Study begins to shed light on racial disparities of cancer-causing genetic mutations

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Most studies reporting the prevalence of breast- and ovarian-cancer causing genes have been conducted with Caucasian women, leaving questions about the role that these same genes play in African American patients with inherited cancers. Now, a team led by researchers at the Basser Center for BRCA in the Abramson Cancer Center at the University of Pennsylvania has taken a step towards a better understanding of this complex subject. Among the results, when compared to previous research focusing on Caucasian women, the study revealed differing patterns of cancer-causing mutations in African-American women. The authors say the results of the study, which will be presented Friday at the 2016 San Antonio Breast Cancer Symposium (poster P5-10-04), could help guide testing recommendations for at risk African American patients.

"We know African American women are more likely be diagnosed with breast cancer before age 45, and are more likely to die from breast cancer at every age than Caucasian women, but we need more information about the pattern of genetic mutations in order to provide more precise and targeted care," said lead author Payal D. Shah, MD, an assistant professor of Hematology/Oncology in the Perelman School of Medicine at the University of Pennsylvania and the Abramson Cancer Center. "The patterns suggest biological differences, and potentially different genetic factors. Identifying mutations that disproportionately affect African American women, if there are any, could potentially help

guide the genetic testing we do for these at-risk patients."

In the study, researchers examined DNA samples of 736 women in three patient groups - African-Americans with cancer, African-Americans without cancer, and Caucasian patients without cancer - in search of patterns of 19 genes known to cause breast and/or ovarian cancer. Notably, when compared to previous research using samples from Caucasian women, results of the study showed mutations of the BRCA1 and BRCA2 genes presented similarly in both races, while CHEK2 gene mutations were seen less in young African American women, and cancer-causing mutations of the TP53 gene were more prevalent.

Results also found differences in how frequently African Americans received gene mutation results called "variants of uncertain significance" - or mutations for which the implications on cancer risk is not known. In the populations studied, nearly 15 percent of African American women without cancer received these uncertain results, compared to roughly 11 percent of Caucasian women.

The authors suggest the disparity may be related to the higher proportion of Caucasians whose genetic information is included in reference databases, and anticipates that the ability to classify these mutations as cancer-causing or not will improve with more widespread testing including African-Americans, and increased data sharing among researchers and commercial laboratories.

"This study is a first step towards being able to zero in on the mutations that are more prevalent in African American patients, but future research is needed to better understand the patterns of genetic mutations across patient populations," Shah said. "Our study clearly demonstrates that patients with cancer have more mutations than those without cancer, but studies examining African American and Caucasian patients with cancer might let us better compare the mutations that are

disproportionately present in African Americans."

Provided by Perelman School of Medicine at the University of Pennsylvania