Review Article

Meta-analysis of meditative/relaxation-based interventions for cognitive impairment in cancer patient

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A B S T R A C T

Objective: This meta-analysis aimed to review any form of meditative/relaxation interventions for managing cognitive impairment in cancer patients, and to examine its intervention effect.
Methods: Three databases (PubMed, PsycInfo, and CNKI) were searched until September 30, 2016. Randomized controlled trials (RCTs) of meditative/relaxation-based interventions for the management of cognitive impairment in cancer patients were considered for inclusion.
Results: A total of 4 RCTs were included in this meta-analysis. Four RCTs with a total of 290 subjects indicated that meditative/relaxation interventions significantly improved subjective cognitive function of cancer patients. The weighted mean difference was 5.29 (95% CI: 2.97, 7.61). The overall effect of Z score was 4.47 ($P < 0.001$). The meditative/relaxation-based interventions had positive effects on the physical and mental QOL (quality of life) of cancer patients. Although the improvement of physical QOL was in favor of interventions, there is no statistically significant difference (Z score = 1.81, $P = 0.07$). For the effects of meditative/relaxation interventions on metal QOL, there is significantly statistical difference (Z score = 2.99, $P = 0.003$). All included RCTs had a follow-up assessment within six months.
Conclusion: Mediation-based interventions had statistically significant difference in improve subjective cognitive function and mental QOL in cancer patients. However, since the conclusion of this meta-analysis was drawn based on limited number of RCTs, future research should be conducted to confirm its positive intervention effects.
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1. Introduction

The prevalence of cognitive impairment in cancer patients is up to 75% [1]. While cancer and its treatment-induced cognitive impairment is usually mild to moderate [2], it exerts a substantial impact on a survivor's ability to perform daily task and impact their long-term quality of life (QOL) [2,3].

As pharmacological interventions used to improve cognitive function and reduce cognitive impairment have significant treatment side-effects [4], meditative/relaxation-based interventions are emerged to be applied for reducing cognitive impairment in cancer patients. Meditative/relaxation-based intervention is

defined as a mental-dominated exercise that involves reaching a focused state of mind and may include breathing and relaxation exercises, including mediation, exercise of yoga, Taichi or Qigong [5]. The mechanism of meditative/relaxation-based interventions for improve cognitive impairment may through stress reduction, so that it may directly or indirectly help the immune system for regulating the cytokine production [3,5].

2. Methods

2.1. Study types

Three databases of PubMed, PsycInfo, and CNKI were searched till September 30, 2016, including articles published in both English and Chinese. Studies were eligible for inclusion if they were randomized controlled trials (RCTs), which addressed the effects of meditative/relaxation-based interventions on reducing cognitive
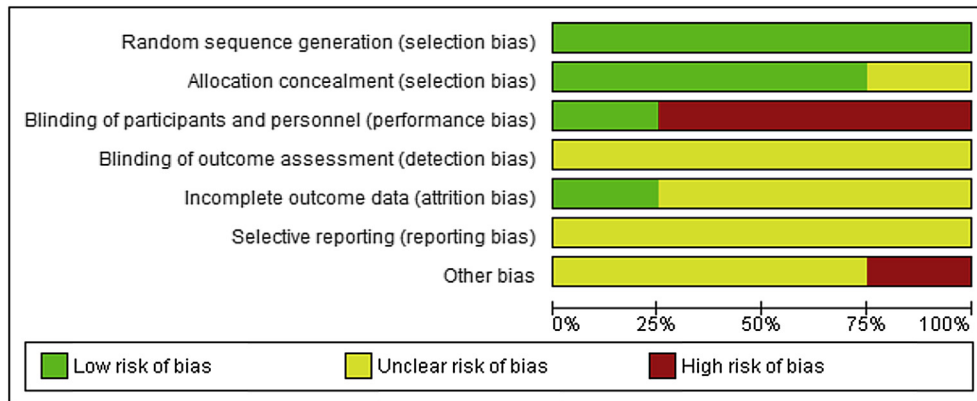
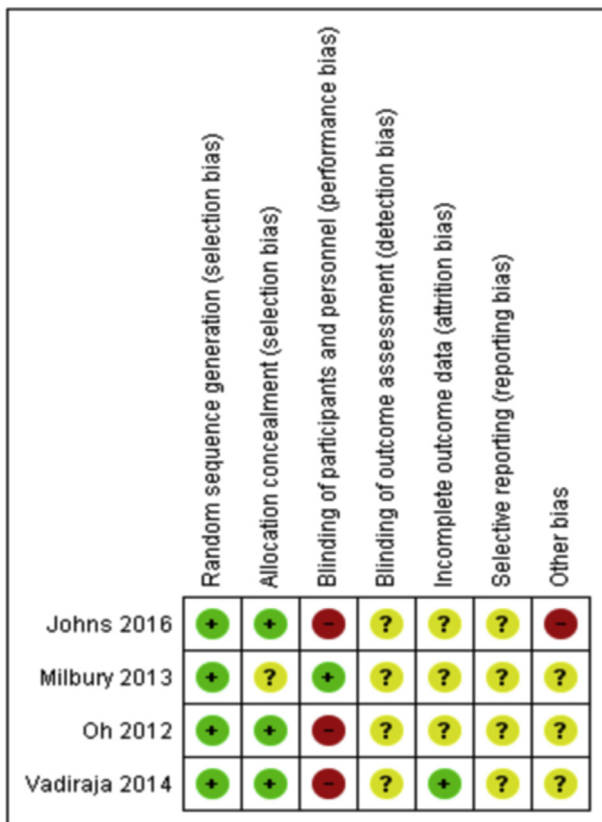**Fig. 1.** Summary of risk of bias of included RCTs.

Fig. 2. Risk of bias for each included RCT.

impairment of adult patients with cancer. RCTs included brain or central nervous system tumors were excluded due to these types of tumor can directly impact the cognitive function of cancer patients.

2.2. Study participants

Patients diagnosed with primary cancer during adulthood-onset (aged 18 years or older), because patient-reported cognitive function measures for childhood-cancer survivors differ from adult measures, and are not diagnosed with a non-brain or non-central nervous system (CNS) tumor, as a brain or CNS tumor can directly impact the brain, and thus the cognitive processes, of cancer survivors.

2.3. Types of interventions and outcome measures

This meta-analysis included any form of meditative/relaxation-based interventions such as meditation, exercise of yoga, Taichi or Qigong. The primary outcome was cognitive function by subjective and/or objective cognition outcome measures. The secondary outcome was quality of life as a result of meditative/relaxation-based interventions.

2.4. Data extraction and assessment of bias risk

For each included RCT, data was independently extracted by two researchers, and disagreement on data extraction was resolved by discussion and verified by the third researcher. The Cochrane Collaboration's Review Manager (RevMan 5.3) [6] was used to evaluate the risk of bias of the included RCTs. The Cochrane Risk of Bias Assessment Tool consists of seven domains including "random sequence generation, allocation concealment, blinding of participants and research personnel, blinding outcome assessment, incomplete outcome data, selective outcome reporting and other
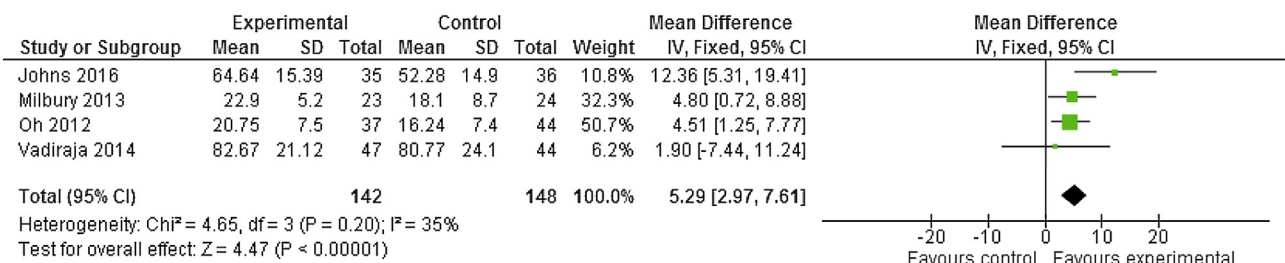

Fig. 3. Effects of meditative/relaxation-based interventions on subjective cognitive function.