



## RESEARCH UPDATES JUNE 2013

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### FOR THE LATEST IN WORLDWIDE INTEGRATIVE CANCER CARE

**IN THIS ISSUE:** Mora and Ciocon reported about a case where auricular acupuncture improved the symptoms and quality of life of a 90 year old woman suffering from leg swelling that was unresponsive to conventional therapy. Showalter and associates reported that breast cancer survivors should avoid sauna use in order to prevent arm swelling (lymphedema). Buttros and colleagues found that postmenopausal breast cancer survivors were at higher risk for developing metabolic syndrome than women without breast cancer. Wurtzen and colleagues reported that a mindfulness-based stress reduction program helped with depression and anxiety in breast cancer patients. Nakau et al. concluded that stress-reducing activities performed in urban green spaces are helpful for the physical, emotional and spiritual well-being of cancer patients. Zhai and colleagues found that a traditional herbal medicine regimen reduced the risk of recurrence of hepatocellular carcinoma after surgery. Braun and associates found that a naturopathic antioxidant treatment inhibited tumour response in men with prostate cancer who were undergoing radiation therapy. Campbell et al. found that increased physical activity before and after colorectal cancer diagnosis was associated with a decreased risk of mortality. In our study of the month, Cantarero-Villanueva and colleagues reported that a deep water exercise program effectively improved cancer-related fatigue and strength in a group of breast cancer survivors.

## ACUPUNCTURE

Mora, JC and J. Ciocon.

### Auricular Acupuncture Treatment to Alleviate Chronic Lower Extremity Swelling Not Responsive to Conventional Therapy.

*J Am Geriatr Soc.* 2013. April 2013; 61S133-S134.

**INTRODUCTION:** According to the 2007 National Health Interview Survey, approximately 3.1 million US adults had used acupuncture in the previous year. Acupuncture is more known for pain management. However, it is also used as an adjunct therapy for the management of nausea, vomiting and lymphedema, especially among patients with cancer. We are reporting a case of an elderly woman suffering from a chronic leg swelling treated with auricular acupuncture. **CASE PRESENTATION:** A 90 year old woman came with chronic progressive leg swelling in both lower extremities for the last 2 years. Her PMH was significant for osteoarthritis of the knee, calculus of kidney, macular degeneration, vitamin D deficiency, Vitamin B12 deficiency, and anemia. Her studies have been negative for deep venous thrombosis. An ultrasound of the lower extremities showed no blood clots and reported edema in the subcutaneous fat with no collection. Heart failure was also considered as a cause of her chronic swelling. However, her echocardiogram showed an ejection fraction of 60%. Her kidney function and liver functions have been normal. Her laboratories only showed mild anemia. She has mainly been managed with furosemide 20 mg a day and stockings for her swelling. Over the last 2 months, patient has been complaining of worsening swelling in the legs, causing problems with walking and her skin is very painful to palpation. Furosemide is no longer reducing her swelling. At the Cleveland Clinic in Florida, we offer acupuncture mostly for pain management. However, we decided to offer acupuncture for the management for her chronic swelling. To date, the patient has received 7 auricular acupuncture treatments, and no other changes to medications have been made. After the acupuncture treatments, there has been a dramatic reduction of the pain and swelling in both legs. The legs are no longer sensitive to palpation, and the patient has reported marked improvement on the quality of her life without side effects. **DISCUSSION:** Auricular acupuncture, a modality of acupuncture, may improve a patient's quality of life and reduce swelling from chronic leg edema. Physicians can provide auricular acupuncture as an adjunct therapy in any setting, especially among the elderly to reduce the risks associated with polypharmacy.

**INSPIREHEALTH'S INTERPRETATION:** Auricular acupuncture (acupuncture applied to the ear) reduced the pain and swelling in the legs of a 90 year old patient who was previously unresponsive to conventional therapy and improved her quality of life. This approach may be applicable to cancer patients as well.

## BREAST CANCER

Showalter, SL, J. C. Brown, A. L. Cheville, et al.

### Lifestyle Risk Factors Associated with Arm Swelling among Women with Breast Cancer.

*Annals of Surgical Oncology*. 2013 March 2013; 203: 842-849.

**BACKGROUND:** Breast cancer-related lymphedema (BCRL) is a feared complication for breast cancer patients who have undergone axillary surgery. Although clinical risk factors for BCRL are defined, data are sparse regarding common exposures that might induce incident arm swelling. The goal of this study was to quantify the association between common exposures thought to be potential risk factors and the occurrence of incident arm swelling among breast cancer survivors with or at risk for BCRL. **METHODS:** This is a prospective subanalysis of the Physical Activity and Lymphedema (PAL) trial, a randomized controlled trial of 295 breast cancer survivors. Participants reported their exposure to 30 different potential risk factors at 3 month intervals for 1 year. Incident arm swelling was defined as a  $\geq 5\%$  increase in interlimb water volume difference between two consecutive time points. **RESULTS:** Twenty-seven participants (9%) experienced incident arm swelling and 268 patients (91%) did not. Sauna use was the only exposure that was significantly predictive of incident arm swelling ( $p = 0.05$ ). Nonwhite and nonblack participants had a significantly increased risk for experiencing incident arm swelling ( $p = 0.005$  for both comparisons). **CONCLUSIONS:** In our patient cohort, many common exposures that have been reported to be risk factors did not prove to have a significant predictive relationship for incident arm swelling. This study supports the recommendation that breast cancer patients who have had axillary surgery should avoid sauna use. The results do not confirm the need for other restrictions that may interfere with the quality of life in women with breast cancer.

**INSPIREHEALTH'S INTERPRETATION:** In this subanalysis of the Physical Activity and Lymphedema (PAL) trial involving 295 subjects, 30 different risk factors for lymphedema (fluid buildup) were evaluated at 3 month intervals for one year, and it was determined that sauna use was the only environmental exposure that significantly predicted the development of lymphedema. Therefore, breast cancer patients who have undergone axillary (near the armpit) surgery should avoid saunas, as this may increase their risk of lymphedema.

Buttros, DB, E. A. Nahas, H. D. Vespoli, et al.

### Risk of Metabolic Syndrome in Postmenopausal Breast Cancer Survivors.

*Menopause*. 2013 April 2013; 204: 448-454.

**OBJECTIVE:** The aim of this study was to assess the risk of metabolic syndrome (MetS) in postmenopausal breast cancer survivors as compared with postmenopausal women without breast cancer. **METHODS:** In this cross-sectional study, 104 postmenopausal breast cancer survivors were compared with 208 postmenopausal women (controls) attending a university hospital. Eligibility criteria included the following: amenorrhea longer than 12 months and aged 45 years or older treated for breast cancer, and metastasis-free for at least 5 years. The control group consisted of women with amenorrhea longer than 12 months and aged 45 years or older and without breast cancer, matched by age and menopause status (in a proportion of 1:2 as sample calculation). Clinical and anthropometric data were collected. Biochemical parameters, including total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, triglycerides, glucose, and C-reactive protein, were measured. Women showing three or more diagnostic criteria were diagnosed as having MetS: waist circumference of 88 cm or larger, blood pressure of 130/85 mm Hg or higher, triglycerides level of 150 mg/dL or higher, high-density lipoprotein cholesterol level lower than 50 mg/dL, and glucose level of 100 mg/dL or higher. For statistical analysis, Student's t test,  $\chi$  test, and logistic regression (odds ratio [OR]) were used. **RESULTS:** The mean (SD) age of breast cancer survivors was 60.6 (8.6) years, with a mean (SD) follow-up of 9.4 (4.4) years. A higher percentage of breast cancer survivors (46.2%) were obese as compared with controls (32.7%;  $P < 0.05$ ), and a smaller percentage showed optimal values for low-density lipoprotein cholesterol, glucose, and C-reactive protein versus controls ( $P < 0.05$ ). MetS was diagnosed in 50% of breast cancer survivors and in 37.5% of control group women ( $P < 0.05$ ). Among the MetS diagnostic criteria, the most prevalent was abdominal obesity (waist circumference  $> 88$  cm), affecting 62.5% and 67.8% of the participants, respectively. In the control group, breast cancer survivors had a higher risk for MetS (OR, 1.66; 95% CI, 1.04-2.68), dysglycemia (OR, 1.05; 95% CI, 1.09-3.03), and hypertension (OR, 1.71; 95% CI, 1.02-2.89). **CONCLUSIONS:** Postmenopausal breast cancer survivors present a higher risk of developing MetS as compared with women without breast cancer.

**INSPIREHEALTH'S INTERPRETATION:** When comparing breast cancer survivors over the age of 45 who had been postmenopausal for over a year with postmenopausal women of the same age without breast cancer, a higher percentage of breast cancer survivors were obese and had less than optimal levels of good cholesterol and blood sugar. Consequently, they had a higher risk of metabolic syndrome.

**E-VERSION EXTRA** Singh-Carlson, S, F. Wong, L. Martin and S. K. Nguyen.

### **Breast cancer survivorship and South Asian women: Understanding about the Follow-Up Care Plan and Perspectives and Preferences for Information Post Treatment.**

*Curr Oncol.* 2013 Apr; 202: e63-e79.

**BACKGROUND AND OBJECTIVES:** As more treatment options become available and supportive care improves, a larger number of people will survive after treatment for breast cancer. In the present study, we explored the experiences and concerns of female South Asian (sa) breast cancer survivors (bcss) from various age groups after treatment to determine their understanding of follow-up care and to better understand their preferences for a survivorship care plan (scp). **METHODS:** Patients were identified by name recognition from BC Cancer Agency records for sa patients who were 3-60 months post treatment, had no evidence of recurrence, and had been discharged from the cancer centre to follow-up. Three focus groups and eleven face-to-face semistructured interviews were audio-recorded, transcribed verbatim, cross-checked for accuracy, and analyzed using thematic and content analysis. Participants were asked about their survivorship experiences and their preferences for the content and format of a scp. **RESULTS:** Fatigue, cognitive changes, fear of recurrence, and depression were the most universal effects after treatment. "Quiet acceptance" was the major theme unique to sa women, with a unique cross-influence between faith and acceptance. Emphasis on a generalized scp with individualized content echoed the wide variation in breast cancer impacts for sa women. Younger women preferred information on depression and peer support. **CONCLUSIONS:** For sa bcss, many of the psychological and physical impacts of breast cancer diagnosis and treatment may be experienced in common with bcss of other ethnic backgrounds, but the present study also suggests the presence of unique cultural nuances such as spiritual and language-specific support resource needs. The results provide direction for designing key content and format of scps, and information about elements of care that can be customized to individual patient needs.

**INSPIREHEALTH'S INTERPRETATION:** South Asian breast cancer survivors had similar experiences and concerns with respect to follow-up care and a survivorship care plan as breast cancer survivors of other ethnic backgrounds, but this study also indicated that they had distinct needs with respect to culture such as spiritual and language-specific support needs.

## **MINDFULNESS**

Wurtzen, H, S. O. Dalton, P. Elsass, et al.

### **Mindfulness significantly Reduces Self-Reported Levels of Anxiety and Depression: Results of a Randomised Controlled Trial among 336 Danish Women Treated for Stage I-III Breast Cancer.**

*Eur J Cancer.* 2013 April 2013; 496: 1365-1373.

**INTRODUCTION:** As the incidence of and survival from breast cancer continue to raise, interventions to reduce anxiety and depression before, during and after treatment are needed. Previous studies have reported positive effects of a structured 8-week group mindfulness-based stress reduction program (MBSR) among patients with cancer and other conditions. **PURPOSE:** To test the effect of such a programme on anxiety and depression among women with breast cancer in a population-based randomised controlled study. **METHODS:** A total of 336 women who had been operated on for breast cancer (stage I-III) were randomised to usual care or MBSR+usual care. Questionnaires including the Symptom Checklist-90r anxiety and depression subscales and the Center for Epidemiological Studies-Depression scale were administered before randomisation and immediately, 6 and 12 months after the intervention. **RESULTS:** Intention-to-treat analyses showed differences between groups in levels of anxiety ( $p=0.0002$ ) and depression (SCL-90r,  $p<0.0001$ ; CES-D,  $p=0.0367$ ) after 12 months. Graphical comparisons of participants with higher levels of anxiety and depression at baseline showed a significantly greater decrease in the intervention group throughout follow-up and no differences among least affected participants. Medium-to-large effects were found for all outcomes in the intervention group in analyses of change scores after 12 months' follow-up. **CONCLUSION:** The 8-week group based MBSR intervention had clinically meaningful, statistically significant effects on depression and anxiety after 12 months' follow-up, and medium-to-large effect sizes. Our findings support the dissemination of MBSR among women with breast cancer. (Clintrials.gov No.: NCT00990977).

**INSPIREHEALTH'S INTERPRETATION:** Breast cancer patients who participated in a structured 8-week group mindfulness-based stress reduction program following surgery had significantly reduced anxiety and depression.

## **SPIRITUALITY**

Nakau, M, J. Imanishi, S. Watanabe, et al.

### **Spiritual Care of Cancer Patients by Integrated Medicine in Urban Green Space: A Pilot Study.**

*Explore (NY).* 2013 March-April 2013; 92: 87-90.

**BACKGROUND:** Psycho-oncological care, including spiritual care, is essential for cancer patients. Integrated medicine, a therapy combining modern western medicine with various kinds of complementary and alternative medicine, can be appropriate

for the spiritual care of cancer because of the multidimensional characteristics of the spirituality. In particular, therapies that enable patients to establish a deeper contact with nature, inspire feelings of life and growth of plants, and involve meditation may be useful for spiritual care as well as related aspects such as emotion. The purpose of the present study was to examine the effect of spiritual care of cancer patients by integrated medicine in a green environment. **METHODS:** The present study involved 22 cancer patients. Integrated medicine consisted of forest therapy, horticultural therapy, yoga meditation, and support group therapy, and sessions were conducted once a week for 12 weeks. The spirituality (the Functional Assessment of Chronic Illness Therapy-Spiritual well-being), quality of life (Short Form-36 Health Survey Questionnaire), fatigue (Cancer Fatigue Scale), psychological state (Profile of Mood States, short form, and State-Trait Anxiety Inventory) and natural killer cell activity were assessed before and after intervention. **RESULTS:** In Functional Assessment of Chronic Illness Therapy-Spiritual well-being, there were significant differences in functional well-being and spiritual well-being pre- and postintervention. This program improved quality of life and reduced cancer-associated fatigue. Furthermore, some aspects of psychological state were improved and natural killer cell activity was increased. **CONCLUSIONS:** It is indicated that integrated medicine performed in a green environment is potentially useful for the emotional and spiritual well-being of cancer patients.

**INSPIREHEALTH'S INTERPRETATION:** Stress-reducing practices such as walks in the forest, growing vegetables in a garden, yoga, meditation, and support groups can help improve physical, emotional and spiritual well-being of cancer patients undergoing conventional cancer treatments.

## TRADITIONAL HERBAL MEDICINE

Zhai, X-, Z. Chen, B. Li, et al.

### Traditional Herbal Medicine in Preventing Recurrence After Resection of Small Hepatocellular Carcinoma: A Multicenter Randomized Controlled Trial.

*J Integr Med.* 2013 March 2013; 112: 90-100.

**BACKGROUND:** Disease recurrence is a main challenge in treatment of hepatocellular carcinoma (HCC). There is no generally accepted method for preventing recurrence of HCC after resection. **OBJECTIVE:** To compare the efficacy of a traditional herbal medicine (THM) regimen and transarterial chemoembolization (TACE) in preventing recurrence in post-resection patients with small HCC. **DESIGN, SETTING, PARTICIPANTS AND INTERVENTIONS:** This is a multicenter, open-label, randomized, controlled study, which was undertaken in five centers of China. A total of 379 patients who met the eligibility criteria and underwent randomization were enrolled in this trial. One hundred and eighty-eight patients were assigned to the THM group and received Cinobufacini injection and Jiedu Granule, and the other 191 patients were assigned to the TACE group and received one single course of TACE. **MAIN OUTCOME MEASURES:** Primary outcome measures were the annual recurrence rate and the time to recurrence. Incidence of adverse events was regarded as the secondary outcome measure. **RESULTS:** Among the 364 patients who were included in the intention-to-treat analysis, 67 patients of the THM group and 87 of the TACE group had recurrence, with a hazard ratio of 0.695 ( $P = 0.048$ ). Median recurrence-free survival of the patients in the THM and TACE groups was 46.89 and 34.49 months, respectively. Recurrence rates at 1, 2 and 3 years were 17.7%, 33.0% and 43.5% for the THM group, and 28.8%, 42.5% and 54.0% for the TACE group, respectively ( $P = 0.026$ ). Multivariate analysis indicated that the THM regimen had a big advantage for prolonging the recurrence-free survival. Adverse events were mild and abnormality of laboratory indices of the two groups were similar. **CONCLUSION:** In comparison with TACE therapy, the THM regimen was associated with diminished risk of recurrence of small-sized HCC after resection, with comparable adverse events. **TRIAL REGISTRATION IDENTIFIER:** This trial was registered in the Chinese Clinical Trial Registry with the identifier ChiCTR-TRC-07000033.

**INSPIREHEALTH'S INTERPRETATION:** This randomized controlled trial with liver cancer patients demonstrated that a traditional Chinese medicine formulation (Cinobufacini injection with Jiedu Granule) provided a greater recurrence-free survival advantage compared with conventional treatment.

## PROSTATE CANCER

Braun, DP, D. Gupta, T. C. Birdsall, et al.

### Effect of Naturopathic and Nutritional Supplement Treatment on Tumor Response, Control, and Recurrence in Patients with Prostate Cancer Treated with Radiation Therapy.

*J Altern Complement Med.* 2013 01 Mar 2013; 193: 198-203.

**OBJECTIVES:** Use of naturopathic and nutritional supplements (NNS) with antioxidant activity is controversial in patients receiving radiation therapy. The effects of concomitant use of NNS with antioxidant activity during radiation therapy for prostate cancer were investigated in terms of clinical tumor responsiveness, kinetics, and durability. **MATERIALS AND METHODS:** A retrospective investigation was done of 134 patients treated with curative intent for limited-stage prostate cancer by radiation therapy. Patients self-selected to receive NNS as part of their treatment and maintenance during an extended post-treatment interval of at least 2 years. The outcome measures were the following: prostate-specific antigen (PSA) nadir;  $\geq 24$  months post-treatment PSA; time to reach nadir; and time to last follow-up were compared across +NNS and -NNS. **RESULTS:** Sixty-nine

(69) patients elected to receive NNS while 65 did not. Seventy-seven (77) (+NNS 39, -NNS 38) patients received hormone therapy while 57 (+NNS 30, -NNS 27) did not. In the nonhormone cohort, median pretreatment PSA, nadir, post-treatment PSA, time to reach nadir, and time to follow-up were 5.5 ng/mL, 0.56 ng/mL, 0.61 ng/mL, 25 months, and 39.7 months for the -NNS group and 5.1 ng/mL, 0.32 ng/mL, 0.44 ng/mL, 27 months, and 50.1 months for the +NNS group, respectively ( $p > 0.05$  for all). Similarly, no significant differences were observed between +NNS and -NNS in the hormone-receiving cohort. **CONCLUSIONS:** The clinical tumor response to radiation therapy in patients with limited-stage prostate cancer is not inhibited by concomitant NNS based on the magnitude of the PSA response, the velocity of the PSA nadir, and the duration of PSA normalization.

**INSPIREHEALTH'S INTERPRETATION:** Use of a naturopathic antioxidant treatment does not inhibit tumor response in prostate cancer patients undergoing radiation therapy as indicated by serum prostate-specific antigen levels.

## EXERCISE

Campbell, PT, A. V. Patel, C. C. Newton, et al.

### Associations of Recreational Physical Activity and Leisure Time Spent Sitting with Colorectal Cancer Survival.

*J Clin Oncol.* 2013 Mar 1; 317: 876-885.

**PURPOSE:** Little is known about the association of recreational physical activity or leisure time spent sitting with survival after colorectal cancer diagnosis. This study examined the associations of prediagnosis and postdiagnosis recreational physical activity and leisure time spent sitting with mortality among patients with colorectal cancer. **PATIENTS AND METHODS:** From a cohort of adults without colorectal cancer at baseline in 1992-1993, we identified 2,293 participants who were diagnosed with invasive, nonmetastatic colorectal cancer up to mid-2007. At baseline, before their cancer diagnosis, and again after their cancer diagnosis, participants completed detailed questionnaires that included information concerning recreational physical activity and leisure time spent sitting. **RESULTS:** During a maximum follow-up of 16.1 years after colorectal cancer diagnosis, 846 patients with colorectal cancer died, 379 of them from colorectal cancer. Engaging in 8.75 or more metabolic equivalent (MET) hours per week of recreational physical activity (equivalent to approximately 150 minutes per week of walking) compared with fewer than 3.5 MET hours per week was associated with lower all-cause mortality (prediagnosis physical activity: relative risk [RR], 0.72; 95% CI, 0.58 to 0.89; postdiagnosis physical activity: RR, 0.58; 95% CI, 0.47 to 0.71). Spending 6 or more hours per day of leisure time sitting compared with fewer than 3 hours per day was associated with higher all-cause mortality (prediagnosis sitting time: RR, 1.36; 95% CI, 1.10 to 1.68; postdiagnosis sitting time: RR, 1.27; 95% CI, 0.99 to 1.64). **CONCLUSION:** More recreational physical activity before and after colorectal cancer diagnosis was associated with lower mortality, whereas longer leisure time spent sitting was associated with higher risk of death. **INSPIREHEALTH'S INTERPRETATION:** Engaging in at least 8.75 hours of exercise per week (roughly equivalent to 150 minutes per week of walking) was associated with a decreased risk of mortality in a group of over 2,000 participants with invasive, nonmetastatic colorectal cancer. Also, sitting for more than 6 hours per day, as compared to sitting for less than 3.5, was associated with a higher risk of all-cause mortality.

## E-VERSION EXTRA

### VITAMIN D

Schottker, B, U. Haug, L. Schomburg, et al.

### Strong Associations of 25-Hydroxyvitamin D Concentrations with all-Cause, Cardiovascular, Cancer, and Respiratory Disease Mortality in a Large Cohort Study.

*Am J Clin Nutr.* 2013 01 Apr 2013; 974: 782-793.

**BACKGROUND:** Serum 25-hydroxyvitamin D [25(OH)D] concentration has been linked to mortality in several studies, but appropriate cutoffs to define risk categories are under debate. **OBJECTIVE:** We aimed to conduct a repeated-measurements analysis on the association of serum 25(OH)D concentrations with all-cause and cause-specific mortality, with particular attention given to the shape of dose-response relations. **DESIGN:** Concentrations of 25(OH)D were measured in  $n = 9578$  baseline and  $n = 5469$  5-y follow-up participants of the ESTHER study, which is a German population-based cohort aged 50-74 y at baseline. Deaths were recorded during 9.5 y of follow-up (median). Restricted cubic splines were used to assess dose-response relations, and Cox regression with time-dependent variables was used to estimate hazard ratios. **RESULTS:** During follow-up, 1083 study participants died; of those, 350 individuals died of cardiovascular diseases, 433 individuals died of cancer, and 55 individuals died of respiratory diseases. The overall mortality [HR (95% CI)] of subjects with vitamin D deficiency [25(OH)D concentrations  $< 30$  nmol/L] or vitamin D insufficiency [25(OH)D concentrations from 30 to 50 nmol/L] was significantly increased [1.71 (1.43, 2.03) and 1.17 (1.02, 1.35), respectively] compared with that of subjects with sufficient 25(OH)D concentrations ( $> 50$  nmol/L). Vitamin D deficiency was also associated with increased cardiovascular mortality [1.39 (95% CI: 1.02, 1.89)], cancer mortality [1.42 (95% CI: 1.08, 1.88)] and respiratory disease mortality [2.50 (95% CI: 1.12, 5.56)]. The association of 25(OH)D concentrations with all-cause mortality proved to be a nonlinear inverse association with risk

that started to increase at 25(OH)D concentrations <75 nmol/L. **CONCLUSIONS:** In this large cohort study, serum 25(OH)D concentrations were inversely associated with all-cause and cause-specific mortality. In particular, vitamin D deficiency [25(OH)D concentration <30 nmol/L] was strongly associated with mortality from all causes, cardiovascular diseases, cancer, and respiratory diseases.

**INSPIREHEALTH'S INTERPRETATION:** In this study of over 5,000 participants, it was found that adequate levels of vitamin D lowered the risk of death from all causes, and from heart disease, cancer, and lung disease in particular.

## STUDY OF THE MONTH

Cantarero-Villanueva, I, C. Fernandez-Lao, A. I. Cuesta-Vargas, et al.

### The Effectiveness of a Deep Water Aquatic Exercise Program in Cancer-Related Fatigue in Breast Cancer Survivors: A Randomized Controlled Trial.

*Arch Phys Med Rehabil.* 2013 Feb; 942: 221-230.

**OBJECTIVE:** To investigate the effectiveness of an 8-week aquatic program on cancer-related fatigue, as well as physical and psychological outcomes in breast cancer survivors. **DESIGN:** A randomized controlled trial. **SETTING:** Outpatient clinic, urban, academic medical center, and a sport university swimming pool. **PARTICIPANTS:** Breast cancer survivors (N=68) were randomly assigned to either an experimental (aquatic exercise group in deep water pool) group or a control (usual care) group. **INTERVENTIONS:** The intervention group attended aquatic exercise sessions 3 times per week for 8 weeks in a heated deep swimming pool. Sessions lasted 60 minutes in duration: 10 minutes of warm-up, 40 minutes of aerobic and endurance exercises, and 10 minutes of cool-down exercises. Patients allocated to the usual care group followed the oncologist's recommendations in relation to a healthy lifestyle. **MAIN OUTCOME MEASURES:** Values for fatigue (Piper Fatigue Scale), mood state (Profile of Mood States), and abdominal (trunk curl static endurance test) and leg (multiple sit-to-stand test) strength were collected at baseline, after the last treatment session, and at a 6-month follow-up. **RESULTS:** Immediately after discharge, the aquatic exercise group showed a large effect size in total fatigue score ( $d=.87$ ; 95% confidence interval, .48-1.26), trunk curl endurance ( $d=.92$ ; 95% confidence interval, 1.97-3.83), and leg strength ( $d=1.10$ ; .55-2.76), but negligible effects in vigor, confusion, and disturbance of mood ( $d<.25$ ). At the 6-month follow-up period, the aquatic exercise group maintained large to small effect sizes in fatigue scores, multiple sit-to-stand test, and trunk curl static endurance (.25> $d$ >.90) and negligible effects for the fatigue-severity dimension and different scales of the Profile of Mood States ( $d<.25$ ). **CONCLUSION:** An aquatic exercise program conducted in deep water was effective for improving cancer-related fatigue and strength in breast cancer survivors.

**INSPIREHEALTH'S INTERPRETATION:** Breast cancer survivors assigned to an aquatic exercise group in a deep water pool showed improvements in breast cancer-related fatigue, and strength, even after six months of follow-up.

We are grateful to the Prostate Cancer Foundation BC and the Canadian Breast Cancer Foundation (BC/Yukon) for their generous support of *Research Updates*.



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