

Review Article

Healthy Lifestyles and their Beneficial Effect on Arthritis

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Abstract: Arthritis, called the ‘disease of the joints’ in Greek, results from inflammation-induced structural damage. It is a common disease, with estimates that 47% of women and 40% of men develop the ailment during their lifetime. Although over a hundred different types of arthritis are encountered in clinical practice, the most common are osteoarthritis, rheumatoid arthritis, and gout. They are associated with considerable suffering and increased disability. The economic cost to society is tremendous. Lifestyle modification has been shown to play a significant role in the prevention and management of these common forms of arthritis. Healthy lifestyle factors include non-smoking, abstinence or intake in moderation of alcohol, regular exercise, avoidance of excess body weight, and a prudent diet. This manuscript discusses the role of these lifestyle behaviors in the common forms of arthritis.

Keywords: Osteoarthritis, rheumatoid arthritis, gout, smoking, lifestyles, exercise, alcohol, diet, obesity.

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INTRODUCTION

Arthritis means “disease of the joints” in Greek [1]. It is defined as an acute or chronic joint inflammation, often accompanied by pain and structural damage [2]. It is an ancient disease, also noted in the Neanderthals [3]. Although there are more than 100 different types of arthritis, the most common ones are degenerative (osteoarthritis), inflammatory (rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, gout,) or infectious (septic arthritis, Lyme's arthritis) in nature [4]. Autoimmune diseases like systemic lupus erythematosus, Sjogren syndrome, scleroderma, myositis, inflammatory bowel disease, celiac disease, etc. may also be associated with inflammatory arthritis [4]. Arthritis is a common disease, with over one third of the American population showing arthritis on imaging [5]. The three common arthritis are osteoarthritis, rheumatoid arthritis, and gout [4]. Osteoarthritis is the most prevalent, usually involving the knee, hip, or the hands [6]. It is more common in females, and it is estimated that 47% of women and 40% of men will develop osteoarthritis in their lifetime [7]. Its incidence and prevalence are predicted to rise in the coming decades due to the aging population, increasing obesity, and high rates of traumatic knee injuries [8]. It is characterized by progressive cartilage loss, synovitis, osteophyte formation, and subchondral bone sclerosis [9, 10]. It is associated with chronic pain,

stiffness, joint instability, and joint deformities [11]. Treatment is largely symptom based [12-14], with many patients needing total joint replacement [15]. It is associated with much disability and mortality and reduces the quality of life in these patients [16-18].

Rheumatoid arthritis (RA) is an autoimmune systemic inflammatory disorder [3]. It affects about 1% of the adult population, with women being affected more frequently than males [19]. It is estimated that the lifetime risk is 3.6% in women and 1.7% in men [19]. Excess production of inflammatory mediators leads to synovial inflammation and irreversible bone destruction [20-23]. The polyarthritis is usually symmetrical³. Its etiology includes several genetic, environmental, and endogenous factors [24, 25]. The patients experience persistent pain and joint deformities [26]. Their quality of life is impaired [27]. RA is often associated with systemic manifestations [28, 29]. It also accelerates associated cardiovascular diseases [30]. It often leads to an inability to work and results in permanent disability [26].

Gout is the most common inflammatory arthritis [31], In the United States it has a prevalence of 3.9% [32] and this rises to 9% in individuals over 60 years of age [33]. The incidence and prevalence of gout are on the rise with a more than 2-fold increase over the past few decades [34]. It is caused by the deposition of

monosodium urate microcrystals in joints and tissues [35]. Hyperuricemia is central to its development [36]. Some predisposing factors include the male sex, advancing age, chronic kidney disease, alcoholism, and diuretics [3]. Acute flare-ups affect the big toe in 50% of cases - other joints sometimes affected include the ankle, midtarsal, knee, wrist, finger, and elbow joints [37]. The affected joint becomes red, tender, hot, and tumid with extreme pain [38]. Diagnosis may be confirmed by finding monosodium urate crystals in synovial fluid or tophus aspirates [39]. Certain comorbid conditions are often associated with gout [40, 41]. In a study spanning 20 years, there was a relative increase was 3-fold for renal disease and dyslipidemia, 4-fold for diabetes, 30% for hypertension, and 50% for obesity [42].

Septic arthritis is a rare acute arthritis [43]. It is usually caused by bacterial seeding of an already arthritic joint, most often from a skin or urinary tract infection [44]. In adults, *Staphylococcus aureus* is the most common pathogen (with streptococci strains also being common) [44]. Infection by gram-negative bacteria is more commonly seen because of trauma, intravenous drug use, immunosuppression, or in the elderly or very young [45]. Bacterial entry into the synovial fluid triggers a release of several chemicals that degrade cartilage and trigger hyperplasia of the synovial membrane [46]. Toxins produced by bacteria also add to the destruction within the joint space [47].

Other diseases often associated with arthritis include systemic lupus erythematosus, inflammatory bowel disease, psoriasis, celiac disease, Sjogren syndrome, systemic sclerosis, dermatomyositis, mixed connective tissue disease etc [48].

DISCUSSION

Five healthy lifestyles have been recognized as having a major impact on morbidity and mortality [49]. These behaviors are non-smoking, abstinence or low to moderate alcohol intake, a normal body mass index, regular exercise, and a prudent quality of diet [49]. According to Yanping *et al.*, adherence to these lifestyles and greatly improve survival and provide several extra years of life, both in men and women [49]. They also help reduce the incidence and impact of the common types of arthritis [50-52].

Smoking

The relationship between smoking and osteoarthritis is somewhat unclear. Although earlier reports suggest that smoking is a risk factor in the knee and hip OA, causing increased proliferation of chondrocytes [53], a subsequent meta-analysis suggested that there may be an inverse relationship between smoking and OA (Odds Ratio = 0.87) [54]. Another study found that smokers probably have a lower risk of radiographic OA than non-smokers [55]. A meta-analysis of 48 observational studies and data

from the 5th KNHANES study of individuals over the age of 50 also found no tangible relationship [56]. Cigarette smoking can however increase the incidence and severity of rheumatoid arthritis [57, 58]. Cigarette smoke mediates an increase of pro-inflammatory cytokine levels, exacerbating disease activity [57, 58]. Smoking may also reduce the effect of antirheumatic treatment [59]. Smoking appears to be associated with high serum uric acid in females [60], and smoking cessation may help prevent gout in women [61]. However, some studies have provided different results [62, 63]. Some studies have suggested that smoking may reduce gout in men, especially due to smoking-related lowering of urate levels in these patients [64, 65]. The association of smoking status and gout may therefore be gender-related and is somewhat controversial at this time,

Alcohol

There is no concrete evidence of an association, beneficial or otherwise, between moderate alcohol consumption and OA [66-69]. However, chronic, and excessive intake of alcohol raises inflammation [70, 71] and may lead to pathological OA-like changes [72]. A similar radiological knee OA effect, rather than a symptomatic effect, was seen in a Korean study in patients with alcohol consumption [73]. Low to moderate amounts of alcohol intake appears to be associated with a decrease in risk of RA incidence [74-76] and better functional status [77]. However, increased frequency of alcohol consumption may be harmful in RA [78]. Overall, the potential benefit of alcohol consumption in RA is somewhat unclear. Alcohol intake may however harm gout, by precipitating it at lower urate levels [79-81]. Alcohol intake may impair the production of oxypurinol and stimulate urate production in the body [82, 83]. Beer intake appears to be more associated with gout than spirits, and spirits more than wine [84].

Obesity

Obese patients frequently have knee and hip osteoarthritis [85]. Obesity results in excessive joint loading resulting in altered gait and movement, causing joint malalignment and cartilage degeneration [86, 87]. Besides the mechanical harm, obesity is also associated with chronic low-grade inflammation [88, 89]. and this results in several comorbidities associated with obesity, including OA [90, 91]. This also explains the increased presence of OA in non-weight-bearing joints⁹². Obesity also interferes with the success of total knee arthroplasty [93]. These patients have significantly higher rates of perioperative and postoperative complications, including infection, failure of wound healing, and increased reoperation, implant revision, or removal rate [94-97]. Obesity increases the risk of RA [98-100], especially in females [101-103]. Visceral obesity also has a strong causal association with RA [104]. Obesity is associated with a worse prognosis in patients with RA, with decreased remission with

treatment and poor outcomes [105-107]. These patients benefit from interventions to prevent and reverse obesity [108]. The associated morbidities are more common in obese patients with RA negatively affecting RA prognosis [109]. Adiposity-related adipocytokines, which exert pro-inflammatory effects cause the most damage [110, 111]. but vitamin D deficiency, sex hormones, and insulin resistance may also play a role [112]. Several studies suggest a potential causal relationship between obesity, serum urate level, and the risk of gout [113-121]. In an evaluation of 10 prospective studies, involving 27,944 cases with a median follow-up of 10.5 years, Aune *et al.*, found that the relative risks for gouty arthritis were 2.67, 3.62, and 4.64 for people with a BMI of 30, 35, and 40 kg/m², respectively, compared with people with a BMI of 20 kg/m² [122]. Further, weight loss helps reduce gout in these patients [123].

Exercise

Physical activity (PA) is defined as any bodily movement produced by the contraction of skeletal muscles resulting in a substantial increase in resting energy expenditure [124]. Exercise is defined as any sport or activity that works large groups of muscles, is continually maintained and performed rhythmically [125]. Several studies have demonstrated that exercise therapy is successful in reducing pain and stiffness, and in improving the physical performance of patients with knee OA [126-129]. Exercise also helps improve the QOL in these patients [130]. Aquatic exercise allows pressure reduction on the joints, which can help decrease pain [131]. Warm water also has a therapeutic effect [132]. Besides aerobic exercises [133], resistance exercises and balance exercises are also helpful [134, 135]. Exercise training is an important part of rheumatoid arthritis management [136]. These patients notice an improvement in joint health and mobility and become more physically active [136]. Their endurance, strength, and balance improves [136]. There is also an improvement in psychological well-being [136]. Increased physical activity and exercise also help reduce the impact of systemic manifestations of RA [137] such as increased inflammation, disturbed vascular function, and increased cardiovascular risk in these patients [138-141]. Their quality-of-life improves [142]. Exercise is relatively safe as compared with pharmacological treatments in the management of arthritis [143]. The American College of Rheumatology/Arthritis Foundation guidelines for the management of arthritis of the hip and knee emphasizes the importance of regularly performed physical exercise as an important therapeutic intervention [144]. Exercise may also be beneficial for gout patients, especially by helping reduce weight which leads to improved hyperuricemia [145].

Diet

Obesity exacerbates osteoarthritis [146-149]. Obese individuals have four times higher odds of

developing OA [150]. A weight-loss diet is therefore helpful [151]. Cholesterol may accumulate in human OA cartilage and high intakes of saturated fats are harmful to these individuals [152]. Low levels of vitamin D and vitamin K have also been implicated in OA [153, 154] although benefits via supplemental are not recommended at this time.

Most used diets appear to improve RA – these include fasting [155], the Mediterranean diet [156, 157], vegetarian diet [158], and a vegan diet [159]. Certain foods may be pro-inflammatory and aggravate RA [160-164]. These include highly refined flours, gluten, trans- and saturated fatty acids, dairy products, red meat tomatoes, eggplants, and potatoes [160-164]. Conversely, some micronutrients are anti-inflammatory and may help lessen RA [165-167]. These include long-chain omega-3 polyunsaturated fatty acids monounsaturated fatty acids, antioxidants, phytochemicals, flavonoids, vitamin D, fruits with enzymatic proteins such as papain and bromelain, ginger, turmeric, black pepper, green tea, and legumes¹⁶⁵⁻¹⁶⁷. However, the benefit of supplementation is unclear.

Gout is related to hyperuricemia and dietary factors that increase the latter are harmful¹⁶⁸. Uric acid-raising foods like refined grains, fructose (fruit juices), meats, organ meats, seafood, alcohol, (especially beer), and high sugar intake (including sugar-sweetened beverages) have been implicated [168-173]. Beneficial products in diet are low-fat dairy products, soy, coffee, and vitamins [174-176]. Both the DASH diet [177] and the Mediterranean diet [178] may help prevent gout or reduce gout attacks.

CONCLUSION

Lifestyle behaviors play an important role in the development and clinical course of arthritis. Osteoarthritis, rheumatoid arthritis, and gout are all worsened by unhealthy lifestyles like obesity, sedentary lifestyle, and a diet rich in unprocessed and processed red meat, saturated fats, and sugary drinks. Alcohol, especially beer, may also aggravate arthritis. The role of smoking cigarettes remains unclear. Healthy lifestyles also have beneficial effects on other major diseases and tend to increase longevity.

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