Podcast available online at www.jneb.org

Research Article

Nutrition Education Intervention for Women With Breast Cancer: Effect on Nutritional Factors and Oxidative Stress

Cecilia C. Schiavon, MsC[1]; Francilene G. K. Vieira, PhD[1]; Vanessa Ceccatto, MsC[1]; Sheyla de Liz, MsC[1]; Alyne L. Cardoso, MsC[1]; Cristiane Sabel, BHSc[2]; David A. Gonzalez-Chica, PhD[1]; Edson L. da Silva, PhD[2]; Daisy Galvan, MsC[1]; Carlos G. Crippa, PhD[3]; Patricia F. Di Pietro, PhD[1]

ABSTRACT

Objectives: To assess the effect of a nutrition education intervention on nutritional factors and oxidative stress during treatment of breast cancer.

Design: Nonrandomized clinical trial conducted in 2010–2011, including an evaluation at baseline and after 12 months.

Participants: Women from Brazil who had breast cancer, divided into an intervention group (IG) (n = 18) and comparison group (n = 75).

Intervention: To increase intake of fruits and vegetables and reduce red and processed meats, via telephone and printed materials.

Main Outcome Measures: Food intake, anthropometry, and levels of lipid hydroperoxide, carbonyl proteins, reduced glutathione, and ferric reducing antioxidant power.

Analyses: Chi-square, Mann–Whitney or *t* tests for baseline data; Wilcoxon or paired *t* tests for intragroup outcomes, linear regression models, and Bonferroni multiplicity adjustment.

Results: The researchers observed an increase in fruit and vegetable intake, reduction in red and processed meat intake, no change in body weight, and an increase in glutathione in the IG over the comparison group. However, after Bonferroni adjustment, only the consumption of fruits and vegetables and fruit was significantly higher in IG.

Conclusions and Implications: This study presents improved dietary changes after a theory-driven nutrition education intervention. Although the sample size is small, it has proven to be clinically relevant.

Key Words: intervention studies, food habits, breast neoplasms, oxidative stress (*J Nutr Educ Behav*. 2015;47:2-9.)

Accepted September 19, 2014.

INTRODUCTION

Breast cancer is the most frequent cause of cancer death in women worldwide, including Brazil.[1] Because of increased longevity and more effective anti-cancer treatments, the number of people surviving this disease has been increasing. However, survival rates in Brazil are still low; 5-year relative survival for breast cancer is generally higher in North America, Australia, Japan, and northern, western, and southern Europe, and lower in Algeria, Brazil, and eastern Europe.[2] According to the CONCORD study,[2] the pooled estimate of 5-year survival in Brazil was 58.4%.[2]

Anti-cancer treatments (radiation and chemotherapeutic agents) exert their effects generating oxidative stress (OS) and potentially damaging not only cancer cells but healthy cells as well. Oxidative stress has been associated with greater cancer recurrence.[3] Furthermore, known nutritional risk factors for cancer recurrence and for an increase in OS (such as weight gain and increased consumption of meat and fatty foods) are observed.[4,5] Patients who are overweight or who gain weight after being diagnosed with cancer have a greater risk of recurrence or death compared with those who maintain stable body weight.[6]

Diet can help to lower the risk of cancer recurrence through the antioxidant effects of fruits and vegetables

[1]Department of Nutrition, Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil
[2]Department of Clinical Analyses, Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil
[3]Department of Tocoginecology, Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil
Address for correspondence: Patricia F. Di Pietro, PhD, Programa de Pós-Graduação em Nutrição, Centro de Ciências da Saúde, Universidade Federal de Santa Catarina, Campus Universitário, Trindade, Cep 88040-900, Florianópolis/SC–Brazil; Phone: +55 48 3721 8014; Fax: +55 48 3721 9542; E-mail: patricia.di.pietro@ufsc.br

http://dx.doi.org/10.1016/j.jneb.2014.09.005

(FV).[3,4] Therefore, education strategies are being evaluated, because it has been shown that long-term adherence to a dietary pattern is a challenge in studies that investigate the relationship between diet and disease. Most nutrition education intervention methods for breast cancer are based on Social Cognitive Theory (SCT),[6-8] which essentially adopts the perspective of acting for self-development, adaptation, and change.[9] However, few studies assess the effects of nutrition education interventions during breast cancer treatment[10] and of OS on breast cancer patients.[3]

Therefore, the objective of this study was to assess the effectiveness of a nutrition education intervention that promotes increased FV intake and reduced consumption of red and processed meats (RPM) in improving nutritional factors and OS biomarkers. Intake of FV is important in preventing cancer and its recurrence,[11] whereas RPM are hypothesized to have a negative impact on breast cancer, possibly owing to the biochemistry of meat compounds and their oxidative processes, such as the mutagenic and carcinogenic effect of the heterocyclic amines.[12]

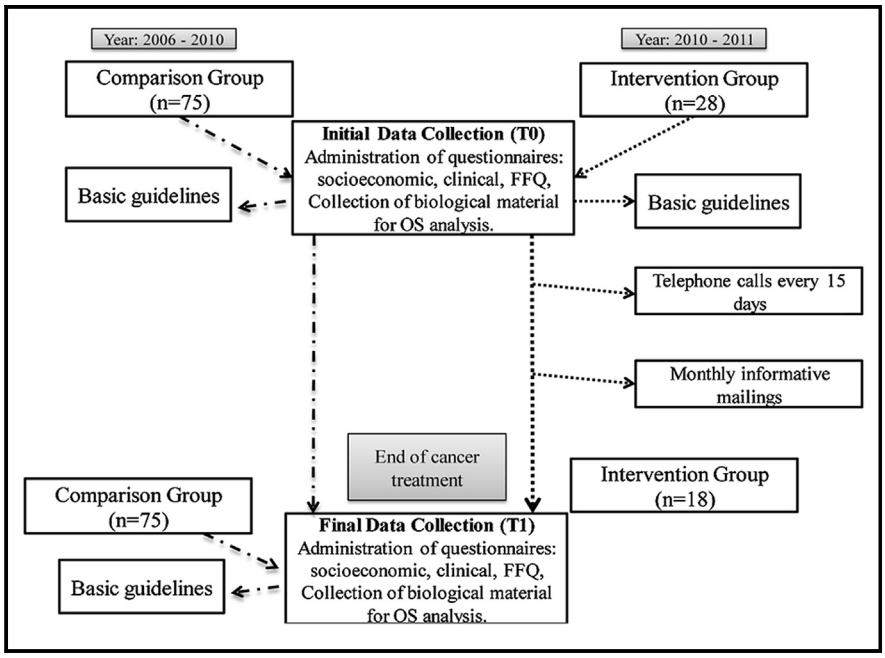

Figure. Study design for a nutrition education intervention for women with breast cancer. FFQ indicates food frequency questionnaire; OS, oxidative stress; T0, time zero (baseline); T1, time one (end).

METHODS

Population and Study Design

A non-randomized, controlled clinical trial was developed in Florianópolis, a city located in southern Brazil, which included women with breast cancer at the time of diagnosis. The data were collected in the Hospital Maternidade Carmela Dutra before surgery and at the beginning (T0) and end of treatment 12 months later (T1). The comparison group (CG) was composed of all women with breast cancer who were investigated between 2006 and 2010.[13-15] Members of the intervention group (IG) were invited to participate in the nutrition education intervention from March to June, 2010. It is important to highlight that for CG patients, basic guidelines were provided before the 2 interviews, whereas IG patients were given continuous guidelines during the treatment (Figure).

Recruitment, the initial interview, and blood collection occurred at Maternidade Carmela Dutra Hospital and included all patients admitted for surgical treatment of suspected malignant breast tumors. Criteria for exclusion were history of cancer or any surgical procedure in the previous year; pregnancy or breastfeeding at the time of diagnosis; human immunodeficiency virus–positive test result; neoadjuvant anti-cancer treatment; and neurological disease diagnosis. This study followed ethical principles and was approved by the Human Ethical Committee of Maternidade Carmela Dutra Hospital, as well as the Committee of Federal University of Santa Catarina. Participants signed an informed consent form during all interviews.

Intervention. The intervention study stages described in the Figure were conducted over 12 months. The main objective conveyed to participants was to consume at least 400 g FV/d (excluding fruit juices and starchy vegetables) and to limit RPM intake to a maximum of 500 g/wk. Red meat refers to beef, pork, lamb, and goat meat. Processed meat is characterized as meat preserved by smoking, curing, salting, or adding chemical preservatives.[11] To facilitate their understanding, participants were encouraged to consume at least 2 servings of fruit/d (2 cups), a small serving of raw vegetables (1 small plate), and 2 servings of cooked vegetables (2 spoonfuls) and to limit the intake of RPM to twice a week, represented by 1 medium steak each time.

During the first meeting (which occurred in the hospital), a 12-month calendar was given to participants, who were instructed to mark how often they consumed RPM and FV. This practice enabled patients to track their own dietary habits, and consequently their involvement with the research. In addition, models of home food measurement were presented using a photo album.[16] After the first hospital contact, the researchers made biweekly phone calls to patients, using a standard protocol. First, patients were asked how they were feeling and if they were able to eat normally. Main points of the intervention also were reviewed.

Bimonthly 24-hour dietary recalls were conducted during a weekday phone call, with a second recall conducted on the following Monday. After hearing reports of food intake, the researcher commented on the quantities of RPM and FV, recommending an increase or reduction in consumption if necessary. The recalls and calendar were used only as a cognitive reinforcement, as suggested by Higgs.[17]