Image Biomarkers of Breast Cancer Risk: Analysis of Risk Disparity Among Minority Populations

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ABSTRACT

Advances in understanding breast cancer risk factors, coupled with advances in assessing methodologies and prevention strategies, are critical to the development of personalized breast cancer surveillance and prevention. This HBCU/MI Partnership Training Award has built upon a collaboration between DSU and Penn, with the goals of: (1) extending the skills of DSU faculty to become competitive breast cancer researchers; (2) establishing an independent research program at DSU by performing a joint research project focused on breast cancer risk disparity in minority populations; and (3) producing high-quality publications and funded grants at DSU to sustain breast cancer research.

Preparing Clinical Data from ACRIN DMIST Study

After IRB approval, we created a database of 11,136 (2,550 minority and 8,586 Caucasian) breast cancer cases gathered as part of the ACRIN DMIST Study. The anonymized database includes patient-level demographic, epidemiologic, and surgical history variables as well as mammography images, digitized in a single database, facilitating a direct and convenient interface with other processing steps. Scripts have been developed for querying ACRIN data to perform quality control and to prepare the data for IBRB estimation.

Estimate Image-Based Risk Biomarkers

We have been developing an interface between the MCIC study database and IBRB image analysis pipeline, which are primarily located in two different sites at DSU. The proposed interface will allow IBRB to provide an automated breast density estimation in the existing MCIC database, facilitating a direct and convenient interface with other processing steps. Scripts have been developed for querying MCIC data to perform quality control and to prepare the data for IBRB estimation.

Previously, we demonstrated that in a database of 507 women with mammography exams, 28% (i.e., 13%) causes have been partially breast-estimation in a single image due to breast size. As depicted, we observed a serious percentage at an initial assessment of ACRIN cases. This high prevalence has required that we design a strategy to measure IBRB in breast-subjecting multiple images.

Conclusion and Impact

Our ultimate goal is to develop IBRB HBCU/MI breast cancer risk disparity analysis tools, with the goal of providing an accurate method for identifying racial or ethnic disparities in breast cancer risk estimation in minority populations by including IBRB and genetic risk factors. Thus, we have conducted the following steps in order to achieve the overarching goal:

1. We have been developing an interface between the MCIC study database and IBRB image analysis pipeline, which are primarily located in two different sites at DSU.
2. We have been performing a joint research project focused on breast cancer risk disparity in minority populations.
3. We have been establishing an independent research program at DSU by performing a joint research project focused on breast cancer risk disparity in minority populations.
4. We have been producing high-quality publications and funded grants at DSU to sustain breast cancer research.

References