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Effect of Adjuvant Yoga Therapy on Bio-Psycho-Social outcomes on Chemotherapy receiving cancer patients: A Narrative Review

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ABSTRACT

Cancer and chemotherapy impose significant physical, psychological, and social burdens on patients. Adjuvant yoga therapy is increasingly recognized as a complementary approach that supports holistic wellbeing. This narrative review evaluates the impact of yoga therapy on selected bio-psycho-social parameters, including European Organization for Research and Treatment of Cancer - Quality of Life Questionnaire - Core 30 (EORTC QLQ-C30), Visual Analogue Scale(VAS), Pittsburgh Sleep Quality Index (PSQI), Urea, Creatinine, C-reactive protein (CRP), Random Blood Sugar (RBS), Sense of Coherence (SOC) and Prakriti analysis using AyuSoft software. A literature search was conducted across PubMed, Google Scholar, Scopus, Web of Science, and UGC care journals, including RCTs, quasi-experimental, cohort, and observational studies involving adult chemotherapy patients receiving structured yoga interventions. Evidence suggests that yoga offers multidimensional benefits, reducing fatigue, pain, and sleep disturbances, improving inflammation and metabolic balance, with favorable effects on CRP and RBS, and neutral to mildly positive outcomes on renal biomarkers. Yoga consistently enhances quality of life, emotional and cognitive functioning, resilience, psychological wellbeing, and Sense of Coherence. Increasing research highlights the potential for personalized therapy through Prakriti-based assessment. Overall, adjuvant yoga therapy appears safe and effective, and its integration into routine cancer care may improve recovery, symptom management, emotional wellbeing, sleep quality, and overall quality of life, while future multicentric trials are recommended to establish standardized and personalized protocols.

KEYWORDS: Adjuvant Yoga Therapy, Oncology, Chemotherapy, Sense of Coherence, Prakriti, AyuSoft, Quality of Life.

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INTRODUCTION

Yoga, deeply rooted in India's spiritual heritage, offers a holistic approach to understanding health that bridges ancient philosophy and modern scientific insights. Yoga Vasistha describe disease as beginning with adhi - subtle disturbances in the mind, emotions, or stress response-which, when left unaddressed, eventually manifest as *vyadhi*, or physical illness. This perspective highlights the profound influence of mental and emotional states on bodily health. According to yogic physiology, the balanced flow of *prana* through the nadis sustain both physical and psychological wellbeing, while imbalances or blockages disrupt harmony.[1] Sage Patanjali describes five stress-producing factors called *Kleshas*. *Avidyāsmitārāgadveṣābhiniveśāḥ kleśāḥ* || (Yoga sutra-2.3). *Avidya* (ignorance), *Asmita* (ego), *Raga* (desire), *Dvesha* (aversion), and *Abhinivesha* (fear of change). These *Kleshas* are the root cause of *Dukha* (physical and mental suffering), and diseases are understood as manifestations of this *Dukha*. An individual's *prakriti* further shapes how they respond to stress and how illnesses progress. Adjuvant Yoga therapy builds on these

principles, using practices such as *asana*, *pranayama*, meditation, and deep relaxation to restore balance across the physical, psychological, and subtle-energy levels[2]. Modern scientific research now echoes these traditional views, demonstrating that yoga therapy can calm the autonomic nervous system, reduce sympathetic arousal, regulate the HPA axis, lower cortisol, and improve immune and inflammatory responses[2,3]. Together, these findings illustrate how mental regulation and energetic balance contribute meaningfully to physical health.[4]

Within this broader understanding of holistic health, cancer stands out as one of India's most pressing public health challenges[5]. Its growing incidence reflects shifting lifestyles, environmental influences, and the realities of a rapidly changing society. Breast, cervical, lung, oral, esophageal, gastric, ovary and colorectal cancers remain the most common, affecting families across socioeconomic backgrounds[6]. Factors such as tobacco use, unhealthy diets, obesity, and delayed medical care often worsen outcomes. Despite advancements in cancer treatment, many patients- particularly in rural areas- continue to receive diagnoses at later stages, reducing survival rates. Beyond the physical burden, cancer brings significant emotional, social, and economic strain to patients and their families. These realities highlight the need for comprehensive, compassionate, and multidisciplinary approaches to care. In this context, integrative practices like yoga as an adjuvant therapy hold meaningful potential in supporting quality of life, easing treatment-related distress, and enhancing overall wellbeing for individuals living with cancer.[7]

METHODOLOGY

Systematic Search Strategy: Databases searched included PubMed, Google Scholar Scopus, Web of Science and UGC care journals using terms: Yoga, Yoga Therapy, Oncology, Cancer, Cancer Patient Undergoing Chemotherapy, Prakriti Analysis using Ayusoft, European Organisation for Research and Treatment of Cancer - Quality of Life Questionnaire - Core 30 (EORTC QLQ-C30), Visual Analogue Scale(VAS), Pittsburgh Sleep Quality Index (PSQI), Urea, Creatinine, C-reactive protein (CRP), Random Blood Sugar (RBS), Sense of Coherence (SOC).

Inclusion Criteria: Randomized Controlled Trials (RCT), quasi-experimental, prospective cohort, and observational studies; adult cancer patients undergoing chemotherapy; yoga-based interventions *(asana, pranayama, Dharana*, relaxation); standard care comparators; outcomes spanning biological, psychological, and social domains; English language; published within the past 20 years.

Exclusion Criteria: Case reports, editorials, letters, conference abstracts without full data; pediatric studies; insufficient methodological quality.

Biological and Physiological Parameters

Renal Function: Urea and Creatinine: Accurate assessment of renal function is essential in oncology and hematology because kidney performance directly determines the safe use of chemotherapeutic agents and other nephrotoxic drugs. Since many anticancer medications depend on renal clearance, impaired kidney function can lead to toxicity from overdosing or reduced therapeutic benefit from under-dosing. Kidney dysfunction is common among individuals with cancer, and treatment-related nephrotoxicity may further worsen renal performance[8]. Serum creatinine- generated through normal muscle metabolism and eliminated via glomerular filtration and tubular secretion- remains one of the most widely used biomarkers of renal status[9]. Accurate estimation is therefore critical, as both overestimation and underestimation of renal function can negatively influence treatment decisions, eligibility for advanced therapies, and overall clinical outcomes.

Cancer and its treatments also produce a range of systemic symptoms, including fatigue, gastrointestinal disturbances, pain, and emotional distress, which collectively impact patient wellbeing. Within this broader context, yoga has emerged as a supportive integrative approach, yet its direct effects on renal biomarkers remain underexplored. Existing research suggests largely neutral or mildly favorable outcomes. A year-long comparison of hot and non-hot yoga practitioners showed no significant acute or long-term changes in serum creatinine or albumin–creatinine ratio, indicating stable kidney function[10]. Another study reported no significant reductions in blood urea and creatinine, along with improvements in physical and psychological quality of life among yoga practitioners[11].

Across the literature, most renal assessments rely on ratios such as the albumin-creatinine ratio, while isolated blood values of urea and creatinine are rarely examined independently. The present study aims to address this gap by evaluating whether yoga therapy can produce measurable changes specifically in blood urea and creatinine levels.

Inflammatory and Metabolic Modulation: CRP and RBS: Inflammation and metabolic dysregulation frequently coexist, and accumulating evidence indicates that yoga may exert a beneficial modulatory effect on both CRP and RBS levels. Through down regulation of sympathetic activation and cortisol release, yoga attenuates physiological stress responses that contribute to elevated inflammatory markers and impaired glucose metabolism[12]. Although some trials have reported no significant CRP differences between yoga and control groups[13], several others demonstrate clinically meaningful improvements. A study documented significant CRP reductions[14], reported comparable anti-inflammatory effects in gout patients receiving integrative therapeutic approaches[15]. Yoga aid improvement in fatigue, emotional well-being, and weight stability even in the absence of measurable CRP or TNF-α changes, suggesting symptom-level benefits may precede biomarker shifts[16]. Meta-analytic evidence further reinforces these findings: observed a pooled CRP reduction of-0.9mg/L, accompanied by enhanced glycemic control. Mechanistic studies indicate that yoga may suppress pro-inflammatory cytokines such as IL-6 and TNF-α, contributing to 10-25% reductions in CRP over time. Improvements in metabolic outcomes are also reported, with noting an average RBS decline of approximately

12mg/dL[17]. Collectively, these data highlight yoga's potential as a scientifically grounded complementary strategy for modulating inflammation and improving metabolic health.

Symptom Management: VAS: Emerging evidence shows that yoga can significantly reduce pain, with CKD studies reporting 60-80% improvement in VAS scores[18]. This suggests strong potential for cancer care, where Adjuvant Yoga Therapy's calming, stress-modulating, and muscle-relaxing effects may offer meaningful relief from persistent pain and enhance overall comfort during treatment.

Year	Author	Study Title	Study Duration	Intervention	Key outcomes
2021	Del Paggio JC et al.	Evolution of the Randomized Clinical Trial in the Era of Precision Oncology	2010–2020 retrospective review	Not applicable (methodology paper)	Shift toward surrogate endpoints (PFS), industry funding ↑ (89%), modest clinical benefit; psychosocial needs remain under-addressed
2025	Chen Z et al.	Regulation of Glycolysis in Gastric Cancer	Not specified	Not applicable	Highlights therapeutic targets; supports importance of multimodal therapy including lifestyle integrative approaches
2025	Filho AM et al.	GLOBOCAN 2022 Cancer Estimates	Global cancer data for 2022	Not applicable	Breast cancer most prevalent among women; emphasizes rising burden & need for supportive care interventions
2023	Namazinia M et al.	Effects of Laughter Yoga on HRQoL in Cancer Patients	4 weeks, weekly sessions (20–30 min)	Laughter yoga, clapping, rhythmic breathing, guided laughter	Improved emotional, physical, role functioning; ↓ fatigue, ↓ pain, ↓ sleep disturbance; improved global QOL
2024	Pradeep MK Nair et al.	Pragmatic Integrative Medicine Approach in Breast Cancer	Variable duration per patient	Yoga therapy, breathwork, guided relaxation + integrative therapies	Improved CBC, tumor markers, weight gain, arrested disease activity on thermal scan; improved subjective well-being
2012	Buffart LM et al.	Physical & Psychosocial Benefits of Yoga in Cancer Patients	Systematic review of trials (4–12 weeks)	Asanas, pranayama, meditation, relaxation	↓ anxiety, ↓ depression, ↓ distress, ↓ fatigue; ↑ emotional & social functioning;

					small effect on sleep
2011	Lin KY et al.	Effects of Yoga on Psychological & Physical Health Systematic review & meta-analysis	Mixed RCT durations	Hatha yoga, breathing exercises, meditation, relaxation	Consistent improvements in physical health (balance, strength, flexibility, mobility, fall risk) and psychological well-being (depression, anxiety, sleep, mood, vitality, hope); benefits are enhanced with regular practice and home exercises.
2021	Yi LJ et al.	Effects of Yoga in Women With Breast Cancer Receiving Chemotherapy	(Review of 7 RCTs) 3–12 weeks yoga interventions	Structured yoga (asanas, pranayama, guided meditation	Maintains weight, prevents treatment-related fatigue, and stabilizes quality of life; no significant changes in CRP or TNF-alpha were observed.
2017	Cramer H et al.	Yoga for Improving HRQOL, Mental Health & Symptoms	Studies up to 2016 (varied durations)	Hatha yoga, mindfulness, breathing, relaxation, meditation	Moderate-quality evidence for ↑ QOL, ↓ fatigue, ↓ sleep disturbance; limited evidence for anxiety & depression benefits
2021	Song J et al.	Effectiveness of Yoga on Cancer-Related Fatigue	Meta-analysis of 16 RCTs. Mixed durations across included trials	Mixed yoga formats; supervised + home practice	Yoga reduces cancer-related fatigue during chemotherapy and/or radiation, with better results when combining supervised and self-practice despite generally low adherence.

Psychological and Quality of Life Parameters

EORTC QLQ-C30: Yoga has been increasingly recognized as a meaningful contributor to QOL enhancement in individuals undergoing cancer treatment, with evidence spanning multiple functional and symptomatic domains. Across studies, yoga consistently improves physical, emotional, cognitive, and role functioning, reflecting its broad therapeutic potential. A study reported that yoga helped prevent treatment-related cognitive decline and cardiac dysfunction[19], while findings from[20] and earlier RCTs[21] demonstrated measurable gains in physical performance and daily functioning. Symptom-focused investigations further highlight these benefits: observed reductions in fatigue, pain, nausea, anxiety and showed that even laughter-based yoga could enhance emotional resilience[22-24]. Importantly, yoga remains a safe intervention, with noting no adverse events and clear improvements in patient-reported QOL[25].

These individual findings align with broader evidence from multiple meta-analyses, which consistently show that yoga therapy improves emotional, social, and functional well-being while reducing psychological distress, sleep disturbances, inflammation, and immune-related symptoms [26–30]. Taken together, this growing body of research supports Adjuvant Yoga therapy as a valuable

complementary modality within integrative cancer care, offering multidimensional improvements that significantly enhance quality of life for patients and survivors.

Sleep Quality (PSQI): Across recent studies, yoga has emerged as a comforting and supportive tool for improving sleep among people living with cancer. Even simple breathing practices—such as breath awareness, *ujjayi*, *kapalabhati*, and *nadi shodhana*-when practiced for just 10-15 minutes twice a day, helped ease sleep disturbances during chemotherapy by calming anxiety and settling the mind[31]. The large YOCAS trials offered even stronger evidence, showing meaningful improvements in sleep quality, including falling asleep faster, staying asleep longer, and relying less on sleep medications[32,33]. More recent work echoed these results, suggesting that yoga's benefits extend across different cancer types and stages[34,35]. Importantly, digital programs evaluated and showed that these gains are achievable even through online sessions, making support accessible from home[36]. Together, these findings highlight yoga as a gentle, restorative practice that helps cancer patients reclaim a sense of ease and restfulness in their sleep.

Sense of Coherence (SOC): Yoga appears to play an important role in helping cancer patients cope better with the emotional and physical challenges of treatment. Evidence shows that it not only supports the body but also strengthen inner resources such as resilience and SOC. Found that regular yoga practice improved cognitive functioning, reduced emotional distress, and enhanced SOC, suggesting that patients felt more capable of understanding and managing their situation[37]. Similarly, Another study reported notable reductions in anxiety, depression, and stress, reflecting yoga's calming influence on mental health[38]. Broader reviews, including those from DePaul University and various studies[39], highlight how yoga helps to reduce fatigue and stabilizes emotional responses during treatment. Mind-body research further shows that yoga nurtures resilience, enabling patients to navigate treatment demands with greater steadiness and confidence[40,41].

Prakriti Analysis: AyuSoft has proven to be a reliable tool for assessing Prakriti, showing strong agreement with physician evaluations even in psychiatric populations, where *Vata*, *Pitta*, and *Kapha* patterns influence emotional and behavioral responses [42]. In cancer patients, it helps identify constitution-specific trends-*Vata* types tend to experience faster tumor progression, Pitta types are more vulnerable to chemotherapy side effects, and *Kapha* types generally show slower disease advancement[43]. These insights highlight how Prakriti shapes both physical and psychological responses. Building on this foundation, future studies will examine whether yoga therapy can positively influence Prakriti traits, supporting personalized, constitution-based interventions to improve recovery, well-being, and overall outcomes in cancer care.

DISCUSSION

Adjuvant Yoga therapy offers multidimensional benefits for cancer patients undergoing chemotherapy. Evidence indicates improvements in inflammatory and metabolic markers (CRP & RBS), reflecting modulation of stress physiology, autonomic function, and systemic inflammation. Renal biomarkers, including urea and creatinine, remain stable or mildly improved, suggesting safety. Yoga alleviates symptom burden, particularly pain, likely via relaxation, parasympathetic activation, and enhanced coping.

Psychological and quality-of-life outcomes consistently improve, with reductions in anxiety, depression, fatigue, and sleep disturbances, and enhanced emotional, cognitive, and social functioning. Sleep improvements and strengthened Sense of Coherence highlight yoga's role in resilience and adaptive coping. Prakriti assessment via AyuSoft enables personalized therapy, tailoring interventions to individual constitution and treatment response.

Limitations: Heterogeneity in Adjuvant Yoga therapy protocols, small sample sizes, diverse cancer types, limited long-term follow-up, inconsistent biomarker measurement, and under-representation of varied populations limit generalizability.

Future Scope: Large multi centric RCTs with standardized Adjuvant Yoga therapy protocols, longitudinal follow-up, mechanistic investigations, Tele-Adjuvant Yoga Therapy delivery models, cost-effective studies, and Prakriti-based personalised approaches are needed to strengthen evidence and guide clinical integration.

CONCLUSION

Overall, evidence from clinical and observational studies demonstrates that yoga therapy is a safe, effective, and holistic complementary approach for individuals undergoing cancer treatment. It not only supports biological health-by modulating inflammation, metabolism, and renal function-but also improves symptoms, sleep quality, emotional resilience, and overall quality of life. Incorporating Ayurvedic principles, such as Prakriti assessment through tools like AyuSoft, allows interventions to be tailored to each patient's constitution, addressing both physical and psychological needs. Future research exploring how Adjuvant Yoga therapy may influence Prakriti traits could further refine personalized care strategies. Taken together, Adjuvant Yoga Therapy offers a meaningful, patient-centered approach that enhances recovery, wellbeing and long-term outcomes for cancer patients and survivors.

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