

COLUMN

Scanning the Global Literature

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Citation

Global Adv Health Med.
2016;5(1):126-128. DOI:
10.7453/gahmj.2015.131

BREAST CANCER SURVIVORS WITH PERSISTENT CANCER-RELATED FATIGUE SHOW AN ALTERED RESTING BRAIN CONNECTIVITY

According to modern neuroscience cerebral networks, cerebral connectivity is decisive for cognitive and emotional functions. A disturbed cerebral connectivity has now been shown in breast cancer survivors with persistent cancer-related fatigue.

In 23 age-matched patients—15 fatigued, 8 non-fatigued; in all the successful treatment of their breast cancer had been terminated at least 12 weeks earlier—the brain activity had been investigated with functional connectivity magnetic resonance imaging. Fatigued patients showed an increased connectivity between the default mode network and regions within the superior frontal gyrus. The degree of increased connectivity was correlated with increased fatigue and decreased sleep quality. Specifically, the connectivity was increased between the inferior parietal lobule to superior frontal gyrus (which was positively correlated to physical fatigue scores and poor sleep quality), between medial prefrontal to inferior parietal lobule (which was positively correlated to subjective mental fatigue scores), between precuneus to anterior insula, and posterior cingulate to cerebellum.

Commentary by Gunver Kienle, Dr med



Many women survive breast cancer today. One third of them suffer from persistent cancer-related fatigue. This is one of the most distressing symptoms that substantially impairs quality of life and is associated with disturbed sleep, impaired cognitive functioning, and depression. Causes are poorly understood. This is the first study to link persistent cancer-related fatigue in breast cancer survivors to intrinsic brain connectivity, particularly between the default mode network and regions within the superior frontal gyrus. The increased connectivity is associated with an increase in mental fatigue and poor sleep quality. The default mode network is a network of certain connected brain areas that become activated when individuals are at rest and not focused on the outside world but have self-referential thoughts, envision the future, etc. The default mode network is involved in a variety of diseases and also activated in patients with chronic pain and depression. The study has some limitations such as small sample size; also, it does not unveil causal relationships. Still, it

hopefully supports the understanding of cancer-related fatigue and the eventual development of a successful treatment. Furthermore, it would be interesting to investigate whether integrative cancer treatments addressing cancer-related fatigue can have an impact in this specific brain function as well.

REFERENCE

Hampson JP, Zick SM, Khabir T, Wright BD, Harris RE. Altered resting brain connectivity in persistent cancer related fatigue. *Neuroimage Clin.* 2015 May 7;8:305-13.

INTEROCEPTION, CONTEMPLATIVE PRACTICE, AND HEALTH

Interoception refers to the awareness and appraisal of internal bodily sensations, a crucial factor in the experience of embodiment. It is a complex and poorly understood concept within healthcare science. This paper reviews and integrates perspectives from neuroscience, contemplative practices, and clinical practice—with the goal of advancing understanding of how embodiment determines wellbeing—and identifies challenges to that understanding. The paper also proposes a predictive coding model for mind-body integration that describes the tension between expected and felt bodily sensations and suggests that contemplative practices hold a solution to affective and psychosomatic disorders through expanding an individual's sense of presence and agency. Recommendations for future research are also presented.

Commentary by Martha Brown Menard, PhD, LMT



Interoception is a fascinating and rarely discussed topic in the healthcare literature. It is intimately related to self-regulation and contributes to broader mood states, yet it has not been widely researched. Perhaps because of its essentially nonverbal nature, interoception can be difficult to articulate.

In this article, the integration of perspectives from the different disciplines presented provides a powerful lens to a better understanding of these phenomena. The focus of contemplative science on reflection on interoceptive processes as a means to more adaptive and health-promoting behavior is logical and well-described, and the expanded taxonomy of interoceptive processes described is novel. The suggestions for future research are challenging, as the necessary tools

and measures have yet to be developed; however, the authors do provide useful guidelines.

REFERENCE

Farb N, Daubenmier J, Price CJ, et al. Interoception, contemplative practice, and health. *Front Psychol*. 2015 Jun 9;6:763.

ALEXANDER TECHNIQUE AND ACUPUNCTURE ARE BOTH HELPFUL FOR CHRONIC NECK PAIN

Chronic neck pain (CNP) is a leading cause of disability and reduced quality of life, and many people with CNP seek treatment with complementary and integrative therapies. This well-designed and rigorously conducted pragmatic clinical trial based in the United Kingdom evaluated 2 well-established alternative therapies for the treatment of CNP. The first therapy was the Alexander Technique, which trains participants through one-to-one lessons in skills targeting improved posture, muscle tone, neuromuscular coordination, and pain management. The second therapy was traditional Chinese-style acupuncture. A total of 517 patients with well-defined CNP (median duration of neck pain for 6 years) were randomly assigned to 1 of 3 groups: Alexander Technique (twenty 30-min sessions) or acupuncture (twelve 50-min sessions) (both 600 minutes total) plus usual care or usual care alone. Interventions were delivered pragmatically in the private offices of credentialed professionals representing both modalities and completed within a 5-month period. The primary outcome was the Northwick Park Questionnaire (NPQ) for neck pain, which was assessed at 0, 3, 6, and 12 months (primary endpoint). Results of this trial indicated between-group reductions in NPQ score at 12 months vs usual care of 3.79 percentage points for Alexander lessons (CI: 0.91-6.66 percentage points) ($P=.010$) and 3.92 percentage points for acupuncture (95% CI: 0.97-6.87 percentage points) ($P=.009$). The 12-month reductions in NPQ score from baseline were 31% for Alexander lessons and 32% for acupuncture. A secondary outcome of self-efficacy also improved for both interventions vs usual care at 6 months ($P<.001$) and was significantly associated ($P<.001$) with 12-month NPQ score reductions following Alexander lessons and acupuncture treatments. No reported serious adverse events related to either intervention were reported.

Commentary by Peter Wayne, PhD



Findings from this trial clearly demonstrate that 2 widely available complementary and integrative therapies significantly reduce the burden of CNP when added to usual care as compared to usual care alone. The observed average 32% reduction (12.8 points on NPQ scale) observed at 12 months for both therapies is clinically relevant, exceeding the defined threshold of 25%. Of note, while

active therapy commenced at approximately 5 months, improvements were sustained and actually increased up until the final 12-month assessment. Secondary analyses support that enhanced self-efficacy following exposure to both Alexander and acupuncture treatments may partially explain why longer-term benefits were sustained. This latter finding supports the belief that lifestyle education and coaching included in many complementary and integrative modalities may be therapeutically relevant and can contribute to their longer-term effectiveness.

REFERENCE

MacPherson H, Tilbrook H, Richmond S, et al. Alexander Technique lessons or acupuncture sessions for persons with chronic neck pain: a randomized trial. *Ann Intern Med*. 2015;163(9):653-62.

SCHOOL-BASED YOGA PROGRAMS IN THE UNITED STATES: A SURVEY

This paper summarized and compared school-based yoga programs in the United States. Online, list-serv, and database searches were conducted to identify programs, and information was obtained regarding each program's scope of work, curriculum characteristics, teacher-certification and training requirements, implementation models, modes of operation, and geographical regions. Thirty-six programs were identified that offer yoga in more than 940 schools across the United States within which more than 5400 instructors have been trained by these programs to offer yoga in educational settings. While the programs varied in the mode of implementation, training requirements, locations served, and grades covered, the majority of the programs shared a common goal of teaching 4 basic elements of yoga: (1) physical postures, (2) breathing exercises, (3) relaxation techniques, and (4) mindfulness and meditation practices. The programs also taught a variety of additional educational, social-emotional, and didactic techniques to enhance students' mental and physical health and behavior. Given the relatively large number of formal, school-based yoga programs currently being implemented in the United States, the authors suggested that school-based yoga programs are acceptable and feasible to implement.

Commentary by Mary Jo Kreitzer, PhD, RN, FAAN



There is growing interest in teaching children skills of self-regulation that may contribute to positive social behavior, improvement of student performance, and reduction of anxiety and stress. Often this content is taught within a broader framework of social-emotional learning that may include mindfulness and yoga as well as other mind-body approaches. This study demonstrates the substantial interest around the implementation of yoga interventions in schools. Given this interest and the growing evidence base underlying mind-body approaches, con-

templative practices such as yoga have the potential to enhance the quality of US public education.

REFERENCE

Butzer B, Ebert M, Telles S, Khalsa SB. School-based yoga programs in the United States: a survey. *Adv Mind Body Med.* 2015;29(4):18-26.

US EMERGENCY DEPARTMENT VISITS RELATED TO ADVERSE EFFECTS OF DIETARY SUPPLEMENTS

Geller and colleagues reported nationally representative estimates of the number of emergency room visits in the United States due to adverse effects from dietary supplements. They analyzed 10 years of data (2004-2013) obtained from the 63 hospitals participating in the National Electronic Injury Surveillance System–Cooperative Adverse Drug Event Surveillance Project. This database is the result of a joint effort by the US Centers for Disease Control and Prevention, the US Food and Drug Administration (FDA), and the Consumer Product Safety Commission. The hospitals were chosen to be representative based on size, location, and treatment of adults vs children. Every emergency room visit record was reviewed, and abstractors used well-defined case definitions. Products typically considered to be foods or drinks (eg, energy beverages) were excluded. The analyses incorporated weighting, complex sampling design, temporal trends, and census-based national estimates.

Over the 10-year period, 3667 cases were identified, extrapolating to an estimated annual average of 23,005 emergency room visits (95% confidence interval 18,611-27,398) leading to 2154 estimated annual hospitalizations. In 88% of cases, attribution was possible to an individual supplement but not individual supplement ingredients. The majority of visits were for females (58%). Though more than one-fourth of visits were for young adults, hospitalization was more likely in older people. One-fifth of visits were for unsupervised ingestions by young children, usually vitamin and mineral products such as iron. For adults, approximately one-fourth of visits were related to a weight-loss product and were 3 times more likely in women than men. In men, sexual enhancement or bodybuilding supplements were more common. Palpitations, chest pain, and tachycardia were the most common symptoms associated with weight-loss and energy supplements. In older adults, difficulty with swallowing supplements (eg, calcium tablets) was more common. No overall change in trend of visits was seen over the 10-year period.

Commentary by Rob Saper, MD, MPH



This rigorously performed analysis is the first nationally representative survey of emergency room visits for adverse effects from dietary supplements. Salient themes include the high frequency of weight-loss and energy supplements in adolescents and young adults;

accidental unsupervised ingestions by young children; and symptoms related to difficulty swallowing supplements in older people. Despite the current regulatory framework for dietary supplements that presumes their safety, this study demonstrates that a significant number of serious safety concerns exist and need to be addressed. In contrast to FDA-regulated pharmaceuticals, dietary supplements do not require any safety labelling, child-resistant packaging, or limits to the size of the tablet itself. Enforced regulations that target these specific issues are needed to reduce the negative impact of dietary supplements.

REFERENCE

Geller AI, Shehab N, Weidle NJ, et al. Emergency department visits for adverse events related to dietary supplements. *N Engl J Med.* 2015;373(16):1531-40.



To view or download the full-text article, visit: www.gahmj.com/doi/full/10.7453/gahmj.2015.131