American Association for Cancer Research

Associations Linking Weight to Breast Cancer Survival Vary by Race/Ethnicity

- Associations found for BMI and waist-to-hip ratio.
- Weight affected overall and breast cancer-specific mortality.

SAN DIEGO — An extreme body mass index or high waist-to-hip ratio, both measures of body fat, increased risk for mortality among patients with breast cancer, but this association varied by race/ethnicity, according to recently presented data.

Marilyn L. Kwan, Ph.D., a research scientist in the Kaiser Permanente Northern California Division of Research in Oakland, Calif., presented these results at the Fifth AACR Conference on The Science of Cancer Health Disparities, held here Oct. 27-30, 2012.

Prior research has shown racial/ethnic differences in survival after a breast cancer diagnosis, particularly among non-Latina whites and African-Americans, according to Kwan. However, reasons for these differences in survival are not clear, and researchers have hypothesized that body size at the time of breast cancer diagnosis might play a role.

"The majority of studies among primarily non-Latina white populations on obesity before a diagnosis of breast cancer have found that increased weight is associated with poorer survival, yet few studies have examined if this association holds true within the major minority groups of African-Americans, Latinas and Asians and whether differences in obesity might explain racial/ethnic differences in survival," Kwan said.

She and her colleagues collected data from 12,025 female patients with breast cancer from the California Breast Cancer Survivorship Consortium. Body mass index (BMI) information was available for 11,351 women including 6,044 non-Latina whites, 1,886 African-Americans, 1,451 Asian-Americans, 1,864 Latinas and 106 others.

"Overall, we found that patients with breast cancer who were underweight, extremely obese or had high levels of abdominal body fat had the worst survival," Kwan said.

In fact, those women classified as underweight had a 47 percent increased risk for overall mortality compared with normal-weight women. Women classified as morbidly obese had a 43

percent increased risk for overall mortality. In addition, women with the highest waist-to-hip ratio (highest level of abdominal fat) had a 30 percent increased risk for overall mortality and a 36 percent increased risk for breast cancer mortality compared with those with the smallest waist-to-hip ratios.

When looking further at mortality within racial/ethnic groups, the researchers found that associations differed by race/ethnicity.

"Among non-Latina white women, being underweight and morbidly obese at breast cancer diagnosis was associated with worse survival, yet this relationship was not found in the other racial/ethnic groups," Kwan said. "Instead, African-American women and Asian-American women with larger waist-to-hip ratios had poorer survival, an observation not seen in non-Latina white women and Latina women."

Latina women had an elevated risk for mortality only among those considered morbidly obese. According to Kwan, this study supports the common lifestyle recommendation to maintain a healthy weight throughout life, but she pointed out that the long-term impact of weight on survival after breast cancer might not be the same in all patients.

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Body size and racial/ethnic differences in breast cancer survival. <u>Marilyn L. Kwan</u>[1], Bette J. Caan[1], Valerie S. Lee[1], Esther M. John[2], Scarlett Lin Gomez[2], Salma Shariff-Marco[2], Theresa H. Keegan[2], Allison W. Kurian[3], Leslie Bernstein[4], Yani Lu[4], Iona Cheng[5], Kristine R. Monroe[6], Richard Sposto[6], Cheryl Vigen[6], Anna H. Wu[6]. [1]Division of Research, Kaiser Permanente Northern California, Oakland, CA, [2]Cancer Prevention Institute of California, Fremont, CA, [3]Stanford University School of Medicine, Stanford, CA, [4]City of Hope, Duarte, CA, [5]University of Hawaii, Honolulu, HI, [6]University of Southern California, Los Angeles, CA.

Background: Studies of body size and breast cancer prognosis have primarily been conducted in non-Latina White women with little research to date in racial/ethnic minority groups. We investigated body size (body mass index [BMI], waist-hip-ratio [WHR], waist-height-ratio [WHtR], waist circumference [WC]) and survival by race/ethnicity (non-Latina White, African American, Asian American, and Latina) in the California Breast Cancer Survivorship Consortium (CBCSC).

Methods: The CBCSC represents 12,025 breast cancer patients diagnosed with primary invasive breast cancer from 1993-2007 from six California-based studies of breast cancer etiology or prognosis. Data on body size, race/ethnicity, and relevant covariates previously collected from in-person interview or mailed questionnaire were harmonized and pooled. Clinical characteristics and mortality information were obtained from the California Cancer Registry. Body size measures included minimum 6 months pre-diagnosis BMI in kg/m2 (underweight <18.5, normal 18.5-<25, overweight 25-<30, obese 30-<35, severely obese 35-<40, morbidly obese ≥40), and median 1 year post-diagnosis WHR, WHtR, and WC (quartiles). Cox proportional hazards models were used to estimate hazard ratios (HR) and 95% confidence intervals (CI) for the associations of each body size measure with all-cause and breast cancer-specific (BC) mortality, adjusted for sociodemographic, lifestyle, clinical, and treatment covariates.

Results: Among 11,351 women with BMI data (6,044 non-Latina Whites, 1,886 African Americans, 1,451 Asian Americans, 1,864 Latinas, and 106 others), a total of 2,744 deaths (1,445 BC-related) were observed after a mean (SD) follow-up of 11.0 (3.8) years. Underweight and morbidly obese women had a statistically significant increased risk of overall mortality compared to normal-weight women (underweight HR=1.47; 95% CI: 1.13, 1.90 and morbidly obese HR=1.43; 95% CI: 1.16, 1.77; p for trend=0.012; departure from linearity p=0.005) while obese and severely obese women had borderline significant increased risks. Similar yet attenuated associations were found for BC mortality. Women in the highest WHR quartile compared to those in the lowest quartile had a significant increased risk of both overall death (HR=1.30; 95% CI: 1.10, 1.55) and BC death (HR=1.36; 95% CI: 1.07, 1.73) with a positive trend of larger WHR and increasing risk (p for trend<0.05). WHtR and WC had similar associations with mortality as WHR. Compared to the entire cohort, non-Latina Whites had an analogous U-shaped association of BMI with mortality risk, while African Americans and Asian Americans had no associations at any BMI level. Latinas had elevated risks only among the morbidly obese. In contrast, larger WHR was associated with mortality in African Americans (p for trend<0.001) while no associations with WHR were found in non-Latina Whites. Asian Americans had elevated risks only in the top WHR quartile. WHtR and WC were not associated with mortality in any race/ethnicity group.

Conclusion: In this large, multiethnic study of breast cancer patients, we found that those with extreme BMI and increased WHR had the worse survival but that the associations varied by race/ethnicity. Obesity and body fat distribution around breast cancer diagnosis appear to have differential effects on survival depending on race/ethnicity.