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## Original Article

# Effects of yoga on negative emotions in patients with breast cancer: A meta-analysis of randomized controlled trials

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## ABSTRACT

**Objective:** The study aims to investigate the effectiveness of yoga on negative emotions in breast cancer patients.

**Methods:** Pubmed, Elsevier, Web of Science, Cochrane Library, CBM, CNKI, Wanfang, and VIP databases were screened throughout October 2015. Randomized control trials (RCTs) examining the effects of yoga versus a non-exercise or waitlist control group on negative moods in breast cancer patients were included. The methodological quality of included RCTs was evaluated by using the Cochrane Handbook 5.1, and data were analyzed using the Review Manager 5.3.

**Results:** A total of 21 RCTs with 1762 participants were included. We found evidence for immediate effects on anxiety ( $p < 0.00001$ ), depression ( $p < 0.00001$ ), distress ( $p < 0.00001$ ), perceived stress ( $p < 0.00001$ ), and emotional well-being ( $p = 0.0002$ ). Sustained effects (3 months) were only found in depression ( $p = 0.004$ ) but not anxiety ( $p = 0.43$ ), and other outcomes were not synthesized because of heterogeneity and the limited number of studies. **Conclusion:** Yoga is valuable in improving negative moods in patients with breast cancer. We also concluded five key mechanisms of yoga therapy in improving negative moods. Further well-designed RCTs with large sample size and long-term follow-up are needed.

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## 1. Introduction

Breast cancer is the most common cancer among women. More than 1.6 million new cases are reported globally each year [1]. Breast cancer patients usually receive multimodal

treatment for a long period, including invasive treatment procedures, surgery, chemotherapy, and radiotherapy, which pose physical and mental pressure to these patients. Apart from treatment-related distress, the diagnosis of cancer itself provokes negative emotion. Moreover, Herschbach et al. proved that breast cancer patients are among

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those cancer survivors with the most severe psychological stress, with fear of illness progression [2] and changes in sexual relationships with partners [3] being cited as main stressors. Anxiety and depression are the most common negative emotions experienced by breast cancer patients. The prevalence of anxiety and depression in these patients during antineoplastic treatment was 64% and 50%, respectively [4]. These negative emotions may cause lower treatment compliance, greater pain, longer hospital stays, and more complications [5]. Thus, improving these emotions in these patients is essential.

In recent years, a growing interest among breast cancer patients has been focused on imparting various mind–body therapies as adjuvants to routine treatment to relieve negative moods [6]. Yoga is the most popular complementary therapy that followed ancient Eastern science [7]. Owing to its accessible and low-risk characteristics, yoga appears to be an appropriate practice for breast cancer patients [7]. Recently, a growing number of research suggested that breast cancer patients who practice yoga may experience improved emotional well-being and alleviated depression, anxiety, and distress. By contrast, those articles revealed the evidence on their respective areas. We conducted the first review of this area to evaluate the effectiveness of yoga for improving negative emotions in breast cancer survivors.

## 2. Methods

### 2.1. Literature search

We used MeSH terms and all field terms when searching the four English databases, namely, Pubmed, Elsevier, Web of Science, and Cochrane Library, and four major Chinese databases, namely, CBM, CNKI, Wanfang, and VIP databases. All results have been checked from their inception until October 2015. The search strategy for Pubmed is revealed in Table 1.

### 2.2. Study eligibility

Articles were selected in a two-step process: in the first step, two independent reviewers screened all titles and abstracts. Search results were combined, and duplicates were removed. The second step included full text evaluations for eligibility and data extractions. The PICOS (population, intervention, comparison, outcome, study design) format was applied to address the research question and establish eligibility criteria as revealed in Table 2. Discrepancies were solved by a third author.

### 2.3. Data extraction

Two independent reviewers extracted data on the study's characteristics (such as name, author, year, and country), the participant (sample size, cancer stage, and age), intervention and control (frequency and duration), and outcome measures. Discrepancies were solved by a third author.

### 2.4. Quality assessment

Two independent authors evaluated the risk of bias by using the Cochrane tool [8], which assesses the risk on six aspects: selection, detection, performance, reporting, attrition, and other biases (baseline imbalance, source of funding, and early stopping). Each of the components can be rated as low, unclear, or high risk of bias and altogether result in an overall rating of bias. Disagreements were resolved by a third author.

### 2.5. Data synthesis

For continuous variables, we calculated standard mean difference (SMD) with 95% confidence intervals (CI) if the units of measurement were not comparable. Heterogeneity was not considered as significant when  $I^2 < 50\%$ . We performed a fixed-effects model to pool the results together unless the results show significant heterogeneity ( $p < 0.1$  and  $I^2 > 50\%$ ), which would require a random-effects model. RevMan 5.3 was used to perform the meta-analysis.

## 3. Results

### 3.1. Study selection

The initial search identified 1972 articles; another 2 studies were found after checking the reference lists, resulting in a total of 1974 articles. After removing duplicate studies, the literature search identified 1826 total records. For 57 potentially

**Table 1 – Search strategy.**

Patient	#1	“Neoplasm” [MeSH] OR
	#2	“carcinoma” [MeSH]
	#3	“Neoplasm” OR “carcinoma” OR “cancer” OR “oncology” OR “malignant” [All fields]
Intervention	#4	“Yoga” [MeSH]
	#5	“Yoga” OR “hatha*” [All fields]
	#6	#4 OR #5
Outcome	#7	“Depression” OR “depressive disorder” OR “anxiety” OR “anxiety disorder” OR “stress disorder” OR “fear” OR “expressed emotion” [Mesh]
	#8	“Depression” OR “depressive disorder” OR “anxiety” OR “anxiety disorder” OR “stress disorder” OR “fear” OR “expressed emotion” [All fields]
	#9	#7 OR #8
Design	#10	“Randomized controlled trial” OR
	#11	“random allocation” OR “double-blind method” OR “single-blind method” [Mesh]
	#12	“Randomized controlled trials” OR “random allocation” OR “double-blind method” OR “single-blind method” [All fields]
Search	#13	#3 AND #6 AND #9 AND #12

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