INPLASY PROTOCOL

To cite: Tsai. Comparative Effectiveness of Different Exercises for Improving Quality of Life in Breast Cancer Survivors: A Network Meta-Analysis of Randomized Controlled Trials. Inplasy protocol 202340007. doi: 10.37766/inplasy2023.4.0007

Received: 04 April 2023

Published: 05 April 2023

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Support: **No.**

Review Stage at time of this submission: **Preliminary searches.**

Conflicts of interest:
None declared.

Comparative Effectiveness of Different Exercises for Improving Quality of Life in Breast Cancer Survivors: A Network Meta-Analysis of Randomized Controlled Trials

Tsai, IC[1].

Review question / Objective: **To assess the efficacy of various exercise interventions in enhancing the quality of life of individuals who have survived breast cancer.**
Condition being studied: **The network meta-analysis adopted the PICO framework (population, intervention, comparison, outcome) with the following specifications: (1) P: human participants with breast cancer and completed treatment, including surgery, chemotherapy, and/or radiotherapy; (2) I: exercise interventions; (3) C: control group without intervention; and (4) O: changes in quality of life. The definition of breast cancer survivor was based on the joint guideline provided by the American Cancer Society and the American Society of Clinical Oncology.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 05 April 2023 and was last updated on 05 April 2023 (registration number INPLASY202340007).

INTRODUCTION

Review question / Objective: **To assess the efficacy of various exercise interventions in enhancing the quality of life of individuals who have survived breast cancer**

Rationale: **Exercise has been shown to have numerous benefits for breast cancer survivors, including improvements in physical function, fatigue, depression, and overall quality of life. However, there is a wide range of exercise interventions available, including aerobic activity, strength training, yoga, and others. The**

existing meta-analyses can only inform us that physical activity, as a whole, is beneficial for improving quality of life, but cannot answer questions regarding dose and type of physical activity.
Network meta-analysis is a statistical method that allows for the simultaneous comparison of multiple interventions and can help to identify which exercise interventions are most effective. By selecting studies within a specific time frame, we can also anticipate which types of exercise interventions can produce statistically significant effects after a certain duration of intervention. The goal of this network meta-analysis is to provide rankings of the effectiveness of different exercise interventions for improving quality of life in breast cancer survivors, as well as an estimation of the duration required for statistically significant effects to be observed. This information can help guide the selection of an appropriate exercise intervention for breast cancer survivors seeking to improve their quality of life.

Condition being studied: The network meta-analysis adopted the PICO framework (population, intervention, comparison, outcome) with the following specifications: (1) P: human participants with breast cancer and completed treatment, including surgery, chemotherapy, and/or radiotherapy; (2) I: exercise interventions; (3) C: control group without intervention; and (4) O: changes in quality of life. The definition of breast cancer survivor was based on the joint guideline provided by the American Cancer Society and the American Society of Clinical Oncology.

METHODS

Search strategy: Two authors (Wang TC and Tsai IC) conducted independent electronic searches in PubMed, Cochrane Reviews, Cochrane CENTRAL, Web of Science, and ClinicalTrials.gov databases using the following keywords: ('breast cancer') AND ('quality of life' OR 'QoL') AND ('exercises' OR 'physical activity' OR 'yoga' OR 'aerobic') AND ('random' OR 'randomized' OR 'randomised') AND ('12 weeks' OR '3 months'). The systematic review and network meta-analysis search strategy covered the period from the earliest record in each database to the last search date (March 25, 2023).

Participant or population: Human participants with breast cancer and completed treatment, including surgery, chemotherapy, and/or radiotherapy.

Intervention: Exercise interventions.

Comparator: Control group without intervention.

Study designs to be included: Randomized controlled trials.

Eligibility criteria: The study employed the following inclusion criteria: (1) randomized controlled trials that recruited breast cancer survivors who had completed treatments including surgery, chemotherapy, and/or radiation therapy, (2) randomized controlled trials that investigated the quantitative assessment of quality of life after exercise intervention, (3) the control group that received no intervention or regular care, and (4) trials that had available data on quality of life pre- and post-intervention at 12 weeks.

Information sources: PubMed, Cochrane Reviews, Cochrane CENTRAL, Web of Science, and ClinicalTrials.gov

Main outcome(s): The primary outcomes evaluated in this study were changes in quality of life measured by quantitative scales.

Additional outcome(s): The secondary outcome measure was the risk difference of dropout at the 12th week, which provides an intuitive indicator.

Data management: The data extraction process was performed independently by two authors (Wang TC and Tsai IC), who collected demographic information, study design, exercise protocol details, and primary and secondary outcomes from the evaluated studies. If the required data were

not available in the published articles, we contacted the corresponding authors to obtain the original data.

Quality assessment / Risk of bias analysis: To evaluate the methodological quality of the studies included in our analysis, we utilized the Cochrane risk of bias tool for randomized trials (version 2, RoB 2, London, United Kingdom) (Sterne et al., 2019).

Strategy of data synthesis: Given the inclusion of multiple types of exercises, a random-effects model was employed for the network meta-analysis. The analysis was performed using MetaInsight (version 4.0.2, Complex Reviews Support Unit, National Institute for Health Research, United Kingdom) under a frequentist framework. MetaInsight is a web-based service for network meta-analysis that utilizes the netmeta package in R software for frequentist statistical calculations.

Subgroup analysis: Based on the included studies, the exercise types were categorized as follows: aerobic and strength training (concurrent), aerobic activity, yoga, and strength exercise.

Sensitivity analysis: Two sensitivity analyses were performed. The first sensitivity analysis performed was one-study removal method. The second sensitivity analysis involved the pre-post correlation coefficient.

Language restriction: No language limit.

Country(ies) involved: Taiwan.

Other relevant information: No.

Keywords: breast cancer survivors, exercise interventions, quality of life, randomized controlled trials, aerobic and strength training.

Dissemination plans: Publication on scientific journal.

Contributions of each author:
Author 1 - I-Chen Tsai.