IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 15, Issue 11 Ver. I (November. 2016), PP 86-94
www.iosrjournals.org

Intervention of Meditative Movement as Complimentary Medicine in the Treatment of Breast Cancer

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Abstract: *Women inflicted with breast cancer undergoing treatment are subjected to a considerable amount of psychological and emotional distress. Most, if not all, are psychologically and physiologically affected during initial stages ofallopathictreatment. Evidence shows that mind-body therapies such as deep-breathing exercises, meditation, relaxation, Qigong, Tai Chi, Yoga and shiatsu are relatively safe to practice as complementary medicine. This review article looks at intervention of yoga as a meditative movement practice in helping breast cancer patients cope with their illness. This practice includes simple movements or postures in meditative states with a focus on breath and mind in order to achieve deep states of relaxation. The findings of this review reveal that the practice of this meditative movement has brought about significant improvement in managing pain, fatigue, loss of appetite, insomnia, anxiety, mood and breathing patterns. It appears that if an integrated intervention of meditative movement existed for a cluster of symptoms, it would benefit the patient considerably. However, it must be noted that some of the findings are limited due to insignificant sample size andheterogeneity.*

Keywords*: breast cancer, meditation, quality of life, yoga intervention*
This review paper was presented at the Integrative Medicine Meeting (IMM) conference which took place 19-22 September 2016 in Rosenfeld, Germany.

I. Introduction

Breast cancer (BC), which is the commonest form of cancer in females in most parts of the universe, is a serious global health problem[1]. A total of 1.7 million new cases were diagnosed globally in 2012. Research shows that 25 per cent of the cases diagnosed are below the age of 50 in high-income countries [2]. Nevertheless, the low and the middle-income groups are not free from this disease; most do not seek treatment as they cannot afford the cost of the widespread technology-based medical care.

In the United States, BC is ranked second to lung cancer as a cause of cancer death in women [3]. Even though the mortality rate due to breast cancer declined steadily since 1990, it was predicted that approximately 40,000 American women would have died of breast cancer in 2015 [3]. As of January 2014, the number of cancer survivors was approximately 14.5 million, with BC as the most common type of cancer representing 41 per cent of the female survivors [4].

Whereas in Malaysia, approximately 5, 000 Malaysian women, aged between 30 and 60 years of age, are diagnosed with BC every year [5]. According to Pannirchellvum (2014), one in 31 women in Malaysia are at risk of contracting this disease. Statistics revealed that the incidence of cancer has escalated from 32,000 new cases in 2008 to 37,000 in 2012, and if no action is taken, the number is expected to increase to 56,932 by 2025 [6].

Interestingly, Colditz and Bohlke (2015) reported that lifetime risk of BC corresponds linearly to the length of the interval from menarche to first birth which justifies the fact that the most common cause of BC is the fact that one is a woman [2]. Unlike the breast cells in men, women's breast cells are highly active. The ageing of breast tissues occur precipitously throughout menarche to first birth phase with cyclical production of estrogen and progesterone hormones during each menstrual cycle [7]. The rate of breast epithelial cell division is high during the luteal phase of the cycle due to high levels of the two hormones. Hence, from menarche to menopause, the rate of breast cancer increases rapidly; however, the increase in the rate is far much lower after menopause [8].

Other causes of BC are not only due to genetic mutations, age, family history, personal history of cancer, chest or face exposure to radiation, obesity, late first pregnancy (above the age of 30), early puberty (below the age of 12), but also due to hormone replacement therapy, and excessive consumption of alcohol and smoking [9]. Surgery, adjuvant radiotherapy, chemotherapy, endocrine therapy and biological therapy are mainstay treatments for breast cancer[10].During the initial stages of medical treatment, 80 per cent of patients are affected psychologically and physiologically [11]. These treatments produce adverse effects such as fatigue, pain, disturbance to sleep, lymphedema, and neuropathy [12]. These adverse effects, in turn, can have a negative effect on the patient's physical, psychological and spiritual well-being, thus bringing about new health issues

such as weight gain, obesity, anxiety and depression. Chemotherapy, specifically those that contain dodetaxel, and hormonal therapies are prone to cause weight gain even in pre-menopausal women [13].

Irwin et al. (2003) reported that physical activity (PA) decreases after one is diagnosed with breast cancer, and the drop is more drastic amongst women who are being treated with chemotherapy and radiotherapy [14]. This probably is another cause of weight gain amongst BC patients.

Stress levels are known to intensify during diagnosis and also during and after completion of treatment of BC [15]. Han (2005) reported that psychological stress and emotional distresses such as anxiety, depression and fear are prevalent amongst BC patients [16]. Escalated levels of cortisol have been observed with BC patients and this probably explains their sufferings in relation to stress [17]. Due to the increased sensitization of the hypothalamo pituitary adrenal (HPA) axis by the psychological stress and erratic cortisol patterns, sleep is affected[18].

Another disheartening but common symptom amongst BC patients is fatigue [19]. During cancer treatment, levels of fatigue heighten; nevertheless, it lingers even at post-treatment for many[20]. Cancer-related fatigue, which encompasses physical, mental and emotional exhaustion, affects one lifestyle negatively. Depression may set in which may, in turn, result in further decrease in activity. Fatigue has been known to cause emotional eating and hence weight gain [21]. Hence, weight gain amongst BC patients is not only associated with certain drug use in chemotherapy, but also with increased levels of cortisol.

There is growing evidence that behavioral interventions may effectively reduce fatigue in BC patients. Exercise and psychosocial interventions have produced positive effects on fatigue; however, up to-date, not many behavioral intervention studies have been conducted with BC patients [22]. This could be due to unwillingness to participate or the patient may be feeling too feeble.

The meditative movement (MM) practice appears to be a promising complementary treatment for BC patients. MM, a relatively new category of exercise, is a practice that combines movement or body positioning (i.e. static position) with pranayama (expansion of the life force) and meditative states [23]. Tai chi, Qigong and yoga are the common MMs practiced today. For the purposes of this review, only studies that have employed yoga as a complementary therapy in BC patients are included.

II. Meditative Movement -Yoga

Yoga is an ancient mind-body discipline which emerged in India in the 6^{th} century [24]. Classical Yoga and its philosophy was first depicted by Patanjali in the Yoga Sutras, the authoritative text on yoga [25]. As yoga is not a religion, people of all faiths can practice this scientific philosophy [26]. The practice of yoga, mainly hatha, which is the physical part of yoga, is very popular not only in India, the US and Malaysia, but also in other industrialized countries. Hatha yoga improves flexibility and builds up strength through the use of the physical postures and breathing techniques.

Patanjali's Yoga is eightfold consisting of eight limbs which are yama (universal ethics), niyama (individual ethics), asana (physical postures), pranayama (expansion of life force), pratyahara (control of senses), dharana (concentration), dhyana (meditation) and lastly Samadhi (bliss). The flexibility about yoga is that it allows individuals to use the limbs that are beneficial to them, and pay less attention to the rest. Nevertheless, in the yogic philosophy, it is the practice of asanas and pranayama that prepares the body and mind for meditation and spiritual development.

In the past eight decades, empirical research has been carried out on the techniques of yoga to test its credibility [27]. Pioneer experiments conducted by Swami Kuvalayananda in 1924 focused on parameters like blood pressure fluctuations, intra-esophageal air pressure and heart rate not only during but also after the practice of asanas and pranayama. Due to reassuring results, yoga was classified by the National Institute of Health as a form of complementary and alternative medicine, and since then people from all walks of life have been practising yoga [28].

Like modern science, yoga's approach is pragmatic; hence, intervention of yoga (in the form of asanas, pranayama, prathyahara, dharana and/or dhyana) as therapy for various diseases has been widely studied. Yoga as therapy or therapeutic yoga has been defined as application of yoga postures and practice to the treatment of health conditions [29]. Evidence from a growing body of research supports the notion that certain yoga techniques may bring about positive effects not only in one's physical but also mental health through the down-regulation of the HPA and the sympathetic nervous system (SNS).

Studies have shown that yoga interventions over a duration of 8 -12 weeks in individuals with and without cancer may not only improve quality of life and sleep, but also reduce depression and stress [30]. Empirical investigations studying the effects of yoga on cancer-relevant psychologic and somatic symptoms including mood, fatigue, pain, sleep and quality of life (QoL) have also revealed useful information about the potential efficacy of yoga as a meditative movement in cancer patients [18].

III. Methods

A comprehensive search was done on studies focusing on yoga intervention in BC patients. The articles were identified by using MEDLINE, PsyINFO and PUBMED. Only studies from articles that were published as full paper, peer-reviewed and written in English language were reviewed. In addition, the reference lists of identified articles were reviewed. In order to facilitate the search, key words such as 'yoga intervention', 'breast cancer','quality of life' and 'meditation' were used. Over 1000 articles were identified.

The search was then streamlined to specifically studies conducted in the last decade that incorporated randomized controlled trials (RCTs) amongst female BC patients who were 18 years old and above. Studies that had included BC patients with chronic medical conditions, multiple cancers, smokers and yoga practitioners were not included in this review. As far as the mode of intervention is concerned, studies that compared intervention of yoga with any form of active treatment or no treatment were included. However, studies which administered yoga as part of a multimodal intervention were excluded. Since there are so many different forms of yoga, only interventions that incorporated asanas pranayama, relaxation techniques and meditation, as complementary treatment in BC patients were consideredalbeit the duration and frequency of the yoga program varied from study to study. Studies which solely focused on meditationas a form of yoga intervention were excluded. Articles that focused on intervention of yoga to female BC survivors who have completed treatment were excluded in this review. Based on all these factors, 10 studies met the inclusion criteria.

This review did not warrant a meta-analysis methodological procedure as therewas too much heterogeneity in all the studies conducted. The yoga intervention programs varied not only in terms of tradition (i.e. Iyengar yoga, Integral Yoga, Restorative yoga, Yoga in Daily Life (YIDL), Patanjali's Classical yoga), but also in terms of duration of program and frequency.

IV. Results

Of the 10 studies reviewed, three were conducted in India, four in the US, two in Germany and one in Slovenia. Tables 1, 2 and 3 details the populations, study methodology and outcome measures of the studies in India, the US, and Germany and Slovenia respectively. These studies were conducted between 2007 and 2016 and they were all randomized controlled studies.

The yoga intervention programs in these 10 studies were heterogeneous. The program duration and frequency varied, ranging from 45-min yoga classes daily over a week to once a week sessions over 3 months. Only in two studies, the control group (CG) did not receive any treatment [31, 32]. In the other eight studies, the CGs received either supportive counselling or physiotherapy, or yoga therapy upon completion of radiotherapy. Albeit the intervention of yoga in all studies included asanas, pranayama and relaxation, no two studies in this review matched in terms of program duration or frequency. Neither did any of the studies match in the duration of the control intervention with the yoga intervention.

Just as in the study of Rosenbaum et al. (2004), intervention of yoga amongst 58 BC patients (stages II – III) undergoing radiotherapy in Banerjee et al.'s study (2007) revealed very promising results [33,34]. The 90-min per session of yoga over six weeks had caused a significant decrease in anxiety, depression and perceived stress. The decrease in the levels may be associated with the relaxation response gained from the integrated yoga approach. Remarkably, there was also a greater reduction in the radiation-induced DNA damage amongst the yoga group (YG) compared to the CG. This could be probably due to lower psychological stress. Previous studies have reported that DNA repair capacity is associated with stress and anxiety [35, 36].

In Rao et al.'s (2008) study, intervention of integrated yoga consisting of breathing exercises, pranayama and yogic relaxation techniques produced significant reduction in anxiety, depression and stress levels amongst the YG patients [37]. A greater improvement in QoL was also reported in this study. Vadiraja et al's (2009) study, on the other hand, reported a reduction in fatigue with the intervention of yoga [11]. In terms of improvement in QoL, his findings concurs with other studies reviewed in this paper [32, 37, 38]. There was a significant reduction in pain, vomiting and nausea, and improvement in sleep in the YG when compared to the CG in Vadiraja et al.'s study.

In the US, Moadel et al. (2007) found that in their 12 –week yoga intervention program for the newly diagnosed and stages I-III BC patients, the CG suffered greater decrease in social well-being compared to the YG in the primary analysis [32]. Nevertheless, in the secondary analysis when the patients were no longer under chemotherapy (i.e. after three months of doing yoga), the patients exhibited greater improvement in the overall QoL, social, spiritual, emotional well-being and mood, just as in Rao's study [37].

However, Danhauer et al. (2009) reported that intervention of yoga in their pilot study produced tremendous benefits not only in mental health and depression, but also in spirituality [31]. BC patients with higher negative affect and lower emotional well-being at baseline appeared to have derived greater benefits from the yoga intervention compared to those with similar values at baseline in the CG. Remarkably, unlike other

studies, the yoga intervention for 10 weeks in this study was conducted by a qualified instructor who is a BC survivor. Also, in this study, ahimsa (i.e. non-violence), a component of the second rung in Patanjali's Classical Yoga, was emphasized. This is probably to ensure that the BC patients respect the limits of their body and not force themselves into the asanas and cause injury.

Chandwani et al. (2010) reported similar findings where BC patients maintained better QoL for some aspects throughout the radiotherapy treatment, low levels of fatigue, high benefit finding but increased intrusive thoughts [38]. Interestingly, the latter was positively correlated to the increase in the benefit finding in the exploratory analysis. The BC patients practiced Patanjali's Classical yoga twice a week for six weeks while undergoing radiotherapy. In a later study, which appears to be the first to compare intervention of yoga against intervention of stretching (SG), and a CG, Chandwani et al (2014) found that the YG produced better physical functioning (PF) and a drop in fatigue levels when compared to the CG [12]. The SG also reported a drop in fatigue levels and improved PF. However, the increase in PF was significant in the YG when compared to the SG. Unlike the yoga intervention in the other studies reviewed, Chandwani et al's yoga intervention appeared comprehensive entailing a typical classical yoga class as it included breath-coordinated warm-up asanas followed by pranayama, a whole range of asanas - seated, standing and in supine positions, deep relaxation and meditation [12]. Warm-up asanas are particularly useful as it prepares the body for more advanced asanas and also minimizes injury. Pranayama, on the other hand, improves not only the ventilatory function of the lungs, but also the gaseous exchange, preventing exhaustion which probably explains the lowering of the fatigue levels [39].

In a one-month RCT study in Slovenia, Kovacic et al. (2013)found that the YIDL system, encompassing asanas, pranayama, relaxation and meditation techniques, appears to be a beneficial non-pharmacological therapy in not only maintaining but also enhancing the psychological well-being in BC patients [40]. Intervention of yoga had positively impacted the self-perceived stress levels in stages I-II BC patients. In this study, the patients did 45 min of yoga daily for the first week, followed by home practice five – seven times a week for the subsequent three weeks. The significant decrease in stress levels is probably due to the different type of breathing and relaxation techniques incorporated in the yoga program administered. It is noteworthy that in this study, the yoga intervention primarily focused on breathing techniques and meditation.

Both the German studies reviewed in this paper produced dissimilar results. While Siedentopf et al.'s (2013) study brought upon significant improvement in QoL and functional status in the YG compared to the CG, Lotzke et al.'s (2016) study produced positive but similar findings in the QoL and fatigue levels between the CG and YG [41, 42]. This may be due to the type of yoga administered in both studies. Iyengar Yoga differs from other styles of yoga in terms of technique, sequence and timing. The technique focuses on precision of the body alignment, while the sequence refer to the order of how the asanas and pranayama are practiced. The timing dictates the amount of time spent in the asana. Unlike other forms of yoga, Iyengar yoga employs the use of "props" such as cushions, benches, blocks, straps and sand bags, which function as aids allowing beginners to experience asanas more easily. Hence, the focus is on the misalignment. It might be that too little time was dedicated to the pranayama and relaxation techniques.

V. Discussion

In this systematic qualitative review, intervention of yoga, which is one of the MM practices, has proven to be an effective non-pharmacological complementary approach to allopathic medicine in improving QoL in BC patients.

It has produced satisfactory outcomes in most, if not all, of the studies examined in this review. According to Woodyard (2011), yogic practices can bring about a calming effect to the mind, thus reducing stress and anxiety which was seen in the studies conducted in India and Slovenia [11, 34, 37, 40, 43]. Newberg (2003) reported that yoga, specifically meditation, helps reduce perceived stress through the cerebro-hypothalamic pathway by influencing the cortical areas that have an impact on the neurotransmitter and hormonal release [44]. The autonomic nervous system (ANS) influences not only the HPA axis, but also the immune response. Yogic relaxation training has been found to normalize the functioning of the ANS by deviating both the sympathetic and parasympathetic indices toward the normal reference values [45].

Studies have also shown that not only meditation, but also concentration and pranayama (through single or double nostrils) may regulate the functioning of the ANS by increasing the parasympathetic response which in turn suppresses the activation of the paraventricular nucleus thus reducing the secretion of cortisol [44]. This probably explains the improvement in not only breathing patterns but also reduction in stress levels insome of the studies reviewed here [11, 34, 37,40].

Cancer-related fatigue can affect the quality of one's life negatively; many patients find it difficult to carry out their daily activities. Pranayama, one of the crucial components in the intervention of yoga, not only improves the ventilatory function of the lungs and gaseous exchange, but also reduces the oxygen debt, thus preventing exhaustion. The slow and controlled yogic breathing rates help enhance oxygen delivery to muscles

and tissues[46]. The PNS is activated,thus reversing the stress response in the body. Deep breathing stimulates the vagus nerve, the main nerve in the PNS, thus slowing down the heart rate, lowering blood pressure and calming the body and mind.

Table 1: Summary of the RCTs using Intervention of Yoga in BC Patients in India

First author (year of publication)	**Basic demographics of population**	**Sample population**	**Current treatment**	**Description of Intervention**	**Instruments used**	**Findings**
Banerjee (2007)	BC stages II-III; undergoing radiotherapy; Mean age =44years (SD = 1.3)	58 YG =35; CG=23	Radiotherapy	YG – asanas, meditation, pranayama, guided imagery, chanting, deep relaxation; Duration = 90 min per session for 6 weeks. CG- supportive counselling and advised to take light exercise	HADS PSS	Significant decrease in anxiety, stress and depression levels in YG; an increase in anxiety and depression in the CG. Reduced radiation-induced DNA damage in the YG compared to the CG.
Rao (2008)	BC stages II –III Age = 49.2 ± 9.6 years	69 YG= 33 CG=36	NR BC patients started with YG prior to surgery and continued with yoga during postoperative recuperation.	YG- breathing exercises, pranayama, yogic relaxation techniques; yoga done at patient's bedside during hospitalization. To practice at home daily upon discharge for 4 weeks CG- supportive therapy and exercise rehabilitation	STAI BDI FLIC	Significant drop in anxiety, depression, treatment-related symptoms & distress, and greater improvement in QoL for the YG compared to the CG.
Vadiraja (2009)	BC stages II -III Mean age = 47.23 years	75 YG = 42 CG = 33	Radiotherapy	YG – asanas, breathing exercise, yogic relaxation, meditation. Duration – minimum 3 one-hour sessions per week for 6 weeks. Home practice required on other days. CG – brief supportive therapy	EORTC QLQ-C30 RSCL	In YG, significant decrease in psychological distress, physical distress and fatigue. Also significant increase in activity level on the RSCL. Sleep and appetite improved. Improved QoL.

Abbreviations used: BC = Breast Cancer; YG = yoga group; CG= control group; QoL = Quality of Life; BDI = Beck's Depression Inventory; EORTC QLQ-C30 = European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C30; FLIC = Functional Living Index of Cancer; HADS = Hospital Anxiety and Depression Scale; PSS = Perceived Stress Scale; RSCL= Rotterdam Symptom Checklist; STAI = State Trait Anxiety Inventory; NR= not reported.

Table 2: Summary of the RCTs using Intervention of Yoga in BC Patients in the United States

First author (year of publication)	Basic demographics of population	Sample population	Current treatment	Description of intervention	Instruments used	Findings
Moadel (2007)	New/recurring BC stages I-III Mean age = 54.81 years (SD = 9.95)	128 YG = 84; CG=44	48 % received medical treatment	YG – physical stretches, asanas in seated and reclined position, breathing, meditation. Duration: 90 min per class per week for 12 weeks. Patients advised to practice daily at home. CG- no treatment	FACT; FACT-G FACIT-F FACIT-Sp DMI	In the regression analysis, YG experienced less deterioration in social well-being compared to the CG. In the secondary analysis, YG exhibited greater improvement in overall QoL and mood.
Danhauer (2009)	BC patients 2-24 months post-surgery or recurrence within past 24 months Mean age = 55.8 years (SD =9.9)	44 YG = NR CG = NR	34 % actively receiving treatment (chemo-therapy and/or radio-therapy)	YG – asanas, pranayama, deep relaxation and practiced ahimsa. Duration – 75 min per week for 10 weeks. No home practice CG – no treatment	SF-12 FACT-B FACIT-F FACIT-Sp CES-D PSQI PANAS	For YG, significant improvement in mental, spiritual and emotional health. Fatigue levels also decreased.
Chandwani (2010)	BC stages I –III Age range = 31.8 -67.9 years	61 YG = 30 CG = 31	Radio-therapy	YG-Patanjali's Classical Yoga: breath–coordinated warm-up movements, forward-, backward-, side-bending asanas in sitting and standing positions, deep relaxation, pranayama, and meditation. Duration -1 hour twice a week for 6 weeks while undergoing radiotherapy. CG- similar yoga program and frequency but administered after completing radiotherapy.	BFI PSQI SF-36 CES-D IES STATE	Some aspects of QoL improved for YG, while those aspects decreased for CG. YG experienced an increase in benefit finding, reduction in fatigue levels but intrusive thoughts were high.
Chandwani (2014)	BC stages 0-III Age range: 25 - 79	128 YG = 53 SG = 54 CG = 56	Radio-therapy	YG- Patanjali's Classical Yoga: breath–coordinated warm-up movements, forward-, backward-, side-bending asanas in sitting and standing positions, deep relaxation, pranayama, and meditation. Duration -1 hour thrice a week while undergoing radiotherapy for 6 weeks. Home practice encouraged. SG – standing, lying down and seated exercises. Duration and frequency: similar to YG. CG – received usual care	SF-36 BFI PSQI CES-D	YG produced better PF and suffered less fatigue compared to CG. SG suffered less fatigue and improved PF. YG produced significantly higher PF compared to SG.

Abbreviations used: BC = Breast Cancer; YG = yoga group; CG= control group; SG = stretching group; QoL = Quality of Life; BFI = Brief Fatigue Inventory; CES-D = Centres for Epidemiological Studies- Depression; DMI = Distressed Mood Index; FACT= Functional Assessment of Cancer Therapy (-G =general; -B = Breast; -Sp= spirituality); FACIT= Functional Assessment of Chronic Illness Therapy (-F = fatigue; -Sp=spiritual well-

being); IES = Impact of Events Scale; PANAS = Positive and Negative Affect Schedule; PF = physical functioning; PSQI =Pittsburgh Sleep Quality Index; SF-12= Short form Survey -12 items; SF-36 = Short form survey -36 items; STATE=Spielberger State Anxiety Inventory.

Table 3: Summary of the RCTs using Intervention of Yoga in BC Patients in Germany and Slovenia

First author (year of publication, location of study)	**Basic demographics of population.**	**Sample population**	**Current treatment**	**Description of intervention**	**Instruments used**	**Findings**
Kovacic (2013, Slovenia)	BC stages I –II Age ≥ 40 years	32 YG =16 CG = 16	Surgery, adjuvant systemic chemo-therapy, radio-therapy	YG - asanas, pranayama, relaxation and meditation techniques; did yoga immediately after surgery. Duration – 45 min of yoga per day for 7 days. Also did 1 week of standard physiotherapy. Advised to practice yoga at home daily for another 3 weeks. CG – Received 1 week of standard physiotherapy after surgery.	GHQ-12 RSCL PSS	YG patients were significantly less distressed during hospitalization and after discharge compared to the CG.
Siedentopf (2013, Germany)	Newly diagnosed patients with BC after surgery. Mean age = 55.82 ±10.72 years	61 YG = 33 CG = 28	Surgery	YG – pranayama, supine position, neck, shoulder and arm asanas, eye exercise, relaxation poses; did yoga immediately after surgery. Duration: 75 min per class, twice week for 5 weeks. CG- did yoga 5 weeks after surgery for the same frequency and duration.	EORTC QLQ-C30 EORTC QLQ-BR23	Significant improvement in QoL and functional status in YG compared to CG. CG- there was improvement but smaller.
Lotzke (2016, Germany)	BC stages I –III Mean age = 51 ± 11 years	92 YG = 45 CG = 47	Radiation, Chemo-therapy, Endocrine therapy	YG – Iyengar yoga: asanas and pranayama. Duration: 1hour per week for 12 weeks. Home practice – 20 min per session, twice a week for 12 weeks encouraged. CG – conventional physical exercise. Duration: similar to YG. Home practice: similar to YG.	EORTC QLQ-C30 BMLSS CFS-D	Both groups showed improvement in global health. No significant difference between CG and YG in terms of life satisfaction, fatigue levels,

Abbreviations used: BC = Breast Cancer; BMLSS= Brief multidimensional Life Satisfaction Scale; YG = yoga group; CG= control group; SG = stretching group; QoL = Quality of Life; CFS-D = cancer Fatigue Scale; EORTC QLQ-C30 = European Organization for Research and Treatment of Cancer Quality of Life Questionnaire C30; EORTC QLQ-BR23 = European Organization for Research and Treatment of Cancer

Quality of Life Questionnaire-breast cancer module; GHQ-12 = General Health Questionnaire -12; PSS = Perceived Stress Scale; RSCL= Rotterdam Symptom Checklist

VI. Limitations

As far as the methodology is concerned, an attempt was made to reduce the inconsistency between the yoga interventions in order to increase the comparability between studies. Hence, the selection of RCTs was further streamlined to yoga interventions that encompassed asanas, pranayama, shavasana, and dhyana. Notwithstanding, there was still evidence of heterogeneity in the yoga intervention across the ten studies reviewed in terms of yogic tradition (i.e. Iyengar yoga, Restorative yoga, Integrated yoga, Patanjali's Classical yoga, YIDL), content and length of program, frequency of intervention and time of administration (i.e. before surgery and right through after surgery followed by chemotherapy/radiotherapy, or immediately after surgery followed by chemotherapy/radiotherapy). This further reduced the total number of eligible RCTs for this review.

Also the participants in all the studies investigated in this review were in various stages of treatment and disease. Level of adherence to intervention varied from study to study. Home practice was not consistent.

VII. Conclusion

Despite the shortcomings in all the studies reviewed, it is evident that yoga is an effective non-pharmacological complementary therapy for breast cancer patients. Its positive effects on stress, anxiety, depression, fatigue, sleep and quality of life should merit its use for these patients.

While investigating the causes and looking for contemporary cures for breast cancer, meditative movement practices such as yoga could be used as a prophylactic intervention in initial stages of the disease. It is a cost-effective complementary therapy which barely requires any form of sophisticated equipment. The potential impact of this MM practice on the QoL of various populations should not be ignored. This qualitative review warrants further studies with larger sample population to examine the effects of not only different styles of yoga but also the varying duration and frequency of yoga programs.

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