

## Congratulations to the 2023 Abstract Award Winners!

### Young Investigator Award

- Santiago Allende: Yoga Is Effective for Treating Chronic Pain in Veterans with Gulf War Illness at Long-Term Follow-up

### Overall Abstract Awards

- **TOP SCORE** | Po-Ju Lin: A Nationwide Multicenter Phase III Randomized Controlled Trial of Yoga vs. a Behavioral Placebo on Inflammation Among Cancer Survivors
- K. Marie Sizemore: Examining Yoga Practice and Perceived Barriers to Yoga in a Sample of Sexual Minority Men Living with HIV
- Nina Vollbehre: The Effects of an Integrated Yoga Intervention on the Symptoms of Attention-Deficit Hyperactivity Disorder (ADHD) in Children

### Review process:

The chair of the abstract committee oversees blinded evaluation and scoring of abstracts by three independent, well-published yoga research reviewers. The reviewers are most often current or previous SYR Scientific Program Committee Members or current or previous invited SYR research presenters.

### ★ Young Investigator Award

### ➤ Overall Abstract Award

## ★ 1. YOGA IS EFFECTIVE FOR TREATING CHRONIC PAIN IN VETERANS WITH GULF WAR ILLNESS AT LONG- TERM FOLLOW-UP

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**Background:** Clinical Practice Guidelines for Gulf War Illness (GWI) recommend integrative health approaches such as yoga for relief from symptoms, yet little is known about the long-term efficacy of yoga in reducing symptoms of GWI. Here, we evaluated the long-term efficacy of yoga and cognitive-behavioral therapy (CBT) chronic pain treatment in a randomized controlled trial of 75 Veterans (57 male, 42-71 ± 7.1 years of age) with Gulf War Illness (GWI).

**Methods:** Participants received either 10 weeks of yoga or 10 weeks of CBT for chronic pain. The primary outcome measures were pain severity, and pain interference (Brief Pain Inventory-Short Form). The secondary outcome measures were fatigue, as indicated by a measure of functional exercise capacity (6-Minute Walk Test), depression, autonomic symptom severity, and quality of life. Piecewise linear mixed models were used to examine study hypotheses.

**Results:** Compared to the CBT group, yoga was associated with greater reductions in pain severity during the 6-month follow-up period (group × time interaction:  $b = 0.036$ ,  $se = 0.014$ ,  $p = .011$ ). Although we did not find between-group differences in the other primary or secondary outcome measures during follow-up ( $p$ 's > .05), exploratory analyses revealed within-group improvements in pain interference, total pain (an experimental outcome variable which combined pain severity and interference), and fatigue in the yoga group ( $p$ 's < .05) but not in the CBT group.

**Conclusions:** This is the first study to report long-term follow-up results of yoga as a treatment for GWI. Our results suggest that yoga may offer long-term efficacy in reducing pain, which is a core symptom of GWI. Future studies will be needed to determine if these improvements depend on continued yoga practice.

## 2. THE EFFECTS OF STEREOTYPES ON YOGA PARTICIPATION AMONG COLLEGE STUDENTS

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**Keywords:** yoga, college students, stereotypes

**Objectives:** This study explores whether the perception of stereotypes related to race, gender, and ability status among college-aged students significantly affects their willingness to participate in yoga. The current demographics of yoga participants in the United States include thin, able-bodied, white females. Despite the various proven benefits of yoga, the presence of these dominant demographics sends subliminal messages to potential participants.

**Methods:** A survey about yoga perceptions and participation was distributed to UNCW students enrolled in Wellness and Physical Activity labs. The survey asked students about their interest

in practicing yoga, what they imagine when picturing someone practicing yoga, and perceived barriers that potentially affect their participation in yoga.

**Results:** The responses revealed many students imagined yoga practitioners as female, white, and able-bodied. Subsequently, the perception of these stereotypes significantly affects their willingness to participate in yoga. Various statistically significant relationships between responses revealed that many students do not feel adequately represented in yoga spaces and would value more diversity and inclusion within the yoga community. There was a statistically significant relationship between responses revealing that many students imagined a yoga practitioner to be female, white, and able-bodied and responses to the statement, “When I imagine someone practicing yoga, they usually do not look like me.” The results were female ( $p < 0.01$ ), white ( $p < 0.01$ ), and able-bodied ( $p < 0.017$ ). There was also a statistically significant relationship between responses to the statements “I feel as if you have to look a certain way to practice yoga” and “I would feel more comfortable practicing yoga in a group setting if the classes were more diverse” ( $p < 0.01$ ). Additionally, there was a statistically significant relationship between gender identity and the statement “When I imagine someone practicing yoga, they usually do not look like me” ( $p < 0.01$ ). The research also determined that in addition to stereotypes, 55.9% of students cited time, 39.1% cited the availability of classes, and 23.6% cited costs as significant barriers that affect their yoga practice.

**Conclusions:** The perception of stereotypes in yoga, among other perceived barriers including time, costs, and availability of classes, has a considerable impact on the willingness of some U.S. college students to participate.

### 3. WORDS MATTER IN YOGA RESEARCH STUDIES: USING APPROACHABLE LANGUAGE REGARDING BIOMARKER AND EPIGENETIC DISCOVERY

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**Keywords:** yoga, perinatal health, research hesitancy, biomarker, epigenetics, research

**Objective:** Increasingly, biomarker discovery has entered the realm of yoga research, as researchers are faced with the enduring questions of what mechanisms/ pathways mediate outcomes. Incorporating biomarkers into yoga research may accelerate our understanding of the inherent complexities in human behavior change and health outcomes. However, incorporating biomarkers as an objective measure of health outcomes is not without

challenges; one such challenge is explaining research aims to study populations who have an earned distrust of research and the medical community. The purpose of this presentation is to explore participants perceptions of participation in biomarker research associated with a yoga-based intervention to reduce perinatal depression.

**Methods:** In this presentation, we will discuss challenges and opportunities related to the use of DNA methylation as a biomarker to predict and categorize individuals’ responsiveness to a yoga intervention. We present preliminary qualitative findings, analyzed using content analysis, from a NIH-funded two-armed longitudinal randomized controlled trial of a yoga-based intervention, compared to an active control, for pregnant women with depression who are historically minoritized and socioeconomically disadvantaged (R01NR020220).

**Results:** Preliminary qualitative data analysis reveals that there may be moderate hesitancy to participate in the biomarker (DNA methylation) aspect of this study in our study population. Although not a universal concern by all participants, just over one-quarter (27%) of individuals did not consent to having their blood drawn, expressing concerns with providing blood samples. Participants who did consent to a blood draw most commonly cited an interest in helping to improve the health and well-being of others through science. Anecdotal discussions with our community partners suggest that there is an earned historic distrust in the community about how blood samples for a test with “DNA” in the name can be used by researchers. Community partners provided important feedback to this yoga research team about recommendations for describing this test with research participants.

**Conclusions:** Qualitative data from our study participants, combined with feedback from our community partners, suggests that there is an opportunity for researchers to improve our communication about biomarkers, particularly DNA methylation, in the context of yoga research. We hope to discuss this at the conference. Our preliminary findings suggest that in order to move the science forward, yoga researchers must engage in deep discussions with community members to understand the challenges and opportunities in explaining biomarker exploration in a person-centered manner.

### 4. “THAT’S POWER RIGHT THERE”: CAN MINDFUL YOGA PROMOTE STIGMA RESISTANCE ALONGSIDE WELLBEING FOR PEOPLE IN THE CRIMINAL LEGAL SYSTEM?

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**Background:** Mass incarceration is both cause and result of structural health and other inequities, particularly among ethno-racially minoritized groups and women. The present qualitative analysis explored lifetime resiliency, stigma, and the tension between individual-level wellbeing benefits and resistance to inequity and stigma during participation in a mindful yoga-based intervention (MYBI) among people who were incarcerated.

**Methods:** Twelve participants incarcerated in 2 correctional facilities were enrolled in a larger feasibility trial assessing a 12-week trauma-informed MYBI for anger regulation. The MYBI involved meditation, pranayama, *asana*, and *savasana* with weekly themes (e.g., strength & courage). Post-MYBI qualitative interviews explored lifetime experiences of stigma and resiliency and perceived benefits of yoga including stigma resistance. All but 2 interviews were recorded and transcribed verbatim; rapid thematic analysis elucidated themes.

**Results:** Most participants reported experiencing some form of lifetime resiliency and stigma (most commonly incarceration, racism, and/or substance use-related). Nearly all during MYBI described increased positive emotions, reduced anger and stress, and improved mental illness symptoms. The majority reported that what they learned in yoga helped them navigate stigmatizing experiences, with 2 broad themes: 1) Yoga practices, particularly pranayama, helped several to cope with or ignore such experiences, with no mention of resistance; 2) Others described yoga helped them reframe resistance away from anger directed externally – including towards “the system,” described by some to lead to violence and/or death – and instead towards reclaiming one’s control and sense of time from the carceral setting.

**Conclusions:** There exists a tension between the frequent focus on individual self-improvement and coping in prison yoga/meditation programming and the position into which it places targets of mass incarceration, to “accept their own responsibility for structurally unjust outcomes” (Godrej, 2022). Although some participants reported improved coping with no mention of resistance, others described reclaiming their internal power through refusal to allow oppressive conditions to dictate their inner/external responses or sense of time. As this MYBI did not include socially-engaged contemplative teachings, future research would benefit from examining whether such an approach more broadly promotes wellbeing and stigma resistance among people who are incarcerated.

## 5. YOGA IT OUT! USING YOGA AS PART OF A RESILIENCE COURSE FOR HEALTH PROFESSIONAL TRAINEES

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**Keywords:** yoga, health, trainees, students, course

**Objectives:** Recently, startling rates of increased depression, anxiety, burnout, have been identified in health professions. The objective of this project is to develop an evidenced-based resiliency course for improving resilience in health professional trainees.

**Methods:** The resilience course was designed by an interprofessional team (certified trauma-informed yoga instructor, physician, clinical psychologist, physical therapist, social worker, nurse). The selection of interventions was based on levels of certainty. Reflection and practice exercises were included for lifelong learning. The resilience course was deployed to students of the Academic Health Science Center at the University of Central Florida, as the study population. Data was collected from the course activities and analyzed using descriptive statistics.

**Results:** The team selected 10 interventions with a high/moderate level of certainty for the course: Yoga; Nutrition-Omega 3FA intake; Emotional Freedom; Emotional Intelligence; Sleep; Acceptance and Commitment Therapy; Cognitive Behavior Therapy; Physical Activity; Active Rest; Psychological Detachment. The course contains individual interactive educational modules with scientific evidence and application videos, and team activities on interventions they were curious, skeptical, or endorsed the most. Course results: 643 students participated in the course and were organized into 120 teams. From all the participants, 12% of the students were curious, while 10% of the students were skeptical about the effectiveness of yoga practices. Eight percent of the teams’ presentation were completed on yoga practices, situating yoga in the 4<sup>th</sup> place of the endorsed interventions (after sleep, cognitive behavioral therapy, and physical activity).

**Conclusions:** A large number of health professional trainees are curious to learn more evidence about yoga or are skeptical about the effectiveness of yoga. After learning about the evidence, the professional trainees endorsed the intervention as useful for health professionals’ resilience. This shows that educational interventions on the evidence of yoga practices increase the buy-in of the health professional trainees in using it for their own health and resilience.

## 6. YOGA IN MEDICINE: A SYSTEMATIC REVIEW OF YOGA FOR MUSCULOSKELETAL DISORDERS

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**Keywords:** yoga therapy, dentists, health professionals



**Objective:** Literature reports growing physical and psychological disorders affecting health professionals and dentists. This study reviews the effect of yoga therapy on musculoskeletal disorders (MSD), mainly towards health professionals and dentists.

**Methods:** Articles search has been performed in Web of Sciences, Scopus and PubMed databases using “Yoga” in association with the following keywords: Pain, Neck, Headache, Hand, Wrist, Low back, Hip, Musculoskeletal disorders, Upper musculoskeletal disorders, Arthritis, Inflammation, Occupational health, Preventive medicine, Dental professionals, Dental practice.

**Results:** A total of 835 articles were screened. Papers not in English language (N=15), or not indexed (N=177), or when only the abstract was available (N=183), or not reporting the detailed Yoga protocol (duration, week frequency, Asana or Pranayama), or reporting non-Yoga-derived protocols (N=370), or describing incomplete results (N=20) were excluded. A total of 70 studies were eligible for the inclusion in the study. Of these, 92% (65/70) were randomized clinical trials and included at least one control group, and 21% (15/70) did not report Asanas name. Self-reported data (questionnaires on pain, quality of life, disability, psychological health, perceived stress, musculoskeletal discomfort) were included in 78% of the studies while measured data (mobility, stiffness, muscle tone, disc degeneration, inflammatory markers, nerve conduction, medication intake) were included in 63% of the trials. Yoga therapy showed significant improvements on Pain-related MSD (9/13 studies, 69%), Head and Neck Pain/migraine (7/7, 100%), Shoulder MSD or upper-crossed syndromes (6/7, 85%), Hand and Wrist pathologies (4/9, 44%), Low-back MSD and Disc herniation (7/9, 78%), Arthritis/inflammation (8/9, 89%), and Preventive medicine/occupational health problems/public health (6/8, 75%), musculoskeletal disorders-related to dental practice (5/7, 71%), musculoskeletal disorders-related to health professionals (3/5, 60%).

**Conclusions:** This systematic review supports the inclusion of yoga as a holistic approach for MSD. Yoga reduced pain intensity, improved functional outcomes, and enhanced overall well-being. Yoga represents a powerful tool for the prevention and treatment of MSD and an extraordinary path for the self-care of dental professionals, healthcare providers and sitting job workers, suffering from occupational biomechanical stresses and awkward postures.

## 7. EFFECT OF YOGA TRAINING ON HRV IN WOMEN WITH PREMENSTRUAL SYNDROME

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**Keywords:** autonomic function, HRV, premenstrual syndrome, yoga

**Objective:** The present study was conducted to assess the effect of three months of yoga training on heart rate variability (HRV) parameters in women with premenstrual syndrome (PMS).

**Methods:** The study was a prospective interventional study conducted in a tertiary hospital at Puducherry, India. Hundred women (18- 25 years) with mild PMS were recruited and randomized into two groups i.e. yoga group and control group using simple random sampling technique. Out of hundred, sixty women completed the study; thirty in each group as the dropout rate was 40%. Yoga group participants underwent a customised yoga training for three months comprising of asanas, pranayamas, mudra and bandha. HRV parameters were recorded using BIOPAC MP 36 system.

**Results:** Short-term HRV parameters recorded during follicular and luteal phases in women of both the groups before and after three months of study period, were compared. After three months of training no significant differences were found in weight, body mass index and waist hip ratio but various HRV parameters changed significantly in yoga group participants when compared to the control group. The time domain indices showed a statistically significant increase in SDNN and RMSSD of yoga group participants in both luteal (P value 0.005 and 0.002 respectively) and follicular phases (P value 0.029 and 0.025 respectively) when compared with the control group. Frequency domain indices LF (P value 0.034), HF (P value 0.009) and TP (P value 0.005) of yoga group participants showed a statistically significant increase in luteal phase and a significant increase in HF (P value 0.032) and TP (P value 0.03) in follicular phase when compared to control group after three months of yoga training. Even though, the LF(nu) and LF: HF ratio showed a decreasing trend and HF(nu) showed an increasing trend in yoga group participants in both the phases, it did not reach statistical significance when compared to the control group.

**Conclusions:** Increased vagal tone was observed in luteal as well as follicular phase of menstrual cycle when compared to control group after three months of yoga training in women with premenstrual syndrome.

## 8. A FIELD EXPERIMENT ON CORPORATE YOGA: EXAMINING THE IMPACT OF SOORYA NAMASKAR ON FLOURISHING AND MEDIATING ROLE OF SUBJECTIVE VITALITY

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**Objective:** Work-related stress and burnout among employees are on the rise globally. The modern-day fast-paced lifestyle and work-related pressures have exacerbated the situation. Since there are social and economic costs associated with work-related stress, there is an urgent need for effective solutions. Contemplative and mind-body practices have demonstrated positive effects in alle-

viating work-related stress. By way of a field experiment, in this study, we examined the effectiveness of a Yoga based program, i.e., the Sun Salutation Challenge, in enhancing subjective vitality and flourishing among employees.

**Methods:** A pre-test, post-test single-arm design was used with a study sample of employees of an Indian technology multinational as the Yoga group ( $n = 41$ ) for a duration of 10 weeks. The Sun Salutation Challenge included Asanas, Pranayama, meditation, which were taught to the Yoga group. Measurements of subjective vitality and flourishing were taken at the start and post-completion of the challenge for assessment.

**Results:** The results of the repeated measures ANOVA ( $F(1, 40) = 19.990, p < .01$ , partial  $\eta^2 = .333$  for subjective vitality and  $F(1, 40) = 16.768, p < .01$ , partial  $\eta^2 = .295$  for flourishing) indicated that the Yoga based program significantly improved the levels of subjective vitality and flourishing among the participating employees.

**Conclusions:** We suggest that the Yoga based program is a feasible and viable workplace well-being initiative that organizations can consider offering to their employees.

## 9. EXERCISE-BASED PROGRAM FOR REHABILITATION OF VETERANS WITH SEVERE MENTAL ILLNESS

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**Keywords:** yoga, veterans, mental illness, schizophrenia, schizoaffective, bipolar 1

**Objectives:** In this Hybrid 1, effectiveness-implementation study, we are evaluating the safety and efficacy of yoga-based exercise (YE) and a Wellness Lifestyle Program (WLP) as adjunctive tools for rehabilitation among Veterans with Severe Mental Illness (SMI), defined here as schizophrenia (SZ), schizoaffective disorder (SZA) and bipolar I disorder (BP1).

**Methods:** We have designed and are evaluating adaptations of our YE protocols (Phase I) and are adapting the protocol for our SMI population. After completing the adaptations, we will conduct a 2-armed RCT (Phase II) in which Veterans with SMI will be randomly assigned to one of 2 arms: YE  $\pm$  treatment as usual or WLP+ TAU and will continue for 12 months, including an initial 12-week training period consisting of two supervised ses-

sions per week, followed by a 12-week training period consisting of one supervised session per week, and monthly refresher training sessions for the remaining 6 months.

**Results:** Yoga poses were tested for level of difficulty with Veterans who experience joint discomfort, muscle pain/stiffness/weakness, balance or general stamina issues. Some poses were modified by Instructors to accommodate these Veterans and thereby encourage participation and continued engagement in the program.

**Conclusions:** We have and continue to elicit important feedback from the Veteran participants via questionnaires, interviews, in-person feedback and observation by Certified Yoga Instructors. We have been able to modify Yoga practices to accommodate Veterans' individual capabilities.

## 10. EFFECT OF ONLINE ISHA UPA YOGA ON SELF-RATED SLEEP QUALITY DURING THE COVID-19 PANDEMIC: RESULTS FROM A RANDOMIZED CONTROL TRIAL WITH COLLEGE STUDENTS

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**Keywords:** yoga, COVID-19, higher education, online, sleep quality

**Objective:** The study's purpose was to conduct a secondary analysis of a randomized control trial (RCT) study to assess the effect of a 12-week online Isha Upa Yoga module in improving sleep quality among college students during the COVID-19 pandemic. In our original RCT (Chang et al., 2022), we found that Isha Upa yoga reduced stress and improved wellbeing for undergraduates during the pandemic. Given the association between mental health and sleep, we hypothesized that the intervention would also improve students' sleep quality.

**Methods:** The study included a 4-week waitlist period with a cross-over design. A sample of 679 participants from universities based in the USA were randomized into intervention and control groups. The intervention involved learning two Isha Upa Yoga practices—Yoga Namaskar and Nadi Shuddhi—online and practicing them daily for 12 weeks. At Week 4, the waitlist control group crossed over to learn the yoga practices for the remaining 8 weeks. Sleep quality was mea-

sured weekly with the single-item Sleep Quality Scale (SQS). Linear mixed-effect models were used to estimate the effects.

**Results:** We found evidence that online Isha Upa Yoga improved students' sleep quality during the pandemic. The Group x Time interaction indicated a significant difference in sleep quality between the intervention and control groups over the 4-week RCT with moderate effect size ( $p = 0.01$ ,  $d = 0.26$ ). For the control crossover group, the Group x Time interaction also showed a significant improvement in sleep quality between the 4-week period before and after practicing yoga with moderate effect size ( $p = 0.001$ ,  $d = 0.28$ ). For the intervention and control crossover groups, there were also significant improvements in sleep quality with moderate effect size ( $p = 0.004$ ,  $d = 0.66$  and  $p = 0.025$ ,  $d = 0.53$  respectively) at the end of the 12-week study compared to baseline.

**Conclusions:** A short online Isha Upa Yoga module showed promise for mitigating the impact of the COVID-19 pandemic on undergraduates' sleep quality. The implications for clinical and non-clinical applications, as well as future research, are discussed.

#### Reference

Chang, T. F., Ley, B. L., Ramburn, T. T., Srinivasan, S., Hariri, S., Purandare, P., & Subramaniam, B. (2022). Online Isha Upa Yoga for student mental health and well-being during COVID-19: A randomized control trial. *Applied Psychology: Health and Well-Being*, 14(4), 1408-1428.

## > 11. A NATIONWIDE MULTICENTER PHASE III RANDOMIZED CONTROLLED TRIAL OF YOGA VS. A BEHAVIORAL PLACEBO ON INFLAMMATION AMONG CANCER SURVIVORS

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**Keywords:** inflammation, yoga, behavioral placebo

**Introduction:** Inflammation, both acute and chronic, is universally associated with primary and secondary cancer development and progression, as well as a myriad of toxicities that negatively affect treatment adherence and survival. The effectiveness of targeting inflammation with non-pharmaceutical therapies such as yoga is not well understood.

**Objective:** We compared the effects of yoga (Yoga for Cancer Survivors; YOCAS) to a behavioral placebo (ASCO survivorship recommendation-based health education) on inflammation (i.e. pro-inflammatory, anti-inflammatory, and overall inflammatory status) in a nationwide multicenter phase III RCT.

**Methods:** Cancer survivors with insomnia, 2-60 months post-treatment, were randomized to receive YOCAS or placebo (75-min./session, 2x/week for 4 weeks). Serum samples were collected at baseline and post-intervention to assess pro-inflammatory markers, IL-1 $\beta$ , IL-6, TNF- $\alpha$ , IFN- $\gamma$ , and anti-inflammatory markers, IL-4, IL-8, IL-10, sTNFRI, via Luminex multiplex assays. ANCOVA and structural equation modeling (SEM) were used to evaluate intervention effects on inflammation.

**Results:** 502 survivors (94% female, mean age 56 $\pm$ 11 years, 74% breast cancer) were enrolled and randomized. ANCOVAs revealed significantly lower levels of pro-inflammatory markers in YOCAS participants compared to placebo participants (IL-1 $\beta$ : -0.07 $\pm$ 0.03,  $p=0.01$ ; TNF- $\alpha$ : -0.04 $\pm$ 0.02,  $p=0.08$ ; IFN- $\gamma$ : -0.07 $\pm$ 0.03,  $p=0.02$ ) where YOCAS participants exhibited stable pro-inflammatory responses (all  $p>0.05$ ) from baseline to post-intervention while placebo participants exhibited increased pro-inflammatory responses (all  $p\leq 0.05$ ). ANCOVAs also revealed a statistical trend toward lower levels of anti-inflammatory markers in YOCAS participants compared to placebo participants (IL-4: -0.06 $\pm$ 0.04,  $p=0.10$ ; IL-10: -0.06 $\pm$ 0.04,  $p=0.09$ ; sTNFRI: -0.06 $\pm$ 0.04,  $p=0.09$ ). SEM demonstrated significantly lower pro-inflammatory status (-0.16 $\pm$ 0.03,  $p<0.01$ ), significantly lower anti-inflammatory status (-0.14 $\pm$ 0.03,  $p=0.03$ ), and significantly lower overall inflammatory status (-0.15 $\pm$ 0.03,  $p=0.01$ ) in YOCAS participants compared to placebo participants.

**Conclusions:** Our data suggest that YOCAS yoga significantly reduces inflammation among cancer survivors. Clinicians should consider prescribing yoga for survivors experiencing inflammation, which may lead to a high chronic toxicity burden and increased risk of progression, recurrence, and second cancers.

**Funding:** NCI UG1CA189961, R01CA181064, T32CA102618

## 12. EFFECTS OF SKY BREATH MEDITATION ON THE WELL-BEING OF SURVIVORS OF HEAD-AND-NECK CANCER AND CAREGIVER DYAD, QUALITATIVE CASE STUDIES

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**Keywords:** head-and-neck cancer, patient caregiver dyad, SKY breath meditation

**Objective:** The purpose of this qualitative work is to understand the effects of SKY Breath Meditation on the psycho-social health of the patient-caregiver dyad in head-and-neck cancer (HNC).

**Methods:** Four participants (three survivors of HNC; one caregiver) participated in the study. Inclusion criteria included fluency in English, functional cognitive-linguistic skills, a physician's diagnosis of HNC or a caregiver of a survivor of HNC, completion of



HNC treatment, and age between 30-75 years. Participants completed a nine-hour group SKY Breath Meditation training across three days (three hours each day) via teleconferencing. SKY, offered by the Art of Living Foundation, is a breathing-based meditation program, which consists of ujjayi breathing, bhastrika breathing, Sudarshan Kriya, and other components related to cognitive education (Brown & Gerbarg, 2005) vagal stimulation, hyperventilation, and clinical observations. Yogic breathing is a unique method for balancing the autonomic nervous system and influencing psychologic and stress-related disorders. Many studies demonstrate effects of yogic breathing on brain function and physiologic parameters, but the mechanisms have not been clarified. Sudarshan Kriya yoga (SKY). Three weeks after the completion of SKY Breath Meditation, participants engaged in a 1:1 interview. The interview questions were semi-structured. Open-ended questions were presented to the participants to better understand the participants' perceptions related to the effects of SKY Breath Meditation. Video and audio recordings were completed. Field notes were also taken to serve as an additional source of primary data.

**Results:** Data collection is completed. Preliminary results indicate that SKY can play a positive role in improving the well-being of survivors of HNC and their caregivers. One participant shared, "My energy is getting better," "My mental attitude about life is better," and "I feel more in touch with life." Another shared, being "more relaxed in mindset," "gratitude in life," and "improvement in falling asleep." Another shared "range of motion of neck and arm is better," "more energy to want to do more stuff," and "remove depression, anxiety." This participant's caregiver shared that she did not worry as much after seeing her spouse getting better, sleeping better, being less scattered, having a less wandering mind, and being calmer.

**Conclusions:** The results of this study will allow for a more in-depth understanding of evidence-based management for the well-being of survivors of HNC and the HNC patient-caregiver dyads. Current research and clinical practices emphasize the physiological domain, with only recent attention shifting toward psychosocial factors. Ultimately, this work will lay the foundation for person-centered and family-centered care — a foundation for improving quality of life.

## 13. EFFECT OF STRUCTURED YOGA ON STRESS AND LIPID PROFILE OF NURSING STAFF OF TERTIARY CARE LEVEL HEALTH SETTING

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**Keywords:** yoga, stress, lipid profile, staff nurse

**Background:** Health-care provider, especially nursing staff, suffers from chronic and acute stress and its consequences. Yoga is recognized as a mind-body practice that integrates an individual's physical and mental components to alleviate stress.

**Objective:** This study aimed to assess the effect of structured yoga program on stress level, body lipid profile.

**Methods:** This was small-scale phase-II randomized trial done in a tertiary care hospital. Willing nursing staff of various department were recruited, randomized into yoga group and control group maintaining allocation concealment. Outcome variables were perceived stress scale (PSS) score, serum cortisol, HS-CRP, lipid profile. The yoga group did initial 12 weeks of supervised yoga, 50 minutes/session, twice/week, the other group remained as control. After 12 weeks, yoga group practiced at home and control group did supervised yoga for another 12 weeks. Data were summarized by mean, SD and 95% CI and t-test/Wilcoxon rank-sum test was done. Result was considered significant at 5% level of significance.

**Results:** Total 110 staff nurses were enrolled, 58 in yoga group and 52 in control group. Baseline characteristics were comparable. At 12<sup>th</sup> weeks, 36 participants in yoga group and 32 in control group remained, while at 24<sup>th</sup> weeks, it was 23 and 26 respectively. First follow-up, mean PSS score was 15.9 (4.8) (95% CI: 14.3-17.6) in yoga group, 20.7 (2.8) (95% CI: 19.7-21.7) in control group (p: 0.0004). The mean PSS score of the two-group reduced significantly from baseline to 16.1 and 16.4 (p<0.05). The serum cortisol, HS-CRP and lipid profile improved in few cases but didn't differ significantly. There was no adverse event reported.

**Conclusions:** Structured supervised yoga could reduce stress level with sustainable effect on the practice and the effect on perceived stress. However, there was no significant effect on body lipid profile which may be due to smaller sample size and being within physiological range. Further study with larger sample size and more intense follow up is recommended.

**Declaration:** Part of the three month follow up analysis was published with doi: 10.1177/2515690X21991998

14. DYNAMICS OF OXYLIPINS SYSTEMIC LEVELS AFTER A SINGLE BOUT OF YOGA EXERCISE: PRELIMINARY RESULTS OF A PILOT STUDY OF YOGA-NAÏVE AND HEALTHY ADULTS

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**Keywords:** yoga exercise, systemic lipid mediators, inflammatory processes

**Background:** Mind-body movement therapies (e.g., yoga, tai chi, or qigong), a form of physical activity (PA), may promote salutogenic effects via modulation of systemic inflammatory processes. However, little research has been devoted to characterizing the dynamics of oxylipins following PA, a family of lipid mediators known to be essential in the initiation and resolution of myofascial inflammation.

**Objective:** To evaluate preliminary data on the dynamics of systemic levels of oxylipins in response to a single bout of high-(HY) or moderate-intensity (MY) yoga exercise session.

**Methods:** 30 healthy participants, 40-60 years old, yoga-naïve, and relatively sedentary, were recruited during 2020/2021. They were randomized into 3 groups (high- or moderate-intensity yoga exercise or a non-exercise control group) after in-person screening and baseline blood sample collection. Participants in both yoga groups received a one-on-one 1-hour yoga session; yoga intensity was verbally cued. After the intervention, blood samples were obtained from all participants using CPT tubes at several timepoints. Five plasma samples from each participant (baseline, 0-, 60-, 120-, 180-min) were selected to quantify oxylipins using liquid chromatography-tandem mass spectrometry (LC-MS-MS). Quantification was achieved using calibration curves and internal standard mixtures for arachidonic acid (AA), Docosahexaenoic acid (DHA), and Eicosapentaenoic acid (EPA). Due to the study's pilot nature, analyses focused on descriptive statistics. We performed exploratory analyses for net Area Under the Curve (netAUC).

**Results:** It was feasible to collect and analyze blood samples at multiple timepoints. Preliminary results identified 2 pro-resolution and 4 pro-inflammatory lipids mediators from the AA family (LXB4, LXA4, 6-keto-PG, TXB2, PGD2, and 12S-HHTre) as the most responsive when comparing changes in netAUC between groups (Table 1). Levels of oxylipins from the DHA and EPA families were heterogeneous within and between groups.

Table 1. Descriptive statistics for netAUC between groups for each lipid mediator

Oxylipin family	Lipid mediator	Group <sup>a</sup>	N (netAUC)	Mean	Std Dev	Lower 95% CI for mean	Upper 95% CI for mean
Docosahexaenoic acid (DHA)	RvD1	HY	9	-1.4	4.6	-5	2.1
		MY	10	-0.3	2.2	-1.8	1.2
		CON	9	1.1	2.4	-0.7	2.9
	RvD2	HY	9	2.5	4.3	-0.8	5.8
		MY	7	2.2	3.3	-0.9	5.2
		CON	9	3.9	4.5	0.4	7.3
	RvD3	HY	5	4.4	2.2	1.7	7.1
		MY	7	10	26	-14	34
		CON	6	5	9.9	-5.4	15
	RvD5	HY	9	-0.4	4.6	-3.9	3.1
		MY	8	-2	7.2	-8	4
		CON	9	0.4	4.6	-3.1	3.9
Eicosapentaenoic acid (EPA)	RvE1	HY	8	-7.1	12	-17	3.2
		MY	7	4.4	17	-11	20
		CON	9	3.5	13	-6.9	14
	18-HEPE	HY	7	2.5	11	-8	13
		MY	8	1.8	6.2	-3.4	7
		CON	9	2.1	9.4	-5.2	9.4
	EicoAcid	HY	8	0.6	8.3	-6.3	7.5
		MY	9	3.5	11	-5	12
		CON	7	-2.5	7.7	-9.6	4.6
Arachidonic acid (AA)	LXB4	HY	6	23	34	-12	58
		MY	9	4.2	25	-15	23
		CON	10	-4.7	16	-16	6.7
	LXA4	HY	7	4.8	16	-10	20
		MY	9	3.4	17	-9.7	16
		CON	10	0.24	15	-10	11
	AA	HY	9	-3.3	16	-16	9
		MY	9	8.4	21	-7.8	25
		CON	8	4.2	18	-11	19
	6-keto-PG	HY	7	2.6	8.4	-5.2	10
		MY	9	0.8	9.7	-6.6	8.3
		CON	9	-7.8	14	-19	3
	TXB2	HY	8	3.1	19	-13	19
		MY	8	4.9	9	-2.6	12
		CON	9	-4.3	22	-21	13
	PGE2	HY	9	1.9	13	-7.7	12
		MY	7	0.6	11	-9.6	11
		CON	10	3.1	13	-6	12
	PGD2	HY	8	15	18	-0.1	30
		MY	6	-2.1	10	-13	8.6
		CON	9	8.3	13	-1.6	18
	12S-HHTre	HY	8	-5	22	-24	14
		MY	8	0.5	16	-13	14
		CON	8	8.4	14	-3.2	20
	15S-HETE	HY	7	2.9	11	-7.7	13
		MY	6	8	5.6	2.2	14
		CON	10	2.3	23	-14	19
	12S-HETE	HY	7	4	20	-14	22
		MY	7	3.5	17	-12	19
		CON	7	12	17	-3.7	28

**Conclusion:** Given observed change over time in the AA family, additional definitive studies aimed at understanding the short- and long-term effects of yoga exercise on systemic dynamics of inflammatory lipids in the context of other key known inflammatory mediators (i.e., cytokines) and their physiological role in health and rehabilitation are needed.

15. ROLE OF WEEKLY YOGA INTERVENTION ON WELL-BEING AMONG THE MEDICAL UNIVERSITY COMMUNITY

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**Keywords:** yoga, wellbeing, happiness, medical university

**Objectives:** According to ancient philosophy, yoga is a spiritual practice that recently gained popularity in the US, mainly as postures, breathing, and meditation for promoting physical and mental well-being. The efficacy of yoga on stress and anxiety levels has not been thoroughly explored in the community of medical universities because of yoga adherence. This study aims to inves-



tigate the effects of peer-guided yoga on happiness in the medical university community.

**Methods:** Twenty-four medical and master's students, faculty, and staff at the California University of Science and Medicine partook in weekly 20-minute yoga sessions led by one certified yoga instructor. One baseline stress Survey devised from the Oldenburg Burnout Inventory was given to each participant at the beginning of the study, and the same Survey was given at the conclusion of the study 3 weeks later. Before each yoga session, participants filled out a Happiness Scale and then completed the same one immediately after the 20-minute session. A third-party website with de-identified data collected surveys. Parameters of interest included inquiries about the perception of one's own workload management, energy for leisure activities, and feelings of weariness/stress at work or school.

**Results:** Among the participants (n=24) of the 3-week-long yoga intervention, all were included in the final analysis. There was no significant effect on burnout assessment before and after the yoga intervention and no significant changes in happiness across the study span. The happiness assessment measured after each yoga session was significantly higher than the happiness assessment measured prior to the yoga session, and this finding was observed within each of the 3 yoga sessions ( $p=0.010$ ,  $p=0.001$ ,  $p=0.000$ , for yoga sessions #1, #2, #3, respectively). The present study suggests that yoga positively affects happiness immediately following the intervention. Data was analyzed via a series of repeated measures of ANOVA computations.

**Conclusions:** There was a significant increase in happiness after a yoga practice of 20 minutes among students and faculty/staff. Although participant happiness scale scores increased significantly in each session, the overall happiness over the course of the 3-week study did not significantly increase. This study and its implications is a major step in the forward direction of establishing yoga's position in academia as a scientific therapeutic method for well-being and mental health. We conclude that the overall happiness scale improves significantly if yoga is practiced daily. Our next study will explore the barrier to daily yoga adherence.

## 16. AN INNOVATIVE YOGIC-BREATH BASED BIO-PSYCHO-SOCIAL INTERVENTION FOR REDUCING RISK BEHAVIORS AND PROMOTING PSYCHOLOGICAL THRIVING IN ADOLESCENTS

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**Keywords:** yogic breathing, risk reduction, psychological thriving, social-emotional learning (SEL), underserved adolescents

**Objective:** To assess efficacy of a Yogic-breathwork based biopsychosocial program to reduce drivers of risk behaviors & promote flourishing in underserved youth

**Methods:** 79 eighth grade students, (Latin-X, low SES) mean age 13.5, were randomized to either an immediate or a delayed start of the SKY Schools (SS) program. The foundation of SS is Sudarshan Kriya Yoga Breath Meditation & pranayama (SKY Breath), documented to rapidly quiet the stress response, increase parasympathetic drive & induce physiological calm. These are interwoven into a robust SEL curricula. Providing SKY breathwork to induce calm is shown to stabilize the cortico-limbic system & would likely allow students to draw upon SEL constructs learned in times of stress, when most needed. Phase I was 2 weeks (2 hrs/day, 8 days) followed by PH II of 8 weekly 1 hr booster sessions. Students were assessed directly before & after the 2 wk Ph I, and post Ph II at 13 wks. All students provided self-reports on 5 standardized SEL & thriving measures of emotion regulation, self-awareness, executive function & relationship skills. As school timing constraints required cross-over of controls immediately after the treatment group completed Ph. I, control group data was only available for Ph I. Differences between controls and treatment group post Ph-I were assessed using independent t-tests. Once controls completed Ph I & II of the intervention, their post-test data was combined w/the initial treatment group. Repeated-measures ANOVA was used to examine significant change over time for the full 12 week intervention

**Results:** Although voluntary, 94 % of students completed the intervention. Upon completing Ph I, the SS treatment arm performed sign. better than controls on measures of emotion regulation ( $p=>.001$ ) & executive function ( $p=.001$ ), with a trend for self-awareness ( $P=.06$ ) & relationship skills. At week 13, SS graduates evidenced significant improvements in self-awareness ( $p=.005$ ), executive function ( $p=.005$ ) and emotion regulation ( $p=.005$ ).

**Conclusions:** Yogic breath based BPS approaches have potential to provide students with tangible strategies that are easy to draw upon during periods of stress, stabilizing capacity for utilizing SEL strategies when most needed. Such programs are highly scalable & well received, potentially narrowing disparities in underserved youth.

## 17. TELEHEALTH YOGA THERAPY GROUPS FOR MIDLIFE AND OLDER WOMEN VETERANS WITH CHRONIC PAIN: A FEASIBILITY PILOT STUDY

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**Keywords:** yoga, yoga therapy, chronic pain, women, veterans

**Objectives:** Yoga Therapy uses an individualized, biopsychosocial-spiritual approach well-suited to meet the complex needs of midlife and older Veterans, a group disproportionately affected by chronic pain. We sought to examine the feasibility and acceptability of synchronous, video-based telehealth Yoga Therapy for chronic pain among midlife and older women Veterans.

**Methods:** We conducted a single-arm pilot of an 8-week Tele-Yoga Therapy group program. Participants were ambulatory San Francisco VA Healthcare System enrollees with a chronic pain diagnosis, aged  $\geq 40$ , and Pain, Enjoyment, and General Activity score of  $\geq 4$  (range 1-10) at screening. After completing an individual assessment with the study Yoga Therapist, participants engaged in a 90-minute group once weekly for 8 weeks. A flexible, trauma-informed protocol incorporated active and restorative asana, pranayama, and lifestyle education. Feasibility measures included completion and attendance rates. Program acceptability was assessed via survey and exit interview at 8 weeks; rapid qualitative analysis was conducted to examine overall experience and barriers and facilitators to engagement. Participants also completed validated measures of pain interference, mood, interoceptive awareness, and health-related quality of life at 8 and 12 weeks; descriptive analyses were conducted for quality, completeness, and distribution of data.

**Results:** Nine women (age  $M=61.9 \pm 12.6$ ) participated in one of two 8-week sessions (May-June, Aug-Sept 2022). Most (67%) identified as White, 22% as Black or multiracial, 44% lived in rural areas, and 67% had no prior yoga experience. Mean PEG score at baseline was 6.6 (SD=1.8). Most (78%) attended  $\geq 6$  of 8 sessions; 89% completed an exit interview and all survey measures. Overall experience, convenience, and individualized attention were rated at the highest level. Audio-visual challenges were the most frequently reported barrier. Participants described the group as “more physically accessible” and “better than past [yoga] experiences,” noting “Yoga helped me feel more disciplined and more hopeful that I could do regular self-care.”

**Conclusions:** Yoga Therapy for chronic pain via synchronous, video telehealth is feasible and well-tolerated, with high rates of satisfaction among midlife and older women Veterans. Findings from this study support a larger trial to test the effectiveness of Tele-Yoga Therapy with the potential to advance holistic, gender-sensitive pain care within healthcare settings.

## 18. LEARNING YOGA THROUGH INTERACTIVE ONLINE CLASSES: PERSPECTIVES FROM MIDLIFE AND OLDER WOMEN ENROLLED IN THE LILA TRIAL FOR URINARY INCONTINENCE

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**Keywords:** yoga, urinary incontinence, women, older adults, telehealth

**Objective:** To explore barriers and facilitators to learning yoga through online instruction among midlife and older participating in a trial of therapeutic yoga for urinary incontinence.

**Methods:** Qualitative study among a sub-sample of ambulatory women aged  $\geq 45$  years with at least daily incontinence participating in the Lessening Incontinence through Low-impact Activity (LILA) trial. LILA is a multisite randomized trial of a 12-week therapeutic yoga vs. physical conditioning intervention for women with urinary incontinence, converted to synchronous, video-based instruction during the COVID-19 pandemic. The yoga arm included two 90-minute group intervention sessions and 60-minutes of self-led practice per week. Content was informed by the Iyengar Yoga method and included pelvic floor education. Among the 121 yoga participants, a purposive sample was recruited across a range of ages and racial/ethnic identities to discuss barriers and facilitators to video-based instruction and sustainability of therapeutic yoga practice. The thematic analysis guided by a biopsychosocial framework was used to analyze interview transcripts.

**Results:** Of the 24 women interviewed, mean age was 63 years (range 45-90), and 54% were White, 21% Asian, 4% Black/African American, 17% multiracial, and 17% Latina/Hispanic. Most (90%) attended  $\geq 22$  of 24 intervention sessions. Participants identified convenience as a key facilitator to participation; privacy of the online setting also mitigated internal stigma around incontinence. Elements of instructor teaching style that enhanced the online experience included use of: verbal instructions with visual demonstration; observation and individualized instruction with ‘corrections’; and solicitation of questions. Increased body awareness, stress reduction, and perceived effectiveness in reducing incontinence contributed to sustained engagement. Common challenges identified were audio-visual and physical space limitations. Women highlighted aspects of in-person yoga instruction not easily replicated online, including social interactions and hands-on assistance from instructors. Motivation and self-efficacy for self-led practice between study sessions were also challenging.

**Conclusions:** Effective engagement of diverse, older women in online yoga interventions requires yoga instructors to address audio-visual challenges and integrate visual and verbal instruction with individualized attention and interaction.

## 19. TEACHING YOGA FOR WELLNESS GROUPS VIA VIDEO-BASED TELEHEALTH: PERSPECTIVES FROM VETERANS HEALTH ADMINISTRATION YOGA TEACHERS

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**Keywords:** yoga, yoga teachers, wellness, telehealth, veterans

**Objectives:** Online yoga has increased in recent years, but little is known about synchronous, video-based telehealth delivery of yoga within healthcare settings. This study examined the perspectives of Veterans Health Administration (VA) yoga teachers regarding a VA Office of Rural Health-funded TeleYoga Program intended to expand access to yoga for rural and underserved Veterans.

**Methods:** Qualitative, interview-based study among yoga teachers from 7 VA TeleYoga Program sites. Interviews focused on teaching experience, program implementation and delivery, and health equity considerations. Interviews were conducted and recorded over Teams; transcripts were analyzed via thematic content analysis.

**Results:** 13 yoga teachers with a range of clinical and yoga backgrounds completed interviews (e.g., recreation therapy, physical therapy, wellness coach, dietician, social worker; RYT 200-hour to Certified Yoga Therapist). Yoga teachers identified four key categories of considerations for delivering synchronous, video-based telehealth yoga within healthcare settings: (1) audio-visual (AV); (2) physical space; (3) accessibility; and (4) administrative. First, AV components teachers required for effective tele-yoga groups included: large monitor, wireless microphone headset, high resolution webcam, adequate lighting, secure videoconferencing platform, and reliable internet connectivity. Second, adequate physical space is still necessary to deliver yoga via telehealth. In the absence of a dedicated fitness room, clinical or office space needs to be adapted. Third, a unique challenge in the VA healthcare setting is delivering yoga for wellness for heterogeneous groups with varying ages, backgrounds, abilities, and health conditions. In this setting, yoga teachers require training to make online yoga accessible and inclusive (e.g., trauma-informed principles, adaptive yoga) and the ability to adapt instruction for patient-specific needs in real time. Finally, critical administrative considerations include adequate support personnel (e.g., scheduling, tech support) and a simple and efficient process for getting patients started with online yoga.

**Conclusions:** VA TeleYoga teachers hold unique expertise and as the popularity of online yoga continues to grow, their perspectives contribute valuable information from which critical program recommendations can be made to facilitate expansion of yoga within healthcare settings.

## 20. A TRAUMA-INFORMED, MINDFULNESS-BASED YOGA INTERVENTION WITH JUSTICE-INVOLVED YOUTH: SATISFACTION AND PERCEIVED IMPACT

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**Objective:** Numerous interventions attempt to reduce recidivism among youth in the juvenile justice (JJ) system, with limited evidence of effectiveness: the reduction in recidivism following participation in these programs is, at best, modest, leaving a majority of JJ-involved youth at risk for recidivism. Previous interventions have not addressed a key predictor of recidivism, trauma-related symptoms, despite evidence that the prevalence of trauma history and exposure to traumatic events is substantial in this population. To address this gap, the present study developed, implemented, and is evaluating an innovative trauma-informed, mindfulness-based yoga ("TIMBY") intervention designed to enhance self-regulation among incarcerated youth in the Georgia Department of Juvenile Justice system.

**Methods:** In-depth qualitative interviews (N=20) are currently underway with youth participants to assess their satisfaction with and perceptions about the impact of the TIMBY intervention on a range of health and psychosocial outcomes, including: depression, anxiety, stress, emotional reactivity, attention, sleep, interpersonal relationships, appetite, physical activity, and self-efficacy. Pre- and post-intervention surveys have been administered to youth participants.

**Results:** Interview recordings will be transcribed verbatim and standard qualitative content analysis techniques will be used to analyze the transcript text using NVivo software. Survey data collection is also underway with youth participants (N=75). Data analyses will examine whether changes in self-regulation are observed from baseline to follow-up and assess the dose-response relationship by quantifying the association between the number of classes attended and changes in self-regulation. Quantitative analyses will also explore changes from baseline to follow-up on a range of secondary outcomes,



including internalizing and externalizing behaviors, hope, perceived stress, coping skills, trauma-related symptoms, and mindfulness. Finally, data abstracted from the JJ electronic medical record will also be analyzed with respect to examining the impact of participating in the TIMBY intervention for youth including: physical and mental health-related diagnoses, medications, criminal charges and behavioral problems. Data collection will be complete by 8/31/23; thus all analyses will be complete prior to the conference.

## 21. TRAUMA AND CARDIAC HEALTH: A YOGA THERAPY CASE STUDY

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**Background:** Traumatic events are related to the incidence of negative health outcomes such as type II diabetes (Mooy, de Vries, Grootenhuys, Bouter, & Heine, 2000) cardiovascular disease (Sumner et al., 2015), and mortality (Ahmadi et al., 2011). The physiologic processes that may underlie links between trauma exposure to chronic disease development are not well understood (Thurston et al., 2020). Among midlife women, trauma exposure is related to lower heart rate variability during wake and sleep (Thurston et al., 2020). Symptoms of post-traumatic stress such as hyper-vigilance and sleep deprivation have strong effects on the heart. Trauma can affect the heart both acutely—such as broken heart syndrome—and chronically such as heart disease (Paulus et al., 2013). The prevalence of hypertension was 34.1% (diagnosed and undiagnosed) among PTSD patients. Patients with PTSD had higher BP and HR compared to patients without PTSD. Trauma exposure may increase BP (Paulus et al., 2013). This case takes a look at PTSD from trauma experienced in childhood and how trauma effects cardiac health of women later in life. Also looking at how stress management and nervous system regulation can help with symptoms of PTSD, which may effect symptoms of other stress related diseases.

**Case Description:** I present a case of a 48 year old hispanic female who experienced sexual abused by a family member between the ages of 8 to 14 years old. She complains of anxiety and stress related illnesses. She has had seizures since she was 8 years old; caused from stress. She had a heart attack at age 30, and pronounced dead for 6 minutes. She was also found to have high levels of cortisol at the time. She was diagnosed with hypertension at age 40, takes Amlodipine. And diagnosed with C-PTSD at age 47, with trouble sleeping. At 48, she was also diagnosed with asthma and vertigo. She currently takes Tafil, Clonazepam, Zoloft, an inhaler, Cinnarizine, Loratadine, and Amlodipine. She works weekly with a psychologist as well. Initial session found her respiratory rate to be 15 breaths per minute, MPT; breathing at a 4:4 Ratio. Heart rate was at 85 per minute with O2 levels at 95%. Her blood pressure was at 109/73 (medicine controlled) with swelling and heat at the feet and ankles.

**Purpose:** Support the salutogenic approach of yoga therapy, treating the entire person on all levels of the *koshas* (five bodies) in helping support health and diminish symptoms of stress, especially for those individuals who have experienced trauma.

**Methods:** Client had at least one session a week, sometimes twice a week with the exception of the 8th session, which took place after a week hiatus. Client adhered to all home yoga program protocol and weekly psychologist appointments as well as doctor appointments for her hypertension. Client received eight yoga therapy sessions, to address her goal of stress management. All sessions were in person and consisted of movement, *pranayama*, and *pratyahara* or *dhyana* catered to trauma and energetic and physical heart health. All interventions were done in seated or supported supine to support heart health and no breath retention was used.

**Results:** Over the course of the eight session, she stopped needing to use her inhaler after the second session. Self-reported, felt easier to breathe. Self-reported, wakes up with energy; describing energy levels average an 8 out of 10 (10 high). After eight sessions, stress levels average at a 4 out of 10 (10 high); Started at an average of 7. out of 10. Client hasn't felt dizzy since third session. O2 levels have risen to 97%. Sound quality of her voice improved since initial MPT test. Blood pressure varied throughout the sessions, some sessions raising her blood pressure to a more normal range, in some cases when working on psychic layers, increasing the blood pressure beyond normal ranges. In the later sessions, blood pressure either stayed in normal range, or lowered slightly. With regards to her mental health, she feels a sense of peace with herself, open to finding her joy once again.

**Discussion:** Individuals who have experienced childhood trauma may have negative physical health effects later in life, specifically hypertension and other cardiovascular issues. Emotions may directly affect heart rate, oxygenation, and blood pressure. Using yoga practices to address the stuck emotions (psychic layer) within the body may alleviate symptoms of stress related diseases; possibly lowering heart rate and blood pressure. Simple movement, breathing, and systematic body relaxations done consistently over time may support the reduction of stress. Supporting individuals as a whole instead of treating symptoms or diseases may be effective in reduction of total symptoms of C-PTSD and cardiac issues due to trauma when used in conjunction with medications and medical supervision. More studies are needed to show the efficacy of yoga practices in lowering blood pressure and heart rate in individuals with childhood trauma. More studies are needed to see if yoga practices can help with increasing heart rate variability and resilience, which would help with stress reduction.

## 22. ASSESSING FIDELITY OF YOGA PROTOCOLS FOR CHEMOTHERAPY INDUCED PERIPHERAL NEUROPATHY: DECISION-MAKING TO IMPROVE CLINICAL TRIAL ADHERENCE

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**Keywords:** yoga, chemotherapy-induced peripheral neuropathy, intervention fidelity

**Objective:** Yoga is an ancient mind-body practice demonstrated to improve physical and psychological health. Despite the recent increase of clinical trials using yoga interventions, lack of methodological rigor makes it difficult to standardize yoga treatment. High quality and consistent fidelity measurement is needed for yoga interventions to standardize trials. We evaluated intervention fidelity of our randomized control trial (RCT) using yoga therapy for management of chemotherapy-induced peripheral neuropathy (CIPN) among cancer survivors.

**Methods:** Our study evaluated pre-existing literature on yoga interventions for cancer-related pain to understand the prevalence of fidelity checks for protocol adherence. We conducted a literature review using key terms (“yoga” and “chemotherapy induced peripheral neuropathy”) through PubMed to understand the current prevalence of intervention fidelity in yoga trials for cancer-related pain. We followed previously established models to measure fidelity and adapted a pre-existing and validated fidelity checklist to assess our RCT’s fidelity.

**Results:** Our literature review revealed four relevant yoga studies (two single arm, two two-arm RCTs). None of the studies specifically describe assessment of intervention fidelity. For our RCT fidelity assessment, two study members independently reviewed 4 of 16 yoga therapy sessions (25%) per instructor using our adapted, validated checklist. High intervention fidelity was found in all evaluated sessions (average of 100% adherence to class structure and 3/3 on specific skills) and constructive feedback was provided.

**Conclusions:** Clinical trials using yoga for cancer-related neuropathy pain currently lack adequate fidelity assessments. Creating a

methodology and a valid and reliable fidelity checklist is essential to assure protocol adherence by yoga therapists for improved outcomes in individuals suffering from CIPN.

## 23. YOGA AND MINDFULNESS BASED EATING DISORDER PREVENTION PROGRAM: AN INTERPRETIVE PHENOMENOLOGICAL ANALYSIS

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**Keywords:** yoga therapy, eating disorder, qualitative, interpretive phenomenological analysis

A growing body of evidence suggests that yoga-based interventions might aid in the prevention and treatment of eating disorders. The current qualitative study used Interpretative Phenomenological Analysis (IPA) to analyze the nature and degree of impact of a yoga and mindfulness-based eating disorder prevention program: Eat, Breathe, Thrive (EBT). Data was collected via semi-structured interviews with 15 female women over the age of 18 who participated in the EBT program between 2018 and 2022. The interviews took place either by phone or via Zoom. Using IPA methodology, and after several rounds of coding, emergent themes were interpreted and organized to develop a theoretical model explaining the mechanism of change experienced and described by EBT participants. Qualitative analysis was done using Quirkos software. The resulting model outlines an experiential progression from psychoeducation and skill development/practice to increased mindful awareness, and empowered state experiences which led to the following outcomes: independent positive action, self-initiated positive state experiences, and increased embodied well-being. Participants reported increased self-compassion and self-acceptance, with decreased emphasis on disordered eating behaviors. Qualitative data is necessary for understanding *why yoga works*, from an experiential perspective. This study adds to the new, and rapidly expanding body of research supporting the positive effects of yoga and mindfulness on the prevention and treatment of eating disorders. These findings are new, and the current data has not yet been published.

## 24. EVERY BREATH YOU TAKE: INCORPORATING A YOGA AND MINDFULNESS INTERVENTION INTO A NEW NURSE RESIDENCY PROGRAM

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**Keywords:** yoga, mindfulness, nurses, new nurses

**Objective:** The purpose of this study was to design, implement, and evaluate a yoga and mindfulness intervention on stress management in an existing New Nurse Residency Program (NNRP) at a large academic medical center.

**Methods:** A 20-minute yoga intervention was placed at the beginning of each of the first three months of the yearlong NNRP. The program was offered virtually as it coincided with the COVID-19 pandemic. Each yoga session included didactic information on the effects of stress, a breathing exercise, and a series of yoga poses that could be modified for sitting or standing. The last session also included a body scan. The newly licensed registered nurses (NLRNs) were given handouts of this information to encourage practicing self-care at home. The intervention was evaluated using the theoretical underpinnings of Bandura's Social Learning Theory promoting self-efficacy and Kirkpatrick's Model for evaluation. Quantitative data was obtained using pre- and post- stress thermometers completed immediately after the intervention, which were used to compute paired *t*-tests. Five survey questions were embedded in the existing NNRP completion survey and evaluated by the researchers for qualitative data.

**Results:** There were 42 participants transitioning to their first job as a registered nurse (RN) in this NNRP. Paired *t*-tests demonstrated statistically significant results for decreased stress immediately following each of the 3 interventions.

Session number	Value	Mean/SD	df	t value	p value
Session 1 N = 20	Pre test	3.7/1.56	19	-7.93	<.00001
	Post test	1.75/1.12			
Session 2 N = 12	Pre test	3.91/2.25	11	-5.38	<.00022
	Post test	2.91/2.30			
Session 3 N = 14	Pre test	5.9/2.42	13	-7	<.00001
	Post test	2.37/1.87			

The qualitative data suggested that the NLRNs understood that mitigation of stress was necessary, and they expressed numerous ways in which they practice self-care, including breathing exercises and yoga, as well as the body scan. Learning to use the breath to decrease stress was reported more often than any other practice and was something they appreciated could be done at work.

**Conclusions:** This project showed that an online yoga and mindfulness intervention significantly improved the stress levels of the NLRNs post intervention and that they were able to achieve self-efficacy by using this information to mitigate stress both at work and at home.

25. A CONCEPTUAL MODEL OF THE PATHWAYS OF ASHTANGA YOGA TOWARDS WELLBEING

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**Keywords:** ashtanga yoga, wellbeing, mechanisms of yoga, reflexive thematic analysis

**Objective:** The purpose of this study is to (1) examine the mechanisms of yoga for wellbeing according to the lived experience of long-term Ashtanga Yoga (AY) practitioners, and (2) integrate findings into a conceptual model extending on existing frameworks on the mechanisms of yoga.

**Methods:** This qualitative study included 23 regular AY practitioners selected from a larger survey to represent a range of characteristics in terms of demographics and yoga practice. Through semi-structured interviews, we explored their perceptions on the ways in which they perceived that different components of AY led to different wellbeing outcomes. Interviews were analysed using Reflexive Thematic Analysis (RTA), allowing an in-depth exploration of participants' lived experiences in relation to three areas: AY, pathways, and wellbeing outcomes.

**Results:** Two themes were identified within AY: *The AY system*, referring to practical and theoretical components of the AY framework, and *The AY method*, representing the way in which the AY system is taught, learnt and practised. Three themes encapsulated pathways to wellbeing. *The transformation of bodily systems, sense of embodiment and self-regulation* reflected neuro-physiological changes and bodily experiences. *The construction, de-construction and harmonisation of the self* encompassed dynamic interactions between personal development and contemplation. *Ways of being and living in the world* represented congruent worldviews and lifestyles in relation to oneself and others. A range of wellbeing outcomes were condensed into the themes *Intrapersonal outcomes* and *Interpersonal and transcendental outcomes*. These findings were integrated with current frameworks and evidence into a conceptual model of AY pathways towards wellbeing. The model argues that a regular AY practice enables holistic self-transformation from transitory to everlasting ways of being, translating into positive human functioning for oneself and others.

**Conclusions:** Elements of the AY tradition can forge distinct pathways leading to intrapersonal, interpersonal, and transpersonal wellbeing outcomes underpinned by neurophysiological processes. Findings highlight the consideration of embodied, holistic and systems approaches to wellbeing research, theory, and practice, as well as the role of a long-term practice in generating wellbeing.



## 26. YOGA THERAPY DURING CHEMORADIATION FOR LOCAL-REGIONAL CERVICAL CANCER

L. Ramondetta

**Background:** Factors that may contribute to psychosocial distress in women with cervical cancer (CxCa) include low socioeconomic status, depression, and anxiety. The treatment of advanced CxCa involves 6-7 weeks of chemoradiation (CRT) which may increase the risk of sexual dysfunction, anxiety/dyspareunia, lymphedema, bowel problems, neurologic symptoms, and depression. This study is examining the feasibility and initial efficacy of a yoga program incorporated alongside CRT for CxCa.

**Methods:** Forty patients with CxCa who are undergoing CRT will be randomly assigned to a yoga group (YG) or a waitlist control group (WLC), with 20 patients in each group. YG patients will ideally participate in 10 yoga sessions offered individually during radiation. The yoga program was developed and chosen in consultation with VYASA. Depending on the needs and capabilities, four main components of the yoga program will dynamically change throughout the treatment: 1) Joint loosening and stretching exercises; 2) Different yogic postures and a deep relaxation technique; 3) Breath energization technique; and 3) Meditation techniques.

Aspects of feasibility include recruitment, adherence, and outcome measures completion. Patients will also complete measures assessing fatigue, depression, anxiety, pelvic pain, meaning in the illness experience, spirituality, and overall quality of life (QOL) at baseline, middle of CRT, end of CRT, and 1 and 3 months later. Group differences in plasma markers of stress and their association with symptoms will be examined. After the 3-month follow-up, the WLC group will be offered 4 group yoga classes.

**Results:** Thirty-four of the 40 patients have been recruited and randomized. To date, the mean age is 43 and 59% are stage IIIC; 32% identify as Hispanic and 14% as African American. The education level of high school or below was 24% and 20% report a household income under \$50,000. We made multiple adjustments during the COVID-19 pandemic involving converting to video delivery. We anticipate completing the trial by the end of 2023. Of those in the YG, 62% have participated at least 50% of the 10 yoga sessions, indicating feasibility. The study is ongoing.

**Conclusions:** Previous research has found that integrating yoga into the treatment regimen of women undergoing radiotherapy for breast cancer was feasible, adherence was high, and the program was efficacious. Whether the same adherence and benefits are found for underserved women with CxCa remains unclear.

## 27. PSYCHOLOGICAL EFFECTS OF SCHOOL-BASED YOGA AND MINDFULNESS PROGRAMS FOR AT-RISK HISPANIC ADOLESCENTS POST COVID-19

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**Keywords:** mindfulness practices, Hispanic adolescents, psychological effects of school-based yoga interventions

**Objective:** This quasi-experimental study compares the differences of psychological well-being impact factors of school-based yoga interventions and mindfulness practices for at-risk Hispanic adolescent high school students with similar students enrolled in traditional physical education classes in a face-to-face setting.

**Methods:** Convenience sampling was applied to freshmen students enrolled in a Physical Education 1 hour course at a designated high school in South Texas. A total of 60 students participated in the study for 10 weeks (2 classes per week). A 20-lesson curriculum was developed by researchers to reflect Kripalu Yoga Philosophy and CASEL SEL core competencies. A hypothesis model was utilized: mind body awareness, self-regulation, and physical postures. To assess psychological wellbeing constructs of mood and affect, measurement instruments employed were two commonly utilized questionnaires, the BRUMS and PANAS-C. Statistical analyses included Friedman's Test for non-parametric data, comparisons of pre-post change scores between yoga and physical education classes, and longitudinal data trends for each measurement instruments' subscales from inception to conclusion.

**Results:** The longitudinal results were analyzed using Friedman's test as the data were not normally distributed. By analyzing pre/post result differences among and between subscale pairs, Friedman's test identified any treatment-related statistically significant differences during the ten weekly testing events. The only statistically significant result was the PANAS-C Positive posttest ( $p=.002$ ), having a large effect size ( $w=1.000$ ). All other domain results indicated mostly small effect sizes, including two domains of the BRUMS (Fatigue and Vigor) with small to medium effect sizes. Overall, longitudinal trends in participant responses from Week 1 to Week 10 comparisons demonstrate a practical significance of gradual increases of improved student well-being in comparison to traditional physical education classes. The students participating in the Physical Exercise class did not fare well. The PANAS-C Negative Affect trends for the Physical Exercise class increased overtime, with the pre-test and post-test trends nearly on top of each other, indicating an increase in negative affect over time and no overall difference in pre and post-test trends. The trend for the negative BRUMS domains (anger, confusion, depression, fatigue, and tension) all remained steady.

**Conclusions:** Overall positive impacts continue to support overall improvement for students participating in Yoga as a form of physical fitness. A school-based yoga program is an innovative approach that supports and cultivates mental skills and socioemotional dispositions.

## 28. CHANGES IN BRAINWAVES, CONSCIOUSNESS, RESPIRATORY RATE, AND HEART RATE VARIABILITY DURING A SINGLE YOGA NIDRA SESSION: A RANDOMIZED PILOT STUDY

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**Keywords:** yoga nidra, insomnia, respiratory rate, EEG

**Objective:** This pilot trial aims to assess feasibility, along with preliminary physiological and psychological effects of Yoga Nidra, a guided meditation technique, in adults with self-reported insomnia.

**Methods:** Twenty-two adults with self-reported insomnia visited our research center two times. At their first visit (V1), participants were instructed to lie quietly for ninety minutes. The primary outcome was change in electroencephalography (EEG), and specifically, alpha brainwave power. Heart rate variability, respiratory rate and self-reported mood and anxiety were also measured. At the second visit (V2), the same protocol was followed, except half of participants were randomized to practice Yoga Nidra for the first 30-min of the 90-minute measurement period.

**Results:** There were no significant changes between groups, from V1 to V2, in alpha EEG power from the occipital lobe (Intervention:  $13 \pm 70\%$  increase during Yoga Nidra at V2 as compared to lying quietly at V1; Control:  $20 \pm 40\%$  decrease during lying quietly at V2 vs. at V1). There were also no significant between group changes (V1-V2) in HRV or EEG-measured sleep onset latency in response to Yoga Nidra. Respiratory rate, however, decreased more in the Yoga Nidra group than in the Control group, with a 1.4 breath/min decrease during the practice (vs. lying quietly at V1) and a 2.1 breath/min decrease during the hour after the practice. In contrast, the Control group showed a 0.2 breath/min increase during the intervention period, and a 0.4 breath/min increase during the hour after (with  $p$ -values of .03 for t-test comparing groups, both during and after the 30-minute intervention period). Our interventions displayed good acceptability (well-tolerated) and

credibility (perceived benefit ratings) with implementation success (target sample size reached; 5% dropout rate).

**Conclusions:** This trial provides preliminary evidence that Yoga Nidra is well-tolerated by, and feasible to deliver to adults who report symptoms of insomnia. We intend to conform decreased respiratory rate in response to Yoga Nidra in larger trials.

## > 29. EXAMINING YOGA PRACTICE AND PERCEIVED BARRIERS TO YOGA IN A SAMPLE OF SEXUAL MINORITY MEN LIVING WITH HIV

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**Keywords:** yoga, HIV, sexual minority health disparities

**Objective:** In the U.S., gay, bisexual, and other sexual minority men (SMM) are disproportionately affected by HIV compared to the US general population. For this population, sexual minority and HIV-related stress add to general life stressors to increase health risks. Studies show yoga can have a positive impact on HIV+ populations, however, limited research has explored this among SMM living with HIV (LWH). The purpose of this study is to examine the association between yoga and HIV-related stress among SMM LWH, as well as perceived barriers to yoga practice.

**Methods:** We present data from an R34 project, which is currently ongoing. This study examines baseline data from the project's open-phase pilot, which aimed to adapt an app-based mindfulness intervention for SMM LWH and substance use. Participants were recruited from an existing database of potential contacts who met the eligibility criteria for the study (>18 yrs old, SMM, HIV positive, and self-reported stimulant use for at least 5 days over the past three months). Eight participants enrolled in the open-phase pilot and completed a baseline survey, prior to downloading the app. To assess yoga practice for managing HIV-related health issues, we used the *Complementary and Alternative Medicine Utilization Checklist*. Regression analyses examined the association between yoga practice and these HIV-related stress outcomes, as measured by the *Impact of HIV on Self-Concept Scale* and *HIV/AIDS Stress Scale* while adjusting for standard demo-

graphic variables. We also report data from the *Perceived Barriers to Yoga Checklist*.

**Results:** Half of the participants indicated “in the past 12 months I have practiced or used yoga as a treatment for a health concern or condition.” Regression analyses revealed a significant and positive association between yoga practice over the past 12 months in predicting the impact on HIV self-concept: overall mean ( $B=1.36$ ,  $p=.04$ ) and loss subscale ( $B=1.06$ ,  $p=.03$ ), both indicating yoga had a positive effect on HIV self-concept. We did not find a significant association between yoga practice and the HIV/AIDS stress scale ( $B=-.22$ ,  $p=.16$ ). In exploring perceived barriers to yoga, reasons noted include it is female dominated (20%), it costs too much (100%), not enough time (40%), it worsens health problems (20%), it does not feel like a workout (80%), and dislike group fitness classes (20%).

**Conclusions:** Despite the limited sample size, these data prove preliminary evidence for the protective effect of yoga for improving experiences of HIV-related stress among SMM LWH. However, inequities regarding access to yoga remain an important issue for SMM LWH and must be addressed. Specifically, our finding identified specific barriers which prevent SMM LWH from accessing yoga, with cost being a barrier endorsed by 100% of participants.

### 30. GAMMA-AMINOBUTYRIC ACID LEVELS IN AN RCT TREATING DEPRESSION WITH YOGA AND WALKING

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**Introduction:** Both yoga and exercise, specifically walking, has been shown to decrease depressive symptoms. This randomized controlled trial (RCT) is a mechanistic study that compared changes in gamma-amino butyric acid (GABA) levels in participants with Major Depressive Disorder (MDD) after metabolically matched 12-week yoga or walking interventions to determine if increases in

thalamic GABA levels were greater in the yoga intervention.

**Methods:** Participants with MDD had Scan 1 prior to randomization to the yoga group (YG) or walking group (WG). The yoga intervention was comprised of yoga postures and breathing exercises. After the 12-week intervention, Scan 2 was obtained, that was immediately followed by the assigned intervention and then immediately followed by Scan 3. The Physician Health Questionnaire-9 (PHQ-9) assessed depressive symptoms before Scan 1 and Scan 2. Thalamic GABA levels were obtained using Magnetic Resonance Spectroscopy (MRS).

**Results:** There were significant within group decreases in PHQ-9 scores in the YG ( $t=5.64$ ,  $df=19$ ,  $p<0.001$ ) and the WG ( $t=2.79$ ,  $df=18$ ,  $p=0.012$ ), with the YG having significantly greater decreases ( $F=4.72$ ,  $df=1$ ,  $p=.047$ ). Increases in GABA levels were only significant between Scan 1 and Scan 3 in the YG when the time between the last intervention and Scan 2 was less than 7 days ( $F=4.48$ ,  $df=1$ ,  $p=.046$ ).

**Conclusions:** This RCT compared the effects of metabolically matched 12-week yoga and walking interventions in participants with MDD. Both the YG and WG had significant decreases in depressive symptoms, with the YG having significantly greater decreases. Significant increases in GABA levels were only seen in the YG if Scan 2 was obtained less than 7 days after the last intervention. This study does not provide evidence that the walking intervention effected thalamic GABA levels. This study does provide evidence that both yoga and walking should be considered as part of a treatment plan for MDD.

### 31. TREATMENT OF MAJOR DEPRESSIVE DISORDER WITH IYENGAR YOGA AND COHERENT BREATHING VERSUS METABOLICALLY MATCHED WALKING INTERVENTION: AN RCT

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**Keywords:** yoga, depression, breathing

**Introduction:** Additional treatments for Major Depressive Disorder (MDD) are needed. This randomized controlled trial (RCT) compares the effects of yoga postures and coherent breathing versus walking on MDD symptoms.

**Methods:** Participants, 18-64 years old with MDD and baseline Beck Depression Inventory-II (BDI-II) score  $\geq 14$ , on either no antidepressants or stable doses for  $\geq 3$  months, were randomized to yoga group (YG) or walking group (WG) for 12 weeks. Exclusion criteria: psychotherapy for depression, psychosis, bipolar disorder, active substance use, suicidal ideation with intent, or current mind-body practice. The yoga posture intervention was metabolically matched to a walking intervention. Each group was assigned 60 minutes physical activity twice weekly plus homework. YG had additional coherent breathing at 5 breaths per minute.

**Results:** Forty-four participants completed the interventions (YG=23, WG=21). Baseline BDI-II scores were comparable between groups ( $p=0.62$ ) (YG=26.70 (4.98) versus WG = 25.86 (6.24) and declined significantly by week 12: YG (-18.52 $\pm$ 8.21,  $p<0.001$ ) and WG (-12.67 $\pm$ 9.04,  $p<0.001$ ), with decreases in YG being significantly greater than in WG ( $p=0.03$ ). Baseline Pittsburgh Sleep Questionnaire Inventory (PSQI) scores were comparable between groups ( $p=0.76$ ) and declined significantly by week 12: YG (3.17 $\pm$ 3.03,  $p=0.000$ ) and WG (2.05 $\pm$ 4.04,  $p=0.03$ ), with no significant differences between groups. Interventions were matched for metabolic activity, but not time.

**Conclusions:** In this metabolically matched RCT both the YG and WG, had significantly reduced symptoms of depression and sleep disruption, a symptom of depression, with the reduction of depressive symptoms in the YG, being significantly greater. Both interventions, yoga and coherent breathing, and walking may enhance outcomes in patients with MDD.

## > 32. THE EFFECTS OF AN INTEGRATED YOGA INTERVENTION ON THE SYMPTOMS OF ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD) IN CHILDREN

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**Keywords:** yoga, children, attention-deficit, hyperactivity, ADHD, executive functioning

**Objective:** To study if a structured yoga intervention helps in reducing symptoms of inattentiveness, hyperactivity, and impulsive behavior in children with symptoms of ADHD.

**Methods:** The “within group” study included 8 participants of ages 6 to 12 who have not practiced Yoga in the past 6 months. The participants were assessed for symptoms of ADHD using the Vanderbilt ADHD Diagnostic Rating Scale (VADRS) survey questionnaire which was completed by the participants’ parents. VADRS questionnaire includes assessment of attention subtype, hyperactivity subtype, school performance, and overall symptoms. Participants were administered Wisconsin Card Sorting Task (WCST) which measures the cognitive functioning in children. Participants attended a 4-week long yoga intervention which consisted of 3 sessions per week. The duration of each session was 40 minutes. Both VADRS and WCST assessments were administered before and after the yoga intervention. Integrated yoga practice included:

- Breath and Body practices – 5 minutes
- Dynamic practices – 10 minutes
- Yoga Asanas – 10 minutes
- Pranayama (breath-regulation practices) – 5 minutes
- Relaxation Techniques – 5 minutes
- Guided Meditation and chanting – 5 minutes

**Results:** Pre and post yoga intervention results were analyzed using the Statistical Analysis tool JASP. In the ADHD Combined Inattention/Hyperactivity group, the mean value changed from 10.00 to 6.75, standard deviation changed from 7.521 to 6.251 and p-value is 0.028. In the hyperactive/impulsive category, the mean value changed from 14.75 to 11.625, standard deviation changed from 7.778 to 6.76, p-value is 0.014. The pre- and post-intervention results were statistically significant. In the inattentive category, the mean value changed from 17 to 14.375, standard deviation changed from 5.757 to 4.565 and p-value is 0.118. Hence, the results were not statistically significant. However, the effect size (ES) was “large” for all the three groups suggesting an existing positive effect of yoga on inattentive subtype, but more research is needed with a larger sample size.

**Conclusions:** The study results were statistically significant compared to previous studies done demonstrating that yoga practice can be utilized as an alternative option for children with ADHD to reduce inattentive and hyperactive behavior and an overall reduction in combined symptoms of ADHD in children.

## 33. SYSTEMATIC REVIEW OF YOGA FOR GASTROINTESTINAL DISORDERS

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**Keywords:** yoga, gastrointestinal disorders, brain-gut axis

**Objective:** Yoga is commonly used by gastrointestinal (GI) patients and may impact the brain-gut axis. The aim of this study is to systematically review the efficacy studies of yoga for gastrointestinal (GI) patients.

**Methods:** We searched PubMed, EMBASE, and relevant systematic reviews and meta-analyses. We included adults with a GI disorder (clinician assessment and/or diagnostic criteria). We excluded studies of yoga combined with other treatments or those with non-GI primary disorders. We assessed GI symptoms, quality of life (QOL), and psychological status.

**Results:** 1,146 citations were identified; 11 studies were eligible and included  $n=503$  patients (range 15 to 78 per study),  $n=261$  yoga participants and  $n=242$  controls. Disorders included irritable bowel syndrome (IBS;  $k=6$ ), colorectal cancer (CRC;  $k=3$ ), ulcerative colitis (UC;  $k=1$ ), and chronic pancreatitis (CP;  $k=1$ ). Most studies assessed yoga versus a comparison group ( $k=8$ ); two studies had three arms; one had a follow-up study. The types of yoga differed (e.g., Hatha, Iyengar), but most were comprised of postures, breathing, and meditation in a group ( $k=7$ ). Exposure to live yoga instruction ranged from 2 to 35 hours over 6 to 12 weeks. In IBS patients, GI symptoms improved on the IBS Symptom Severity Scale more for the yoga participants compared to controls. In UC patients, yoga (compared to a control condition) showed greater reductions in disease activity (on the Clinical Activity Index) and fewer disease flares. Psychological status and QOL were assessed using multiple instruments. In IBS, UC and CP patients, greater QOL improvements were seen for yoga versus control participants. For IBS patients, anxiety and depression showed greater reductions for yoga participants than controls. In this group, when yoga was compared to dietary changes, those in the yoga group showed greater reductions in anxiety but not depressive symptoms. In CRC patients, anxiety and depression

improved in one study, and depression only in the other.  
**Conclusions:** Emerging research supports that yoga shows promise for improving GI symptoms, QOL, anxiety, and depression across disorders; however, evidence is limited regarding the number and sample size of studies. Research protocols that use standard yoga interventions and consistent outcome measures in well-defined GI cohorts are warranted.

34. YOGA AND MINDFULNESS FOR LONG COVID

M. Tobias, A. Meulenbroek

**Objective:** The COVID-19 pandemic has greatly impacted individuals worldwide. In The Netherlands, approximately 90,000 individuals experience persistent symptoms, significantly affecting their quality of life and societal participation.<sup>1</sup> This study explores the effects of a yoga and mindfulness program on enhancing the recovery and well-being of long COVID patients by restoring autonomic nervous system functioning, enhancing energetic balance, promoting body awareness and self-care, reducing stress and anxiety, and fostering a supportive community. This study explores the effects of this program, aiming to provide valuable insights for their management and rehabilitation.

**Methods:** Using a mixed-methods approach with a pre-post intervention design, participants were recruited from two physical therapist offices. They underwent an eight-week yoga and mindfulness program, followed by an optional nine-week follow-up program. Sessions included asana practice, breathing exercises, meditation, and relaxation techniques. VAS scores and questionnaires evaluated physical symptoms, psychological well-being, stress levels, and quality of life. Participants monitored their symptoms each session through completed forms. The study is ongoing.

Key Findings: Yoga and Mindfulness for Long COVID

	Positive/Yes	Neutral/Maybe	Negative/No
Have you noticed an improvement in your overall health since participating in the yoga & mindfulness program?	30%	65%	5%
To what extent has the practice of yoga and mindfulness influenced your quality of life?	84%	12%	4%
To what extent have you been able to integrate mindfulness into your daily life outside of the sessions?	13% Fully integrated	78.3% Partially integrated	8.7% Not at all integrated
Have you experienced a change in stress and anxiety levels after participating in the program?	100%		
Have you noticed that your energy levels and fatigue are better managed?	75%		12.5%
Have you noticed any changes in your immune system since participating in the program?	65%	30%	5%
What contribution does Yoga & mindfulness make to your mental well-being?	100%		

**Results:** This cohort's symptomatology effectively mirrors that of Long COVID patients nationally, indicating representativeness.<sup>2</sup> Preliminary analysis of data from almost 1,000 completed forms by 75 participants (8% male, 92% female) revealed significant improvements in fatigue management, overall well-being, and quality of life among program participants. Participants also reported reduced levels of stress and anxiety.

**Conclusions:** The findings of this study hold significant importance in the context of a new condition, long COVID, as it provides evidence for the positive effects of yoga and mindfulness on well-being and resilience. The alignment of these findings with existing literature further emphasizes the potential benefits of incorporating yoga and mindfulness in managing symptoms, promoting overall well-being, and enhancing resilience. This study highlights the potential effectiveness of a yoga and mindfulness program in supporting the recovery and well-being of individuals with long COVID.

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## 35. APPLYING THE FALSIFIABLE LOGIC MODEL TO AN INNOVATIVE MINDFULNESS-BASED INTERVENTION COMBINING YOGA AND SOCIAL EMOTIONAL LEARNING

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**Keywords:** yoga, social emotional learning, falsifiable logic model, program evaluation

**Objective:** This study applies the Falsifiable Logic Model (FLM) to evaluate Mindfulness-Based Interventions (MBIs) in schools. FLM approach is needed because most studies of school-based MBIs are premature effectiveness evaluations. We conducted a formative program evaluation of a new intervention integrating yoga and social emotional learning (SEL) to determine feasibility, fidelity, and acceptability. Our findings inform future implementation and evaluation of this program, as well as has general implications for evaluation of new evidence-based strategies to promote student mental health and well-being.

**Methods:** An innovative MBI, combining yoga movement, breathwork, meditation, and SEL curriculum called Classroom Clarity (CC) was administered in Houston public high schools and taught by volunteers via a non-profit organization. CC is provided to schools primarily comprising Black and/or Hispanic students from low-income families. Class settings varied: two during lunch/intervention, two club/elective periods, and one during gym. Five classes, including one for special education students, are led by instructors with 200+ RYS training. Weekly

data collection included fidelity measures, such as class count and curriculum components addressed using a 6-point system. Acceptability was evaluated through session attendance and student engagement, rated by instructors on a 5-point Likert scale.

**Results:** A total of 78 sessions of CC were delivered in FY23. In the first semester, only 22 sessions were held due to implementation barriers, while the second semester had 56 sessions across the five classes. Instructor surveys were completed 92% of the time, and the average session had 10 students (ranging from 2-22). Nearly 75% of sessions maintained the CC curriculum structure – SEL first, then yoga. Most teaching elements were completed in each session: pulse check (96%), SEL lesson (88%), SEL activity (84%), yoga postures (85%), breathwork (89%), and meditation (70%). Instructors perceived student engagement to be at least 75% overall for 92% of sessions with surveys.

**Conclusions:** The need for the FLM approach was supported because logistical barriers resulted in fewer classes or only being able to teach the yoga or SEL portion, possibly weakening results in an evaluation. By the second semester, the CC program was well implemented in schools with fidelity and engagement. The next step is a pilot study of feasibility and acceptability of collecting effectiveness data.

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## 36. A MOBILE INTERVENTION MERGING YOGA AND SELF-MANAGEMENT SKILLS (MY-SKILLS MOBILE) FOR INDIVIDUALS EXPERIENCING SYMPTOMS OF LONG COVID

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**Objective:** The purpose of this study was to investigate the acceptability and benefits of a mobile intervention Merging Yoga and Self-Management Skills (MY-Skills Mobile) as a complementary therapy for fatigue, pain, mood, and quality of life in patients with long COVID.

**Methods:** This was a single-arm pilot of MY-Skills Mobile, an 8-week fully remote, web-based yoga and self-management education intervention focused on supporting patients with long COVID symptom management and health promotion. Participants received an initial individual yoga therapy session followed by group yoga via Zoom two times per week for 60 minutes. Yoga was progressively challenging with seated, supine, and standing postures, pranayama, meditation, and restorative yoga. Participants were provided recorded videos for breathwork, hatha yoga, and meditations. Self-management content (educational videos, discussion boards, and interactive activities for goal setting, monitoring, and problem-solving) was delivered asynchronously. Participants completed self-reported measures of long COVID symptoms for fatigue (PROMIS-13), pain (Brief Pain Inventory), and health-related quality of life with the mental health sub-scale (SF36) at pre and post intervention. After completing MY-Skills Mobile, participants were asked to report benefits from yoga and rate their satisfaction with the intervention (1-10 most satisfied). Symptom measures and self-report acceptability were analyzed descriptively and assessed for mean changes from pre to post assessment.

**Results:** Nine participants enrolled; 55.8 ±10.9 years of age, all female individuals, and 88% White. Participants reported that yoga helped them relax, feel happy, and increase energy. Most participants indicated satisfaction with yoga (mean=8, mode=10) and reported their favorite aspects as: breathing exercises, guided relaxation, and Savasana (final relaxation). Improvements in long COVID symptoms were found for fatigue (↓63.1±2.4 vs 61.7±5.7), pain interference (↓3.7±2.1 vs. 3.4±3.0), health related quality of life (↑38.1±34.3 vs. 48.9±25.0) and mental health (↑56.4±21.9 vs 60.9±23.6).

**Conclusions:** Patients with long COVID experience high symptom burden for many months after initial infection of the COVID-19 virus. Results from this study provide insight into the delivery of mobile interventions for patients with long COVID and suggest MY-Skills Mobile may be suitable as a complementary therapy for fatigue, pain, mood, and quality of life.

## 37. INFLUENCE OF TRATAKA AND PRANAYAMA PRACTICES ON ADOLESCENTS WITH EXTENDED EXPOSURE TO DIGITAL DISPLAY (COMPUTER SCREEN AND MOBILE PHONES)

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**Keywords:** yoga, trataka, social media, youth, adolescents, eye strain, visual media, digital

**Objective:** The prevalence of digital display usage is very high among adolescents of age 10 to 19 years, especially during the Covid 19 lock down, creating an environment prone to visual stress directly related to extensive time watching screens/phones, social stress due to isolation with digital media dominating all social interactions. A specially designed yoga module consisting of Trataka and Pranayama is conducted and evaluated with regards to improvements in vision, cognitive functions and anxiety reduction in adolescents of age 10 to 19 years.

**Methods:** Children between the ages of 10 to 19 years were recruited for this study and were placed in one of two groups: Intervention Yoga (n=41) and control (n=18). The intervention group underwent a specially designed Yoga module of Trataka (a visual cleansing technique) and Pranayama (voluntarily regulated breathing). This was given for a period of 3 weeks (21 days) via remote sessions using ZOOM. The control group did not undergo this module. The subjects in both groups were assessed before and after the intervention. The assessments were done using Visual Strain surveys, Digit Span Test and Six Letter Cancellation Test (SLCT) to evaluate concentration, and STA (State Trait Anxiety) to measure anxiety.

**Results:** The intervention group showed statistically significant reductions on the Visual Stress Survey scores (p<0.003, mean reduced from 16.8 to 14.7) and on STA of positive sentiments (calm, content, relaxed) (p<0.02, mean increased from 8.65 to 9.38). The measures on concentration (DLST and SLCT) did not statistically differ before and after the Intervention in the Intervention group. Voluntary Testimonials (n=11) were collected for the intervention group, and these showed a perceived positive effect of Trataka practice. The control group did not have any statistically significant changes in any of the measures (p>0.05 for all comparisons).

**Conclusions:** The practice of Trataka along with Pranayama can alleviate ocular strain and anxiety in adolescents who use digital display units during covid pandemic.

### 38. EXPLORING YOUNG WOMEN'S EXPERIENCES PARTICIPATING IN A MINDFUL YOGA INTERVENTION FOR DEPRESSION: QUALITATIVE ANALYSIS OF POSITIVE AND NEGATIVE EFFECTS

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**Keywords:** mindful yoga, young women, qualitative measures, positive and negative effects

**Objective:** Evidence of the benefits of yoga for patients with major depressive disorder (MDD) is mixed. Although randomized controlled trials (RCTs) are still considered the gold standard of research, RCTs have been criticized for limitations such as the generalizability to real-world settings. Adding qualitative measures to RCTs may give additional insight into the range of outcomes experienced by participants. This may be especially important when it comes to potential negative effects, as only half of previous yoga-intervention studies include drop-out rates or adequately reports safety data including adverse events. Therefore, we used qualitative measures to assess the (positive and negative) experiences of young women (18-34) with MDD ( $N = 171$ ) receiving a 9-week mindful yoga intervention added to treatment as usual.

**Methods:** The qualitative assessments were conducted alongside an RCT with two conditions (treatment as usual-only and treatment as usual plus mindful yoga). After the last assessment (12-month follow-up), the interviews were conducted. Questions were open-ended and positive and negative experiences were noted. In addition, we explicitly asked about potential negative effects. Interviews were systematically analyzed and statements were placed in domains and subcategories, including Affective, Cognitive, Conative, Somatic and Yoga Skills Domains.

**Results:** Of the 171 participants 88 were randomized to receive the mindful yoga intervention. Qualitative interviews of 58 participants (66%) were collected. Of these, 81.0% reported positive effects, and 65.5% reported negative effects. Positive experiences consisted mostly of positive affect (56.9%), meta-cognition (e.g., becoming more aware of emotions; 44.8%), general physical relaxation (41.4%), body awareness (36.2%), acceptance (34.5%) and change in effort or striving in daily life (e.g., taking more time for relaxation; 34.5%). Negative experiences consisted

mostly of meta-cognition (e.g., becoming more aware of negative thoughts; 37.9%), agitation or irritability (20.7%), physical inflexibility (12.0%), pain (10.3%) and self-conscious emotions such as awkwardness (10.3%).

**Conclusions:** The majority of young women in the mindful yoga intervention added to treatment as usual experienced both positive and negative effects. This shows the importance for future RCTs to broadly assess positive and negative experiences in order to gain insight into the range of experiences of participants.

### 39. MINDFUL YOGA VERSUS RELAXATION FOR YOUNG ADULTS WITH SYMPTOMS OF DEPRESSION: COMPARISONS OF BRIEF LABORATORY-BASED INTERVENTIONS

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**Keywords:** depression, mindful yoga, mediators, rumination, attentional bias

**Objective:** High prevalence of depression in young adults indicates the importance of finding effective treatments for this population. The purpose of these two studies were to test whether, compared to an active control group, a short mindful yoga intervention for undergraduate students leads to greater reductions in depressed affect and whether rumination and attentional bias mediate this effect.

**Methods:** In Study 1 undergraduates ( $N=71$ ) received one 30-minute session of mindful yoga or relaxation. Next, they practiced at home for 15 minutes per day during eight days using a practice video. In Study 2 undergraduates ( $N=74$ ) pre-screened for symptoms of depression followed the same procedure as Study 1. Assessments took place at baseline, after the 8-days of home practice, and at 2-months follow-up. Measurements included self-report depression symptoms (using the Major Depression Inventory and the Depression subscale of the Depression Anxiety and Stress Scale) and rumination (using the brooding scale of the Rumination Response Scale) and attentional bias (using a reaction time task, the exogenous cueing task).

**Results:** In Study 1, 70 participants completed the post-intervention assessments, and 64 participants completed the 2-month

follow-up assessments. A repeated measures ANOVA showed no significant interaction effect of condition and time,  $F(2,126) = 0.58, p = .561$ , partial  $\eta^2 = .009$ . Post-hoc moderation analyses showed that for participants with greater depressed affect at baseline, mindful yoga was more effective in reducing depressed affect at post-intervention and 2-months follow-up. In Study 2, 71 participants completed the post-intervention assessments, and 65 participants completed the 2-month follow-up assessments. A repeated measures ANOVA showed a significant interaction effect of condition and time,  $F(2,126) = 4.215, p = .017$ , partial  $\eta^2 = .063$  in favor of mindful yoga. Post-hoc analyses showed that from baseline to post-intervention the difference was not significant,  $F(1,69) = 0.34, p = .563$ , but was significant from post-intervention to follow-up,  $F(1,63) = 6.09, p = .016$ , and from baseline to follow-up,  $F(1,63) = 5.46, p = .023$ . Neither study showed mediation effects for rumination or attentional bias.

**Conclusions:** The results suggest mindful yoga may have promise for young adults with symptoms of depression.

## 40. COST-EFFECTIVENESS OF A MINDFUL YOGA INTERVENTION ADDED TO TREATMENT AS USUAL FOR YOUNG WOMEN WITH MAJOR DEPRESSIVE DISORDER

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**Keywords:** cost effectiveness, depression, women, yoga, randomized controlled trial

**Objective:** Young women are particularly at risk for developing major depressive disorder (MDD). MDD in this group is associated with substantial societal costs. Therefore, we studied the (cost) effectiveness of adding a mindful yoga intervention (MYI+TAU) to treatment as usual (TAU) for young women with MDD.

**Methods:** A randomized controlled trial ( $N=171$ ) comparing TAU+MYI with TAU-only. Assessments were at baseline, post-intervention, and at six- and 12-month follow-up. All participants were currently in treatment. MYI consisted of a manualized 9-week group training with weekly sessions of 1.5-hours. The economic evaluation focused on the balance between costs and health outcomes of the MYI added to TAU (MYI+TAU) compared to TAU-only in the targeted population. Symptoms of depression (Depression Anxiety and Stress Scales; DASS) and quality adjusted life years (QALYs) were used as primary health outcomes in the economic analyses. The economic evaluation was conducted from a societal perspective; relevant costs within and outside the healthcare sector were prospectively assessed during 15 months for all the included participants.

**Results:** A total of 171 participants were randomized, of whom 88 received the MYI. Mean total societal costs during the 15 months of the study were €11.966 for the MYI+TAU group and €13.818 for the TAU group. The differences in mean total costs between groups (-€1.852) were not statistically significant (95%CI lower boundary -€6.611, upper boundary +€2.854). Health outcomes (DASS and QALY) were slightly in favor of MYI+TAU, but differences between groups were not statistically significant, although both outcomes tended to be more positive for MYI+TAU (mean DASS difference 6.41, 95%CI lower boundary -1.11, upper boundary 13.74; mean QALY difference 0.02, 95%CI lower boundary -0.05, upper boundary 0.09). The absence of significant differences between mean total costs of MYI+TAU and TAU should be interpreted with some caution, since the study was powered (as most economic evaluations) to demonstrate differences in health outcomes and not costs. Combining costs and health outcomes in cost-effectiveness analyses indicated that MYI+TAU is likely to be cost-effective compared to TAU, which was confirmed by sensitivity analyses.

**Conclusions:** Findings from this study suggest that MYI+TAU warrants future attention for the potential to be cost-effective compared to TAU for young women with MDD.

## 41. INTERDISCIPLINARY PAIN MANAGEMENT IMPROVES INTEROCEPTIVE AWARENESS IN CHRONIC PAIN

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**Keywords:** chronic pain, interoceptive awareness, interdisciplinary rehabilitation, yoga

**Objective:** Interoceptive awareness (IA) reflects one's attentional and emotional relationship with unpleasant sensory experiences and is altered in individuals with chronic pain. While IA is emerging as a mechanism that may contribute to improved pain outcomes in yoga-based and mind-body practices, little evidence exists regarding the role of IA in response to an interdisciplinary pain management program integrating mind-body techniques such as mindfulness, yoga, and tai chi.

**Methods:** This study presents preliminary findings of an ongoing pre-post study examining change in IA in a homogeneous pain population completing a 4-6-week interdisciplinary pain management program. A sample of N=27 completed study participation at the time of analyses. Outcomes were assessed before and after program participation and included the Multidimensional Assessment of Interoceptive Awareness-Version 2 (MAIA-2) and the PROMIS-Pain Intensity short form. Paired sample t-tests examined changes in response to intervention.

**Results:** Analyses revealed a significant improvement in overall MAIA-2 ( $t(25)=6.725, p<.001$ ) and PROMIS-Pain Intensity scores ( $t(25)=4.512, p<.001$ ). Subscale analyses showed an improvement on six of the eight MAIA-2 subscales: Noticing, Attention Regulation, Emotional Awareness and Self-Regulation ( $p's < .001$ ), Body Listening ( $p=.043$ ) and Trusting ( $p=.042$ ); whereas the two negatively worded scales did not show a significant change. The improvements in these six subscales are consistent with previous trials examining changes in IA in response to mind-body interventions in healthy individuals.

**Conclusions:** These findings demonstrate that IA can be improved in response to standard of care pain rehabilitation, supporting the concept that IA is a modifiable construct in chronic pain worth further exploration in mind-body interventions. Highly significant improvements in Noticing, Attention Regulation, Emotional Awareness and Self-Regulation suggest that these components of IA are particularly relevant therapeutic targets for chronic pain.

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## 42. MINDFULNESS, STRESS AND PAIN CORRELATE WITH INTEROCEPTIVE AWARENESS IN OLDER ADULTS

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**Keywords:** yoga, interoceptive awareness, mindfulness, older adults

**Objective:** Interoceptive awareness (IA), is emerging as an important mechanism that may contribute to the physical and mental health benefits of yoga-based practices. However, little evidence exists regarding the role of IA in mind-body practices and how it may relate to mindfulness, stress, and pain levels in older adults.

**Methods:** This analysis was conducted utilizing data from an ongoing clinical trial investigating the neurocognitive benefits of yoga, aerobic exercise and stretching in older adults ages 55-79. A sample of N=168 participants completed baseline questionnaires prior to completing the intervention, including the Freiburg Mindfulness Inventory (FMI), Perceived Stress Scale (PSS), Self-regulation for Exercise Scale (SRES), and the Short Form-12 (SF12) measuring physical and mental health. A smaller sample of N=29 also completed the Multidimensional Assessment of Interoceptive Awareness (MAIA). Pearson's correlations, controlling for age were conducted for total scores. Follow-up analyses examined correlations between MAIA subscales with all other measures and the SF12 pain interference item.

**Results:** In the smaller sample overall IA demonstrated significant low to moderate correlations with mindfulness ( $r=.512, p<.01$ ), physical health ( $r=.434, p<.05$ ) and pain interference ( $r=.384, p<.05$ ), but was not associated with stress, mental health, or exercise self-regulation. In the larger sample, mindfulness was associated with better mental health ( $r=.421, p<.001$ ), lower stress ( $r=-.428, p<.001$ ), and greater exercise self-regulation ( $r=.229, p<.01$ ), but not physical health or pain. MAIA subscale analyses indicated that the Noticing, Attention Regulation, Emotional Awareness and Self-Regulation components of IA are particularly relevant to mindfulness ( $r's=.390-.505$ ), physical health ( $r's=.414-.558$ ), and pain ( $r's=-.410$  to  $-.490$ ) but remain unrelated to stress, exercise self-regulation and mental health.

**Conclusions:** These findings indicate that IA is related to mindfulness in older adults, but that they have distinct relationships with health outcomes: IA is related to physical health and pain and mindfulness is related to mental health and stress. Future mind-body interventions should consider assessing both IA and mindfulness to evaluate differential effects on physical and mental health outcomes.

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