: Healthcare professionals need to be skilled in assessing social determinants of health and taking them into consideration in clinical care. In addition, more research is needed to identify the separate and combined influence of race and ethnicity and social determinants of health on process of care, quality of care and outcomes in diabetes, especially in the South, where the burden of disease is particularly high.

Key Indexing Terms: Social determinants of health; Diabetes; Health disparities; Psychosocial factors; Neighborhood factors. **[Am J Med Sci 2016;351(4):366–373.]**

BURDEN OF TYPE 2 DIABETES

Based on estimates from the Center for Disease Control and Prevention (CDC), 29.1 million people in the United States, or 9.3% of the population, have diabetes.[1] The burden of diabetes is high, with 71% also diagnosed with high blood pressure (BP) or using prescriptions to lower their BP, and 65% also diagnosed with high cholesterol or using prescriptions to lower their cholesterol.[1] Cardiovascular disease death rates are 1.7 times higher, hospitalization for heart attack is 1.8 times higher and hospitalization for stroke is 1.5 times higher for those diagnosed with diabetes.[1] In addition, diabetes is the leading cause of blindness, kidney failure and nontraumatic lower limb amputation in adults.[1] The economic burden is also significant, with an estimated cost of $245 billion in the United States.[1] Medical expenditures for those with diabetes are 2.3 times higher than those without diabetes, and indirect costs of disability, work loss and premature death was estimated at $69 billion in 2012.[1]

Between 2006 and 2010, an increase occurred in the disparity between the prevalence of diagnosed diabetes among those living in the South and other regions of the United States.[2] The age-standardized prevalence of diabetes in the South increased significantly from 7.1-8.8%, a relative difference of 25.2% and the highest prevalence of any Census region.[2] The relative difference compared with the Northeast was 14.5% in 2006, and increased to 39.7% in 2010.[2] Based on county-level diabetes prevalence estimates, a “diabetes belt” has been described to exist in the Southeast United States.[3] This belt, covering counties from 15 states, includes large sections of the states of Alabama, Georgia, Kentucky, Louisiana, Mississippi, South Carolina, Tennessee and West Virginia.[3] Differences in demographics and risk factors between counties in the diabetes belt and the rest of the United States include a higher proportion of non–Hispanic African Americans, higher prevalence of obesity and sedentary lifestyle and a lower proportion of people with a college degree.[3] These differences suggest a need to consider variations in diabetes prevalence and outcomes by racial or ethnic, behavioral and socioeconomic factors. As a result, it is necessary to better understand the influence of race and ethnicity and social determinants of health, or the social and economic conditions that influence health status on diabetes outcomes to address the increased burden of diabetes in the Southern United States.

RACIAL DIFFERENCES IN DIABETES OUTCOMES

Members of racial and ethnic minority groups are disproportionally affected by diabetes compared with non–Hispanic Whites. According to the most recent estimates by the CDC, among people aged 20 years or older in the United States, 9.0% of Asian Americans, 12.8% of Hispanics, 13.2% of non–Hispanic Blacks and 15.9% of American Indians or Alaska Natives have been diagnosed with diabetes compared with 7.6% of non–Hispanic Whites.[1] Minority populations have been shown to suffer a greater burden of disease, exhibit poorer self-management abilities and experience more diabetes-related complications compared with non–Hispanic Whites,[1,4,5] resulting in worse diabetes outcomes and higher rates of mortality.[4]

National policies such as the *Healthy People* initiatives have been implemented since the turn of the 21st century to identify, to reduce and ultimately to eliminate inequities in healthcare and promote the highest level of care among all population groups across America.[6] In addition, organizations such as the American Diabetes Association have established standards of medical care in diabetes, particularly for the "ABCs" of diabetes, which include a glycosylated hemoglobin A1c (HbA1c) $<7\%$, BP $<140/90$ mm Hg and low-density lipoprotein cholesterol (LDL-**C**) <100 mg/dL (2.6 mmol/L),[7] but these goals are often not attained by minority populations compared with non–Hispanic Whites.[7-9]

Despite the existence of such policies and guidelines, a divide in care across various chronic conditions such as diabetes, continues to persist between vulnerable populations and the current majority. Evidence of racial and ethnic differences observed in select clinical outcomes briefly discussed later illustrates the aforementioned inequity in care between groups. As such, equitable and comprehensive efforts for improving care and eliminating disparate care among multiple population groups is warranted.

Glycemic Control

Glycemic control is necessary to reduce complications, especially microvascular injuries, and improve outcomes associated with diabetes care. Affected by biological, socioeconomic and quality-of-care factors,[5] HbA1c is the clinical measure routinely assessed to proxy glycemic control in individuals with type 2 diabetes. Unfortunately, minority groups consistently fall below the recommended guidelines for optimal results (ie, HbA1c $<$ 7%), further widening the disparity in glycemic control observed between minority groups and non–Hispanic Whites.

In a systematic review of the literature to assess the influence of racial differences on monitoring and outcomes in diabetes, Campbell et al[10] demonstrated significant differences in glycemic control by race and ethnicity. Despite varying research designs, sample sizes, source data and study limitations, members within minority populations (African Americans, Hispanic and Asian Americans) were found to have significantly higher HbA1c levels compared with non–Hispanic Whites.[10] Additionally, regardless of the study population and the measured outcome (ie, HbA1c threshold of $<7\%$ vs $<9\%$), differences in glycemic control by race and ethnicity were observed, and these differences were clinically significant indicated by a difference in HbA1c by a minimum of 0.5 between groups.[10] Finally, a persistent racial gap in glycemic control between African Americans and non–Hispanic Whites was continually observed in the populations assessed during the systematic review.[10] Similarly, in a meta-analysis to assess disparities in HbA1c levels between African American and non–Hispanic White adults with diabetes, Kirk et al[5] found a difference in the HbA1c of approximately 0.65% between African Americans and non–Hispanic Whites, which indicated a higher HbA1c for African Americans across studies. Kirk also conducted a meta-analysis to assess disparities in HbA1c levels between Hispanic and non–Hispanic White adults with diabetes.[11] As observed between African Americans and non–Hispanic Whites, Hispanic adults had higher HbA1c levels by a difference of approximately 0.5% compared with non–Hispanic White adults.[11] The findings presented by Campbell and Kirk demonstrate differences in glycemic control by race and ethnicity and contribute to the evidence indicating disparate care between population groups.

These reviews are further supported by continued evidence in the literature demonstrating differences in glycemic control by race and ethnicity.[5,12-16] In a study describing racial and ethnic differences in HbA1c among non–Hispanic Black, Hispanic and non–Hispanic White persons with diagnosed and undiagnosed diabetes in the United States, non–Hispanic Whites had lower mean HbA1c levels than both non–Hispanic Blacks and Hispanics.[16] In addition, non–Hispanic Whites with diabetes were less likely to have an HbA1c $\leq$ 11% compared with non–Hispanic Blacks and Hispanics.[16] In a study to examine longitudinal differences in glycemic control between 8,813 non–Hispanic Black and non–Hispanic White Veterans, Egede et al[12] showed non–Hispanic Black veterans to have higher HbA1c levels over time and poorer glycemic control compared with non–Hispanic White Veterans. Similarly, in a study to determine racial and ethnic differences in the control of multiple diabetes outcomes in a diverse sample of adults in the Southeastern United States, the unadjusted mean HbA1c was found to be significantly higher in non–Hispanic Blacks compared with non–Hispanic Whites.[13]

BP Control

BP control in patients with diabetes is another vital component of care management needed to reduce the risk or slow the progression of complications such as