

# An Evaluation of Obesity's Association with Prostate Cancer-Associated Mortality and Racial Disparity in Mississippi Counties

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## **Introduction:**

African American men have an almost 2.5 times higher prostate cancer-associated mortality rate than Caucasian men (1). The reasons for this disparity are complex, and potentially include a greater role for obesity in prostate cancer-associated mortality for African Americans (2). It is unknown if a potential racial disparity in an association between prostate cancer-associated mortality and obesity can be demonstrated at a population level.

## **Methods:**

County age-adjusted, race-specific prostate cancer mortality data for the years 1998-2013 was accessed for the eight states with recent publicly available data on [www.cancer-rates.info](http://www.cancer-rates.info). County age-adjusted male obesity prevalence was accessed from [www.cdc.gov](http://www.cdc.gov). All counties with less than fifteen deaths over study period were excluded due to unstable mortality rates. Linear trendlines with correlation coefficients were generated for race-specific graphs of mortality rate versus male obesity prevalence using Microsoft Excel. To test for a disparity in the prevalence of obesity's association with prostate cancer-associated mortality, the slopes of these trendlines were compared using a student's t-test.

## **Results:**

The slope of the linear trendline for the county level African American prostate cancer-associated mortality rate versus the prevalence of male obesity was 1.51 with a correlation coefficient of 0.30. The slope of the linear trendline for the county level Caucasian prostate cancer-associated mortality rate versus the prevalence of male obesity was 0.33 with a correlation coefficient of 0.15. The slopes of these two trendlines were statistically significantly different ( $p < 0.0001$ ).

## **Conclusion:**

Discacciati and colleagues suggested a direct relationship between BMI and advanced prostate cancer (3). Our analysis of epidemiologic data weakly supports this, as there was a very weak positive correlation between male obesity prevalence and prostate cancer-associated mortality rates for Caucasian males and a weak positive correlation for African American males. Of interest, however, is the significant difference in the slopes of the trendlines, suggesting what role obesity does play in prostate cancer aggressiveness may be more impactful for African Americans than Caucasians. Further work is needed to investigate this population level finding in regards to obesity's impact on prostate cancer aggressiveness and/or disparities in prostate cancer outcomes. In particular, translational work into obesity's impact on the prostate cancer microenvironment (e.g. causing an exaggerated inflammatory milieu leading to more aggressive disease) and on drug metabolism should be investigated.

1. C DeSantis, D Naishadham, A Jemal. Cancer statistics for African Americans, 2013. CA: a cancer journal for clinicians 63 (3), 151-166

2. Zhang X, Zhou G, Sun B, et al. Impact of obesity upon prostate cancer-associated mortality: a meta-analysis of 17 cohort studies. *Oncol Lett.* 2015;9:1307–1312.

3. Discacciati A, Orsini N, Wolk A.. Body mass index and incidence of localized and advanced prostate cancer--a dose-response meta-analysis of prospective studies. *Ann Oncol* 2012;23:1665-71.