Do highly active workers die early?

Elucidating the physical activity health paradox in a systematic review with meta-analyses

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Introduction

- Physical activity (PA) is important in prevention of (e.g., Sofi e.a., 2008)
  - CVD
  - Mortality
- Effects of different domains (e.g., work and leisure time) are considered positive and alike
- International guidelines: ~30 mins MVPA daily

Introduction

- Recent surprising evidence suggests a *PA health paradox* (e.g., Clays e.a., 2014; Hu e.a., 2014; Harari e.a., 2015):
  - Positive health effects of high int. leisure-time PA (LTPA)
  - Negative health effects of high int. occupational PA (OPA)
- Even when adjusted for PA (and other relevant factors)!

Aims

Address the *PA health paradox* by:

- Systematically reviewing the effect of OPA on all-cause mortality
- Quantifying this effect in a meta-analysis
  - In particular interested in high vs low OPA

Methods - Search

- A-priori registered systematic review (Prospero)
- Systematics searches in Pubmed, Embase, CINAHL, PsychINFO and Cochrane, with term for:
  - PA
  - Occupational
  - Mortality
- Selection (by two reviewers):
  - Original longitudinal studies
  - Effect of OPA on all-cause mortality
  - Fully adjusted models

Methods - Extraction

- Data extraction (by two reviewers):
  - Study (name, design, follow-up period)
  - Sample (n, relevant inclusion/exclusion, age, country etc.)
  - Adjustment for relevant factors (age, gender, lifestyle, SES, health etc)
  - Assessment methods of OPA and mortality
  - Effect sizes
- Risk of bias assessment: methodological quality scale (by two reviewers)
- Syntheses and description

Methods – Meta analysis

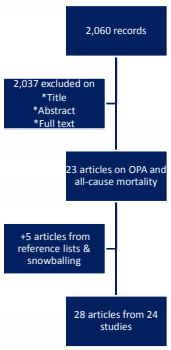
When homogeneous → pooled hazard ratios (HRs & 95%CI)

PA continuum

Sedentary — Low — Moderate — High

Low vs High

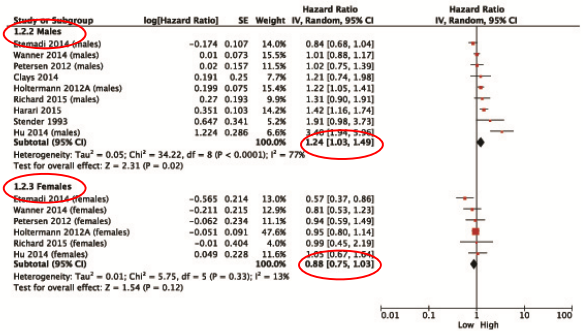
Results



Results

- 24 studies, n=288,264 participants with 18% mortality
- Assessment methods
  - OPA self-reports (1960-2006)
  - Mortality registers
- Follow-up period: mean 17.7 [3.3 35.0] years
- Samples:
  - 14 mixed-sex samples, 1 female only, 9 male only
  - 13 relatively healthy samples (excluding sick workers), 11 general population
  - 2 specific working samples (industry, manufacturing), 22 general samples
- Risk of bias: 86% [36% 96%] quality
- Meta-analysis possible on 18 studies

Results



Results

Sensitivity analyses

- HRs higher in relatively healthy populations
- Not able to asses effect of risk of bias

Discussion

- Male workers with high OPA die earlier
- Supporting the *PA health paradox*
- Difference in nature of OPA and LTPA
  - OPA consists of manual handling, repetitive work, static postures
  - Performed over long periods, not allowing for recovery
  - No fitness improvement
  - Increase in chronic BP and HR
  - Atherosclerosis, CVDs, …
- Males engage in higher intensity jobs than females
  - Or have different physiological responses to OPA than females

Discussion

- Self-reports → Objective measures needed
  - To avoid misclassification
  - Better harmonization OPA definitions (↓ heterogeneity)
- Adjustments
  - Moderation and mediation analysis
  - Residual confounding
- May be publication bias

Conclusion

- Male workers with high OPA die earlier
- Important implications for current guidelines (not distinguishing OPA from LTPA)
- Needs to be studied further
  - Using objectively measured OPA
  - Properly teasing out causality
  - Looking at CVDs more detailed

Thanks

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