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| **Examining the Impact of Environmental, Behavioral, and Genetic Factors on Racial Disparities in Breast Cancer Outcomes**  Nubaira Rizvi; Qingzhao Yu\*  Biostatistics Program, School of Public Health, Louisiana State University Health Sciences Center, New Orleans, LA 70112, USA. |
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| **Background:** Breast cancer is the second leading cause of death among U.S. women. Approximately 1 out 8 women will get it during their lifetime. It remains particularly high among Black patients. Moreover, Black women had a 30% to 60% higher likelihood of being diagnosed with advanced-stage breast cancer compared with White women, which indicates severe racial disparities in the breast cancer outcome. Growing research evidence suggests that racial and health disparities arise from complex interactions among multi-level factors. |
| **Objectives:** The study aims to identify mechanisms that underlie racial disparities in cancer progression among breast cancer patients, considering both environmental and individual risk factors. Additionally, the goal is to demonstrate a novel statistical method on mediation analysis to the integrated, multilevel All of US (AoU) database. |
| **Methods:** The comprehensive AoU database that combines electronic health records (EHR), survey, social economic environmental and genomic data collected from multiple resources is utilized to analyze the observed disparities. A total of 7385 adult female breast cancer patients were included in the dataset. The multilevel mediation analysis method is employed to discover the mechanistic roles of demographic and genetic factors in racial disparities among these subjects. |
| **Results:** There is a significant (p=0.04) difference in survival between white and black breast cancer patients. The joint factors of general health, including general physical health, mental health, social satisfaction, general health, significantly contributed to explaining the racial disparity in survival (IDE= 0.895; 95% CI (0.441,1.819)) along with some specific genes. |
| **Conclusions:** This study shows that the underlying status of general health-related variables and specific gene mutations contribute towards the racial disparity in breast cancer outcomes. |
| **Recommendations:** The multilevel statistical methods developed through the project can help reduce the health disparity. Improving the general physical health, mental health, social satisfaction, general health among black women can help bridge the gap. |
| No IRB was needed for this project. |