Sex differences in Cardiorespiratory Fitness After Exercise Training in Adults With Atrial Fibrillation: A Systematic Review Protocol

Sol Vidal-Almela, MSc[a,b], Isabela R. Marçal, MSc[a,b], Tasuku Terada, PhD[a] , Carley D. O'Neill, PhD[a,c] , Jennifer L. Reed, PhD[a,b,c*]

[a] Exercise Physiology and Cardiovascular Health Laboratory, Division of Cardiac Prevention and Rehabilitation, University of Ottawa Heart Institute, Ottawa; [b] School of Human Kinetics, Faculty of Health Sciences, University of Ottawa; [c] Sport Science, Faculty of Science and Technology, Douglas College, [d] School of Epidemiology and Public Health, Faculty of Medicine, University of Ottawa Heart Institute.

UNIVERSITY OF OTTAWA HEART INSTITUTE
INSTITUT DE CARDIOLOGIE DE L'UNIVERSITÉ D'OTTAWA

Background

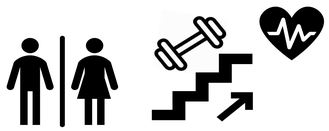
- **Atrial fibrillation (AF)** is characterized by an irregular cardiac rhythm and rapid heart rate, affecting more than 37 million people globally.[1]
- Patients with AF often have a low **cardiorespiratory fitness (CRF),** a strong predictor of all-cause mortality.[2]
- Emerging research suggests important **sex-differences** in CRF in patients with AF.[3]

Females vs males with AF

↓ CRF levels; Quality of life

↑ AF-symptoms; Obesity; Depression

- **Exercise training** is recommended to improve CRF in patients with AF.[4]



Do females with AF experience different improvements in CRF following the same exercise intervention when compared to males?

- A systematic evaluation is needed as a first step to provide evidence-based exercise recommendations for patients with AF applicable to both sexes.

Purpose

- To compare changes in CRF following exercise training between females and males with AF.

Methods

Systematic review design	Participants	Study designs
In accordance to PRISMA statement[5] and Amstar[6].	Adults (≥18 years old) with an AF diagnosis.	Prospective cohort and experimental designs.

Interventions → **Exercise training** (≥4wks)
Aerobic, strength or yoga, not limited to setting (e.g. group) or mode (e.g. virtual).

- **Primary outcome:** Changes in CRF - highest value of oxygen consumption ($\dot{V}O_2$peak), directly measured or estimated (in $mL \cdot min^{-1} \cdot kg^{-1}$, $L \cdot min^{-1}$ or METs).
- **Secondary outcomes:** General/specific quality of life, mental health (e.g. depression levels), frequency/severity AF symptoms, additional physical health (e.g. blood pressure).

Methods

Table 1. Planned methodological assessments.

Methods	Assessments
Search strategy (completed)	MEDLINE ; CINAHL; Embase; PycINFO; Cochrane Library.
Data management (completed)	Covidence Systematic Review.
Selection of eligible Studies (in progress)	Two reviewers (SVA, IRM). Third reviewer (JLR) for disagreements.
Data extraction	Spreadsheet. Microsoft Excel.
Quality and risk of bias	TESTEX (12 criteria).[7]
Quality of the evidence	GRADE approach.[8]
Quantitative data synthesis	Mean difference or standardized mean differences. Descriptive data for categorical variables.
Planned statistical analyses	Random-effects model. Cochrane RevMan 5.4.1 or Comprehensive Meta-Analysis.
Heterogeneity and publication bias	I^2 statistic; visual inspection; Eggers test.

Clinical Relevance

- To determine whether females and males with AF respond differently to exercise in CRF changes. To address the lack of sex-based analyses in previously conducted exercise studies and provide evidence applicable to both sexes when developing exercise recommendations to the AF population.

Acknowledgments

- Sponsored by Health and Behavior International Collaborative Research Award and International Behavioural Trials Network 2021-2022.

References

1. Lippi G et al. Global epidemiology of atrial fibrillation: An increasing epidemic and public health challenge. International Journal of Stroke. 2021 Feb 1;16(2):217–21.
2. Younis A et al. The role and outcome of cardiac rehabilitation program in patients with atrial fibrillation. Clin Cardiol. 2018:41(9):1170–6.
3. Wagner M et al. Sex differences in health status and rehabilitation outcomes in patients with atrial fibrillation treated with ablation: Results from the CopenHeartRFA trial. Eur J Cardiovasc Nurs. 2018: (2):123–35.
4. Ross R et al. Canadian 24-Hour Movement Guidelines for Adults aged 18–64 years and Adults aged 65 years or older: an integration of physical activity, sedentary behaviour, and sleep. Appl Physiol Nutr Metab. 2020:45(10 (Suppl.2):S57-S102.
5. Page MJ et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021: 372:n71.
6. Smart NA et al. Validation of a new tool for the assessment of study quality and reporting in exercise training studies: TESTEX. Int J Evid Based Healthc. 2015: (1):9–18.
7. Shea BJ et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. BMJ. 2017:j4008.
8. Guyatt GH et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. BMJ. 2008: 336(7650):924–6.

Registration: PROSPERO #CRD42022302310