International Research Journal of Ayurveda & Yoga Vol. 6(12), pp. 74-79, December, 2023
Available online at http://irjay.com
ISSN: 2581-785X
DOI: 10.47223/IRJAY.2023.61213

REVIEW ARTICLE

The Impact of Yoga in Cancer Caregivers: A Review of Current Literature

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ARTICLE INFO

Article history:
Received on: 05-11-2023
Accepted on: 19-12-2023
Published on: 31-12-2023

Key words:
Cancer,
Caregivers,
Quality of life,
Yoga

ABSTRACT

This review explores yoga's impact on cancer caregivers, focusing on mental health, stress, and quality of life. As crucial supporters of cancer patients, caregivers often face distress. Yoga shows potential in reducing stress and enhancing caregiver well-being. This study analyses yoga interventions to underscore their benefits in improving mental and physical health within cancer care.

1. INTRODUCTION

Cancer is a debilitating disease that affects millions of people globally. It affects not only patients but also those who provide care for them. Caregivers play an indispensable role in offering physical, emotional, and logistical support to individuals with cancer. The demands of caregiving often result in significant psychological and physical distress among these individuals, which affects their well-being. Studies have shown that caregiving can lead to impaired physical health, emotional distress, lifestyle disruptions, work-related changes, financial strain, and uncertainty regarding the future.[1] Systematic reviews have emphasized the need to understand the impact of caregiving demands on caregivers' physical and psychological well-being.[2,3] Caregivers provide physical care to patients and address their emotional and financial well-being.[4] Research has explored the interdependence of physical and mental health among caregiver–patient dyads, highlighting the impact of caregiving on both patients and caregivers.[5] The effects of caregiving on caregivers' mental and physical health have also been observed in various contexts, such as caring for patients with cancer.[6] Various complementary interventions have recently gained attention for their potential to alleviate stress and enhance the quality of life (QoL) in diverse populations facing health-related challenges.

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Yoga, an ancient mind–body practice rooted in Indian philosophy, has gained increasing recognition for its potentially positive impact on caregivers' physical and mental health. The feasibility of well-being for caregivers has been explored in various studies that have sought to determine the effects of yoga on caregivers' physical health and coping strategies, yielding promising results.[7,8] Several studies have demonstrated the potential benefits of yoga for caregivers, including its capacity to reduce anxiety and depression, enhance QoL, and strengthen coping mechanisms.[9-12] Moreover, research has indicated that yoga interventions can significantly improve mental health outcomes for caregivers, such as reducing stress and promoting overall well-being.[13-15] Yoga fosters self-compassion and mindfulness, which can benefit caregivers by improving mental and physical well-being, reducing stress, and enhancing coping mechanisms. These findings underscore the potential of yoga as a valuable intervention to support caregivers in managing challenges associated with their roles.

Cancer remains a pressing global health concern, affecting a substantial number of individuals worldwide. The latest data suggest that the incidence of cancer is increasing, with an estimated 18 million new cases and 9.6 million cancer-related deaths reported annually in 2018.[16] This has resulted in significant economic and societal consequences for health-care systems worldwide. The World Health Organization predicts that the number of new cancer cases will increase to 26 million globally by 2040, further exacerbating the disease burden.[17] The adverse effects of cancer on the health and

functioning of patients and their caregivers have been identified as a critical area of research and clinical priority.[18]

The impact of yoga on cancer patients has gained significant attention in recent years, and its potential benefits in enhancing QoL and managing symptoms have been recognized.[19] Several systematic reviews and meta-analyses have highlighted the positive effects of yoga on psychological health outcomes in patients with cancer, including improvements in anxiety, depression, stress, and QoL.[20-22] Low-intensity forms of yoga, such as gentle hatha and restorative yoga, are both feasible and effective in addressing sleep disruption, cancer-related fatigue, cognitive impairment, psychosocial distress, and musculoskeletal symptoms in cancer patients receiving chemotherapy and radiation, as well as in cancer survivors.[23]

McDonnell conducted a systematic review to investigate the effects of Mindfulness-Based Interventions (MIBi) on lung cancer survivors and their partners.[24] The review revealed that MIBi had a positive impact on cancer-related distress, depression, self-compassion, mindfulness skills, and rumination. However, the researchers noted a significant gap in the literature as no interventions have specifically targeted the partners alone. Hence, further research is required to address this. Kusi conducted a meta-analysis on 28 trials involving 3876 participants to evaluate the effectiveness of psychoeducational interventions (PEIs) for cancer caregivers.[25] The study found that PEIs positively impacted depression, anxiety, caregiver burden, and QoL immediately after the intervention. Furthermore, the PEIs maintained their effectiveness on anxiety and QoL even at longer-term follow-up.

In their systematic review of 21 studies (19 RCTs), Fu explored the effects of psychosocial interventions for adult cancer caregivers between 2011 and 2016.[26] The interventions varied across nine categories: family connect, self-determination theory-based, cognitive-behavioral therapy, emotion-focused therapy, and others. The review revealed that paired interventions addressing caregivers' self-care, interpersonal connections, and patient symptom management enhanced caregivers' QoL and reduced depression. In addition, music therapy showed promise in alleviating anxiety among cancer caregivers. Despite the significant attention given to interventions aimed at alleviating the burden of cancer caregivers, there is a notable lack of research on the influence of yoga in this population.

Here, we aim to explore the existing literature and provide insights into how yoga practices can positively impact the well-being of cancer caregivers who dedicate themselves to caring for patients. We felt such a review would provide valuable insights by comparing the benefits of yoga to those of other interventions and would help fill a crucial void in our understanding of the role of yoga in supporting cancer caregivers.

2. METHODS

For this narrative review, we searched several databases using relevant keywords, including Cochrane Library, PubMed, Embase, Emcare, Cinahl, Amed, and Web of Science. We aimed to identify studies that investigated the use of yoga interventions in cancer caregivers. We only included randomized clinical trials published in peer-reviewed journals, written in English, and published between 2003 and 2023.

3. RESULTS

After removing duplicates, conference abstracts, and non-English publications, we identified 12 publications in total that came up with the initial screening; only four of these were randomized studies and published in full; here, we discuss the results in detail; the results are also summarized in Table 1.

Milbury conducted a randomized controlled trial to evaluate the feasibility and efficacy of a dyadic yoga (DY) intervention as a supportive care strategy for patients with Stage I to III non-small-cell lung or esophageal cancer undergoing thoracic radiotherapy (TRT) and their caregivers (N = 26 Dyads).[27] Participants were randomly assigned to either a 15-session DY intervention or a waitlist control (WLC) group. Comprehensive assessments of QoL (SF-36) and depressive symptoms (CES-D) were conducted for both groups before TRT and randomization. Patients also underwent the 6-min walk test, with subsequent evaluations occurring on the final day of TRT and 3 months later. The study met the predefined feasibility criteria, with consent, adherence, and retention rates at 68%, 80%, and 81%, respectively. After analyzing the data using multilevel modeling and considering relevant covariates, patients in the DY group showed significant clinical improvements compared to the WLC group in the 6-min walk test (DY = 473 m vs. WLC = 397 m, d = 1.19), SF-36 physical function (DY = 38.77 vs. WLC = 30.88; d = 0.66), and social position (DY = 45.24 vs. WLC = 39.09; d = 0.44) over the follow-up period. Moreover, caregivers in the DY group reported marginally clinically significant improvements in SF-36 vitality (DY = 53.05 vs. WLC = 48.84; d = 0.39) and role performance (DY = 52.78 vs. WLC = 48.59; d = 0.51) compared to those in the WLC group. The authors concluded that DY intervention is feasible and beneficial for patients undergoing TRT and their caregivers. However, they recommended a more extensive efficacy trial, incorporating a stringent control group, to substantiate and generalize these findings across a broader spectrum of cases.

In another prospective randomized trial, Milbury explored the efficacy of a couple-based meditation (CBM) program for individuals with brain tumors and their partners.[28] The study involved patients receiving usual care (UC) or CBM through a series of therapist-led sessions conducted through FaceTime. The mediation program aimed to improve mindfulness, compassion, gratitude, purpose, and emotional disclosure among the participating couples. In total, 60 eligible dyads were approached, of which 37 (62%) consented, 35 (95%) were randomized, and 22 (63%) completed all assessments. The CBM intervention was administered over 4 weekly sessions, and both groups were reassessed 6 and 12 weeks after baseline. The results showed promising outcomes, primarily for the patients involved. Significant improvements were observed in cognitive and general disease symptoms, as well as in relationship well-being and compassion. However, while patients and their partners reported finding the intervention beneficial, significant improvements with medium-to-large effect sizes were primarily evident in patients. The lack of substantial changes in partners prompts further exploration into tailoring interventions to better address the specific needs of this group within such programs. The study provides evidence of the feasibility of the CBM intervention using videoconferencing delivery.

In their prospective randomized controlled trial, Lee examined the effects of a self-administered Iyengar yoga intervention on family caregivers of adult patients who underwent allogeneic hematopoietic stem cell transplantation at a national center.[29] The study included 50 subjects randomly assigned to receive either UC education or the intervention group. The intervention group underwent the yoga intervention, which involved gentle yoga poses and breathing exercises, for 6 weeks using an audio recording file. The primary

outcome measure was perceived stress, which was assessed using the NIH toolbox Perceived Stress. Secondary outcome measures included psychological factors such as depression and anxiety measured with PROMIS R Depression and Anxiety and cardiometabolic biomarkers measured by nuclear magnetic resonance spectroscopy. The study found no significant group differences in stress, depression, and anxiety. However, there were noteworthy interaction effects between the group and time for large triglyceride-rich lipoprotein particle (TRL-P), ($F(1,43) = 10.16$, $P = 0.003$) and low-density lipoprotein particle (LP-IR) ($F(1,42) = 4.28$, $P = 0.045$). *Post hoc* analyses revealed that large TRL-P and LP-IR levels increased over time in the control group but remained stable in the intervention group. The authors hypothesized that standard lipids of cardiometabolic risk may not be sensitive enough to detect short-term early changes in caregivers. In conclusion, the study suggested that using gentle yoga poses and breathing exercises through the intervention may mitigate the risk of cardiometabolic disease in caregivers by inhibiting the development of insulin resistance despite perceptions of psychological distress remaining unchanged.

Another pilot randomized controlled trial conducted by Milbury compared the feasibility and effectiveness of two supportive care strategies for family caregivers of patients receiving radiotherapy for glioma of the brain.[30] The study compared a DY intervention and an individual caregiver yoga (CY) intervention, both administered for 45 min sessions, 2–3 times a week, over 6 weeks (15 sessions). Patients and their caregivers were randomly assigned to the DY, CY, or UC arm. 67 dyads from the patients and the caregiver cohort were randomized into the three arms. Each DY session had a brief introduction, followed by individual and dyadic mind–body techniques. Aligned with universal Hatha Yoga practices, the sessions included joint loosening with mindfulness training, postures (asanas) with relaxation techniques, breathing exercises (pranayama), and meditation. The structure and content of CY sessions closely mirrored DY sessions, maintaining similarity, including the absence of additional poses. However, CY sessions, attended solely by caregivers, lacked the dyadic focus and partner exercises present in DY sessions. Caregivers completed assessments of their depressive symptoms, QoL, and caregiving reactions at baseline, 6 weeks, and 12 weeks, with a subset participating in qualitative interviews at 12 weeks. Caregivers in the CY arm reported significantly more subjective benefit than those in the DY arm ($d = 2.1$; $p < .01$), consistent with qualitative assessments. The CY group also showed improvements in mental QOL ($d = 0.46$) and reduced financial burden ($d = 0.53$) compared to the UC group.

In addition, caregivers in the CY group reported greater caregiving esteem ($d = 0.56$) and less health decline ($d = 0.60$) than those in the DY group. Therefore, the authors concluded that an individual approach might be a better supportive care strategy for this vulnerable caregiver population. They recommended a larger, adequately powered efficacy trial to validate further and generalize these findings.

4. DISCUSSION

Based on the findings from these small studies, we feel that integrating yoga practices into the lives of caregivers holds promise in enhancing their overall well-being. The amalgamation of yoga postures, breathing techniques, and meditation yields positive outcomes, showcasing potential avenues for improving physical and mental health. The TRT patients study provides encouraging evidence for the feasibility and potential benefits of DY as a supportive care strategy in thoracic cancer patients and their caregivers. The study highlights the importance of holistic approaches to cancer care that address both the physical and psychosocial needs of patients and their support systems. DY offers a unique opportunity to foster communication, connection, and shared coping mechanisms between patients and caregivers. However, further research with larger samples and stricter controls is needed to solidify these findings and determine optimal implementation strategies.

In the brain tumor patient group study, CBM as a supportive intervention shows the potential to improve well-being in both patients and partners, with observed improvements in cognitive and general disease symptoms, relationship well-being, and compassion. The delivery of CBM through videoconferencing was found to be feasible and accessible. However, there are areas for further research, such as tailoring CBM to better address the specific needs of partners, considering the relatively small sample size, and assessing the long-term effects of the intervention. CBM could also be beneficial for promoting resilience, managing stress, and strengthening relationships in couples facing cancer. Future research could explore the potential benefits of CBM for other types of cancer and chronic illnesses.

The Lee study utilized an innovative approach by exploring a self-administered Iyengar yoga intervention, which could potentially be accessible to caregivers. It also focused on cardiometabolic health, going beyond psychological well-being and investigating potential benefits for physical health. The findings are encouraging, as the intervention appeared to stabilize triglyceride-rich lipoprotein particle and LP-IR levels, suggesting potential protection against cardiometabolic disease development. However, there are points for further research, such as a larger sample size, assessing the long-term effects of the intervention on both psychological and physical health, investigating the specific mechanisms by which yoga influences cardiometabolic markers, and tailoring the intervention to individual preferences and needs. In addition, the study emphasizes the importance of considering both mental and physical well-being when supporting caregivers and suggests potential scalability and accessibility for wider caregiver populations. Further research could also explore the application of yoga for caregivers of patients with other chronic conditions.

The study conducted by Milbury on a DY program for glioma patients and their family caregivers during cancer treatment and Hurricane Harvey proves individual yoga had significantly more subjective benefits and improved mental QoL and caregiving burden compared to both DY and usual care. The study also took a holistic approach by addressing various aspects of caregiver well-being. Qualitative insights from interviews provided additional depth and understanding of participants' experiences and emphasizes the importance of tailoring interventions to the specific needs of different caregiver populations; this suggests the potential combination of individual and dyadic approaches for a more comprehensive supportive care program.

It is essential to acknowledge the limitations inherent in these studies. The small sample sizes, combined populations of patients and caregivers, and the design of these studies raise questions about the generalizability and specificity of these findings. These constraints emphasize the need for more robust, focused studies dedicated solely to caregivers, utilizing better-designed methodologies to validate and expand upon these initial results.

Future research should address these limitations by conducting larger-scale studies specifically targeting caregivers. Implementing more refined methodologies and diverse participant pools could yield comprehensive insights into the precise mechanisms and benefits of yoga tailored to this population. Exploring long-term effects, assessing

various forms of yoga practices, and investigating the optimal duration and frequency of sessions could enrich our understanding and pave the way for more tailored and effective interventions.

5. CONCLUSION

While the preliminary findings of these studies suggest encouraging outcomes, further research is imperative to solidify the efficacy of yoga interventions for caregivers. Addressing the limitations, refining methodologies, and delving deeper into the multifaceted benefits could unlock yoga's full potential as a supportive tool in enhancing the well-being of those providing care to others.

6. ACKNOWLEDGMENT

None.

7. AUTHORS' CONTRIBUTIONS

All the authors contributed equally in design and execution of the article

8. FUNDING

Nil.

9. ETHICAL APPROVALS

This study not require ethical clearance as it is a review study.

10. CONFLICTS OF INTEREST

Nil.

11. DATA AVAILABILITY

This is an original manuscript, and all data are available for only review purposes from principal investigators.

12. PUBLISHERS NOTE

This journal remains neutral with regard to jurisdictional claims in published institutional affiliation.

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How to cite this article:
Giridharan S. The Impact of Yoga in Cancer Caregivers: A Review of Current Literature. IRJAY. [online] 2023;6(12);74-79.
Available from: https://irjay.com
DOI link- https://doi.org/10.47223/IRJAY.2023.61213

Table 1: Summary of study results

Publication details	Sample size/Study design	Population	Intervention/Outcome measures	Conclusion
Milbury (2019), *Psycho-oncology*	26 Dyads/Randomized trial	Stage I to III non-small cell lung or esophageal cancer undergoing thoracic radiotherapy and their caregivers and Waitlist Controls	15-session DY intervention/QoL (SF-36), Depressive Symptoms (CES-D), 6-min walk test	The DY intervention demonstrated feasibility (consent: 68%, adherence: 80%, retention: 81%). Patients in the DY group showed significant improvements in the 6-min walk test (DY=473 m vs. WLC=397 m, d=1.19), SF-36 physical function (DY=38.77 vs. WLC=30.88; d=0.66), and social position (DY=45.24 vs. WLC=39.09; d=0.44) over the follow-up period. Caregivers in the DY group reported marginally clinically significant improvements in SF-36 vitality (DY=53.05 vs. WLC=48.84; d=0.39) and role performance (DY=52.78 vs. WLC=48.59; d=0.51)
Milbury (2020), *Journal of pain and symptom management*	60 Dyads/randomized trial	Individuals with brain tumors and their partners and Wait list controls.	Couple-Based Meditation/Cognitive and general disease symptoms, Relationship well-being, Compassion	Significant improvements were observed in cognitive and general disease symptoms, as well as in relationship well-being and compassion, primarily for patients. While patients and partners reported finding the intervention beneficial, significant improvements with medium-to-large effect sizes were primarily evident in patients.
Lee (2022), *PloS one*	50 Caregivers/Randomized trial	Family caregivers of adult patients who underwent allogeneic hematopoietic stem cell transplantation	Self-administered Iyengar Yoga intervention/Perceived Stress (NIH toolbox), Depression and Anxiety (PROMIS R), Cardiometabolic Biomarkers (NMR Spectroscopy)	No significant group differences in stress, depression, and anxiety. However, positive effects were observed for large TRL-P ($F(1,43)=10.16$, $p=0.003$) and LP-IR ($F(1,42)=4.28$, $p=0.045$). Post-hoc analyses revealed that large TRL-P and LP-IR levels increased over time in the control group but remained stable in the intervention group.
Milbury (2023), *Cancer Medicine*	67 Dyads/Randomized trial	Family caregivers of patients receiving radiotherapy for Glioma of the brain	DY, individual CY/depressive symptoms, QoL, Caregiving reactions	Caregivers in the CY arm reported significantly more subjective benefit than those in the DY arm (d=2.1; $P<0.01$), consistent with qualitative assessments. The CY group also showed improvements in mental QoL (d=0.46) and reduced financial burden (d=0.53) compared to the UC group. In addition, caregivers in the CY group reported greater caregiving esteem (d=0.56) and less health decline (d=0.60) than those in the DY group

DY: Dyadic Yoga, QoL: Quality of life, CY: Caregiver Yoga, WLC: Waitlist control, UC: Usual care, LP-IR: Low-density lipoprotein particle, TRL-P: Triglyceride-rich lipoprotein particle