

## **Program Proposal: RAD Yogi (Yoga for Rheumatoid Arthritis Dysfunction)**

Statement of Need: Rheumatoid arthritis is an autoimmune, inflammatory disorder affecting 1.5 million adults in the United States.<sup>(1)</sup> Women are twice as likely than men to be diagnosed with rheumatoid arthritis and the majority symptoms begin between the ages of 40 and 60 years of age.<sup>(1)</sup> Rheumatoid arthritis causes chronic, debilitating pain, functional disability, work limitations, substantial healthcare costs, decreased quality of life, and increased mortality.<sup>(2)</sup> The International Association for the Study of Pain (IASP) reports that rheumatoid arthritis is one of the major categories of chronic pain.<sup>(3)</sup> Individuals with RA are twice more likely to have activity limitations, including activities of daily living (ADLs), self-care, and exercise, than those without arthritis.<sup>(4)</sup>

Individuals with jobs or careers requiring higher physical demands were more likely to lose their job, retire early, or reduce amount of work hours due to their disease.<sup>(5)</sup> In developed countries, like the US, 50% of those diagnosed with RA are unable to work full-time within 10 years of the initial diagnosis.<sup>(6)</sup> In 2003, rheumatic conditions, like RA, were responsible for \$47 billion in lost earnings.<sup>(7)</sup> In 2012, over 9,000 hospitalizations were due to RA, costing over \$374 million in healthcare costs.<sup>(8)</sup> There is a high prevalence of mental health conditions comorbid with RA, including depression, which impacts quality of life, social involvement and adherence to disease interventions.<sup>(4,9,10)</sup> One study suggests a strong association of arthritis with depression, suggesting individuals have an 18% increased risk of having major depression.<sup>(10)</sup> The exact cause of RA is unknown; however, there are several risk factors including genes that are linked to other autoimmune diseases, cardiovascular disease, associations with estrogen and reproductive hormones, as well as smoking, which is the strongest modifiable risk factor for RA.<sup>(4,9)</sup> Living with chronic pain, activity restrictions, inability to

perform their job, and substantial healthcare bills, individuals with RA have lower health-related quality of life than those without arthritis.<sup>(2,4)</sup>

Rheumatoid arthritis is a type of polyarthritis, meaning it is classified as affecting more than five joints and characteristically presents in smaller, synovial joints of the wrist, hand and fingers.<sup>(2)</sup> RA can also affect larger joints such as the hip and knee; stereotypically, RA appears symmetrically across the body, but this is not always the case.<sup>(11)</sup> Symptoms of pain, swelling, redness and stiffness are present, but RA joints are also tender, soft and “boggy”, which distinguishes them from other types of arthritis.<sup>(11)</sup> Morning stiffness is also common in this population; however, with RA, it typically lasts over an hour and is a result of the prolonged period of rest overnight.<sup>(11)</sup> Individuals with RA can also experience fatigue, muscle soreness, weakness, low-grade fever and weight loss.<sup>(12)</sup> The disease process can vary depending on cycles or flare-ups, with individuals experiencing fluctuating symptoms and even later remission.<sup>(2)</sup>

Inflammation primarily affects the synovial membrane lining of joints, leading to subsequent damage of articular cartilage, bone and other musculoskeletal tissues.<sup>(12)</sup> The importance of early diagnosis and management with DMARDs (Disease Modifying Anti-rheumatic Drugs), which block the inflammatory cascade, is to prevent further damage to other musculoskeletal tissues, leading to other complications.<sup>(13)</sup> Capsule, tendon and ligament can become inflamed and overly stretched due to the presence of edema in the intra-articular space.<sup>(14)</sup> Tendinitis, tenosynovitis and ligament laxity can cause subluxation, which can potentially cause cervical myelopathy, if subluxation occurs at the atlantoaxial joint.<sup>(14)</sup> These can also lead to angular deformities and malalignments, which further contribute to damage of articular cartilage.<sup>(14)</sup> When

articular cartilage becomes inflamed and begins to break down, and the disease process is not curbed by medication, it can lead to damage to subchondral bone.<sup>(14)</sup> The bony erosion and subsequent peri-articular and subchondral osteoporosis can cause insufficiency fractures in this population.<sup>(14)</sup> This complication can be exacerbated by the fact that chronic inflammation increases bone resorption and decreases bone formation, doubling the risk of osteoporosis.<sup>(15)</sup> Loss of functional movement and avoidance of physical activity due to pain can cause disuse atrophy of all musculoskeletal tissues, including muscle, which can lead to weakness and even more loss of functional mobility, reflecting a feedforward negative cycle.<sup>(14)</sup>

Because it is a systemic inflammatory disease, RA can also affect bodily organs such as the heart, lungs, eyes, skin and nervous system.<sup>(13)</sup> Individuals with RA have a higher risk of developing coronary artery disease, interstitial lung disease, scleritis and conjunctivitis, rheumatoid nodules, and myelopathy or neuropathy (i.e. carpal tunnel and foot drop).<sup>(13)</sup> There are several biomarkers of systemic inflammation and stress, including rheumatoid factor (RF), anti-citrullinated peptide antibody (ACPA), C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR).<sup>(16)</sup> Having positive tests for these biomarkers indicate presence of autoimmune response or inflammation and suggest more rapid progression of joint disease and subsequent damage.<sup>(16)</sup>

Purpose/Objective of RAD Yogi: Through yoga, the RAD Yogi program promotes lifelong physical activity for individuals living with rheumatoid arthritis. The RAD Yogi program will target people with rheumatoid arthritis dysfunction, including restrictions or limitations in self-care, job requirements, functional mobility, or exercise. Individuals in any stage of the disease process are welcome, including those who have been recently

diagnosed, have been managing their diagnosis for years, or are in remission. The purpose of the RAD Yogi program is to teach a safe, gentle, effective way of exercising, though yoga, in order to reduce arthritis-related pain, depression and disability. Information sessions will educate participants on the relationships between chronic disease, chronic pain, stress, and depression with emphasis on how yoga can be a source of relaxation, stress reduction and pain management. Instructors will identify and modify poses and sequences specifically for the rheumatoid arthritis population with the focus on improving joint mobility and flexibility. Participants will exit the program with the knowledge and self-efficacy to perform yogic breathing, meditation, movement sequences and modified poses to continue to practice on their own. Secondly, the program serves to connect a community of similar individuals to ultimately foster a network of new yogis who support and encourage positive behavior change.

Background: Yoga has been shown to be a safe and useful intervention for pain related to various types of chronic disease, especially of the musculoskeletal nature.<sup>(17,18)</sup> In a review of the literature, the most relevant and best evidence (as scored by the AMSTAR checklist for systematic reviews) included Bussing et al. (2012), and Ward et al. (2013), which are both systematic reviews and meta-analyses. Ward et al. (2013) suggested that yoga had a clinically meaningful effect on pain, function and psychosocial outcomes for various musculoskeletal conditions, including RA.<sup>(18)</sup> The meta-analysis found a moderate treatment effect of yoga for pain and function, especially when compared to passive interventions.<sup>(18)</sup> Bussing et al. (2012) indicated a moderate effect of yoga on pain and pain-related disability associated with several chronic conditions including rheumatoid arthritis.<sup>(17)</sup> There were varying durations of yoga for each systematic

review, but the entire range of yoga intervention for both was 1 to 24 weeks.<sup>(17,18)</sup> Bussing et al. found slightly higher effect sizes for shorter duration programs.<sup>(17)</sup> One study included in Ward et al. (2013) showed reduction of pain levels in patients with rheumatoid arthritis after 40 days, with duration of sessions lasting 90 minutes; however, frequency per week was not stated.<sup>(18)</sup> The RAD Yogi program is 8 weeks long with hour-long classes held twice per week because this reflects the average frequency of included studies within the two systematic reviews. Specifically, 8 weeks is the average between 40 days (~5-6 weeks) and 12 weeks (the middle of the range of 1 – 24). Similarly, 60 minute classes were common and reflected a reasonable dosage for twice a week for total intervention.<sup>(18)</sup> Hatha and Iyengar were the most commonly studied styles of yoga, while the NPRS (Numeric Pain Rating Scale) was a validated pain outcome for assessment used in both systematic reviews.<sup>(17,18)</sup>

Additionally, Bussing et al. (2012) found that yoga had a moderate effect on mood, aligning with research stating that short-term yoga has a moderate effect on depression severity.<sup>(19)</sup> Regular yoga practice significantly improved antioxidant levels, reduced stress hormones and increased cytokines related to immune response.<sup>(20)</sup> It is unclear whether this immune response is beneficial to autoimmune diseases like RA. One study found that just one week of yoga decreased levels of rheumatoid factor,<sup>(21)</sup> and yoga experts were shown to have significantly lower levels of C-reactive protein than novices, suggesting that yoga can help to regulate inflammatory markers that occur in response to stress or disease.<sup>(22)</sup> Finally, yoga philosophy may increase self-efficacy and disease management by improving one's health locus of control.<sup>(3)</sup>

Goals: At the program's completion, participants will have a basic understanding of importance of exercise for joint health and chronic disease measured by demonstration and participation in the full 8 weeks. As measured by the survey, patients will have self-efficacy for performing modified yoga poses and sequences after 16 classes. Breathing and meditation components will decrease perceived levels of stress, measured indirectly through improved self-efficacy of disease management. The RADAR outcome will capture improvement in participants' overall disease activity (from baseline to 8 weeks), including number of involved joints, morning stiffness, tenderness, activity limitations, and pain.<sup>(23)</sup> Additionally, patients will show improvement in SF-36 scores from baseline to indicate improved health-related quality of life. The Numeric Pain Rating Scale will be used to compare pain levels before and after each yoga session and the goal is to show a trend in reduction of pain with activity by the end of 8 weeks.

Program Description: The RAD Yogi program was created for the purpose of instructing individuals with rheumatoid arthritis on how to perform yoga safely and to encourage future yoga practice after program completion. Therefore, it is not an ongoing series of classes, rather it is offered six times per year to maximize the amount of participants or program graduates. RAD Yogi is an 8-week long course, consisting of hour-long classes held twice per week, for a total of 16 classes. The program will host a mandatory orientation prior to initiation of the program to make sure all participants are cleared to participate from their rheumatologist or primary care physician. RAD Yogi will be taught by two instructors, including one physical therapist and one occupational therapist who are both certified in Medical Therapeutic Yoga, which is an evidence-based methodology.<sup>(24)</sup> The primary styles of yoga from which poses and sequences are

derived are Hatha and Iyengar style yoga, which have both been shown to improve pain outcomes for this population.<sup>(17,18)</sup> These styles include guided breathing, meditation, poses, and sequences that can be modified for individuals with rheumatoid arthritis. Each week will have different themes that focus on using yoga to manage aspects of their disease (i.e. Yoga for Flare-ups, Yoga for the Hand and Wrist). The maximum amount of participants will be fifteen to maximize one-on-one instruction. Demographic information, initial diagnosis date, and severity of symptoms will be assessed at orientation, and will be used to screen for patients who are most appropriate and who will benefit most from yoga intervention. To assess outcomes, data from participants will be collected at baseline, at the end of the program at eight weeks and after the program has ended, at twelve weeks for follow-up. The NPRS will be used to assess pain before and after each session, while the SF-36 and RADAR (Rapid Assessment of Disease Activity) will be used to assess health-related quality of life and disease activity.<sup>(25,26)</sup> Recruitment of participants will be through flyers and handouts at rheumatologists' offices. The program will cost \$100, equaling less than \$7 per class.

Program Evaluation: To evaluate the effectiveness of the program, the aforementioned outcome measures will be used to assess goal realization. Additionally, a participant survey will be given at the end of each program evaluating strengths, weaknesses and recommendations for future programs. There will also be questions regarding perceived self-efficacy for yoga and disease management. To further capture the impact of yoga, a follow-up questionnaire will be given at twelve weeks to inquire about job limitations, self-care, stress and depression, functional mobility and daily activity levels. The

information gleaned from this program and its participants can be given to National entities like the Arthritis Foundation to be used for future research.<sup>(1)</sup>

Justification: The RAD Yogi program will influence determinants of health at the individual and interpersonal realms of the Social Ecological Model.<sup>(27)</sup> Specifically, the RAD Yogi program aims to increase individual self-efficacy of those diagnosed with RA to exercise without causing further pain or damage to their joints. Through group exercise, RAD Yogi facilitates interpersonal bonding and a social support network of people living with this chronic disease which will improve participants' overall well-being. Both self-efficacy and social support are constructs described by the Social Cognitive Theory of cognitive, environmental and social influences on health behaviors.<sup>(28)</sup>

The RAD Yogi program will host a monthly orientation for interested participants to provide information about how yoga is effective for reducing pain, depression and disability. According to the Transtheoretical Model, increasing awareness of the benefits of yoga is a process of change called consciousness raising.<sup>(29)</sup> Active participants will be encouraged to attend the orientation to give personal testimonials of their experience in order to inspire and motivate attendees to take action.<sup>(29)</sup> By hosting this orientation monthly, participants can learn about the program without having to commit and can begin to plan their schedules in order to accommodate the classes. This recruitment method maximizes the network of potential participants by capturing those in various stages of change according to the Transtheoretical Model.<sup>(29)</sup> Starting an exercise routine/regimen or program requires commitment and motivation; therefore, only those who are in the action stage begin this change.<sup>(29)</sup> People living with RA who want to make a change but do not know how and those who have been recently diagnosed and



want to make a plan can attend an orientation and decide if the RAD Yogi program is a good fit. Offering these orientations once a month gives those who may be in the contemplation or preparation stages a month to decide or plan their change; regardless, they know this program is available to them when the time is right.<sup>(29)</sup> The RAD Yogi program also provides resources, handouts and suggestions for maintenance of yoga practice after completion.<sup>(29)</sup>

The RAD Yogi program aims to challenge the assumption that those with rheumatoid arthritis cannot exercise without pain and that rest is the only way to decrease symptoms. It is possible that those recently diagnosed with this disease have been afraid to try exercise classes for fear it would be too hard or painful. For those who have tried exercise, it may have caused them to flare-up. These setbacks and failures can be discouraging, which is why the RAD Yogi program was created. According to the Social Cognitive Theory, self-efficacy is the belief that one can succeed; people with low self-efficacy will avoid activities or behaviors in which they lack confidence.<sup>(28)</sup> Self-efficacy can be enhanced through stress-free practice and successful experiences.<sup>(28)</sup> The RAD Yogi program increases participants' self-efficacy by providing classes with modifications of yoga poses, gentle movement sequences and light stretching designed with the particular symptoms of RA in mind. Participants learn how to correctly perform modified poses in a welcoming environment through RAD Yogi classes in hope that after the program they will have confidence to perform them in other environments such as a local gym or yoga class.

The RAD Yogi program brings together people of all ages, activity levels, genders, ethnicities and races living with rheumatoid arthritis. Ideally, the program will

attract those who have been recently diagnosed to start intervention early in order to minimize future joint damage. This program provides an opportunity for connection and socialization in a group setting. The Social Cognitive Theory states that social support positively influences a person's behavior through encouragement, peer modeling and social networking.<sup>(28)</sup> The program facilitates bonding between participants over shared experiences and challenges related to RA. After participants have completed the two-month program, they are encouraged to utilize this social network to continue their yoga practice and maintain their positive behavior change.<sup>(29)</sup> Behavior change and health behaviors are highly influenced by peers, family, co-workers and community; the RAD Yogi program aims to foster friendships and build a community network of RAD Yogis.

The RAD Yogi program accounts for social determinants that influence health behaviors within the individual and interpersonal realms of the SEM.<sup>(27,30)</sup> Individual social determinants include income, transportation, education, and overall life stress related to this disease.<sup>(30)</sup> For instance, the RAD Yogi program is offered at a very reasonable price to attract those with limited incomes. The two-month commitment allows participants to offset yearly gym membership fees by continuing to practice at home for free after improving self-efficacy. Offered within the Chapel Hill Carrboro area, there is free public transit which makes these classes accessible to those who cannot drive or do not have access to a car. While all participants have a rheumatologist, this program can provide gaps in education regarding physical activity due to the presence of a licensed physical therapist with a background in therapeutic medical yoga.

## References

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