Background: There is strong evidence to indicate that risk of both breast and prostate cancer are increased among those with a positive family history of the same disease, particularly among first-degree relatives. Furthermore, risk for both diseases has been shown to increase with the number of affected relatives and is inversely related to the age of diagnosis among affected relatives. However, less is known about the relationship between breast and prostate cancer within families, and particularly among minority populations. Studies suggest that mutations in both BRCA1 and BRCA2 are associated with prostate cancer; however these mutations are projected to account for just 2% of families demonstrating aggregation of breast and prostate cancer.

Methods: Prospective analyses were conducted among participants of the WHI observational study, aged 50 to 79 and free of breast cancer at the time of their baseline examination. Eligible study participants provided information on both their family history of prostate and breast cancer as part of their baseline interview. Subjects were followed for breast cancer diagnoses through December 31st, 2010. A Cox-proportional hazards regression modeling approach was used to estimate risk of breast cancer associated with a positive family history of prostate cancer, breast cancer or both among first-degree relatives adjusting for important covariates. Stratified analyses were performed to estimate race-specific estimates of breast cancer risk associated with family history.

Results: Of 78,171 eligible participants, there were 3,506 breast cancer cases diagnosed over the study period. Not surprisingly, a family history of breast cancer among first-degree relatives was associated with an increase in breast cancer risk (adjusted Hazard Ratio [aHR]=1.42; 95% CI=1.30-1.55 and aHR=1.66; 95% CI=1.32-2.08, for 1 and 2 or more affected first degree relatives, respectively). A family history of prostate cancer among first degree relatives was also associated with a modest increase in breast cancer risk even after adjustment for confounders including family history of breast cancer (aHR =1.14; 95% CI=1.02-1.26). Furthermore, in a separate analysis, a positive family history of breast cancer alone was associated with a 42% increase in risk (95% CI=1.29-1.55), and a family history of prostate cancer alone was not significantly associated with breast cancer (HR =1.10; 95% CI=0.98-1.24). However, a family history of both breast and prostate cancer was associated with a 78% increase in risk (aHR=1.78; 95% CI=1.45-2.19). When analyses were stratified by race, the risk estimates associated with a family history of both breast and prostate cancer were higher among black women (HR =2.34; 95% CI=1.09-5.02), than white (HR =1.66; 95% CI=1.33-2.08).

Conclusions: Our findings suggest that prostate cancer diagnosed among first-degree family members increase a woman’s risk of developing post-menopausal breast cancer. Breast cancer risk is increased particularly among women with a family history of both breast and prostate cancer and higher still among black women compared to white women. Future studies are needed to determine the relative contribution of genes and shared environment to the risk of both cancers.

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