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# Curcumin and Fish Oil: Potential Alternative or Adjunctive Treatments to NSAIDs and Immune Modulating Medications for the Treatment of Chronic Inflammation

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## Abstract

- The aim of the present review is to evaluate the efficacy and safety of curcumin and fish oil as alternative or adjuvant treatments to NSAIDs and immune modulating medications for the treatment of chronic inflammation.
- An online search of CINAHL, PubMed, Cochrane and Alt Healthwatch databases was conducted. It was limited to peer-reviewed articles and clinical trials in academic journals within the last ten years.
- Current research suggests that curcumin may be efficacious in the treatment of chronic inflammation. It is generally regarded as safe up to 12 gm/day with mild gastrointestinal effects but poor bioavailability has limited its clinical application.
- Current research provides evidence that fish oil is efficacious for the treatment of chronic inflammation in a variety of chronic diseases. It is generally regarded as safe at doses of 3 gm/day with mild gastrointestinal effects and no increased risk of bleeding.
- In vitro studies have demonstrated a synergistic anti-inflammatory effect when curcumin and fish oil are used concomitantly.

## Introduction

- Research has demonstrated that chronic inflammation may drive many chronic diseases.
- Despite advances in the treatment of these complex chronic diseases their occurrence rates have continued to increase.
- High costs and adverse effects of standard anti-inflammatory treatments have prompted patients to seek more cost-effective and non-toxic agents for their management.
- It is estimated that approximately 50% of Americans are consuming dietary supplements to promote health and wellness.
- Curcumin and fish oil are two dietary supplements with demonstrated anti-inflammatory properties.

## Statement of the Problem

- Non-steroidal anti-inflammatory drugs (NSAIDs) and immune modulating medications are the mainstays of treatment for chronic inflammation yet their use is associated with a variety of adverse effects which can limit or prevent their use.
- Methodologically robust studies are needed to evaluate if dietary supplements can be effectively and safely used as alternative or adjuvant treatments for chronic inflammation.

## Research Questions

- In patients with chronic inflammatory processes, is curcumin more effective with fewer adverse effects than NSAIDs and immune modulating agents at reducing inflammation?
- In patients with chronic inflammatory processes, is fish oil more effective and with fewer adverse effects than NSAIDs and immune modulating agents at reducing inflammation?
- In patients with chronic inflammatory processes, does concomitant administration of curcumin and fish oil elicit a synergistic anti-inflammatory effect?

## Literature Review

### Inflammation, Chronic Disease and Anti-Inflammatory Mechanisms of Curcumin and Fish Oil

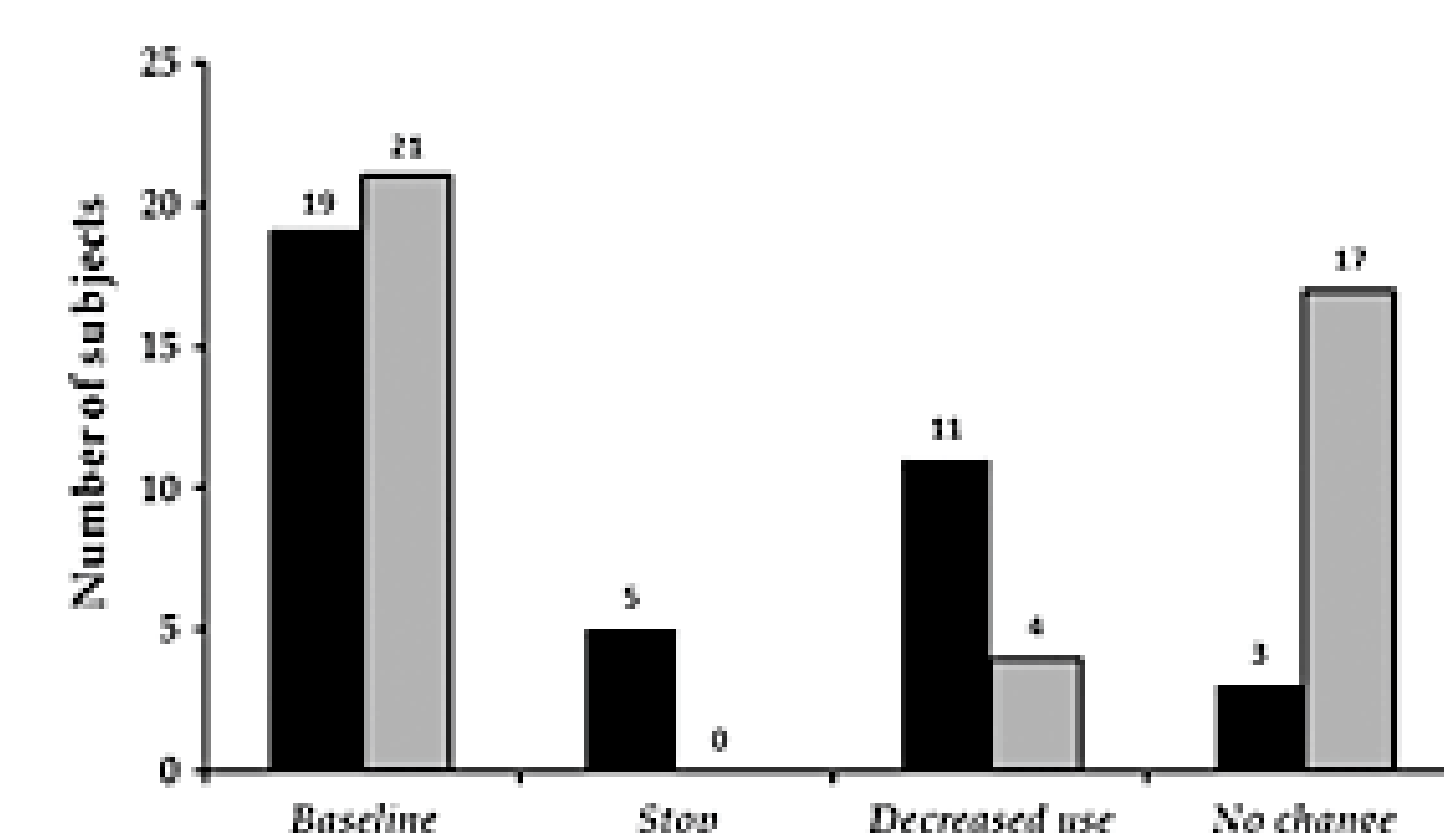
- Chronic inflammation creates a prolonged state of oxidative stress and damage which may lead to the progression of many chronic inflammatory and degenerative disorders.
- Curcumin exerts its anti-inflammatory effects by downregulating inflammatory cytokines, enzymes and transcription factors.
- Fish oil exerts its anti-inflammatory effects by inhibiting neutrophil recruitment, blocking production of pro-inflammatory prostaglandins, leukotrienes, and cytokines, and inducing macrophage phagocytosis and apoptotic cells.

### Safety and Efficacy of NSAIDs and Immune Modulating Agents

- Panahi et al. found that in patients with osteoarthritis, analgesics and NSAIDs, are only partially efficacious and their long-term use has been associated with adverse effects.
- A systematic review by Garg et al. found the use of sulfasalazine, mesalamine and immunosuppressives is efficacious for the treatment of ulcerative colitis but is associated with high rates of adverse effects.
- According to Chandran & Goel common adverse effects include gastrointestinal bleeding, fluid retention, renal toxicity, cardiovascular effects, accelerated osteoporosis, myelosuppression, hepatotoxicity, ocular and auditory toxicity and increased risk of infection.

### Safety and Efficacy of Curcumin

- Bigford & Rossi found no significant differences in cognitive scores and/or biological features of Alzheimer's disease with unenhanced curcumin but found it safe and tolerable up to 12 gms/day.
- Panahi et al. found 1500 mg/day of curcumin enhanced with Bioperene may be efficacious in alleviating symptoms without significant adverse effects in patients with knee osteoarthritis and significantly decreased NSAID use.



(Frequency of the use of NSAIDs/painkillers at baseline and at the end of study. Overall, the proportion of subjects reporting no or decreased use of NSAIDs (naproxen) at the end of study was significantly greater in the curcumin versus placebo group ( $p < 0.001$ ).

- Chandran & Goel found 1 gm/day of enhanced BCM-95 curcumin alone or in combination with diclofenac sodium decreased CRP levels without any significant adverse effects but was similar if efficacy to placebo in reducing joint tenderness and swelling in patients with rheumatoid arthritis.
- Panahi et al. found 1 gm/day of curcumin enhanced with piperine as compared to placebo improves biomarkers of systemic antioxidant, lipid peroxidation and inflammation in patients with metabolic syndrome.
- Lang et al. found 3 gm/day of unenhanced Cur-Cure curcumin in addition to optimized mesalamine therapy was superior to placebo in inducing clinical and endoscopic remission without increased rates of adverse effects in patients with ulcerative colitis.

### Safety and Efficacy of Fish Oil

- Arriens et al. found fish oil improves quality of life, disease activity, and biomarkers of inflammation with only mild gastrointestinal adverse effects in patients with SLE.
- A meta-analysis by Goldberg & Katz found fish oil improves pain outcomes and reduced NSAID consumption at doses above 2.7 gm/day in patients with rheumatoid arthritis.
- A systematic review by Lev-Tzion et al. found no evidence of benefit of fish oil in maintaining remission of Crohn's disease but found no serious side effects.

### Synergistic Effects of Curcumin and Fish Oil

- Saw et al. found that curcumin and fish oil in vitro had a synergistic anti-inflammatory effect and concluded there is strong evidence these effects may be translated into human trials.

## Discussion

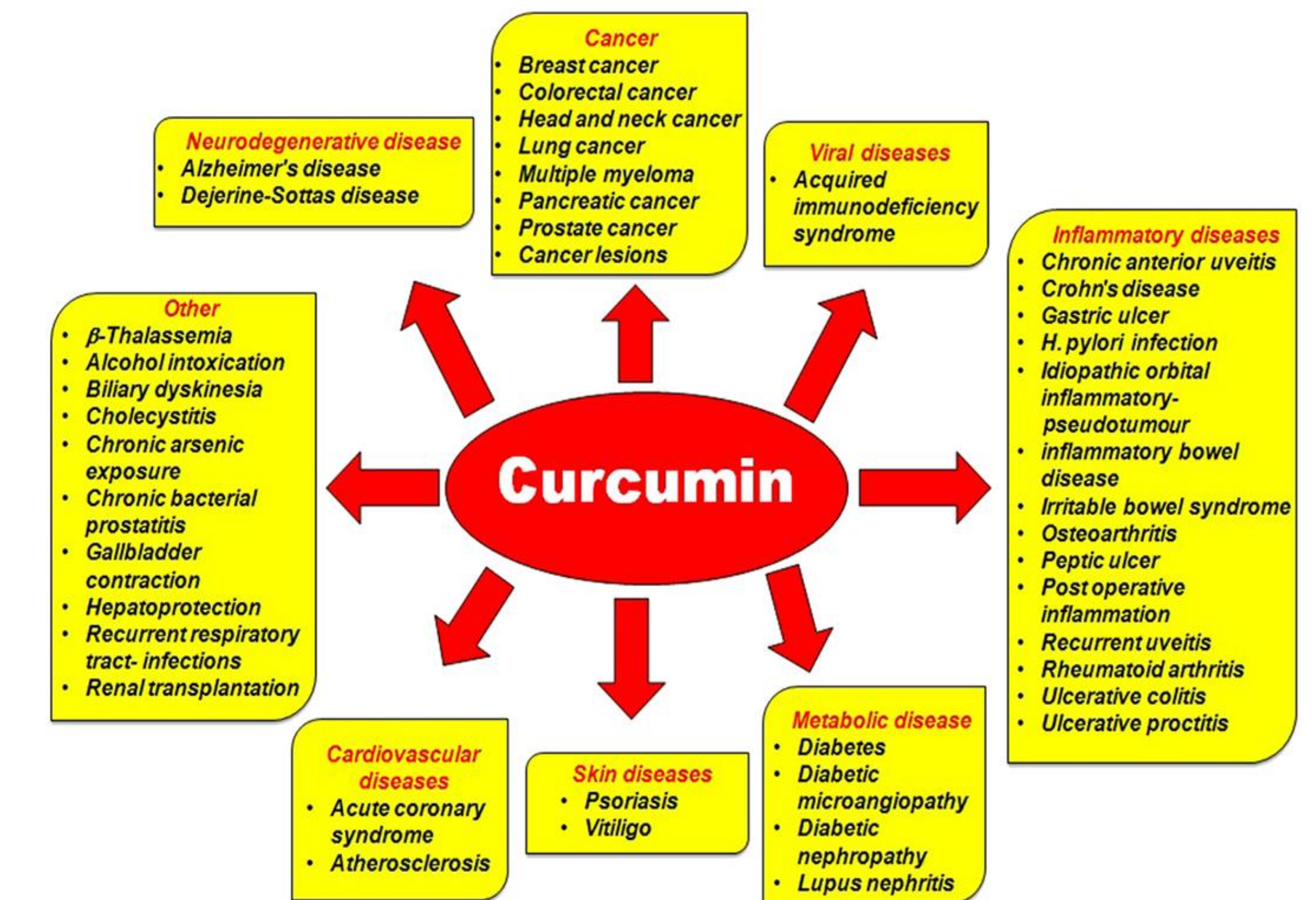
- Current mainstays of treatment for chronic inflammation are NSAIDs and immune-modulating medications which are associated with high rates of adverse effects.
- Current literature appears to provide evidence that curcumin may be efficacious in the treatment of chronic inflammation in a variety of chronic diseases with only mild gastrointestinal adverse effects should its limitations with poor bioavailability be overcome.
- Current literature supports that fish oil taken at doses of  $> 2.7$  gm/day is efficacious in reducing inflammation in a variety of chronic diseases and is safe up to 3 mg daily with only mild gastrointestinal adverse effects even in patients with high bleeding risk.
- Studies indicate that curcumin and fish oil may be a reasonable alternative or adjunctive therapy in the treatment of chronic inflammatory conditions and may decrease the need for NSAIDs and immune modulating agents thus decreasing their adverse side effects.
- Due to different mechanisms of action in vitro studies provide evidence of a synergistic anti-inflammatory effect when curcumin and fish oil are given concomitantly. Human studies are needed.

## Applicability to Clinical Practice

- In patients who desire to use dietary supplements to treat chronic inflammation there is evidence that curcumin and fish oil may be efficacious with only mild gastrointestinal adverse effects and may help reduce NSAID use.
- Curcumin may be efficacious in doses ranging from 500 mg/day to 12 mg/day in a variety of chronic diseases. A bioavailability enhanced formulation should be used.
- Fish oil may be efficacious in a variety of chronic diseases at a dose of 3 gm/day with no increased risk of bleeding. There does not appear to be evidence to support the efficacy and safety of higher doses.

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