***Review Article***

**Mindfulness-based therapies and Cancer-related fatigue: A Narrative Review**

**Abstract**

Cancer is the second leading cause of death from non-communicable diseases, following cardiovascular diseases. It represents the highest rates of morbidity and mortality globally, and its prevalence continues to increase. Despite significant advancements in available treatments, most cancer therapies are associated with both immediate and long-term side effects. These include nausea, vomiting, fatigue, loss of appetite, changes in taste, dry mouth, hair loss, altered bowel habits, and pain, among others. One of the most common and debilitating symptoms experienced by cancer patients is fatigue. According to the European Association of Palliative Care, fatigue is defined as "a subjective feeling of tiredness, weakness, or lack of energy," which can be caused by cancer itself or its treatments. Cancer-Related Fatigue (CRF) can occur at any stage of the disease and may persist for years after treatment has concluded.

It is essential to develop a comprehensive management strategy that combines Complementary and Alternative Medicine (CAM) systems with a patient-centred, individually tailored holistic approach. Integrative oncology, which combines conventional therapies with evidence-based CAM practices, offers a patient-centred, holistic approach to managing CRF effectively. Biobehavioural and mindfulness-based interventions, such as yoga and meditation, are examples of such approaches. Therefore, this review aims to explore the existing literature on the role of mindfulness-based interventions in addressing CRF.

**Keywords**- *Cancer-related fatigue, Mindfulness, Yoga*

# Introduction

Cancer is the second most common cause of non-communicable disease-related mortality following cardiovascular disease (Shaji et al., 2023). Being one of the most feared chronic diseases, it also accounts for the highest rate of morbidity. Worldwide, several millions of individuals are diagnosed with cancer, and its incidence is still on the rise. A cancer diagnosis is a major life stressor that can negatively impact a person's physical, social, spiritual, and psychological well-being (Figure 1). Despite interesting advancements in the available treatment modalities, most of the cancer treatment regimens are associated with immediate and late side effects. Nausea, vomiting, fatigue, loss of appetite, changes in taste, dry mouth, hair loss, altered bowel habits, and pain are a few of them (Altun & Sonkaya, 2018)

Fatigue is very prevalent and is one of the most distressing symptoms that have a detrimental impact on the overall quality of life during all stages and facets of the cancer journey (Al Maqbali et al., 2021). It is described as "a subjective feeling of tiredness, weakness, or lack of energy," according to the European Association of Palliative Care (EAPC) (Radbruch et al., 2008). One of the most debilitating symptoms cancer patients succumb to is fatigue.

Cancer-related fatigue (CRF) can be described as complex, multifaceted, and distressing exhaustion caused by cancer and/or its treatments that interfere with daily activities (Yang et al., 2019) shown in Figure 1. CRF can be distinguished from the "normal" drowsiness felt by healthy people in that it is not alleviated by rest or sleep and is characterized by feelings of exhaustion, weakness, and loss of energy (Hofman et al., 2007). It is described as intense and chronic tiredness on a physical, emotional, and cognitive level, which is not related to previous activities and cannot be entirely reduced by sleep (Bower, 2014).



Figure 1: Factors related to Cancer-related fatigue (Carroll, Kohli, Mustian et al.2006)

90% of cancer patients report CRF during their active treatment and more than 50% of them report fatigue after the completion of the treatment. It may set in both as a consequence of cancer as well as a side effect of cancer treatment. CRF is not just a symptom of advanced cancer, it can arise at any stage of the disease and can last for years after the completion of the treatment regimen (Kirshbaum, 2010).

As CRF directly impairs and hinders the overall quality of life in cancer survivors, effective management of CRF is vital to address the multifaceted impact of this symptom on cancer patient's physical, emotional, and social well-being. And it is crucial to assist patients in coping with this difficult aspect of cancer and its treatment. For the best management of CRF, a multimodal approach that involves both pharmaceutical and non-pharmacological interventions is frequently advocated.Top of Form

A meta-analysis conducted by Mustian et al included the four most commonly recommended treatments for CRF including exercise, psychological intervention, exercise and psychological intervention combined, and pharmacological intervention, and concluded that pharmacological interventions did not improve CRF to the same extent as nonpharmacological interventions (Mustian et al., 2017). It is crucial to intervene and to provide the best comprehensive management strategy with the combination of CAM system and with patient-centred, individually tailored holistic approach.

# Aim and Objective of the current review

This review is aimed at mapping the available literature and to provide thorough thought on the significance of mindfulness-based interventions (MBIs) on cancer-related fatigue (CRF).

Observations in existing knowledge: CRF is a common symptom experienced by cancer patients that affects the quality of life of cancer patients and can impact their ability to undergo treatment. The current treatments for managing this symptom are limited. Mindfulness-based interventions (MBIs) have shown promising results in reducing cancer-related fatigue.

MBIs are evidence-based intervention for treating symptoms of cancer and its treatments, which cannot be effectively treated with the pharmacological interventions. Being Mindful- is to be aware of one’s thoughts, feelings, body sensations, and surroundings in the present moment (Baer et al., 2019). With a salutogenic, health-promoting focus that encourages and promotes mindfulness, which subsequently helps one to become aware of his current moment, it also complements conventional medicine. Additionally, it aids in actively setting aside anxieties from one's thoughts, which lessens stress and promotes relaxation and simultaneous mental and physical recovery. MBIs teach participants to pay attention to present-moment experiences in a compassionate and nonjudgmental manner (Shapero et al., 2018).

Mindfulness focuses on accepting the current moment without judgement. Cancer patients can utilise mindfulness to manage with their challenges, cultivating acceptance and lowering the mental and emotional energy used on opposing or struggling with their situation. MBI has definitive effect on anxiety, depression, pain, loneliness, and sleep disturbance, and that in turn will help to relieve fatigue related to cancer such as emotional distress, sleep disorder, activity level, malnutrition, pain, anaemia and non-cancer commodities (Figure 2).

A study conducted by Yasunori Nakamura et al., concluded that - mindfulness, has a direct effect on fatigue, and also indirectly mitigates anxiety, depression, pain, sense of isolation, and sleep dysfunction and hence will alleviate the symptom of fatigue among cancer patients (Ikeuchi et al., 2020).

According to the literature, fatigue can be caused by the interaction of several psycho-physiological processes. Further, evidence suggests that cancer and its treatments activate the immune system by triggering the production of pro-inflammatory cytokines, resulting in peripheral inflammation; these events subsequently alter the glucocorticoid hormone response and cause mitochondrial dysfunction. Studies on mindfulness interventions in cancer patients show that mindfulness can boost the function of anti-inflammatory glucocorticoid receptors in leucocytes (Carlson et al., 2019).

According to the previously published evidence (Kim et al., 2021), the practice of mindfulness can guide participants purposefully pay attention to the present moment and non-judgmentally monitor the unfolding of experiences moment by moment, and therefore having a profound benefit via the mind-body connection. It guides individuals to focus on their bodily sensations and acknowledge any discomfort without interpretation, elaboration, or evaluation.

By focusing attention on experience as it happens, MBIs enable people to recognise, accept, and disengage from unpleasant bodily sensations and dysfunctional thinking processes. By doing this, an individual will also learn strategies to combat reactive avoidance behaviour and ruminative thought patterns that are akin to the development and relapse of anxiety and depression and thereby helps to lessen the overall symptom burden of fatigue.

# Materials and Methods

# Literature Research

This review consists of a literature search at NCBI PubMed, Cochrane, and EMBASE using keywords like mindfulness-based interventions, mind-body intervention, cancer, and oncology. For a broader range of searches, there was inclusion of terms like Yoga, meditation, mindfulness-based stress reduction, and mindfulness meditation. Full-text copies of all studies of possible relevance were obtained. A manual search of reference lists of all approved papers was conducted for additional information, ensuring the inclusion of relevant articles identified through cross-references

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Figure 2: Flow Chart of identification and screening of studies via Database search

# Selection of the studies

To include in this review, articles signifying the efficacy of mindfulness-based interventions in the management of cancer-related fatigue, published from 2018 to 2022, Randomized controlled trials, Systematic reviews and meta-analyses, and observational studies including only human subjects, published in the English language were considered (Figure 3).

Screening was performed for titles and abstracts by two independent review authors, potentially eligible citations were retrieved for full-text review. A third review author checked the excluded records.

Abstracts, editorials, conference proceedings, clinical trial registrations, and grey literature were excluded (Table 1).

# Results and discussions

A total of 115 articles were identified through the electronic database search. Title and abstract screening were performed for all the relevant articles. After the application of inclusion and exclusion criteria, 8 studies were found appropriate for this review. In examining the diverse body of literature related to the efficacy of mindfulness-based interventions on cancer related fatigue, several prominent findings were noted, reflecting both the depth and breadth of research in this field. Numerous studies have been taken up by enthusiastic researchers to explore the benefits of mindfulness-based interventions among cancer patients. The synthesis of evidence revealed a compelling linkage between MBIs and CRF, shedding light on the intricate interplay between these essential components in cancer care. This integrative approach highlights the complexity of the subject matter and lays the groundwork for a more nuanced understanding. As we delve deeper into the literature, a notable pattern emerged regarding the benefits of MBIs in the management of CRF.

Johns et al. (Johns et al., 2021) conducted a pilot study to examine the efficacy of mindfulness-based stress reduction (MBSR) for CRF and related symptoms in a sample of 35 cancer survivors. They were allocated to either a 7-week MBSR intervention or a wait-list control group. The study found that mindfulness-based stress reduction is a promising treatment for CRF and associated symptoms.

A study conducted by (Zetzl et al., 2021) also found that weekly reminder e-mails can positively influence cancer patients to establish a regular Yoga practice at home and they will have improvement in their general and emotional fatigue. This can also be used as a strategy for the continued practice of MBIs to get the desired physiological benefits.

Even when the world was hit by COVID-19, Internet-Based Mindfulness-Based Stress Reduction (iMBSR) program was found beneficial for patients with Breast Cancer. A study conducted by Chuanyuan Kang and his co-workers concluded that, an 8 weeks of iMBSR was efficacious in reducing the psychological symptoms and in improving quality of life (Kang et al., 2021).

It is also been found that MBIs given to family care givers of cancer patients has the potential to enhance the overall wellbeing and can reduce the burden on family care givers. And this in turn can help those family care givers to take more care of the cancer patient (Al Daken & Ahmad, 2018).

In a qualitative study, Fernanda F. Zimmermann et al. concluded that, mindfulness-based intervention like Coping with Cancer Mindfully can provide psychological and emotional support to the patients with advanced cancer (Zimmermann et al., 2020).

A Single-Blinded Randomized Controlled Trial conducted by Yildirim and his co-workers concluded that a 10-day mindfulness-based stress reduction programme combined with music therapy had considerably reduced stress and depression levels and also improved overall psychological well-being scores (Yildirim et al., 2024).

**Conclusion**

Certainly, based on the available evidence and research findings, it can be concluded that MBIs show promise in effectively reducing CRF. Numerous studies have suggested that incorporating mindfulness practices, such as meditation and mindful awareness, into the treatment plans of cancer patients can lead to significant improvements in fatigue levels. These interventions not only address the physical aspects of fatigue but also contribute to enhancing overall well-being and quality of life for individuals undergoing cancer treatment.

Despite the richness of relevant insights, it is necessary to recognize the limitations of the studies addressed. It is crucial to recognize the heterogeneity of study designs, mindfulness interventions, and cancer populations found in the reviewed literature. Through a careful examination of the evidence presented in the reviewed articles, it becomes evident that there is a need for continued exploration and refinement of certain concepts, methodologies, and gaps in the existing literature. In future studies, standardization and rigorous methodology will boost the validity of findings and make it easier to identify specific characteristics that contribute to the success of mindfulness-based therapies. Additionally, the majority of studies predominantly focused only on mindfulness-based stress reduction, raising questions about the broader applicability of the observed patterns.

The insights gained from this review contributes to the existing body of literature, provides a foundation for scholars, and practitioners to consider MBIs as a part of CRF management protocols. As the landscape of the topic evolves, this narrative review serves as a valuable resource for those seeking to navigate the effectiveness of MBIs in CRF management.

Although further research is needed to fully understand the mechanisms and long-term effects, the existing body of evidence supports the potential benefits of MBIs in alleviating CRF. Integrating these practices into comprehensive cancer care approaches may offer a valuable and holistic means of improving the overall health and resilience of cancer patients. Further many protocols must be conducted with RCTs and other standards to validate the beneficial influences of mindfulness-based interventions on cancer related fatigue.

A more refined understanding of beneficial effects of MBIs, could inform more effective strategies for the management of CRF. The theoretical contributions of this review can encourage scholars to explore novel pathway in future research.

In conclusion, the evidence presented in this narrative review suggests that MBIs offer potential as a supportive approach for mitigating CRF. Furthermore, it is also clear that MBIs remain a dynamic and evolving field that might be considered for continued exploration, ongoing investigation and discovery.

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