

Usual Dietary Intake among Female Breast Cancer Survivors Is Not Significantly Different from Women with No Cancer History: Results of the National Health and Nutrition Examination Survey, 2003-2006

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ABSTRACT

Dietary intake is a modifiable behavior that may reduce the risk of recurrence and death among breast cancer survivors. Cancer survivors are encouraged to consume a diet rich in fruit, vegetables, and whole grains and limit red meat, processed meat, and alcohol intake. Using data from the National Health and Nutrition Examination Survey (2003-2006), this study examined whether breast cancer survivors and women with no history of cancer differed in the distribution of usual intake of foods included in the dietary recommendations for preventing cancer and recurrences. Participants completed one or two 24-hour dietary recalls. The food groups included in this analysis were whole fruit; total vegetables; dark green and orange vegetables; whole grains; red meat; processed meat; alcohol; and calories from solid fat, alcohol, and added sugar. The National Cancer Institute Method was used to estimate the distribution of usual intake and to compare breast cancer survivors (n=102) to noncancer respondents (n=2,684). Using age and cancer survivor as covariates, subgroup estimates of usual intake were constructed. No significant group differences were found, except that survivors reported a greater intake of whole grains. More than 90% of both groups did not meet recommendations for fruits, vegetables, and whole grains; 75.4% and 70.2%, respectively, consumed less than the red meat recommendation; and <10% of either group met the recommendation for percent energy from solid fat, alcohol, and added sugar. The diet of breast cancer survivors was not significantly different from women with no history of cancer.

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BREAST CANCER IS THE MOST COMMON CANCER among women and the second most common cause of cancer-related death.¹ However, advances in early detection and treatment have increased 5-year survival rates among individuals diagnosed with stage I, stage II, or stage III breast cancer to 88%, 74% to 81%, and 49% to 67%, respectively. There are approximately 2.5 million breast cancer survivors in the United States, and as that number increases, research is needed to prevent recurrence, second malignancy, and mortality in this group, and to manage morbidity associated with breast cancer and its treatment.¹⁻³

An extensive body of literature has provided strong evidence of statistically significant, positive correlations between body weight and either recurrence or survival.⁴⁻⁶ Recently, several evidence-based approaches have been identified to reduce body weight and improve lifestyle among breast cancer survivors.⁷ For example, improving dietary quality and quantity of foods eaten are modifiable behaviors that may be targeted to support healing, recovery, and survivorship. Specific approaches included increasing the consumption of fruit, vegetables, whole grains, and nuts; consuming seafood twice per week;

avoiding *trans* fats and highly processed foods; reducing portion sizes; and minimizing the consumption of sugar-sweetened beverages.⁷

During active cancer treatment, the overall goals of nutritional care for survivors are to prevent or resolve nutrient deficiencies, achieve or maintain a healthy weight, preserve lean body mass, minimize nutrition-related side effects, and maximize quality of life.⁸ After treatment, the American Cancer Society Guidelines on nutrition and physical activity encourage survivors to achieve or maintain a healthy weight, engage in regular physical activity (reduce inactivity, exercise at least 150 min/wk, strength training at least 2 days/wk), and consume a diet rich in fruit, vegetables, and whole grains.⁹ Cancer survivors are also encouraged to limit red meat and alcohol intake and avoid consumption of processed meat.^{8,9} In addition to red meat, there is convincing evidence that consumption of processed meat is a risk factor for certain types of cancer.⁹ Processed meat refers to meats preserved by the addition of preservatives (such as nitrites), or by smoking, curing, or salting; and meat that is altered from its natural form to enhance its digestibility, taste, or color.^{10,11}

Using the National Health and Nutrition Examination Survey (2003–2006), the objective of this study was to examine whether breast cancer survivors and women with no history of cancer differed in the distribution of usual intake of foods included in the dietary recommendations for preventing cancer and recurrences. These differences were also examined in the context of adherence to the US Department of Agriculture (USDA) food pattern recommendations.¹² Estimating usual intake, or long-term averages, of foods consumed by a population to assess compliance with dietary recommendations can be challenging because most individuals vary their intake daily and self-reported dietary intake measures are prone to measurement error. Therefore, distributions of foods; food groups; and solid fat, alcohol, and added sugar (SoFAAS) consumed were estimated by using a statistical method for usual dietary intake developed by the National Cancer Institute (NCI), which accounts for within-person variation of dietary intake.^{13,14}

METHODS

Data Source and Sample

The National Health and Nutrition Examination Survey (NHANES) is a population-based survey designed to collect information on the health and nutrition of children and adults in the United States. Data from the combined 2003–2004 and 2005–2006 surveys are reported in this study. The NHANES surveys a representative sample of the civilian, noninstitutionalized population. Sampling methods are described in detail at the National Center for Health Statistics website (<http://www.cdc.gov/nchs/nhanes.htm>). Briefly, all participants complete an in-person household interview. Following the household interview, all participants are asked to complete a health examination where a 24-hour dietary recall is administered. Participants who attend the health examination are also asked to complete a second 24-hour dietary recall by telephone 3 to 10 days later.

Data from female NHANES (2003–2006) respondents was included in the analysis if they met the following criteria: reported a history of breast cancer or never had a cancer diagnosis; were the same age or older than the youngest breast cancer survivor (34 years); completed at least one 24-hour dietary recall; had reliable dietary recall data (participants with complete individual foods list data); were not pregnant or breastfeeding at the time of the survey and examination; and had measured height, weight, body mass index (BMI), and waist circumference data. Female respondents who reported a history of other cancer(s) or who reported a history of breast cancer and other cancer(s) were excluded from the analysis because other types of cancer may affect dietary intake. A total of 2,786 female NHANES participants met the inclusion and exclusion criteria and were included in the analysis. From this group, 102 identified themselves as breast cancer survivors. This study was deemed exempt under federal regulation 45 CFR §46.101(b) (www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html).

Measurement

Dietary Intake Data. The NHANES utilizes two 24-hour recalls to assess dietary intake. Using the USDA's Automated Multiple-Pass Method, the first dietary assessment was interviewer-administered. Quantities of foods and

beverages reported were translated into the number of equivalents for the MyPyramid major groups and corresponding subgroups. There are seven major MyPyramid components and a total of 32 groups and subgroups in the MyPyramid Equivalents Database (version 2.0, 2008, USDA). Mixed dishes are disaggregated to the appropriate MyPyramid food groups using recipes. For example, a broccoli salad with apples, nuts, and an oil-based salad dressing is first disaggregated into their basic components: vegetables, fruits, nuts, and oil.

The food groups used for this analysis were whole fruit (cup equivalents), total vegetables (cup equivalents), dark green and orange vegetables (cup equivalents), whole grains (ounce equivalents), red meat (ounce equivalents), processed meat (ounce equivalents), alcohol (% energy), and the Healthy Eating Index-2005 component score representing calories from SoFAAS.¹⁵ The red meat category includes beef, pork, veal, lamb, and game, and excludes lean organ meats and processed meats. The red meat category does not include frankfurters, sausage, or luncheon meats. The processed meat category includes frankfurters, sausage, and luncheon meats (meat from meat or poultry). Further information about the USDA MyPyramid Equivalents Database can be obtained elsewhere.¹²

Anthropometric Measures. Body measurements were taken by trained NHANES health technicians at the health examination and included height, weight, and waist circumference. BMI was calculated and participants were classified as “underweight” (BMI <18.5), “healthy weight” (BMI 18.5 to 24.9), “overweight” (BMI 25.0 to 29.9), or “obese” (BMI ≥30.0).

Cancer Status, Health Behaviors, and Sociodemographic Characteristics. To classify participants as breast cancer survivors or noncancer respondents, items from the Medical Conditions Questionnaire were used, including “Have you ever been told by a doctor or other health professional that you had cancer or a malignancy of any kind?” and “What kind of cancer was it?” Respondents that only reported a breast cancer diagnosis were classified as breast cancer survivors, and respondents that reported “no” or “don't know” (n=10) to ever being told that they had cancer were classified as noncancer respondents. The time since breast cancer diagnosis was calculated by subtracting the age at diagnosis from the current age reported in the Demographics Questionnaire. Self-reported variables obtained from the Demographics Questionnaire included race/ethnicity, marital status, education level, and family poverty income ratio.

Statistical Analysis

All statistical analyses were performed using Statistical Analysis Software, version 9.2 (2010, SAS Institute Inc). The software's survey procedures were used to account for the complex survey structure of NHANES to estimate means, standard deviations, frequencies, and to compare groups. A *t* test was used to compare age between groups. Linear and logistic regression that accounted for the complex survey structure were used to compare demographic and anthropometric data adjusted for age. The NCI Method was used to

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