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Systematic review and meta-analysis of interventions to support modal shift to active travel

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1 Introduction

The physical and mental health, environmental, social and economic benefits of shifting from private car travel to active travel are well established (Brand et al., 2021, Celis-Morales et al., 2017, Martin et al., 2014, Stevenson et al., 2016, Sahlqvist et al., 2013). Shifting trips away from private car travel to active travel also acts to reduce vehicular emissions and noise pollution, with positive flow-on health outcomes (Woodcock et al., 2009). Reflecting this, levels of government in countries around the world are increasing investment on modal shift to active travel. Synthesised evidence on the most effective interventions to support modal shift to active travel is, however, lacking. As a result, it is unclear which interventions should be prioritised to maximise uptake of active travel. In this systematic review with meta-analysis we aimed to assess the efficacy of interventions aimed at increasing walking and cycling.

2 Methods

MEDLINE, PsycINFO and Web of Science were searched on 22nd May 2023. Eligible study designs included randomised and non-randomised studies of interventions with specific study design features that enabled estimation of causality with minimal risk of bias. Where possible, meta-analyses synthesised results within intervention types. The main outcome of interest was modal shift to active modes (walking and cycling). PROSPERO Registration: CRD42023445982.

3 Results

106 studies were included in the review. The studies were conducted in 23 different countries, the most common of which were the USA (*n*=32), Australia (*n*=14), England (n=9), Canada (*n*=5) and China (*n*=5). Physical environmental restructure interventions, such as protected bike lanes and traffic calming infrastructure, were most effective in increasing cycling duration (OR = 1.70, 95% CI 1.20 – 2.22). Other intervention types, including individually tailored behavioural programs, and provision of e-bikes were also effective for increasing cycling (OR = 1.33, 95% CI 1.23-1.43, OR = 1.13, 95% CI 1.02.-1.22). An intensive education program intervention demonstrated the greatest impact on walking duration (OR = 1.96, 95% CI 1.68 – 2.21). Quality assessment revealed limited reporting of details for blinding of participants, assessors, and individuals delivering the intervention.

4 Discussion

This systematic review with meta-analysis provides evidence for investment in active transportation infrastructure, such as protected bike lanes, to increase active transport uptake. It also provides evidence for investment in non-infrastructure interventions. Further research to understand what combinations of intervention types are most effective for modal shift are needed. Active transport research needs to move towards more robust trials with consistent outcome measures to improve quality of evidence.

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