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As life has been extended through advances in medical treatments, there is growing interest in characterizing what accounts for extended longevity or exceptional survivors.¹ Exceptional survivors are individuals whose productive life span greatly exceeds the average for their relevant sub-group(s).¹ Both individuals at particular ages as well as members of different racial groups have different survivorship and different life expectations.¹

One of the most striking demographic characteristics in health statistics continues to be the race difference in mortality/longevity between African Americans and Whites. This difference in death rate estimates for African Americans persists until age 85, resulting in a life expectancy gap of 6.2 years for men and 4.5 years for women.² At age 40, the differential between White and African Americans in life expectancy was 3.8 years and the difference was 2.2 years at

age 60 years but at 80 years the estimates are equal and at 90 years, African Americans show a slight (.6 year) advantage.² The survivors in the cohort of 90-year-old African Americans represent a unique group that seem to possess special characteristics that could provide insight into longevity.

Exceptional survivors have been described as those living into very late life with intact cognition, survival without physical disability, or survival without severe chronic disease. Exceptional survival has also been described in persons with chronic diseases or risk factors who survive to a much older age than expected, given their conditions or risk status. Presently, a singular variable or set of variables has not been defined for exceptional survival; however, scholars across multiple disciplines are interested in many of the variables as they examine the biological underpinnings of health, disease and aging.¹

The cause for the disparity in longevity between racial groups has been, in large part, the impetus for efforts to reduce health disparities and the focus of intense scrutiny on health care practices and outcomes.³ Behavioral and social scientists have identified many different factors influencing racial/ethnic differences in health and mortality. While behavior plays an important role in unequal health burden between these groups, behavioral factors interact with biological factors (eg, genes).⁴ It has long been known that if genes play a significant role in longevity, there

should be greater similarity of individual longevity within families or lineages than within the population as a whole.

African Americans continue to evince the highest mortality rates due to cardiovascular disease (CVD) and have a prevalence rate of hypertension (44%) that is the highest in the world.⁵ Deaths associated with CVD arise from a myriad of risk factors that include, but are not limited to: elevated blood pressure; smoking; excess body weight; sedentary lifestyle; hypercholesterolemia; and diabetes, all of which are influenced to varying degrees by behavioral factors, as well as limited access to quality health care. Yet, chronic psychosocial stress is perhaps one of the most commonly studied behavioral culprits. Factors such as chronic work stress/job strain, major life events and early childhood adversity have been resoundingly linked to increased CVD risk and mortality. However, the extent to which these findings are generalizable to African Americans is limited. This seems particularly salient as African Americans have been noted to report greater perceived stress, on average, compared with Whites.⁶ Further, there is a growing body of work focusing on understanding the mechanisms through which stress exacerbate or produce disparities in health outcomes.

Heritability of life span has been found to vary significantly by age and by racial/ethnic group, with African Americans having the lowest heritability.⁷ This does not suggest that

Ethn Dis. 2017;27(1):1-2; doi:10.18865/ed.27.1.1.

Keywords: Longevity; Exceptional Survivors; Genetic Influences; Stress, African Americans; Aging

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genes do not impact survival among African Americans, but rather that complex relationships exist between genes and environment to account for longevity in perhaps different patterns than found in other ethnic groups. Therefore, to understand longevity, it is important to investigate the underlying genes that contribute to longevity in African Americans.

One potentially critical genetic marker and physiological response to

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chronic stress is shortened telomere length (TL). Differences by race in TL may be indicative of the cumulative burden of differential exposure to oxidative stress (and its predictors) over one's life.⁸ While this and other investigations have studied genetic adaptations and polymorphisms as contributors to longevity, there is perhaps no more studied than APOE. Variants of this genotype have been found to be associated with increased risk for Alzheimer's disease but it is not completely clear what impact the APOE genotype has on African Americans. For example, Maestre and colleagues⁹ found that the APOE2/E3 genotype (not the E4/E4 allelic combination) was associ-

ated with an eightfold increased risk of Alzheimer's disease in African Americans and conversely associated with reduced risk in Whites. This is just one example indicating that the mere presence of this genotype does not predetermine the presence of the disease state, and reinforces the need to examine gene-environment interactions.

CONCLUSIONS

Very little evidence, if any, accounts for the increased survival in elderly African Americans in the face of the cumulative effects of hazards such as lifelong stress from discrimination and social inequalities.¹⁰ From our perspective, more focus is needed on jointly addressing behavioral and biological factors involved in longevity and chronic health factors that contribute to mortality.

Three observations stand out. First, due to patterns of mortality, exceptional survival among African Americans is a much-understudied issue. Second, it appears that the same factors that may impact longevity are also factors central to the prevalence and incidence of poorer health in African Americans. Lastly, the impact of these variables can be observed in families due to genetic influences and/or possibly due to learned behaviors, which could arise from the shared environment within families.

Taken together, these observations suggest that there are complex pathways to achieving exceptional survival in African Americans. To this end, we suggest future research should examine how stress impacts health status and longevity by studying their patterns of associations within and between families.

ACKNOWLEDGMENT

KEW and RJT are supported on a grant from NIA/NIH (R01-AG054363-01)

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