1. YOGA FOR CHRONIC LOW BACK PAIN: INVESTIGATING MECHANISMS OF ACTION AND ADHERENCE TO HOME PRACTICE

Rebecca L. Acabchuk1,2, Crystal L. Park1, Katherine Bernier3, Divya Ramesh4, Angela Starkweather5

1. Department of Psychological Sciences, University of Connecticut, Storrs, CT 06269
2. Institute for Collaboration on Health, Intervention, and Policy (InCHIP), Storrs, CT 06269
3. Center for Advancement in Managing Pain, School of Nursing, Storrs, CT 06269

Keywords: yoga, back pain, mechanisms, home practice, emotion regulation

Background: Recent studies have shown that, if practiced regularly, yoga can reduce chronic low back pain (CLBP), but the mechanisms through which yoga exerts these effects have not been identified. Understanding the mechanisms of action will help optimize yoga programs to improve clinical outcomes.

Objective: The purpose of this pilot study is to investigate theory-based mechanisms of action of yoga for CLBP using both quantitative and qualitative assessments to assist mediation analysis in future large-scale clinical trials. We also sought to explore what factors facilitate the development of a regular home practice.

Methods: 12 adults ranging from age 20 to 64 reporting chronic low back pain for 3+ months participated in a 12-week yoga intervention (1x/week for 1 hour) that used iyengar-style alignment cues and integrated various meditation techniques; material was provided to help establish a daily home yoga practice (i.e., custom video, pose manual, homework log, and written instructions). Cohen’s d effect sizes were calculated to gauge change at follow-up from baseline for outcome measures and proposed mechanisms. A follow-up satisfaction questionnaire and qualitative interview were also included.

Results: All participants who completed the study (N=9) adhered to study requirements, attended weekly classes and successfully established a regular home practice despite obstacles. Satisfaction levels were very high; participants reported improved physical movement, reduced stress levels, reduced pain and no adverse reactions. Effect sizes were large for the Brief Pain Inventory (Cohen’s d = 0.97), medium for self-efficacy (Cohen’s d = 0.79), small to medium for Quantitative Sensory Testing (Cohen’s d = 0.28 to 0.69), and small for the Emotion Regulation Questionnaire-Suppression subscale (Cohen’s d = 0.36). No effects appeared for the Five Facet Mindfulness Questionnaire and additional scales of emotion regulation. Qualitative findings explore mechanisms from a participant perspective, and provide insight into how best to assist participants in developing a daily home practice.

Conclusion: Results of this study may assist future studies investigating the mechanisms of action of yoga for chronic low back pain, which may include acceptance and self-efficacy. Custom video and encouragement promoting internal motivation may help people establish a regular home practice.

2. THE EFFECTS OF A SMALL RANDOMIZED YOGA INTERVENTION ON BALANCE AND FUNCTIONAL MUSCLE STRENGTH FOR PEOPLE WITH PARKINSON’S DISEASE

E. Adams1, M. Van Puymbroeck2, A. Walker3, B. Hawkins4, A. Schmid5

1. Clemson University, 2. Colorado State University

Key words: Yoga, Parkinson’s Disease, MiniBEST, balance

Objective: The purpose of this secondary data analysis was to evaluate the outcomes of an 8-week therapeutic yoga intervention on the balance and muscle function of people with Parkinson’s Disease (PD), as measured by the four Mini Balance Evaluation Systems Test subscales (MiniBEST), and the 5 times sit to stand test (5TSSST).

Methods: This secondary data used in this analysis was from a randomized, single blind, wait-list controlled, pilot study with the following inclusion criteria: Participants must have had a diagnosis of PD between 1.5-4 on the modified Hoehn and Yahr scale of PD progression, have been able to speak English, reported experiencing a fear of falling (FoF), scored 4/6 or higher on the mini-mental state exam, and committed to attending the intervention twice weekly for 8 weeks. Exclusion criteria included lack of transportation to the intervention, a self-reported life expectancy of less than 12 months, or current physical activity involvement, including current yoga participation. Participants met twice a week for 60-minutes. The primary intention of the intervention was to improve balance and reducing FoF. The intervention was an eight week hatha yoga course of progressing difficulty taught by a yoga therapist. It included breath practice, modified yoga postures in sitting, standing, and supine positions, and ended with a 10 minute savasana.
**Results:** A total of 27 participants completed the study, with 15 in the experimental group, and 12 in the waitlist control group. Average age was 67, and 63% of the sample was male. A paired-samples *t* test was calculated to compare the mean of the baseline MiniBEST subscale scores and 5TSSST scores, to the mean of the posttest MiniBEST subscale scores and 5TSSST scores. MiniBEST anticipatory subscale pretest scores (*M*=4.04±1.46) and posttest scores (*M*=4.96±0.928) demonstrated significant improvement in anticipatory balance (*t*(22)= 5.163, *p*=0.001). MiniBEST reactive subscale pretest scores (*M*=2.43±2.06) and post-test scores (*M*=4.00±2.00) demonstrated significant improvement in balance (*t*(23)= 5.10, *p*=0.001). MiniBEST sensory subscale pretest scores (*M*=4.52±1.620) and posttest scores (*M*=4.96±1.360) demonstrated significant improvement in sensory balance (*t*(23)= 2.21, *p*=0.038). MiniBEST dynamic gait subscale pretest scores (*M*=5.61±2.89) and posttest scores (*M*=7.78±2.26) demonstrated significant improvement in balance (*t*(19)=5.79, *p*=0.001). The 5TSSST pretest time in seconds (*M*=14.68± 7.77) and posttest time (*M*=11.43± 4.37) demonstrated a significant improvement in lower limb functional muscle strength after the intervention (*t*(21)=2.285, *p*=0.33).

**Conclusion:** People with PD who participated in a therapeutic yoga intervention experienced an improvement in balance and functional muscle strength as measured by the 5TSSST, and the MiniBEST anticipatory, reactive, sensory, and dynamic gait subscales.

### 3. Convenient and Live Movement (CALM): Feasibility of Internet-Based Yoga Classes for Women Undergoing Radiation Therapy for Breast Cancer

**E.L. Addington,¹ S. Sohl,² J. Tooze,² S.C. Danhauer²**

1. Northwestern University Feinberg School of Medicine, Chicago, IL; 2. Wake Forest School of Medicine, Winston-Salem, NC

**Key words:** yoga, cancer, e-health, internet delivery

**Objective:** Evidence for the efficacy of yoga for adult cancer patients is growing. However, many patients lack access to instructors with cancer-specific training, and ability to attend yoga classes is limited by treatment schedules and side effects. We therefore conducted a pilot trial of Internet-based, cancer-adapted yoga classes for women receiving radiation therapy for breast cancer.

**Methods:** Women were recruited to participate in 12, 75-minute cancer-adapted yoga classes offered twice weekly during the 6-week course of radiation. Classes were delivered via an internet-based videoconferencing platform that allowed women to participate in classes from home, while still being able to see and interact with the instructor and other participants. Data were collected on feasibility and acceptability outcomes, including qualitative feedback from participants and the yoga instructor.

**Results:** Among the 42 women we approached, 13 declined to be screened for eligibility: 5 due to lack of interest; 8 due to scheduling conflict. Just over half (n=23, 54.8%) were ineligible, including 10 without internet/computer access and 4 who already engaged regularly in yoga. Of 6 women (14.3% of those approached) who were eligible and provided consent, 2 withdrew prior to beginning yoga classes. The remaining 4 participants attended between 1-11 of 12 online yoga classes. In post-intervention interviews, participants and the instructor agreed that internet-based yoga classes hold great potential for increasing access and improving psychological outcomes in adults with cancer. Qualitative feedback from participants revealed suggestions for future trials of internet-based yoga classes, including: offering more varied class times to accommodate patients’ demanding schedules and fluctuating symptoms; enrolling patients after they have acclimated to cancer treatment; streamlining participants’ interface with technology; and careful attention to participant burden when selecting measures. The instructor recommended closed session courses, as opposed to rolling enrollment; teaching the same modified poses for all participants, rather than individual tailoring; and using a large screen to allow closer monitoring of students’ class experience.

**Conclusion:** Internet delivery may increase patients’ access to cancer-adapted yoga classes. This study informs how to optimally design the classes, technology, and research procedures to maximize feasibility and acceptability in future trials.

### 4. Yoga is Associated with Psychological Flexibility: Correlates of Change in Stress and Posttraumatic Stress Among Veterans

**T. Avery,1,² C. Rosen,2,³ C. Blasey,² D. Moore-Downing1, L. Colley,1 L. Mahoney,1 P.J. Bayley,1**

**IAYT 2017 SYMPOSIUM ON YOGA RESEARCH**
5. A RANDOMIZED CONTROLLED TRIAL TO EXPLORE THE MYOCARDIAL LEVEL EVIDENCE FOR THE BENEFICIAL EFFECT OF YOGA THERAPY IN HEART FAILURE.


Corresponding author: Dr. Bandi Hari Krishna, Assistant Professor, Department of Physiology, Sri Venkateswara Medical College, Tirupati, Andhra Pradesh, India. Postal code: 517507.

Key words: Ejection fraction, NT pro BNP, oxidative stress.

Background: Although medication improves both the symptoms and mortality rates of heart failure (HF), the side effects do create hurdles for the consistent use of medication. Information about the non-pharmacological approaches, like yoga that may improve the symptoms is scanty and the reports on the beneficial effect of yoga is limited to quality of life, exercise time, and inflammatory markers.

Therefore, in this study, we assessed the effect of yoga therapy of ejection fraction (EF), the index, oxidative stress and NT pro BNP which gives direct information about myocardial stress.

To the best of our knowledge, this is the first registered trial from India on the effect of 12 weeks yoga therapy on HF patients.

Methods: 130 HF patients randomized into a control group (CG), yoga group (YG). The CG (n = 65) received medical therapy, the YG (n = 65) received yoga therapy and medical therapy. 44 patients in YG and 48 patients in CG completed the study. Myocardial stress was assessed with NT pro BNP, assessment of EF, tei index was used to evaluate cardiac function, Total Anti Oxidant Status (TAOS), Malondialdehyde (MDA), and Redox Ratio (RER) was used to assess the oxidative stress.

Results: In YG, 12 weeks yoga therapy resulted in significant decrease in NT pro-BNP (pre: 3965.48 ± 1365.08, post: 1395.55 + 997.08, p<0.001) and in CG (pre: 5495.47 ± 1382.50, post: 4722.62 ± 1924.70, p<0.05). However, when the changes before and after 12 weeks were expressed in percentage, NT pro BNP was reduced 63.71% in yoga therapy group and 10.77% in the control group. Between group difference was statistically significant (p<0.001). EF increased 36.88% in YG, 16.09% in CG. Tei index reduced 27.87% in YG, 6.82% in CG. Between group significance for EF %, p<0.001, Tei index, p<0.001. MDA was reduced...
59.49% in YG and 15.81% in the CG, TAOS was increased 99.66% in YG and 19.90% in CG, and RER was reduced 77.19% in YG and 20.59% in the CG. The improvement of EF was negatively correlated with NT pro-BNP, MDA, as well as RER. There were no orthopedic injuries, cardiac symptoms or cardiac problems during or with respect to the yoga therapy sessions.

**Conclusion:** Significant reduction of NT pro BNP and its correlation with increased EF gives shows the evidence that, yoga can work at the myocardium level to improve the cardiac function in HF patients. So, we conclude that yoga is safe, it reduces myocardial stress, improves cardiac function and QoL in stable HF patients.

* This work was carried-out in the departments of Physiology, Cardiology, Biochemistry and Advanced Centre for Yoga Therapy Education and Research (ACYTER), Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry, India. Postal code: 605006.

6. **BARRIERS AND FACILITATORS TO YOGA PARTICIPATION AMONG RACIALLY/ETHNICALLY DIVERSE, LOW-INCOME ADULTS**


**Background:** National estimates indicate that African-Americans, Hispanics, and persons with low household income are less likely to practice yoga. This disparity is also reflected in lower rates of participation in yoga research among racial/ethnic minorities. In this context, we conducted a qualitative formative assessment to elucidate the barriers, facilitators, and expectations contributing to disparities in the practice of yoga and participation in yoga research.

**Methods:** We recruited 24 racially/ethnically diverse adults, with and without prior yoga experience, residing in a low-income housing community in Boston, MA, to participate in individual interviews (n=5) or focus groups (n=19). We conducted a thematic analysis, informed by the Social Contextual Model for health behavior change, and an audit of the emerging themes to ensure the trustworthiness of the data.

**Results:** Our sample comprised of 75% women, and 42% were white, 25% African American, 17% Asian, and 13% Hispanic. More than 70% of our sample did not have a college degree, 50% were employed full-time, and 29% were employed part-time. Participants were between the ages of 20–81 years, with a mean age of 47.8 years (SD=15.6). At least 33% had no prior yoga experience. The major emergent themes for barriers to yoga practice included fear of injury, lack of ability/ self-efficacy to perform the practices, perception of yoga as lacking physicality, preference for other types of exercise, and time and space constraints. Facilitators of yoga engagement included a knowledgeable, personable, yoga instructor who provides individualized instruction, introductory classes, and promotional messaging that highlights the potential benefits of yoga, such as stress reduction.

**Conclusion:** Our findings suggest that a participant engagement in community-based yoga programs and interventions may be enhanced by employing a high quality and personable yoga instructor, creating a program that is accessible and safe for yoga naïve participants, and explicitly communicating the potential benefits of yoga. Further work is needed to identify barriers to participation in yoga specific to men, as well as factors contributing to adherence and retention rates in yoga clinical trials among low-income and ethnic/minorities.

7. **NATIONAL SURVEY OF YOGA PRACTITIONERS IN THE UK: MOTIVATORS AND PERCEIVED HEALTH BENEFITS**

Tina Cartwright, Ellie Connolly, Karen Pilkington

1. University of Westminster; 2. University of Portsmouth

**Key words:** Yoga, health conditions, stress, wellbeing, lifestyle

**Objectives:** Despite the popularity of yoga and evidence of its positive effects on health and wellbeing, little is known about yoga practice in the UK. This survey investigated the characteristics of people who practice yoga, motivations for initiating and maintaining practice, and perceived impact of yoga on health and wellbeing.

**Methods:** Cross-sectional anonymous online survey. Recruitment was primarily through UK-based yoga organisations, yoga studios, and marketing at yoga events. 2434 people completed the survey and met the inclusion criteria (UK resident, practised yoga within 12 months, over 18 years). The survey included yoga-specific questions relating to practice and perceived helpfulness, health and lifestyle questions,
and measures of stress (PSS) and wellbeing (WEMWB).

**Results:** The majority of participants were female (83%), white (90%), and well educated (71% ≥ degree), with a wide age range (18-92 years; mean=48.7, SD=12.5) and years of yoga practice (mean=13.9, SD=11.6). Principal reasons for being initially attracted to yoga were general wellness (39%) and fitness (19%), with 47% reporting a change in focus over time with greater emphasis on stress management (18%) and spirituality (21%). 16% of participants reported starting yoga to manage a physical or mental health condition, with musculoskeletal and anxiety/depression the most commonly cited health conditions. Yoga was reported as helpful in managing a wide range of health issues. Most highly rated, in terms of helpfulness, were stress (98%), anxiety (97%), back and shoulder pain (95% & 92% respectively), depression (93%), arthritis (87%), sleep problems (79%) and headaches (75%). Frequency of practice (versus hours practised in class or years of practice) was most strongly correlated with a range of perceived benefits of yoga, in particular lifestyle changes (r=.30-.34, p<.0005) and sleep improvement (r=.20-.23, p<.0005). In linear regressions models, yoga practice variables accounted for a small but significant percentage of variance in stress (7%) and wellbeing (6%) (p<.0005).

**Conclusions:** Demographic findings were consistent with those in other countries. Yoga practitioners reported a wide range of reasons for initiating and maintaining a yoga practice with a change in focus from physical to psycho-spiritual factors over time. Yoga was perceived as helpful for managing a wide range of physical and psychological health issues suggesting avenues for future research.

## 8. THE PERCEPTIONS OF PRE-SCHOOL CHILDREN ABOUT YOGA PRACTICE

J.C. Foleto¹, M.S Palma¹

1. *Universidade Federal do Rio Grande do Sul*

**Keywords:** yoga; children; perceptions.

**Objective:** The practice of yoga has gained increasing popularity recently due to the numerous benefits provided to practitioners, both in physical aspects as well as in aspects related to the mind, emotions and general well-being. Similarly, the practice of yoga for children has also become increasingly popular in Brazil and in the world, and research in this area has been gaining more space in literature. However, it is perceived that there are still few studies that seek to investigate the perception of practitioners of yoga about this practice. Thus, it is important to give voice to children so they can express the richness of their thoughts, perceptions and also the way yoga becomes present in their lives. Considering this, this study aimed to investigate the perceptions of children about the practice of yoga.

**Study population:** Participants included eleven children aged 5–6 that were enrolled in a kindergarten of a private school in the city of Porto Alegre, Brazil.

**Methods:** This is a qualitative study, characterizes as a case study. It was applied a yoga program to children, which lasted 13 months, with a weekly frequency of 2 times, and duration of 45 minutes each session. In order to investigate the perceptions of children about Yoga practice, semi-structured interviews were applied to them. For the analysis of the information, it was used the technique of content analysis.

**Findings:** From the analysis of the content, the following categories were listed for discussion: (1) Yoga and Meditation; (2) Learning related to the practice of Yoga; (3) Self-perception from Yoga; and (4) Yoga for life. It was possible to observe that children consider yoga as a nice and fun practice, associating it to the reach of calm and general well-being. Other aspects related to self-knowledge and self-regulation of behaviors, thoughts and emotions were also observed in their speeches. Children also reported much appreciation for this practice, giving value to the learning provided during the lessons, and also applying these tools on different contexts and situation of their day-to-day, such as and family.

**Conclusion:** Children of the present study understand Yoga as a pleasant practice and capable of generating numerous learning in different aspects of their development, which can be applied in different contexts of their lives.

## 9. THE EFFECTS OF A YOGA INTERVENTION PROGRAM ON CHILDREN’S MOTOR ABILITIES, PERCEPTIONS AND FEELINGS: DOES SEX MATTER?

J.C. Foleto¹, N.C., Valentini¹, K.R.G., Pereira¹

1. *Universidade Federal do Rio Grande do Sul*

**Keywords:** yoga; children; motor abilities, perception, feelings

**Objective:** Yoga programs for children have gained popularity recently. Moreover, they have showing benefits in several aspects in the development of the practicing children, such as improvements on balance, strength, flexibility and also
some changes on social, emotional and cognitive abilities. This study aimed to investigate the effects of a Yoga intervention program on boys’ and girls’ motor abilities, perceptions and feelings.

**Methods:** In this quasi-experimental study, with mixed method, participated 16 kids aged 6 to 8, from the 1st grade of a public elementary school in Brazil. The intervention of hatha yoga occurred during 12-weeks in the physical education lessons, twice weekly, with 45 min each session; Children were assessed using the Bruininks-Oseretsky Test of Motor Proficiency Second Edition and the flexibility test (sit and reach – Eurofit, 1988). Semi-structured interviews were conducted to assess the perceptions and feelings of children about the yoga program. Data were analyzed with frequencies and Mann Whitney U test. The information obtained in the interviews was analyzed using the content analysis technique.

**Results:** Sex comparisons showed advantage for boys at the post intervention on strength task (S1 p= 0.050). Also, boys showed significant improvements from pre to post intervention on one balance (B5 p=0.021) and one strength (S5 p=0.017) tasks, while girls showed on balance (B5 p=0.027, B6 p=0.012), strength (total test strength p=0.034) and flexibility (p=0.012). Information of the interviews showed that all children demonstrated interest in continuing to practice Yoga. Most girls claimed to have practiced yoga at home, while only half of the boys said the same. Regarding the learning content, most of the children reported the postures learned, however the girls in general also emphasize knowledge related to breathing, and/or the acquisition of confidence and calmness. Likewise, when asked about what yoga is, girls related the practice to sensations or feelings such as calm, well-being, relaxation, and joy, while most boys related yoga directly to yoga postures.

**Conclusion:** Findings suggest that boys and girls benefit from the yoga program in balance and strength, however girls also improve in flexibility. Furthermore, even though boys and girls comprehend and benefit themselves in different ways, the implementation of yoga practice in physical education lessons contributed to several aspects of children’s development.

10. **YOGA AND MINDFULNESS INTERVENTIONS FOR YOUTH WITH ADHD: A META-ANALYSIS AND SYSTEMATIC REVIEW OF THE LITERATURE**

Chimiklis, A.,¹ ² Dahl, V.,² Spears, P.,³ Goss, K.,² Fogarty K.,² Chacko, A.,²

**Key words:** Yoga, mindfulness, ADHD

**Objective:** ADHD is a chronic neurodevelopmental disorder affecting 3–7% of children. Given that mindfulness practices promote receptive attention and open monitoring, and that ADHD is characterized by deficits of inattention, understanding their overlap may offer insight to the utilization of alternative methods to treat ADHD. Studies have offered support for the relationship between attention and mindfulness (e.g., Zylowska et al., 2008), but evidence is limited and further investigation is warranted. In light of the growing utilization of yoga and mindfulness in ADHD populations and potential benefits it has on ADHD symptoms, executive function deficits, and social functioning, we sought to evaluate these interventions.

**Methods:** A systematic literature search was conducted using the electronic databases: PsychINFO, ERIC, PubMed, and MEDLINE. Key terms included: mindfulness, meditation, yoga, Attention Deficit Hyperactivity Disorder, ADHD, Attention Deficit Disorder, hyperactivity, hyperkinesis, inattention, and impulsivity. A study was included if it (a) included youth (ages 5–17) diagnosed with ADHD or 50% of the sample identified exhibited significant symptoms of inattention, hyperactivity, or impulsivity, (b) determined short- and/or longer term treatment effects (c) published 1990–2015 in a peer reviewed English language journal, (d) summarized specific yoga and/or mindfulness interventions, and (e) was a treatment outcome study.

**Results:** Reported outcome data was abstracted from the included articles, and entered into the Comprehensive Meta-Analysis Software program. We used a random effects model as it provides a more conservative estimate of the combined data and a wider confidence interval. Effect sizes were computed using Hedge’s g.

**Conclusions:** The results are promising for the efficacy of mindfulness-based/yoga interventions, yet the majority of outcomes saw only small effects. The low quality of the studies—a result of small sample sizes, lack of a control group, and the use of non-manualized treatments—may have inflated the efficacy of the intervention on those outcomes that saw moderate to large effects. Further research is warranted.
11. CHALLENGES IN RECRUITING VETERANS WITH GULF WAR ILLNESS FOR A STUDY COMPARING YOGA TO COGNITIVE BEHAVIORAL THERAPY FOR TREATING CHRONIC PAIN

R. Cho,¹ D. Moore-Downing,¹ L. Collery,¹ J. Schienle,² ³ ⁴ S. Chan,⁵ ⁶ S. Kim,¹ L. Mahoney,¹ P.J. Bayley,¹ ²


Key words: Yoga, recruitment, chronic pain, Gulf War Illness

Objective: This study identifies, implements, and analyzes the effectiveness of multiple avenues of recruitment for a randomized controlled trial to treat chronic pain. The study was aimed at veterans who have chronic pain stemming from Gulf War Illness (GWI); treatment groups consisted of 10 weeks of either yoga or cognitive behavioral therapy (CBT) designed to treat pain.

Methods: Gulf War Illness is defined using the Fukuda criteria (Fukuda et al., 1998, JAMA) as one or more chronic symptoms from at least two of three categories: musculoskeletal, fatigue, and mood-cognition. Accordingly, we enrolled veterans who served in the United States Armed Forces during the Persian Gulf War (1990-1991), regardless of deployment status, and endorsed musculoskeletal pain and at least one other category. Both broad and focused recruitment methods, including mass mailings using national registries (Gulf War Registry, Defense Manpower Data Center (DMDC)), local mass mailings, partnerships with VA clinics, physician outreach, referrals from other clinical trials, flyers, and local veteran events were used to identify and enroll veterans who met the inclusion criteria.

Results: Overall, study enrollment of Gulf War veterans with chronic pain from Gulf War Illness had a recruitment yield (enrolled/total potential participants) of 5.8%. 1152 total prospective participants contacted the study, including 482 out-of-state individuals. Of the 938 individuals the study team was able to contact (81%), 465 individuals completed the telephone screening. 71 Gulf War veterans provided written informed consent, and 67 were eligible for the study and randomized to a treatment group (recruitment yield = 5.8%).

Of the 67 veterans randomized, the largest contributions came from participants recruited from mass mailings using national registries (40%) and local resources (22%), in addition to flyers at local VA hospitals and clinics (18%). Among the other approaches, face-to-face interactions between the study team and prospective veterans yielded the next highest contribution (15%).

Conclusions: Our experience with recruitment of Persian Gulf War veterans illustrates the challenges encountered in selecting methods of recruitment that target veterans from specific combat eras. We conclude that this patient population is most successfully recruited using a highly targeted approach involving mass mailings from national registries.

12. A FEASIBILITY AND ACCEPTABILITY STUDY OF A TRAUMA-INFORMED MIND/BODY PROGRAM IN SOMALIA

Cook-Cottone, C. P.¹ & Guyker, W.¹

1. University at Buffalo, State University at New York

Key Words: Trauma-informed, Yoga, Cultural Acceptability, Secular Yoga, Feasibility, Acceptability

Objective: The purpose of this study is to investigate the feasibility and acceptability of a trauma informed yoga program in Somalia among populations likely to be exposed to traumatic events (i.e., former child soldiers and women exposed to gender-based violence).

Methods: The Mind-Body Wellbeing Program is designed to support trauma-exposed individuals in the following key areas: (1) physical wellbeing, (2) emotional wellbeing, and (3) positive relationships with self and community (see Figure 1- Mind-Body Practices for Wellbeing). Primarily, the goal of the program is to deliver the themes of growth during active mind-body practice. The program is designed to deliver the 10 Core Principles for Growth in 10 to 12 weeks, with 2 to 3 sessions per week on each of the principles. The 10-week program focuses only on the 10 principles. The 12-week program includes an introduction week and a closing week. This curriculum is based on the current state of knowledge in the field of mind/body physical practice and trauma interventions and support. In order to assess feasibility and acceptability the participants completed pre-and posttest. For pretest, the assessment team read the consent documents to participants who volunteered to complete the assessments (N = 112). This occurred early in the program implementation in September of 2016 (within a few weeks of the program initiation). For the posttest, a sub-group of
participants (N = 89) volunteered to complete the post-program survey in March of 2017 resulting in span of approximately 6 months of participation in the program between pre and post-program assessment.

**Results:** Data was collected from a group that consisted of approximately 35.7% men and 64.3% women. This pilot program, bringing mind and body practices to a Somali culture with Muslim customs, resulted in many positive comments and ratings in all areas. Overall, the participants found the program to be very good to excellent in all areas assessed (94.4% recommend to a friend, 93.3% 10 principles good to excellent, yoga 94.4% good to excellent, 96.6 teachers and assistants good to excellent). Critically, pre- and post-intervention surveys found that the participants experienced significantly reduced distress and symptoms related to trauma (Somali Distress Scale \( t = .43, p < .00001 \)), as well as improved self-regulation (Brief Self-Regulation \( t = 8.89, p < .00001 \)) Scale self-concept (Self-Efficacy Scale WHO \( t = 4.73, p<.0001 \)) and growth mindset (Personal Growth Beliefs Scale \( t = 6.37, p<.0001 \)).

**Conclusions:** These findings suggest that this program is feasible to carry out and likely acceptable to the population represented by the sample of participants who volunteered for these assessments. Finally, there were positive significant results in all areas assessed suggesting intervention efficacy.

### 13. A CHAIR PARTNER YOGA INTERVENTION FOR INDIVIDUALS WITH DEMENTIA AND THEIR CAREGIVERS: EXPLORING RELATIONSHIP QUALITY

**C. Ericson,** C. Rees, 2 C. Tompkins 1

1. George Mason University, Fairfax, VA 2. Yoga for Alzheimer's, Baltimore, MD

**Key words:** Yoga, Dementia, Caregiver, Relationship.

**Objective:** The purpose of this study is to determine the effects of a chair partner yoga class on the quality of the relationship between caregivers and care recipients with dementia.

**Methods:** A preliminary study was carried out in an adult day health care center for individuals with moderate dementia. Four dyads (individuals and their caregivers) participated in six weekly gentle partner chair yoga classes. The ages of the participants ranged between 71 and 80 years old. The primary outcome measure for the study was the Dyadic Quality of Relationship Scale (DQRS) which is a measure of the impact of the provision and receipt of family care on the quality of the relationship (Sebern & Whitlach, 2007). All caregivers completed the scale prior to the beginning of the study and at its conclusion. Also, observers during the classes completed a behavioral checklist and recorded additional observations. All sessions were videotaped and reviewed using the same measures to ensure validity. This small pilot study was not powered to measure statistical differences but was designed to inform future larger studies.

**Results:** Participants completed the full series of classes. Mean scores were computed on all items of the DQRS. On a scale of 1 to 4 with 1 being strongly disagree and 4 being strongly agree, caregivers overall reported being less angry at their spouse with dementia (pre-yoga mean of 2.5 to post-yoga mean of 1.5) as well as less depressed when they had problems in their relationship (2.75 to 2.0), less resentful (2.75 to 1.0), less strain (3.25 to 2.25) and feelings of learning good things about themselves increased (3.0–3.5).

Reports of feeling closer to care recipient than they had in a while did not change (2.0 pre and post) nor did the feeling that the person made too many requests (2.0 pre and post). Feeling that they had more patience than in the past decreased (3.25 to 2.5), as did feeling they learned good things about the recipient (3.25 to 2.5) and that communication between them had improved (2.75–2.5). Review of live observations and videotapes of classes also showed an increase in the ability to enjoy each other and connect in positive ways during classes, most notably when doing partner poses.

**Conclusion:** Yoga can positively affect the quality of relationship between caregivers and dementia care recipients in several key areas.

### 14. YOGA TEACHER TRAINING FOR ADULTS IN CUSTODY: EMPOWERING A COMMUNITY FROM THE INSIDE OUT

**Freeman, H., Brems, C., Marsh, S.**

**Pacific University**

**Key words:** Yoga, prison, yoga teacher training, adults in custody (AIC)

**Objective:** Yoga science is being applied within multiple treatment contexts and is found to be physically and emotionally therapeutic in many ways, especially within prison settings. Integrated teaching of the entire yoga psychology (i.e., all eight limbs) in the context of modern neuroscience is beginning to emerge; however, such integration had not yet reached yoga classes in Departments of Corrections. The
current study was a program evaluation of an integrated yoga teacher program to understand the impact of bringing yoga psychology (as an integrated, eight-limbs, system) to adults in custody (AICs)—teaching them to become certified yoga teachers who will be able to teach other AICs.

**Methods:** The study utilized quantitative and qualitative measures to assess the yoga teacher program’s impact on the individual, their relationships, and the overall prison environment. The sample included assessments (Five Factors of Mindfulness Questionnaire/FFMQ, Self-Compassion Scale-SF/SCS-SF, Perceived Stress Scale/PSS) and interviews with 12 adults in custody (AICs) and nine yoga teacher trainer volunteers, as well as key informant interviews with two correctional officers and five administrators who work within or directly with the Department of Corrections in the implementation of the program.

**Results:** Quantitative results revealed significant enhancements and sustainability in all key outcome variables (self compassion, mindfulness, perceived stress, understanding of yoga philosophy, and teaching skills) from pre-test to program completion and from completion to 3-month follow-up. Additionally, AIC yoga teachers become more similar on all outcome measure to the volunteer teachers from pre-test to program completion to follow-up.

Qualitative methods (used in 31 key informant and focus group interviews) queried about personal experiences, attitudes and values, behaviors, relationships, yoga philosophy in prison, culture, and future directions with emerging themes that illuminated the overall positive effects of the yoga teacher training program on the prison community.

**Conclusion:** Training AICs to be yoga teachers is an effective mechanism to empower AICs to enhance their own well-being, while providing them with an opportunity to support other AICs to strengthen their community in prison.

**Key words:** Caregiver, Alzheimer’s, dementia, yoga, self-care

**Objective:** Purpose of study was to investigate safety, feasibility, and preliminary effects of an inter-professional, yoga, wellness and caregiving skills program for caregivers of family with dementia.

**Methods:** Eight week, single arm pilot trial, once/week classes of one hour interactive educational module, followed by one hour integrated yoga class. An inter-professional team consisting of PhDs in basic science, psychiatric rehabilitation, physical therapy, psychology, health sciences, and public health, as well as physician assistants, a registered dietician, integrative medicine MDs, along with yoga teachers and therapists, designed and implemented this study. Eight educational modules designed to enhance an aspect of caregiver wellbeing and/or caregiving skills were designed by inter-professional teams, which co-led their modules. Yoga classes were designed by a team of five experienced yoga teachers lead by the PI, with each class taught by two teachers. Inclusion: Adult caregiver of family member with Alzheimer’s or other dementia for minimum of 16 hr/week, able to understand English, perform gentle yoga movements, and provide permission letter from primary care doctor. Assessments performed one week prior to intervention, and post at weeks 9 and 16.

**Results:** Eight caregivers, 2 of spouses, 6 of parents, ages 50 to 84, 6 females, were enrolled. One dropped out due to caregiving and transportation challenges. The study was feasible, with successful recruitment, retention and effective delivery of the intervention. It was safe, with no reported adverse events. Program evaluation at 9 weeks indicated that the most important aspects were: meeting other caregivers, sharing of experiences/stories, sense of camaraderie (7), Yoga, meditation, relaxation, breathing (5), emotional and spiritual benefits (2), educational component (2). Most helpful Modules: Resiliency, Spirituality & Self-Care (4), Palliative & End-of-Life Care (1), Integrative Health & Wellness Options (1), and Eight Dimensions of Wellness (1). Week 16 evaluation indicated most important skills utilized in the past 8 weeks: Coping skills (3), Mindfulness, stretching, breathing & relaxation (2), knowledge of how others deal with situations (1), Patience (1), Importance of self-care (1). Additional outcomes in data analysis.

**Conclusions:** The study was feasible, safe, with continued physical, emotional, and intellectual benefits.

15. CAREGIVER: CAREGIVERS OF FAMILY WITH ALZHEIMER’S: RELEVANT EDUCATION, GENTLE YOGA INTEGRATED WITH VALUABLE EVERYDAY SKILLS AND RELAXATION


16. YOGA THERAPY FOR MILITARY PERSONNEL AND VETERANS: QUALITATIVE PERSPECTIVES OF YOGA STUDENTS AND INSTRUCTORS

S. Hurst,1 M. Maiya,1 D. Casteel,1,2 A. Sarkin,1 A. Elwy,3,4 C. Park,5 E. Groessl,1,2


Key words: Yoga, chronic conditions, veterans, military, qualitative methods

Objective: Millions of military personnel and veterans live with chronic mental and physical health conditions that often do not respond well to pharmacological treatments. Side effects and lack of treatment response have spurred efforts to study and promote integrative health treatments for this population. Our objective was to explore the attitudes and perspectives of military personnel and veterans toward yoga as a therapeutic modality.

Methods: Participants included 24 yoga students with a military background and 12 instructors who have taught yoga for military personnel and/or veterans. A semi-structured set of questions was used to guide 30–60 minute interviews with each participant. Interviews were professionally transcribed and checked for accuracy. Qualitative data were coded using a directed content approach and a qualitative software program. Visualization software was also used to examine interconnections among themes.

Results: Five themes emerged from the interviews: (1) mental health benefits experienced from yoga practice; (2) physical health benefits experienced from yoga practice; (3) important yoga elements and conditions that support effective practice; (4) facilitators for engaging military in yoga practice; and (5) challenges and barriers to yoga practice for military. Themes are exemplified by multiple quotes from yoga students and instructors.

Conclusions: The study found consistent reports of mental and physical benefits of yoga practice, ongoing stigma and the need for combating and demystifying yoga and other CIH practices, the importance of designing interventions to address the unique mental health issues and perspectives of this population, and the importance of efforts by military leadership to bring CIH to military personnel and veterans.

17. ONLINE YOGA AS A NON-PHARMACOLOGIC SYMPTOM MANAGEMENT APPROACH IN MYELOPROLIFERATIVE NEOPLASMS

Jennifer Huberty1,2, Ryan Eckert1, Krisstina Gown1, Brenda Ginos2, Heidi E. Kosiorek2, Amylou C. Dueck2, Linda Larkey2, Ruben A. Mesa2

1. School of Nutrition and Health Promotion, Arizona State University (ASU); 2. Mayo Clinic, Phoenix, Arizona, United States; 3. College of Nursing and Health Innovation, ASU

Background: Polycythemia vera (PV), essential thrombocythemia (ET), and myelofibrosis (MF) are Philadelphia-negative myeloproliferative neoplasms (MPNs) characterized by deregulated myeloid lineage cell production, splenomegaly, and increased risk of vascular events. MPN patients have difficult symptom burden (e.g., fatigue, depression, anxiety, sleep disturbance) not resolved by current medical therapies. The purpose of this study was to determine the feasibility (i.e., acceptability, practicality, demand) of online, home-based yoga to improve symptom burden in MPN patients.

Methods: MPN patients, recruited by social media, were asked to complete 60 min/week of online yoga (designed for MPN patients) for 12 weeks and completed online self-report surveys (weeks 0, 7, 12 and 16) on participation (Qualtrics), disease features, and symptom burden (MPN Symptom Assessment Form; NIH PROMIS measures of pain, anxiety, depression, sleep, and sexual function).

Results: Two hundred and forty-four MPN patients completed the eligibility survey, 55 completed the informed consent, and 38 MPN patients completed the 12-week intervention. The majority of participants were diagnosed with either PV (n=16) or ET (n=16), with MF being less common (n=6). Yoga participation averaged 50.8±36.2 min/week with 37% (n=14) of study participants averaging 60 min/week of yoga (i.e., demand). Overall, 68% of participants were satisfied with online yoga and 75% felt that it was helpful for coping with MPN-related symptoms (i.e., acceptability, practicality). Additionally, 75% of participants felt safe from injury while participating in online yoga. Only one adverse event was reported (irritated enlarged spleen). Post intervention there were significant improvements in total symptom burden (effect size [ES] =−0.36, p=0.004), anxiety (ES=−0.67, p=0.002), depression (ES=−0.41, p=0.049), sleep (ES=−0.58, p<0.001), and fatigue (ES=−0.33, p=0.04). Changes in symptom burden was also significant at follow-up (wk 16) except for fatigue which had a trend for maintained
improvement (ES=-0.34, p=0.06). There were no significant differences in outcomes between those that averaged <60 min/week of yoga compared to those that averaged ≥60 min/week of yoga.

**Conclusions:** A 12-week online yoga intervention is feasible (i.e., accepted, practical) for MPN patients and merits a randomized trial in order to further evaluate its efficacy as a complementary therapy.

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**18. DEVELOPMENT AND TESTING OF A YOGA INTERVENTION PROGRAM FOR PATIENTS WITH PARKINSON’S DISEASE**

* C. Justice,1 C. Cheung,2 A. Samson-Burke,3

1. Hennepin County Medical Center/ St. Catherine’s University, MN; 2. University of Minnesota, MN; 3. Mind Body Solutions, MN

**Key words:** Yoga, yoga therapy, Parkinson’s Disease

**Objectives:** Preliminary research indicates that yoga could be a valuable tool for people suffering from Parkinson’s Disease (PD). However, there is little published about the process by which the yoga interventions were designed and evaluated. This study elaborates on the process of developing and testing of a bi-weekly, 12-week yoga program to determine its safety and feasibility for people with PD.

**Methods:** The lead yoga teacher used input from a focused literature review to design an initial draft of the intervention program. This draft was reviewed by a group of yoga experts (n = 6) in order to develop the final intervention program. This intervention program was implemented to 19 participants with PD, mean age 63±8 (49–75) via twice weekly yoga classes for 12 weeks.

**Results:** Through this comprehensive development process, a series of 24 individual hour-long yoga sequences were created. These included yoga postures (asana), breathing techniques (pranayama), and mindfulness meditation principles specifically chosen in order to address concerns unique to the PD population. The feasibility of the program was supported with excellent attendance - 90% of participants attended ≥75% of the classes, with 4 participants attending 100%. No adverse events were reported.

**Conclusion:** This development process produced a safe and enjoyable yoga program, specific for the needs of people with PD. However, this methodology could serve as a template for future studies on how to develop safe and effective yoga interventions for other populations.

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**19. DEVELOPING AN EVIDENCE-BASED DIAGNOSIS-SPECIFIC YOGA THERAPY PROGRAM FOR BACK PAIN**

*C. Justice,1*

1. Hennepin County Medical Center, MN and University of St. Catherine, MN

**Key words:** Yoga, yoga therapy, back pain, disc, sciatica, scoliosis, degenerative disc disease, stenosis

**Objective:** While there has been a great deal of research examining the therapeutic benefits of yoga for non-specific lower back pain, there is little available on the use of yoga for specific back pain diagnoses. The purpose of this study was to develop evidence-based yoga therapy programs specific to four common back pain diagnoses: disc bulges/ sciatica, scoliosis, degenerative disc disease, and stenosis.

**Methods:** A literature review was performed on PubMed and the International Journal of Yoga Therapy databases using the key words yoga AND “lower back pain”, “low back pain”, “back pain”, disc, sciatica, stenosis, and scoliosis. Studies were included if they specifically addressed a therapeutic yoga program for any of the above-mentioned four back pain diagnoses. Study designs included randomized controlled trials, case studies, correlational research, matched case control studies, and design/ protocol development articles. Two additional yoga therapy texts that addressed disc bulges/ sciatica, scoliosis, and stenosis and 5 additional articles on chronic and/ or non-specific lower back pain were also included in the analysis. The yoga programs detailed in the articles and texts were then analyzed to compare the yoga practices for each diagnosis. This analysis was used by the author to create a preliminary draft of four diagnosis-specific yoga therapy programs. This draft was then reviewed by an expert panel of physical therapists who were also yoga instructors/ therapists (n=3).

**Results:** The literature review resulted in 7 studies specifically focused on either disc bulges/ sciatica, scoliosis, or degenerative disc disease. No articles on yoga for stenosis were found. The author used input from the literature and expert panel reviews to create four evidence-based yoga therapy programs addressing the specific needs and issues around these four diagnoses. Each program included specialized yoga postures (asana), breathing practices (pranayama), and meditation techniques.

**Conclusions:** The yoga therapy programs designed in this study could be validated in future studies on populations with these specific lower back pain diagnoses.
yoga therapists could use these programs as an evidence-based scaffolding to inform a yoga-based treatment program for people with these four common back pain diagnoses, providing an outline upon which a patient-specific yoga therapy program can be laid.

**20. BRIDGING BODY AND MIND: CASE STUDY OF A 10-WEEK TRAUMA-INFORMED YOGA PROTOCOL FOR VETERANS**

L. Justice, C. Brems, & K. Ehlers

1. All authors are from the School of Graduate Psychology at Pacific University, Hillsboro, OR.

**Key words:** Trauma-informed yoga, veterans, PTSD, protocol

**Objective:** This case study explored feasibility and preliminary efficacy of therapeutic yoga as a complementary form of treatment for combat-related trauma. It recruited for and implemented a 10-week trauma-informed (TIIY) yoga protocol for veterans in an interprofessional community health treatment setting.

**Methods:** Feasibility was measured by recruitment, retention, and level of participation in the study. Efficacy was explored via effects on hyperarousal, avoidance of affect, negative affect, body awareness, barriers to practice, and motivators to practice. Outcome measures included the Posttraumatic Stress Disorder Checklist, Scale of Body Connection, PROMIS Alcohol Use, PROMIS Substance Use, Difficulties in Emotional Regulation Scale, and Self-Compassion Scale-Short Form. All measures were administered at baseline, week 5, week 10, and 5-week follow-up. Pulse rate was collected at the beginning and end of each yoga session. A Qualitative Feasibility Questionnaire (FQ) was administered weekly as well as at the 5-week follow-up to assess barriers and motivators for home practice and collect feedback about session content.

**Results:** Recruitment faced tremendous challenges and resulted in only 7 interested individuals. Four (3 males; 1 female) were successfully enrolled in the study after 7 phone screenings and 5 in-person interviews. Two prospective participants no-showed for the in-person interview; one dropped out thereafter. The four enrolled clients had a 100% retention rate, reported no adverse events, and participated in 80% of classes. Clinically significant enhancements were observed on trauma- and body connection-related scales for 3 of the 4 participants from baseline to follow-up. The FQ revealed barriers to practice (time, motivation), motivators for practice (increased calm, stress-management, reductions in pain), and recommendations for the classes (increased discussion of veteran-specific topics, location).

**Conclusion:** Findings suggest this 10-week trauma-informed protocol faces challenges to recruitment; however, retention and participation were high. Outcome measures demonstrated promising efficacy of the protocol for reducing trauma-related symptoms.

**21. YOGA THERAPY IN HEALTHCARE SETTINGS: A PROPOSED INTAKE PROTOCOL**

E. Razmjou, L. Justice, H. Freeman, D. Colgan, N. Hidalgo, N. Vladagina, C. Brems

1. All authors are from the School of Graduate Psychology at Pacific University, Hillsboro, OR

**Key words:** Therapeutic yoga, yoga therapy, structured intake

**Objective:** Although yoga has become increasingly common in health and mental healthcare settings, rarely do agencies thoroughly assess all aspects of human functioning involved in yoga practice during their standard intake interview. As large numbers of patients may present with complex histories of mental and physical health concerns, it is important to gather information before working with these clients in yoga or yoga therapy, as current and historic symptoms will undoubtedly affect their trajectory, and response to therapeutic yoga.

**Methods:** The current exploratory study describes the development of an intake form designed to guide a comprehensive assessment of individuals who seek to use yoga or yoga therapy for healing and resilience, attending to body, emotions, mind states, and relationships. This information may be valuable in allowing yoga teachers and therapists to build a holistic picture of each student or client. The proposed form guides clinicians and yoga therapists toward documenting demographic information, presenting concerns, as well as clients’ relevant biopsychosociocultural history. The intake interview is designed to be used in conjunction with narrow-band measures that assess relevant health, mental health, and psychosocial domains, and can be varied based on the setting and context of yoga therapy. The intake protocol, developed based on a comprehensive literature review, is currently being pilot tested at an interprofessional community health clinic. The researchers are also eliciting qualitative feedback from yoga therapists, yoga researchers, psychologists, and other healthcare experts to further refine and develop the intake protocol.
**Future Directions:** A standardized yoga intake protocol provides a clinical foundation for treatment planning and continuity of care for clients, and allows for opportunities to explore clients’ intentions, values, and goals for engagement in yoga and yoga therapy. It collects data that can be used for program planning, outcome assessment, and research purposes, illuminating variables that are correlated with improvement in overall well-being.

**22. “YOGA RESETS MY INNER PEACE BAROMETER”: A QUALITATIVE STUDY ILLUMINATING THE PATHWAYS OF HOW YOGA IMPACTS ONE’S RELATIONSHIP TO ONESELF AND TO OTHERS**

M. Kishida,1 S. Mama,1 S. Elavsky,2

1. Pennsylvania State University, University Park, PA; 2. Masaryk University, Brno, CR.

**Key words:** Yoga, mindfulness, compassion, social connectedness

**Objective:** The purpose of this qualitative study was twofold: (1) to better understand how yoga practitioners perceive intra- and interpersonal outcomes of their yoga practice, and (2) to develop a conceptual model of yoga effects on intra- and interpersonal outcomes that may underlie the “relational” benefits of yoga, by proposing specific pathways that could be further tested and fine-tuned by future research.

**Methods:** This qualitative study was embedded in a larger quantitative study of yoga, the Daily Off the Mat (Daily OM) study. 107 community-dwelling yoga practitioners (88% Caucasian, 92.6% female, 41.2 ± 15.9 years) completed open-ended questions which asked questions focusing on whether yoga influences one’s relationship to oneself and to others. A subsample (n=12) completed in-depth interviews (approximately 45 minutes in duration). Both the open-ended responses and verbatim interview transcripts were analyzed for emergent themes using a constant comparison approach.

**Results:** Collectively, four themes emerged from both the open-ended responses and in-depth interviews. Practitioners talked about the ability of yoga to generate calm states, mindfulness, (self-)compassion, and a sense of connectedness. Throughout the themes, a common pattern emerged such that yoga practice first, led to positive intrapersonal changes, which then, influenced one’s interpersonal relationships. Based on these results, a conceptual model was also developed depicting potential relational pathways of how yoga works.

**Conclusion:** This is the first study that evaluated in a qualitative manner, the perceived relational benefits of yoga in practitioners across diverse styles of practice, providing evidence which may be particularly useful for guiding hypotheses to be tested in experimental context (contributing to the first stage of evidence in the recently developed NCCIH’s framework for developing and testing mind-body interventions). Although it is clear future research is warranted to continue the work of understanding the relational influences and pathways of yoga, the qualitative findings from this work illuminate the potential of yoga, both as a practice of improving one’s relationship to oneself (intrapersonal) through mindfulness and self-compassion, and to others (interpersonal), through the enhancement of compassion and social connectedness, which can ultimately lead to enhanced health and wellbeing.

**23. EFFICACY OF A BIOMECHANICALLY-BASED YOGA EXERCISE INTERVENTION FOR OSTEOARTHRITIS OF THE KNEE: A RANDOMIZED CONTROLLED TRIAL**

Alexander Kuntz1, Sarah Karampatoς1, Elora Brenneman1, Jaclyn Chopp-Hurley2, Emily Wiebenga3, Jonathan Adachi2, Monica R. Maly4

1. Kinesiology, 2. Medicine, 3. Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada 4. Department of Kinesiology, University of Waterloo, Waterloo, Ontario, Canada

**Key Words:** Osteoarthritis, exercise, yoga, pain

**Background:** Knee osteoarthritis (OA) is a chronic disease involving the breakdown of joint tissues resulting in pain and disability. Exercise provides equivalent pain relief to medication, improves physical functioning, and ameliorates co-morbidities. However, certain forms of exercise can potentially overload the joint. This study features a yoga intervention designed for knee OA by incorporating postures that minimize a mechanical loading variable implicated in disease progression.

**Objective:** To compare the efficacy of this biomechanically-tailored yoga program as treatment for knee OA with the current “gold standard” of physical therapy, and a no-exercise attention control group consisting of guided relaxation.

**Methods:** A single-blinded, 12-week, parallel, randomized
control trial was conducted. Participants included women 50 years of age or over with clinical knee OA (n=31; age 67.0±8.3 years; body mass index (BMI) 30.4±5.5 kg/m²) who were stratified by disease severity and randomized to 1 of 3 interventions: biomechanical yoga exercise (YE: n=10), traditional exercise (TE: n=11), or no exercise (NE: n=10). Participants were asked to attend 3 supervised classes per week of their respective intervention. The primary outcome measure was pain; secondary outcomes included patient-reported physical function and mobility performance. Analysis of covariance compared mean change scores (follow-up minus baseline) between groups for each outcome; where baseline data was a covariate (Sidak adjustment for multiple comparisons). Paired t-tests (2-tailed & Bonferroni corrected) were computed to compare pre/post intervention time points for within group effects. 

Results: One participant was lost to follow-up (TE). Mean class attendance per week for YE, TE, and NE was 3.0, 2.7, and 2.8, respectively. The YE and TE groups demonstrated statistically and clinically significant within-group improvements in pain, physical function, and mobility performance (p<0.017), while the NE group did not. The YE group reported greater improvements in pain (p=0.003) and physical function (p=0.010) compared to the NE group. There were no significant between-group differences in mobility performance (p>0.05).

Conclusion: The yoga intervention yielded comparable, and in some cases possibly greater improvements in the major burdening symptoms of the disease compared to traditional exercise. Yoga appears as an efficacious and well-tolerated conservative treatment option for women with knee OA.

24. SIGNIFICANT SYMPTOM BURDEN REDUCTION DESCRIBED BY BONE MARROW TRANSPLANT INPATIENTS AFTER RECEIVING INDIVIDUALIZED 40-MINUTE YOGA THERAPY.

T. Leonard,1 L Wright,1 J Chapman,2 EK Waller,1, RI Maynard,1

1 Department of Hematology and Medical Oncology, Winship Cancer Institute of Emory University, Atlanta, GA; 2 St. Mary’s Medical Center, Dignity Health, Commonweal, Yoga for Cancer and Chronic Illness, San Francisco, CA

Key Words: Yoga, Bone Marrow Transplant, Inpatient

Objective: The inpatient treatment of blood and lymphatic cancers with Bone Marrow Transplant (BMT) can create marked symptom burden including extreme fatigue, pain, nausea, and anxiety associated with indeterminate hospital stay, potential engraftment failure, and long term disease prognosis. Yoga therapy (YT) was delivered to BMT inpatients as an optional clinical service to assess symptom reduction and integration into standard medical care.

Methods: A 40-minute YT session was offered as an optional service to BMT inpatients. Symptom data was obtained before and after the session using FACT-BMT (version 4). YT was delivered to patients reclined in bed or seated in a chair and consisted of standardized practices including body awareness, breathing awareness, movement, and imagery.

Results: Patients (n=221) completed both pre-and post-data interviews Overall, patients reported significant (p<0.05 paired t-test) reduction in nausea, pain, side effects, sadness, nervousness, and lack of energy. The largest decreases in reported symptoms were feelings of nervousness and lack of energy. 162 (73%) patients reported a decrease in at least one of the six symptoms assessed, and only 21 (10%) patients reported an increase in some symptoms. Total pre- and post- session scores decreased significantly (p<0.05). Breathing awareness was the most frequently used YT practice (n=212,96%), followed by body awareness (n=195,88%), and imagery (n=122, 55%). Movement was the least used YT practice (n=66, 33%).

Conclusion: This data points to the efficacy of YT for symptom relief with inpatient BMT, most notably perceived reduction of nervousness and increase in energy. This suggests the benefit and adaptability of YT as a non-pharmacological adjunct to traditional medical care for BMT, even in cases of high symptom burden and decreased mobility.

25. THE MEDIATIONAL RELATIONSHIP BETWEEN SLEEP AND CANCER-RELATED FATIGUE STEMMING FROM YOGA: A URCC NCORP RCT IN 321 CANCER PATIENTS

P-J. Lin1, I. Kleckner1, C. Cole1, M. Janelins1, L. Peppone2, A. Peoples1, E. Kulakova1, C. Heckler1, R. Gaur2, J. Giguerre3, M. Messino4, J. Ruzich5, K. Mustian1


Key words: Yoga, cancer-related fatigue, sleep
Background: Cancer-related fatigue (CRF) is one of the most incapacitating adverse effects of cancer and its treatments. CRF co-occurs with impaired sleep quality in cancer survivors, increasing morbidity and mortality. We have previously shown that yoga significantly lowers CRF and improves sleep quality in survivors. However, it is not clear if the effect of yoga on CRF is mediated by improvements in sleep quality. This study assessed the mediating effects of changes in sleep quality stemming from YOCAS® yoga on improvements in CRF.

Methods: We conducted a secondary analysis on data collected from a multicenter phase III randomized controlled clinical trial with 2 arms (standard care and standard care + a 4-week YOCAS® yoga intervention). 321 cancer patients (96% female; mean age, 54 years; 77% had breast cancer) reported both sleep quality, measured by the Pittsburgh Sleep Quality Index (PSQI), and CRF, evaluated by Multidimensional Fatigue Scale Inventory (MFSI). Causal mediation analyses were used to estimate effects of the changes in global PSQI scores and in each PSQI subscale on the relationship between yoga and CRF.

Results: Yoga significantly improved both CRF (p<0.01) and sleep quality (p<0.01), compared to standard care, with total reduction in CRF by 6.5 points. Sleep quality significantly mediated the changes in CRF by 1.4 points (p<0.01) in addition to the direct effect of yoga on CRF reduction (by 5.1 points; p<0.01), suggesting that 22% (95% CI: 7%-54%) of the reduction in CRF was mediated through improving sleep quality. Among the PSQI subscales, daytime dysfunction had the most mediating effect of yoga on CRF. In this model, yoga directly improved CRF by 4.1 points (p=0.01) and the mediating effect of yoga on CRF via daytime dysfunction was 2.4 points (p<0.01), suggesting that 37% (95% CI: 23%-81%) of the improvements in CRF was mediated through decreasing daytime dysfunction.

Conclusions: Between 22 and 37% of the improvements in CRF from yoga are due to improvements in sleep quality and reductions in daytime dysfunction. Clinicians should consider prescribing yoga for survivors experiencing CRF in combination with sleep disorders. Funding: NCI UGCA189961, R25 CA1402618.

26. YOGA AND BODY IMAGE: FINDINGS FROM A LARGE POPULATION-BASED STUDY

D. Neumark-Sztainer,1 R. MacLehose,1 A. Watts,1 C. Pacanowski,2 M. Eisenberg,3

1. Division of Epidemiology and Community Health, School of Public Health, University of Minnesota; 2. Department of Behavioral Health and Nutrition, College of Health Sciences, University of Delaware; 3. Department of Pediatrics, University of Minnesota

Key words: Yoga, body image, eating disorders, young adults

Objective: This study explored the potential for yoga to promote a positive body image in a general population of young adults.

Methods: Data were collected from 1,826 young adults (age: 31.1±1.6 years) participating in Project EAT, a 15-year longitudinal study. Data from the third and fourth waves of Project EAT (EAT-III and EAT-IV), collected five years apart, were utilized. Associations between yoga at EAT-IV and concurrent body satisfaction were examined with linear regressions. Interactions between dichotomized (lowest quartile vs upper three quartiles) prior (EAT-III) body satisfaction and yoga use were also examined. Satisfaction with 13 body parts was assessed (scale range: 13–65).

Results: Practicing yoga on a regular basis (30 minutes/week over the past year) at EAT-IV was reported by 16.4% (n=297) of young adults (23.0% of women and 7.7% of men). In analyses adjusted for sociodemographics, EAT-III body satisfaction and EAT-III body mass index, young adults practicing yoga had higher concurrent body satisfaction at EAT-IV than those not practicing yoga (difference: 1.5 units, p=.03). Analyses with interaction terms showed some evidence of effect modification of the association between yoga and concurrent body satisfaction by prior body satisfaction (p=0.01). Specifically, analyses stratified by levels of prior (EAT-III) body satisfaction showed a greater impact of yoga on body satisfaction at EAT-IV among those who had lower levels of prior body satisfaction. Among young adults within the lowest quartile of prior body satisfaction, body satisfaction at EAT-IV was 4.1 units higher among those practicing yoga as compared to those not practicing yoga (p<.01).

Conclusions: Practicing yoga may be beneficial for body satisfaction, particularly for those with low body satisfaction. These findings have important public health implications given the extent of body dissatisfaction, its harmful consequences, and the growing popularity and availability of yoga within many communities.
27. A PROPOSAL TO STUDY THE EFFECT OF YOGA AND MEDITATION ON HIPPOCAMPAL VOLUMETRY AND NEUROGENESIS AMONG PEOPLE WITH CHRONIC DRUG RESISTANT EPILEPSY


National Institute of Mental Health & Neurosciences (NIMHANS), Bangalore-560029, India

Key words: Yoga, meditation, epilepsy, mesial temporal sclerosis, epilepsy surgery, neurogenesis

Objective: Chronic drug resistant mesial temporal lobe epilepsy (MTLE) with mesial temporal sclerosis (MTS) leads to atrophy of the hippocampus due to neuronal loss. Yoga and meditation may reverse this neuronal loss. In this randomised controlled study funded by SATYAM, DST, Govt. of India, we intend to evaluate the hippocampal volumes by voxel-based morphometry, serum cortisol, BDNF, cytokines, heart rate variability, neuropsychological evaluation before and after epilepsy surgery among people with MTLE and MTS. Through an integrated effort and expertise in the fields of clinical epileptology, hippocampal volumetry, neuropsychology, epilepsy surgery, neuropathology and Yoga Centre at NIMHANS, we intend to document the beneficial effects of Yoga and Meditation.

Methods: Sixty patients (age range 18-50 years and both genders) will undergo standard pre-surgical evaluation along with hippocampal volumetry, autonomic, biochemical and neuropsychological assessments 3 months prior to surgery and 6 months after the surgery. Half the patients will undergo structured Yoga and Meditation for 3 months prior to surgery and for 6 months after surgery. The other half will be in the control wait-list group. As a standard of care, all patients will undergo anterior temporal lobectomy and amygdalal hippocampectomy. Histopathological study of the resected hippocampal specimen will be undertaken for diagnosis as well as evaluating the extent of neurogenesis. Following surgery, cure or control of epilepsy will be documented as per Engel’s classification and correlated with other parameters in this study.

Expected Results: In this study, the following results are expected in the cohort randomised to the Yoga & Meditation group in contrast to the control wait-list group: 1. Arrest of progression of the hippocampal atrophy, 2. Increase in the volume of the contra-lateral hippocampus, 3. Decrease in the levels of serum cortisol and cytokines, 4. Increase in the levels of BDNF, 5. Decrease in the heart rate variability, 6. Improvement in the IQ, memory, cognitive functions and quality of life scores.

Conclusion: Epilepsy surgery cures or controls seizures in a majority of people with MTLE and MTS. Yoga and Meditation may enhance the beneficial effects of surgery by a number of factors like neurogenesis and better functional organization of the contralateral hippocampus. The outcome of this project may help people with chronic drug resistant epilepsy not only in India, but world-wide.

28. CHANGES IN AUTONOMIC FUNCTIONS AND BLOOD BIOMARKERS BY PRACTICING SITTING ISOMETRIC YOGA IN PATIENTS WITH ME/CFS

T. Oka

1 International University of Health and Welfare hospital, Nasa-shiobara, Japan

Objective: We have reported that isometric yoga improves fatigue in patients with myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) who are resistant to conventional therapy by a randomized, controlled trial (Oka T et al., Biopsychosoc Med 2014,8:27). The aim of this study was to investigate its possible mechanisms by comparing autonomic nervous function and blood biomarkers before and after practicing isometric yoga.

Method: Fifteen patients (12 female, mean age 38.0 years old) with CFS who hadn’t improved satisfactorily even after the conventional therapy for at least 6 months practiced isometric yoga (biweekly 20 min practice with a yoga instructor and daily home practice) for eight weeks. Acute effects of isometric yoga on fatigue, autonomic function, and blood biomarkers were investigated on the final session with an instructor. The effect of isometric yoga on fatigue was assessed by administration of the Profile of Mood Status (POMS) questionnaire immediately before and after the session with the instructor. Autonomic nervous function (heart rate (HR) variability) and blood biomarkers (DHEA-S, prolactin, MHPG, HVA, total carnitine, free carnitine, acyl carnitine, BDNF, TGF-β1, IL-6, and TNF-α) were also compared before and after practicing yoga.

Results: Practicing isometric yoga significantly reduced the POMS fatigue score (p<0.01) and increased vigor score (p<0.01). It also reduced HR (p<0.05) and increased the HF (p<0.05) of the HR variability. It increased serum levels of
DHEA-S (p<0.05), whereas it reduced serum levels of cortisol (p<0.05) and TNF-α (p<0.05) and had a tendency to reduce serum level of prolactin (p<0.1).

Conclusion: Single session of sitting isometric yoga reduced fatigue and increased vigor. It also increased the vagal nerve activity and had a tendency to activate dopaminergic system, because activation of dopaminergic system inhibits prolactin secretion. Furthermore, it reduced TNF-α, a proinflammatory cytokine. Changes of these parameters might be associated with fatigue-relieving effect of isometric yoga in patients with ME/CFS.

29. THE FEASIBILITY AND EFFECTIVENESS OF MINDFUL YOGA FOR HEAD START PRESCHOOLERS

R. Razza, R. Linsner, D. Bergen-Cico, E. Carlson, S. Reid

1. David B. Falk College of Sport and Human Dynamics, Syracuse University

Keywords: self-regulation, yoga, mindfulness

Objective: The goal of this pilot-study was examine the feasibility and effectiveness of an 8-week mindful yoga program for at-risk preschoolers. Of particular interest was whether participation in the intervention was associated with gains in specific facets of self-regulation, including attention and behavioral regulation.

Methods: Two rounds of an eight-week mindful yoga intervention were conducted in an urban Head Start center. The program was delivered by a certified child yoga instructor and her husband who visited the center twice a week. Each 25-minute session included a centering activity (e.g., feather breathing, mindful listening), various child-centered yoga poses (e.g., downward dog, cat/cow), and a relaxation pose (e.g., deep-belly breathing). Classrooms were randomly assigned to the intervention and control conditions. Three classrooms participated in the intervention in fall 2016; two classrooms served as wait-list controls for the fall and received the intervention in spring 2017. All children were assessed three times across the school year. These assessments were conducted by trained research assistants in quiet area inside the classroom or in the hall. The assessment included the Head Toes Knees and Shoulders behavior regulation task, pencil-tapping task of inhibitory control, and the Leiter attention sustained task.

Results: These results represent findings from the first round of the intervention (fall 2016); data from the second round of the data will be incorporated into the final poster. The analytic sample increased from time 1 (n=30) to time 2 (n=62) due to a change in consent procedure. T-tests revealed that children in the intervention (74%) were more likely to pass the pencil-tapping task compared to children in the control group (52%), \( \chi^2 (1, N = 62) = 3.26, p < .10 \). A series of ANCOVAs examined differences across the self-regulation tasks; initial score on the task was entered as a covariate and group status as the between-group factor. Although intervention status did not reach significance in the model for behavioral regulation, \( F(1, 20) = 1.64, n.s \), the adjusted mean for children in the intervention group (\( M = 10.34 \)) was greater than the mean for the control children (\( M = 3.37 \)). The results for the two groups did not differ for the sustained attention task.

Conclusion: Overall, the results suggest that a brief mindful yoga intervention holds promise in promoting behavioral self-regulation among preschoolers.

30. A QUALITATIVE COMPARISON OF YOGA INSTRUCTOR BELIEFS BETWEEN STYLES

T.M. Rybak, T. Reeves, J. Kaufman, J., Jorgensen, R.

1. The University of Memphis

Keywords: yoga, yoga styles, yoga instruction philosophy, yoga instruction strategies

Objective: Teacher characteristics are a key component to understanding student learning processes. Beliefs and values that teachers hold is one of the more elusive and potentially influential constructs. Despite a paucity of empirical research exploring yoga instructor characteristics, Park et al. (2013) suggests that teachers engage with students on multiple dimensions and perceptions of an ideal teacher may differ from yoga-students to yoga-teachers. It is unknown whether this differs between style of yoga. Style informs instructional choices and context therefore some individual differences may occur. An important component of context in yoga that influences pedagogy and environment is the style. This study aims to identify and explore yoga teacher characteristics (i.e., values and beliefs) and determine differentiated between style of yoga.

Methods: The current study employed grounded qualitative analysis with coding and fuzzy set comparison. The data is part of a larger qualitative study. Yoga instructors were recruited through national organizations via email. Inclusion criteria included an upper level certification in a specific yoga style and a history of at least 5 years of teaching. The
styles of yoga represented were diverse in nature (e.g. General, Ashtanga, Holistic, Hot Yoga, Iyengar, and Power); however, Kundalini Yoga and Gentle Yoga participants were unable to make the interviews due to scheduling restrictions. Semi-structured phone interviews were completed and transcribed verbatim. Once themes were identified fuzzy-set coding was used between styles to identify presence of themes.

**Results:** Theme clusters were identified as Yoga Components and Yoga Instructor Duties. Themes derived in initial analysis are represented in Table 1. Fuzzy set comparison revealed some differences between yoga styles, specifically Holistic and Power Yoga. However, more similarities than differences were revealed overall, suggesting that some beliefs are held across styles.

**Conclusion:** While there is evidence of style differences in instruction. Many themes of yoga, instructor beliefs, and values are not distinct to a specific style. This qualitative inquiry suggests the field would benefit from a larger-scale quantitative exploration of yoga instructor beliefs and values across style to find areas of convergence and divergence.

**31. A QUALITATIVE ANALYSIS OF YOGA INSTRUCTOR BELIEFS ACROSS STYLES WITHIN AN EDUCATIONAL PSYCHOLOGY FRAMEWORK**

T. Reeves¹, J. Kaufman, R. Jorgensen¹, T.M. Rybak⁵, J. Dunn¹

1. The University of Memphis

**Key words:** yoga instruction, yoga instruction philosophy, style, a history of at least 5 years of teaching, 18 years of age or older and signed consent. Approximately 100 instructors were contacted to be a part of the study. A total of 13 of 21 yoga instructors who expressed interest, met conclusion criteria, and 11 completed phone interviews (3 men and 8 women). Participants were primarily Caucasian (72%). While this was a part of a larger qualitative study, purposeful sampling (Patton, 1990) of yoga instructors across styles was employed.

**Results:** Respondents indicate that pivotal components include: an environment for growth; choice in instruction; and internal factors. Within environment for growth participants suggest the instructor role includes providing physical safety, emotional safety and the body as a space to learn. Choice in instruction was identified around responsibility, languaging and instruction methods. Internal factors included personal practice and intuitive instruction.

**Conclusion:** The model that emerged from the interviews reflects that of reciprocal determinism which involves environment, person, and behavior. Current findings suggest a potential framework to further explore the process learning and progress in yoga.

**32. THE EFFICACY OF A MINDFUL YOGA PROGRAM ON STRESS RESPONSE AND AWARENESS AMONG URBAN ELEMENTARY SCHOOL STUDENTS**

S. Reid¹, R. Razza¹, R. Linsner¹, D. Bergen-Cico¹

1. Syracuse University

**Key Words:** yoga, mindfulness, school-based interventions

**Objective:** The purpose of this study was to evaluate the effectiveness of a mindful yoga program on stress and empathy among urban youth.

**Methods:** Participants included 83 5th grade students (50.6% female; mean age = 10.29 years) from three faith-based elementary schools located in Philadelphia. Forty-two students were in the intervention group and forty-one were in the control group. The intervention group had approximately 40 minutes of programming weekly administered by certified yoga instructors for the school year. Programming included breath work, yoga poses, and mindful meditation. Participants completed self-report assessments in the fall (T1; pre-test) and at the end of the spring (T2; post-test). Students’ stress responses were measured using the Involuntary Engagement Scale from the Responses to Stress Questionnaire (RSQ). Empathy and perspective taking skills
were assessed using the Thoughts and Feelings Questionnaire (TFQ).

**Results:** Focal analyses included ANCOVAs with intervention status and pretest scores as covariates. Results indicated significant effects of the intervention for four of the five subscales of the Involuntary Engagement Scale. There was a significant effect of the intervention on intrusive thoughts, $F(1,80) = 5.39, p < .05$, such that these thoughts decreased among students in the program and increased among the control group. Intervention status was also significant for emotional arousal, $F(1,80) = 6.68, p < .05$, such that students in the intervention experienced a decline while students in the control group saw an increase. Intervention status was significant for amount of time spent ruminating, $F(1,80) = 5.62, p < .05$, as it prevented the increase seen among the control group. Interestingly, students in the intervention also experienced an increase in involuntary action, $F(1,80) = 5.17, p < .05$. This finding could be an indication that the program increased participants’ awareness of their engagement in these behaviors. Similarly, students in the intervention experienced a significant decrease in their empathic ability at T2, $F(1,80) = 6.41, p < .05$, which could also suggest an increased awareness due to the intervention. Intervention status did not influence perspective taking skills.

**Conclusion:** The mindful yoga program significantly reduced maladaptive stress responses and increased empathic awareness.

### 33. QUALITATIVE RESPONSES TO YOGA AS A COMPLEMENTARY THERAPY FOR SMOKING CESSION: THE BREATHEASY STUDY

Rochelle K. Rosen,$^{1,2}$ Ernestine Jennings,$^{1,3}$ Shira Dunsiger,$^{1,2}$ Ryan Lantini,$^{1}$ Herpreet Thind,$^{4}$ Marie Sillice,$^{6}$ Naama Gidon,$^{5}$ Santina Horowitz,$^{1}$ Bruce Becker,$^{6}$ & Beth Bock$^{1,3}$

1. Centers for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI; 2. Department of Behavioral and Social Science, Brown School of Public Health, Providence, RI; 3. Department of Psychiatry and Human Behavior, Alpert Medical School, Brown University, Providence, RI; 4. Department of Community Health & Sustainability, University of Massachusetts Lowell; 5. Motion Center Yoga, Providence, RI; 6. Department of Emergency Medicine, Rhode Island Hospital, Providence, RI.

**Objective:** BreathEasy is an NCCIH-funded study examining the efficacy of yoga as a complementary therapy for smoking cessation. From 9/2012 - 6/2016 12 cohorts of smokers (N=227) received 8 weeks of cognitive behavioral therapy for smoking cessation and either iyengar yoga (n=113) or a wellness class (n=114). Smoking cessation met once a week; yoga or wellness each met twice a week for 8 weeks. This presentation reports on the perceptions of yoga participants about their experiences of yoga overall, and by confirmed quit status.

**Qualitative Participants:** Focus groups were conducted in 8 of the 12 cohorts. 61 yoga participants (range 5-12 participants per group) attended focus groups.

**Methods:** A trained facilitator using a structured focus group guide asked participants about their experiences of yoga and its effect on their quitting experience. Focus groups were recorded, transcribed and coded by two or more qualitative analysts using Applied Thematic Analysis.

**Results:** At 8 weeks, 28.1% of Yoga participants reported 7-day point prevalence abstinence (PPA); average smoking rate had decreased from a mean of 16.45 (SD=7.84) cig/day at baseline to 6.06 (SD=6.22) cig/day. Dose of yoga received was significantly associated with a greater odds of 7 day PPA at 8 weeks (p<.05). Among yoga participants, those who were light smokers at baseline (<=10 cig/day) were significantly more likely to be quit at 8 weeks (p=.04) compared to heavier smokers. Focus group data indicate that many, though not all, participants used yoga-related skills during their quit attempt; some felt breathing and/or postures decreased craving and helped with quitting-related stress. Regardless of quit experiences or ultimate quit success, participants found the group experience to be helpful: groups provided relevant social support and participants appreciated learning yoga with other beginners. Qualitative data analysis of yoga comments by baseline degree of smoking and final quit status indicate that yoga was endorsed as helpful for craving or life stress by both light and heavy smokers as well as those who quit, cut down or continued smoking. Some participants explicitly link successfully quitting to their yoga experience.

**Conclusions:** This is the first large scale trial of yoga for smoking cessation with men and women. Qualitative results revealed the importance of yoga postures and breathing to the process and phenomenology of a smoking cessation attempt for many participants.

**Keywords:** Yoga, smoking cessation, qualitative analysis, clinical trial
34. EFFECTS OF ONE SESSION OF MEDITATION AND YOGA ON OVERALL WELL-BEING

M. Saaraswat,1 B. Saaraswat MD,2 S. Mathur MS MEd RDN,3 S. Jaisinghani,4

1. Bucknell University; 2. Guru Geom Integrative Medicine LLC; 3. New Jersey Agricultural Experiment Station; 4. New Jersey Institute of Technology

Key Words: Yoga, Meditation, Well-being, Stress Reduction

Objective: Meditation and yoga have become common practices used by integrative medicine physicians and practitioners to improve overall health of patients. The purpose of this study is to understand the benefits that can be provided, mentally, emotionally, and physically, even in one session of meditation.

Methods: Dr. Saaraswat held a guided meditation and yoga session for one hour. Participants completed a pre and post survey at the meditation session. The survey consisted of 6 major categories/questions: Energy Level, Life Satisfaction, Stress Reduction, and Physical, Mental, and Emotional well-being. Participants were asked to rate each category on a scale of 1 to 10, with 10 being perfect.

Results: Out of 64 participants who ranged from 12 to 70 years old, a majority in their forties, most of them had previous meditation experience. 77% of participants had felt an increase in energy level after the meditation session. The mean change from pre-session was 1.13 and this was the highest increase amongst all the categories. 52% participants noted no change in overall life satisfaction while 41% participants noted an increase. The mean change for Life-Satisfaction was 0.44. 53% of participants had an increased rating of physical well-being while 43% had an increase in mental well-being and 64% had an increase in emotional well-being. The mean changes for physical, mental, and emotional well-being were 0.73, 0.37, 0.94, respectively. There was an outlier (at an alpha level of .05) for the change in mental well-being of -8. The change in stress also had an outlier (at an alpha level of .05) of -10. Stress-Reduction increased for 56% of participants and the mean change was 0.72. This category had the largest standard deviation; we suspect this due to the phrasing of the question and a range of stress levels among participants. When the participants were asked on a scale from 1-10, how much they enjoyed meditation so far, around 65% said 10/10.

Conclusion: There was an overall increase for each category. This study shows that just one session of meditation has an impact on a person’s well-being. Participants will be followed for a 6 month and 1 year survey. Additionally, Dr. Saaraswat will continue her study to understand how multiple meditation sessions will affect a person’s overall well-being.

35. PILOT STUDY: DOES EXERCISE PARTICIPATION ENHANCE ON-TASK BEHAVIOR AND TASK COMPLETION IN PRESCHOOL CHILDREN?

H. Sabolek Consiglio, PhD1; C. Fuller, PhD2; J. MacDonald, PhD3

1. Department of Psychology, 2. Department of Health and Fitness Studies, 3. Department of Applied Behavior Analysis, Regis College School of Health Sciences, Weston, MA

Objective: The purpose of this study is to assess the effects of three levels of physical activity (no exercise/circle time, low intensity exercise/yoga, and high intensity exercise group exercise) on time on-task and task completion behavior in pre-school children. We tested the hypothesis that both yoga and high intensity group activity would improve task completion and increase time on-task in a block building activity compared to the circle-time control condition.

Methods: This study employs an alternating treatments single-subject design. Single-subject alternating treatment designs are advantageous as behavioral control can be demonstrated in a single participant, and then replicated across a small number of participants. Single-subject designs allow the researcher to account for pre-existing variability between participants as each participant’s results are analyzed relative to their own baseline. Detailed yoga and exercise protocols will be provided. Briefly, each session consisted of participant engaging in an instructor led 12 minutes of the treatment (Circle Time, Yoga or Moderate to Vigorous Physical Activity (MVPA)) followed by time on a block-building task. Time on task and task completion was then recorded for the block building activity. Only one session was completed per day, and session were ran two to three times per week. One to Four participants engaged in each session, depending on their availability for that day. Upon completion, each participant will have engaged in each condition at six times.

Preliminary Results and Significance: While we currently have four children participating in the study, we only have sufficient data from one participant. Preliminary data (n=1) suggests that the duration of on-task behavior is greatest following high intensity exercise, although yoga also increased
time on task. Data collection and analysis is ongoing. Results from this study may help to answer questions regarding how to enhance student performance and persistence within a task. These findings will be beneficial in the classroom environment to promote on-task behavior and increase learning opportunities. The current study contributes to the limited research regarding physical activity and on-task behaviors in the preschool sector.

36. BHASTRIKA PRANAYAMA TRAINING DECREASES P300 LATENCY AND INCREASES ITS AMPLITUDE IN PHYSICALLY FIT SOLDIERS

Danilo Forghieri Santaella1,2,3, Alessandra Mussi Ribeiro4, Regina H. Silva5, Kátia Coelho Andrade1, Dráulio Barros de Araújo1

1 Brain Institute of Rio Grande do Norte University; 2 Sports Center of University of São Paulo; 3 Psychobiology Department of Rio Grande do Norte University

Key words: bhashrika pranayama; Yoga; P300; electroencephalography

Objective: Since the effects of pranayama training on evoked related potentials (ERP) have been poorly investigated, the aim of this study was to investigate the effects of bhashrika pranayama training on auditory ERP of physically fit soldiers.

Methods: Thirty healthy, physically fit (18±1 years) male soldiers were randomly assigned to: bhashrika (B - n=15) and control (C - n=15). Protocol: 2 auditory oddball experiments - baseline and after 1 month of 30 min every day bhashrika training or waiting period. Bhashrika was composed by 45 Kapalabhati followed by 1 Surya Bhedana. ERP used 80/20 proportion for even/odd tones. Sixty four active electrodes were placed (10-20 system); impedance <5kΩ at all sites. Peak amplitude and peak latency of P300 measured at the vertex and parietal electrodes. Significance accepted p<0.05 for between groups t-test for independent measures and for intra group paired t-test. Clinical Trial NCT01866683. Financial support CNPq 407145/2012-5.

Results: Baseline–Both groups presented similar P300 among all electrodes for amplitude, and latency. One Month–Latency was significantly greater in B than in C at TP10, P6, P4, CP3, PO8 and Pz, and greater in TP7. Amplitude was significantly greater in B than in C at TP10, PO7, Oz, POz, P8, TP8, Oz, P7, PO4, Pz, P3, PO8, CP2 and PO10. Baseline vs. 1 Month–B group significantly increased P300 latency in P1 and Fz, and significantly decreased amplitude at P6; C significantly increased latency at P8, TP8, and PO8, and significantly decreased amplitude at CP1, CP2, CP3, CP4, CP5, CP6, CPz, P2, P3, P4, P5, P7, Pz, PO3, PO4, POz, and Oz. Conclusion: One month of bhashrika pranayama training improves latency and amplitude of P300 in physically fit soldiers, with faster response to auditory stimuli, and increased neural engagement.

37. EFFECTS OF PRANAYAMA ON CLINICAL IMPACT AND PSYCHOSOCIAL ASPECTS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

A.P. Malinauskas1,2, D.F. Santaella3, P. Newfeld1, CR Carvalho2

1. Universidade Paulista (UNIP), 2. School of Medicine of University of São Paulo (FMUSP), 3. Sports Center of University of São Paulo (CEPEU Lad)

Key words: COPD; rehabilitation; respiratory exercises; Yoga.

Introduction: COPD is a common, preventable and treatable pathology, with persistent airflow limitation, not fully reversible, usually progressive, and associated with increased inflammatory response of airways and lungs to harmful gases and particles. Dyspnea is a very debilitating symptom of COPD. Pulmonary rehabilitation aims at reducing its symptoms. During pranayamas one manipulates components of breathing; however, there are few studies addressing the association of both interventions in COPD.

Objective: To verify the influences of pranayama on clinical impact, anxiety, depression symptoms and quality of life in COPD patients as complementary therapy.

Methods: 18 COPD patients recruited (Pulmonary Rehabilitation Clinic - HC-FMUSP); classified as B, C or D (Global Initiative for Chronic Obstructive Lung Disease), aged 72±9 years (6 women); randomized into 2 groups: pulmonary rehabilitation (PR, n=9) and pulmonary rehabilitation plus pranayama (PRP, n=9). Drug therapy remained unchanged during the protocol. Both groups underwent 2 pulmonary rehabilitation sessions (PRS) a week (12 weeks); only PRP had 30 additional min of bhashrika pranayama immediately after PRS. Volunteers performed 10 bhashrikas (20 Kapalabhati for 1 surya bedhana) per session. Questionnaires were applied at study entry (Pre) and 12 weeks (Post): COPD clinical impact (CAT), anxiety and
38. EFFECT OF MINDFULNESS-BASED YOGA ON INCREASED MODERATE INTENSITY PHYSICAL ACTIVITY IN WOMEN WITH DEPRESSION

K. Schuver, PhD, C-IAYT, M. Cameron, PhD, MS, MA, RN, B. Lewis, PhD

1. Center for Spirituality & Healing and School of Kinesiology, University of Minnesota, Minneapolis, MN; 2. Center for Spirituality & Healing, University of Minnesota, Minneapolis, MN; 3. School of Kinesiology, University of Minnesota, Minneapolis, MN.

Key words: Yoga, mindfulness, depression, physical activity, physical activity recall

Objective: Research indicates that mindfulness-based interventions may have a positive influence on a variety of psychological and physical outcomes. Previous research indicates that depression is generally associated with low physical activity levels. Increasing physical activity has the dual benefit of improving overall health and alleviating depression and anxiety. The purpose of this prospective, randomized, controlled intervention pilot study was to examine the efficacy of a 12-week mindfulness-based yoga intervention relative to a comparison condition among sedentary, depressed women (n=40) on reported overall physical activity.

Methods: Women with a history of diagnosed depression and currently depressed were randomized to a mindfulness-based yoga condition (MBY) or a walking comparison condition (WCC). The MBY intervention consisted of a home-based yoga asana, pranayama and meditation practice with mindfulness education sessions delivered over the telephone. The WCC condition consisted of home-based walking sessions and health education sessions delivered over the phone. Self-reported physical activity were assessed at baseline, post-intervention (12 weeks), and one-month follow-up.

Results: Repeated measures analysis was used to examine change in physical activity over time. Participants significantly increased their physical activity from baseline to post-intervention, f(1,33)=22.07, p<.001, and from baseline to one-month follow-up, f(1,33)=26.67, p<.001. Participants in the MBY group significantly increased their physical activity from baseline to post-intervention, f(1,17)=10.12, p<.005 and baseline to one-month follow-up, f(1,17)=15.10, p<.001. Participants in the WCC group similarly reported significant increases in physical activity from baseline to post-intervention, f(1,15)=37.44, p<.001 and baseline to one-month follow-up, f(1,15)=12.63, p<.05.

Conclusion: Previous research indicates that depression is generally associated with low physical activity levels. Increasing physical activity has the dual benefit of improving overall health and alleviating depression and anxiety. Similar to aerobic exercise, hatha yoga is associated with improved cardiopulmonary fitness, muscular strength, and endurance. Results indicated that a mindfulness-based yoga and walking intervention may be equally beneficial in increasing overall physical activity participation among depressed women. Future studies with larger sample sizes and extended follow-up are needed.

39. YOGA THERAPY PILOT STUDY FOR CHILDREN WITH AUTISM: RATIONALE AND STUDY DESIGN

K. Searl, M. Sullivan

Background: Autism Spectrum Disorder (ASD) is associated with behavioral deficits and anxiety, low tolerance to stimuli and change, sleep disturbance, difficulty with connection and socialization and alterations in vagal tone. Yoga has been found to help with both vagal tone and anxiety in ASD. Yoga also has benefits in self-regulation for psychological health. However, no studies have addressed yoga’s effects on tolerance to stimuli and change, sleep disturbance, connection, socialization or vagal tone in those with ASD. Research Objectives: To investigate the feasibility of a yoga intervention to evaluate the parameters of tolerance to stimuli and change, sleep disturbance, connection, socialization or vagal tone in those with ASD.

Methods: An evidence-informed protocol was designed to study the population of 10 children with High Functioning Autism (HFA), with medical or educational diagnoses of ASD between the ages of 11-14. A pilot study was developed to look at the feasibility measured through recruitment and retention rates for the potential benefit of offering yoga therapy. Students will be recruited from a community center that serves children with ASD. All students will receive a customized session that follows the same timeline. The same
yoga therapist will see the student for individual yoga therapy in an ASD-Friendly treatment room. Session frequency will be 2 times weekly for 16 weeks with an accompanying home practice 3 times a week. The home-based training will mirror the individual session and tracked in a journal that will be provided by the yoga therapist to the guardian of the child. Outcome measurement tools will include the use of the ABC-C, Neuro-QOL Item Bank 2.1 Pediatric Fatigue Short Form, The Journey to Wild Divine Biofeedback Software. These measures will be given pre, mid, and post intervention to assess self-regulation for tolerance to change, sleep disturbances, connection, socialization and vagal tone. The date collected will be grouped together to determine the results of program.

Discussion: This study will help to determine the feasibility and benefit of a yoga program for children with HFA to help with tolerance to stimuli and change, sleep disturbance, connection, socialization and the relationship to vagal tone. This study describes the development and design of critical components such as creating an ASD friendly environment, protocol development, timeline and outcome measurement tools.

40. FEASIBILITY AND ACCEPTABILITY OF ONLINE YOGA FOR MOOD DISORDERS


Key words: Yoga, mood disorders, online interventions

Objective: Mood disorders, including unipolar depression and bipolar disorder, can be chronic mental health conditions that significantly impact one’s everyday life activities. Although effective treatments for mood disorders exist, including pharmacotherapy or psychotherapy, some individuals do not find these options to be either sufficiently efficacious or acceptable. There is a need for additional tolerable and easily accessible interventions for treating mood disorders. In-person yoga classes have been shown to promote general physical and mental health and to improve depression symptoms in unipolar depression. Yoga may be helpful for bipolar depression as well, although research is limited.

The primary aim of the current study was to examine the feasibility and acceptability of a single online hatha yoga session for individuals with both unipolar and bipolar depression.

Methods: Individuals with mood disorders were recruited from MoodNetwork, an online community of people with mood disorders, to participate in one 30-minute online Hatha yoga class. Forty-four individuals completed all components of the yoga class. Participants were asked to rate their affect using the Positive and Negative Affect Scale (PANAS) before and after participating in the online session. Participants were also asked to rate the class on a scale from 1 (“Disliked it very much”) to 10 (“Liked it very much”) as well as complete a qualitative feedback questionnaire.

Results: There was a statistically significant decrease in participant negative affect from pre- to post-class ($t = -6.05; p < .001$), but no changes in positive affect ($p > .10$). The mean score on the yoga session rating was 7.68 ($SD = 1.86$), indicating most participants liked the online class. Participants provided mostly positive comments (57%) on the qualitative feedback questionnaire, including enjoying the breathing exercises ($n = 14$ participants) and having an overall positive experience ($n = 11$). The next most common type of feedback was suggestions for improvement (28%), including adding more instructions/explanations during the class ($n = 10$). The last type of feedback was negative (15%), including comments on class structure ($n = 4$).

Conclusion: These data suggest that online yoga tailored for individuals with mood disorders may be both feasible and acceptable for participants as an adjunctive treatment to other care. Online yoga as an intervention for mood disorders warrants further investigation.

41. YOGA AS A COMPLEMENTARY THERAPY FOR PATIENTS WITH TYPE 2 DIABETES: AN INITIAL INVESTIGATION


1. Department of Public Health, University of Massachusetts Lowell, Lowell, MA; 2. Centers for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI; 3. Department of Psychiatry and Human Behavior, The Warren Alpert Medical School of Brown University, Providence, RI; 4. Division of Endocrinology, Diabetes and Metabolism, The Warren Alpert Medical School of Brown University, Providence, RI; 5. Hallett Center for Diabetes, Rhode Island Hospital, Providence, RI; 6. The Motion Center Yoga, Providence, RI
**Key words:** Yoga, type 2 diabetes, stress, glycemic control, feasibility study

**Objective:** The purpose of this study is to examine the feasibility and acceptability of yoga among adult patients with type 2 diabetes (T2DM).

**Methods:** Adult diabetics (eligibility criteria: age >18 years with T2DM for more than 6 months, HbA1c levels of >6.5) were randomly assigned to either: 1) a 12-week iyengar yoga intervention given twice weekly, or 2) a twice-weekly 12-week program of traditional exercise (e.g., walking, stationary cycling). Intervention was delivered in group format in two cohorts. Assessments were conducted at end of treatment (12-week), and at 3- and 6-month post-intervention.

**Results:** Participants (n=48) were diverse in demographic characteristics: 38% male, 73% White, 8% Hispanics, 21% were high school graduate or less; 27% had annual income <35K and 48% were married. At baseline, mean age of participants was 56 years, mean BMI 34 kg/m2, and mean HbA1c was 8.3. Only 33% were engaged in some form of exercise at baseline. Attendance was high in the 12-week program, with 82% attendance at yoga classes and 75% for the control group. All participants (n=24) in the yoga group and 23/24 in the control group completed the 12-week assessment. Acceptance of the yoga program was high with satisfaction score of 4.63 on a 1 to 5 scale; scores were higher for relaxation techniques (Mean = 4.75), and breathing exercises (Mean = 4.75) compared to the poses (Mean = 4.5). Participants perceived that yoga helped their efforts to manage diabetes (Mean score = 3.83 on 1 to 5 scale). All participants in the yoga group said that they would recommend the yoga program to other diabetics.

**Conclusion:** Yoga intervention was feasible and acceptable for a diverse group of adults with type 2 diabetes. Data are being analyzed to examine the effect of yoga on glycemic parameters (HbA1c, fasting and postprandial glucose) and potential mediators (stress, mindfulness) compared to the control condition.

**42. IF WE OFFER, WILL THEY COME: YOGA FOR HISPANICS**

H. Thing, A. Garcia, M. Velez, K. Hulverson, J. Lavine, K. Tucker,

1. University of Massachusetts Lowell, Lowell, MA; 2. Senior Center, Lawrence, MA

**Key words:** Yoga, Hispanics, acceptability, survey

**Objective:** National surveys indicate that yoga is typically practiced by the White population. The purpose of this study was to examine whether yoga would be an acceptable practice for the Hispanic population. This study was conducted as part of formative research before implementing a community-based yoga intervention.

**Methods:** Participants were recruited from a community center serving the Hispanic population. Surveys were conducted with adults who self-identified as Hispanics. Participants had the option to complete the survey in their preferred language (i.e. English or Spanish). Bilingual staff assisted with translation of documents, recruitment, informed consent and data collection. The survey included questions about beliefs and attitude related to yoga, benefits of yoga practice and barriers to participation in yoga. Data were analyzed using SPSS software.

**Results:** Participants (42 men, 79 women) were 18-85 years old (Mean age =49). Only 29% reported ever doing yoga before. More women reported that yoga involves meditation (87% vs. 69%, p=.015) and breathing exercises (78% vs. 55%, p=.008) compared to men. Women also perceived more benefits of yoga practice compared to men: yoga would help them focus (75% vs. 57%, p=.048), improve overall health (87% vs. 62%, p=.001), improve sleep (81% vs. 38%, p=.000), make them more flexible (82% vs. 64%, p=.027) and reduce stress (80% vs. 43%, p=.000). Barriers to yoga practice differed by gender with more men perceiving that they would have to do unrealistic pretzel-like poses (24% vs. 4%, p=.001). The perception that there would be only women in class and that yoga practice would take up too much of their time were other barriers to yoga for men. But the topmost barrier for both men and women was cost associated with yoga practice. Majority participants (60%) were willing to attend a low cost yoga class if offered and another 33% mentioned that they would consider it.

**Conclusion:** There are gender differences in the perceptions related to benefits and barriers to yoga practice among the Hispanics. Overall, participants were willing to attend a yoga class at a low cost to them.

**43. A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS OF YOGA FOR CHILDREN AND ADOLESCENTS**

N.L. Trent, A.E. Lee-Winn, S. Miller, T. Mendelson, S.B.S. Khalsa

1. Brigham and Women’s Hospital, Harvard Medical School, Boston, MA; 2. Johns Hopkins Bloomberg School of Public Health; 3. RTI International
Key words: yoga, children, adolescents, youth, RCT

Objective: Given widespread yoga program delivery with youth and a growing number of empirical studies in this area, we conducted a systematic review of randomized controlled trials (RCTs) testing the effects of yoga on health and mental health outcomes in youth.

Methods: We conducted a search of electronic databases including PubMed, PsychINFO, Web of Science, and Science Citation Index through March 2017. Studies were eligible for inclusion if they were: an RCT of a yoga intervention with participants between 5 and 18 years of age. Data were extracted and coded for (1) Participants: total enrolled, gender, age, race/ethnicity, socioeconomic status; (2) Intervention: format, delivery location, content, duration, frequency and; (3) Outcomes: measures, significant outcomes, and effect sizes. Two independent coders reviewed all studies and discrepancies were resolved with another author.

Results: There were a total of 26 RCTs from the U.S., India, Australia, Canada, and the Netherlands. Constructs assessed across studies were: mental health/substance abuse (n=12), physical health (n=9), cognitive functioning (n=5). With respect to the control condition, 14 studies used a treatment as usual/no activity control and 12 studies used an active control: physical activity (n=11), mindfulness meditation (n=1). Almost all studies took place in school settings and a few studies took place in a hospital or clinic. Positive effects were seen on an array of outcome measures, including pain intensity, anxiety, negative affect, working memory, self-esteem, weight, executive function, and school grades.

Conclusion: Yoga shows promise as an intervention for youth, with positive effects on a wide range of outcomes (e.g. executive function; pain; academic performance; mental health symptoms; physiological stress reactivity) and a range of settings (e.g. schools, hospitals, pediatric pain clinic). Future studies with active control groups, larger sample sizes, and that report on implementation fidelity are needed to address limitations in the literature and advance our understanding of yoga as an effective intervention among youth.

44. THE YOGA AND MEDITATION DAILY PRACTICE AND ITS ASSOCIATION WITH INATTENTIVE AND HYPERACTIVITY SYMPTOMS IN ADHD CHILDREN

F. Veillette, F. Thériault-Couture, E. Simard, P. Rouleau, FYC, LP. Tessier & N. Rouleau, Ph.D

School of Psychology, Laval University, Quebec City, Canada (all authors)
CERVO Brain Research Center, Quebec City, Canada (all authors)

Key words: Mindfulness, ADHD, Yoga, meditation, body scan, practice

Objective: Regular home practice is known to be a key element of therapeutic benefits from mindfulness-based interventions (MBIs). Yet, home practice has never been studied with ADHD children. The aims of this study were to 1) investigate the formal home practice of ADHD children during an MBI, and 2) verify the relationship between symptoms and practice adherence.

Methods: 27 ADHD children (43% girls), aged from 7 to 11 (M = 9.33) participated in the study. ADHD symptoms were assessed by parents (Conners-3) and the practice was collected for 7 weeks in a daily log completed by children and parents. PEACE, a MBSR-adapted program for ADHD children, is an eight-week program (n=4-8 interventions 90 min) given by a child neuropsychologist (NR) and a qualified MBSR teacher (LPT). Sessions include psychoeducation, predefined sequences of hatha yoga, sitting meditation, and body scan. Participants were asked to practice on a daily basis and then to record it in a log, which they had to bring back each week.

Results: 25 children completed the program and 21 provided a valid journal (84%). The mean number of logs provided by each child was 5.7 (SD = 1.43). A completed day was considered a missing data (and not 0). On a total of 49 days, children reported in average 28.5 days of yoga (SD = 11.62), 17.5 of body scan (SD = 9.05) and 16.9 of meditation (SD = 10.0). An ANOVA showed a significant effect of activities, F(2, 40) = 26.998, p < .001. Pairwise comparisons showed a more frequent yoga practice (p = 0.001), while meditation and body scan did not differ (p > 0.999). Exploratory correlations were marginally significant nevertheless the effect size was medium between the practice of yoga and the severity of hyperactivity at pre-intervention (r = .37 p = 0.097), and between the practice of meditation and inattention symptoms (r = .37 p = 0.096).

Conclusions: The structure of PEACE allows for a reliable daily practice and valid daily logs in ADHD children. Although instructions clearly mentioned to practice the three activities daily and each practice was taught every session, children significantly practiced more yoga at home. Interestingly, their practice could be influenced by the severity and nature of symptoms when entering the program. Since we found that hyperactivity and inattention were respectively associated with a more frequent practice of yoga
and meditation, we propose to study further how MBIs could be personalized according to symptoms.

**45. INCORPORATING MINDFUL YOGA THERAPY WITH COGNITIVE PROCESSING THERAPY CAN IMPROVE STRESS RELATED OUTCOMES FOR VETERANS**

Wright, J. J.¹, Kinzeler, N. R.², Adcock, K.³; Peters, M.², Gregory, S.¹, Kissell, K. M.¹, Renzenbrink, A.¹; Chard, K. M.⁴ & Wilson, J. F.²

(1) REAL Human Performance, (2) Substance Abuse Resources & Disability Issues Program, Boonsboat School of Medicine, Wright State University, (3) Interact for Health (4) Cincinnati Veterans Affairs Medical Center

**Keywords:** yoga, veterans, PTSD, coping skills, cognitive processing therapy, mindful yoga therapy, yoga protocol

**Purpose:** Veteran suicide and substance abuse related deaths are skyrocketing at alarming proportions due to posttraumatic stress disorder (PTSD). Cognitive Processing Therapy (CPT) is an evidence-based practice that has been utilized to help people recovering from PTSD; however, veterans continue to demonstrate gaps in their ability to use the coping skills learned in CPT. Effective, complementary means are needed to combat the effects of PTSD and enhance post-traumatic growth. Mindful Yoga Therapy (MYT) is a trauma-informed, evidence-based 8-week protocol offered in conjunction with CPT that utilizes mindfulness, breathing practices, meditation, yoga nidra and gratitude practices to provide self-care and self-regulation techniques to enhance well-being for veterans.

**Methods:** MYT was offered at the Cincinnati VA Medical Center Trauma Recovery Center as part of the 8-week residential, clinical therapy protocol. Seventeen cohorts of veterans participated in the program (n=172), including six women’s PTSD, six men’s PTSD and five men’s TBI cohorts. Program effectiveness was evaluated using pre- and post-program surveys. Four validated survey instruments—Perceived Stress Scale, Brief COPE, Short Grit Scale, and the Mindful Attention Awareness Scale were administered and, participant attendance, engagement, and perceived physical and emotional wellbeing were also recorded for each session. Three cohorts of veterans (n=27) participated in focus groups to assess the satisfaction and usefulness of the MYT program.

**Results:** Of the 172 veterans who began the program, 73% finished the program and completed pre- and post-test surveys. Paired sample t-tests indicated significant increases in MYT participants’ mindfulness (p<.001) and grit (p<.001) from pre- to post-test. Participants also demonstrated significant reductions in perceived stress (p<.001) and engaged in less maladaptive coping behaviors at post-test (p<.001). Participants reported improvement in their physical and emotional well-being throughout the program. Themes from the focus groups revealed that participants recommend the MYT program and use the skills learned in the program to relieve pain, manager anger, facilitate sleep, relax, and make better choices.

**Conclusions:** The MYT program had a positive impact on the psychological, emotional, and physical wellbeing of veterans with PTSD/TBI. Future studies will evaluate the long-term impact of the program and evaluate usefulness of skills in CPT session.

**46. PILOT STUDY OF A MODIFIED YOGA PROGRAM FOR HEAD AND NECK CANCER (HNC) SURVIVORS**

Sujatha Yarlagadda, Barbara A. Murphy, Mary S. Dietrich, Jie Deng, Melissa Adair, Sheila H. Ridner

Vanderbilt University Medical Center, Nashville, TN

**Objective:** Aggressive treatment for HNC has increased survival. Resultant late-effects create long-term musculoskeletal impairment (MSI), physical symptoms, psychological distress, impacting quality of life. A modified yoga intervention using poses, breath work, relaxation & meditation may improve outcomes. A two year randomized wait list control study was conducted testing a modified yoga program for HNC survivors. Primary aims were feasibility (recruitment, compliance), satisfaction, safety, MSI and need for pose modifications. Secondary aims were preliminary efficacy for range of motion (ROM), posture, pain, and psychological distress.

**Population:** Patients who completed treatment > 3 months prior to study, cancer free, and medically cleared. Methods: Individualized 8-week yoga protocol, thrice a week, 90-minute sessions for 4 weeks then twice a week for 4 weeks or wait list control. Patients with feeding tubes did not do back bends (except supported fish pose), supported shoulder stands or abdominal twists. Fidelity Measures: home practice guide with 16 poses for neck-shoulders-back, 8 week instruction plan detailing progression of poses and other practices, documented pose modifications, videotaped yoga sessions and maintenance of home practice diary. Instruments: Demographics/treatment information. Assessed baseline,
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4-8 weeks: MSI, symptoms, posture, jaw-neck-shoulder ROM. Sample: 62 patients recruited and eligible, 40 consented and randomized.

Results: Median age 63 yrs, 63% male, 90% white, 32% single, 33% income <$30,000. Of 20 intervention subjects, 5 discontinued (1 recurrence, 2 medical conditions, 2 work). 53% of patients were frail & severely deconditioned. Average 5.3 (SD=2.0) impairments per patient; areas included neck (80%), shoulder (67%), posture (53%), jaw motion (53%). Disease specific impairment and frailty mandated pose modifications. Median 19 of 20 sessions completed; Median 35 of 36 home practices reported; All program components rated median 10 of 10 possible score. No adverse events were reported. Exploratory analysis of efficacy measures indicated potential benefit for ROM, pain, lymphedema, anxiety, and depression.

Conclusions: A modified yoga program in HNC pts is safe. Recruitment rates and satisfaction were high. Demographics of HNC pts did not limit recruitment. Significant limitations in movement requiring pose modifications were found. Preliminary efficacy data supports further investigation of yoga in this population.