The Relationship between Post-Diagnosis Recreational Physical Activity and Breast Cancer Recurrence: A Systematic Review and Meta-Analysis

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Abstract

Breast cancer recurrence risk peaks within 5 years post-diagnosis, making survivorship care critical. While pre-diagnosis physical activity is protective, the impact of post-diagnosis recreational physical activity (rPA) is less understood. This systematic review and meta-analysis examined whether high rPA after diagnosis reduces recurrence risk and whether meeting U.S. Physical Activity Guidelines (150 min/week) is sufficient. Nine cohort studies (n = 37,787 survivors; 4,524 recurrences) were analyzed using random-effects models. High rPA was associated with a 13% lower recurrence risk (HR = 0.87, 95% CI: 0.77–0.96), while meeting minimum guidelines showed no significant effect (HR = 0.93, 95% CI: 0.85–1.02). Stronger associations were observed in studies assessing rPA ≥5 years post-diagnosis. Findings suggest higher levels of rPA should be promoted in survivorship care, as current minimum recommendations may be insufficient

Introduction

Breast cancer (BC) recurrence risk is highest within the first 5-years following initial diagnosis, making survivorship care a critical window for intervention. As survivorship rates increase, identifying modifiable lifestyle factors that may reduce recurrence risk becomes increasingly important. While the protective role of recreational physical activity (rPA) before BC diagnosis are well-documented, the role of post-diagnosis rPA, particularly its impact on recurrence remains less explored.

Objectives

[1] When compared to minimal recreational physical activity (rPA), does a high level of post-diagnosis rPA affect breast cancer recurrence risk in female breast cancer survivors?

[2] Do the national Physical Activity Guidelines for Americans, which recommends adults get 150 minutes of moderate-intensity physical activity each week, significantly reduce the risk of breast cancer recurrence in female breast cancer survivors?

Methods and Materials

PICO Criteria

- **Population:** Female breast cancer survivors (≥18 years); **Exposure:** Post-diagnosis rPA; **Comparison:** Meeting rPA guidelines vs not, and high vs low rPA; **Outcome:** Breast cancer recurrence.

Screening and Selection

- MEDLINE (PubMed), CINAHL, and Web of Science were used to search for studies published to investigate the relationship between post-diagnosis rPA and breast cancer recurrence (up to February 19, 2025).
- 2635 studies were initially imported on Covidence for screening, title and abstracts were screened by two independent reviewers. 22 studies passed the initial screening and moved to a full-text review, and to confirm their eligibility.
- At all stages of screening studies were reviewed by two team members, and any conflicts were resolved between them, and a consensus was made. The full PRISMA flow chart can be seen in **Figure 1**.

Quality Assessment and Extraction

- 9 studies moved to the quality assessment and extraction.
- Quality assessment used the New Ottawa Scale (NOS) form by the team of reviewers.
- Extraction of relevant data, including, study characteristics, rPA assessment, statistical methods, subgroup analyses, missing data, outcome ascertainment, study outcomes, study strengths and limitations was completed on Covidence.

Statistical Analysis

- Calculation of effect sizes (hazard ratio) through random effects model comparing high vs low rPA meeting rPA recommended guidelines vs not and .

Subgroup Analysis

- Explored BC subtypes, study characteristics, menopausal status, and follow-up period as potential sources of heterogeneity.
- PROSPERO Registration #: CRD420251001115

Results

1. Search Results

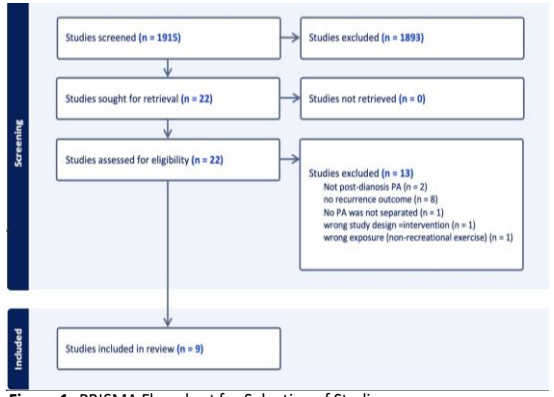


Figure 1: PRISMA Flowchart for Selection of Studies

2. Effect on Recurrence: High vs. Low rPA

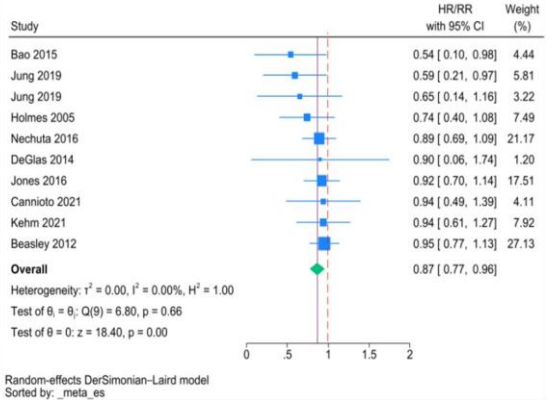


Figure 2: Forest plot

High rPA was associated with 13% lower risk of breast cancer recurrence.

Continued Results

3. Effect on Recurrence: Meeting rPA guidelines

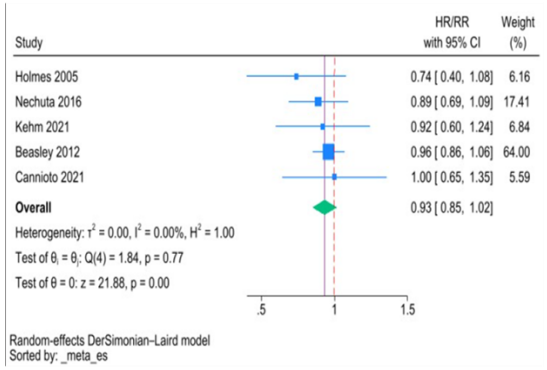


Figure 3: Forest plot

Meeting recommended rPA guidelines was *not* associated with lower risk of breast cancer recurrence.

4. Finding: Subgroup Analysis

Timing of rPA assessment	Finding
< vs ≥ 5 years	rPA measured ≥5 years post-diagnosis was associated with lower risk of breast cancer recurrence.

Conclusions

These findings suggest that high levels of rPA postdiagnosis reduces recurrence risk by 13% and the current minimum recommendations may not be sufficient to reduce recurrence risk. Further research is needed to determine optimal rPA recommendations and guidelines for BC survivors. Additionally, these findings emphasize the value of healthcare professionals promoting higher levels of rPA within survivorship care plans for BC survivors.

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References

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