A workplace-based intervention to increase levels of daily physical activity: the Travel to Work cluster RCT

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Scientific summary

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Background

There may be opportunities for working adults to accumulate recommended physical activity levels (≥ 150 minutes of moderate-intensity physical activity in bouts of ≥ 10 minutes throughout the week) during the commute to work. Systematic reviews of interventions to increase active transport indicate that studies predominantly rely on self-report and lack robust statistical analyses.

Objectives

To evaluate the effectiveness, cost and consequences and mechanisms of impact of a workplace intervention to increase walking during the commute to and from work.

Primary outcome

Does the intervention lead to an increase in the daily number of minutes of moderate to vigorous physical activity (MVPA) after 12 months compared with the control group?

Secondary outcomes

The secondary objectives relating to physical activity and travel mode were:

1. Does the intervention lead to an increase in overall physical activity compared with the control group?
2. Does the intervention decrease the daily number of minutes of sedentary time compared with the control group?
3. Does the intervention lead to an increased number of journeys in which walking to work is the major mode of travel compared with the control group?
4. Does the intervention increase the MVPA attributable to walking on the commute compared with the control group?

Economic outcomes

There were three key economic outcomes of interest:

1. What are the intervention costs to participating employers and employees?
2. Does the intervention lead to increased or decreased costs in terms of health-care use, commuting costs and productivity losses?
3. Does the intervention lead to improved well-being?

Process outcomes

The aim of the process evaluation was to examine the context, delivery and response to the intervention. There were two main outcomes of interest:

1. What were the barriers to, and facilitators of, walking during the daily commute?
2. Was there evidence of social patterning in the uptake of the intervention, particularly in relation to socioeconomic status, age and gender?

Methods

Trial design

The study was a multicentre, parallel-arm cluster randomised controlled trial incorporating health economic and process evaluations.

Workplace and participant recruitment

Using available lists of employers, workplaces in seven urban areas in south-west England and south Wales were sent information about the study and asked for expressions of interest. Workplaces with fewer than five staff were considered too small to deliver the intervention at a reasonable cost, and workplaces with plans to significantly downsize or relocate, or in which most staff were on short-term or zero-hours contracts, were not eligible because of the need for a 12-month follow-up. Within participating workplaces, employers were asked to provide all employees with an information leaflet describing the study and eligibility criteria. Employees who always walked or cycled to work already were ineligible, as were those who were disabled in relation to walking, intended to leave the workplace within the following 12 months or whose job required regular driving. All eligible employees were invited to participate in the study.

The Walk to Work intervention

The 10-week Walk to Work intervention was supported by the inclusion of nine behaviour change techniques (BCTs): providing information (about the benefits of walking to work), encouraging intention formation, identifying barriers and solutions, goal-setting, self-monitoring (with travel diaries and optional pedometers), providing general encouragement, identifying social support, reviewing goals and relapse prevention.

Employers were asked to identify a suitable Walk to Work promoter within the workplace. The research team delivered a training session, lasting approximately 1 hour, to the Walk to Work promoters at their workplaces. The training was based on a DVD (digital versatile disc), developed by the research team, which promoters retained after the session. The training included information about the benefits of walking, using BCTs to promote increased walking during the whole route or as part of a mixed-mode journey, providing support and accessing relevant websites for information and resources. Walk to Work promoters were given booklets, also developed by the research team, to assist them in the role.

Walk to Work promoters were given details of participating employees in their workplace and were asked to (1) provide the employees with Walk to Work booklets and an optional pedometer, (2) highlight benefits of increased walking, (3) discuss barriers and solutions to walking during the commute, (4) identify routes and methods of incorporating walking in their journeys and (5) provide ongoing support through four contacts over the following 10 weeks. Walk to Work promoters were prompted and encouraged in their role through four newsletters from the research team over the 10-week intervention period. These were provided by e-mail or in paper form to suit the workplace. Promoters were reminded to contact their colleagues, pass on the newsletters and encourage the use of relevant BCTs to increase walking. Posters and booklets with ideas about how to support the Walk to Work intervention were provided for employers.

Sample size calculation

Using findings from the feasibility study, the sample size for the trial was based on an average cluster size of eight, an intracluster correlation coefficient of 0.15, participant attrition of 25% and equal numbers of workplaces in the intervention and the control groups. It was calculated that 339 individuals were needed per study group to detect a 15% difference in MVPA [equal to a difference of 0.36 standard deviations (SDs)] with 80% power at the 5% significance level. Therefore, 678 employees were required from 84 workplaces (42 for the intervention group and 42 for the control group).

Physical activity measures

Physical activity was measured using accelerometers (ActiGraph GT3X+; ActiGraph, Pensacola, FL, USA). Validated accelerometer thresholds were used to compute daily time spent in MVPA and being sedentary. To identify physical activity during the commute, participants wore a GPS (Global Positioning System) receiver (Qstarz BT-1000X; Qstarz International Co., Ltd, Taipei, Taiwan) during their journeys. GPS data were time-matched with accelerometer data and visualised in a geographic information system (ArcMap version 10.2.2; Environmental Systems Research Institute, Inc., Redlands, CA, USA). Journeys were manually identified and segmented for other data to provide a measure of duration of the journey and associated MVPA.

Health economic costs and consequences

The cost–consequences analysis included employer, employee and health service costs and consequences with well-being measured using the ICECAP-A (ICEpop CAPability measure for Adults).

Process evaluation

A mixed-method process evaluation included survey questions and semistructured interviews to explore the context, delivery and response to the Walk to Work intervention.

Randomisation procedures

Randomisation took place at the workplace level after baseline data collection. Workplaces were randomly allocated to either the Walk to Work intervention or a usual practice control. Assignment of workplaces was undertaken at the Bristol Randomised Trials Collaboration by a statistician not involved in workplace recruitment. Allocation was based on random number generation, such that one workplace from a matched set (based on location, size and type of business) was randomised to the control and one (or two in a triple) to the intervention. Given the nature of the intervention, it was not possible to blind participants following randomisation.

Statistical methods

Individuals providing a measurement of the primary outcome were included in the primary analysis that compared intervention or usual practice workplaces as allocated. The treatment effect was estimated as a mean difference using multivariable linear regression, including treatment group, baseline MVPA, workplace size, location and type of business as covariates, and the workplaces as a normally distributed random effect (to take account of clustering). This approach was adapted to the secondary outcome measures, with a zero-inflated negative binomial regression model, with robust standard errors, estimating treatment effect on the modal shift measure (number of journeys when walking was the major mode of travel).

Sensitivity analyses were pre-planned to assess (1) the impact on the primary analysis of any imbalance in baseline covariates, (2) any non-normality in the distribution of the primary outcome and (3) different quality-assurance thresholds for accelerometer data. The third analysis included a greater number of participants in the primary analysis and so explored the influence of missing values. Subgroup analyses of the primary outcome measure explored whether or not age at baseline (above/below the median), gender (male/female) and household income (above/below £30,000) modified the intervention effect; these analyses proceeded by adding interaction terms to the regression models used in the primary analysis.

Separate multivariable logistic regression models were developed to examine factors associated with physical activity during the commute and mode of travel to work.

Ethics approval

Ethics approval for the study was obtained from the Faculty of Health Sciences Research Ethics Committee at the University of Bristol.

Results

Recruitment and retention

Recruitment took place in two phases: during May to July 2015 and March to May 2016. Invitations for expressions of interest were sent to approximately 9800 workplace addresses. A total of 271 expressions of interest were received and, after screening for eligibility and giving further information about the study, 87 workplaces were recruited: 10 micro-sized (5–9 employees), 35 small (10–49 employees), 22 medium-sized (50–249 employees) and 20 large (≥ 250 employees). Within the workplaces, 654 participants who were predominantly qualified to degree level or above (60%) and lived > 2 km from their place of work (89%) were recruited. Following the baseline data collection, 44 workplaces (331 participants) were randomised to receive the intervention and 43 workplaces (323 participants) were randomised to the control group. At the 12-month follow-up, 84 workplaces (41 intervention, 43 control) and 477 employees (73% of those originally recruited to the study) took part in data-collection activities.

Process evaluation

All workplaces randomised to the intervention group received the Walk to Work promoter training session and relevant booklets and resources. Following the loss of two workplaces, the Walk to Work promoters in 41 workplaces received four newsletters over the 10-week intervention period to disseminate to participating employees. Descriptive statistics from survey questionnaires suggest that participants in the intervention group of the study were aware of the Walk to Work promoters in their workplaces and attempts were made to encourage increased walking during the commute. Employer support for the intervention tended to focus on the provision of information rather than improvements to facilities or incentives with cost implications. Key factors influencing whether or not participants increased walking during the commute were identified through the behavioural questionnaires and qualitative interviews. These included commuting distance and workplace location; availability and cost of alternatives to private car use; caring responsibilities; and stress during the commute.

Outcomes and estimation

There was no evidence of an intervention effect on MVPA at the 12-month follow-up [adjusted difference in means 0.3 minutes, 95% confidence interval (CI) –5.3 to 5.9 minutes]. There was no evidence that the effect of the intervention differed between different age groups, between males and females or between participants differing in household income. In the intervention group, 142 out of 331 participants (43%) provided a measure of the primary outcome (accelerometer data for ≥ 3 days and for 10 hours per day); in the control group, 180 out of 323 participants (56%) provided that measure. This is clearly a limitation to the strength of conclusions that can be drawn, but we do not believe that the missing measurements caused the study results to be misleading. Measuring the primary outcome for participants who provided at least 1 day of accelerometer data provided an outcome measure for 189 out of 331 participants (57%) in the intervention group and for 217 out of 323 participants (67%) in the control group; repeating the analysis with these data led to the same conclusion of no intervention effect.

Economic evaluation

The cost of the intervention was, on average, £181.97 per workplace and £24.19 per participating employee. There was no clear association between workplace size and cost per employee. Estimated productivity lost from self-rated productivity at work scores suggest that participants in the control group had more lost productivity due to ill health, with an adjusted difference in wages of –£231.35 (95% CI –£424.77 to –£37.92). Intervention participants had a marginally higher quality of life over the follow-up period than the control participants (average 0.018, 95% CI 0.000 to 0.036; scores anchored at 0 indicated ‘no capability’ and scores anchored at 1 indicated ‘full capability’). However, the lack of improvement in MVPA or active commuting, and the higher loss to follow-up in the intervention group, cautioned against overinterpreting these findings.

Physical activity and mode of travel to work

In comparison with car users (mean 7.3 minutes, SD 7.6 minutes), walkers (mean 34.3 minutes, SD 18.6 minutes) and public transport users (mean 25.7 minutes, SD 14.0 minutes) accrued substantially higher levels of daily MVPA during their commutes. Combined accelerometer and GPS data indicated that participants who walked ≥ 10 minutes during their commute were more likely to have a shorter commute distance ($p < 0.001$). No access to a car ($p < 0.001$) and absence of free workplace parking ($p < 0.01$) were independently related to walking to work and using public transport. Shorter commuting distances were also related to walking to work ($p < 0.001$). Public transport users were less likely to combine their commute with caring responsibilities ($p = 0.03$). Analyses of qualitative interviews identified several key influences on travel mode: commuting distance and workplace location; availability, reliability and cost of alternatives to private car use; and child-care responsibilities.

Conclusions

This study, incorporating objective measures of physical activity and a 12-month follow-up period, addresses some of the concerns of those who have called for greater rigour in assessing the effectiveness of active travel interventions. However, although the target for workplace recruitment was achieved, this was after a large mailout to workplaces across seven urban areas. It was not possible to check if all workplaces on the lists were extant, whether or not addresses and contact details were accurate or if the information reached someone with the authority decide about study participation. Nevertheless, with only 271 responses from > 9000 letters, it can be concluded that this study, clearly related to workplace travel behaviour, was not of interest to a majority of employers. Furthermore, within workplaces, participant recruitment was also limited. Issues of recruitment, context and reach will be further explored through the process evaluation.

Implications for policy and practice

It has been shown that walking to work, either the whole route or combined with public transport, is an important contributor to objectively measured physical activity levels in a large sample of adult employees recruited from diverse workplaces and settings in the UK. We believe that the picture is sufficiently clear to assert that supporting walking during the daily commute (either as the main mode or as part of a mixed-mode journey) is important for both transport and health providers. The findings suggest that interventions to increase walking to work should take the wider determinants of commuting behaviour into account, and consideration needs to be given to commuting distances, availability of car parking and access to convenient and reliable public transport. This places the emphasis on interactions between the correlates of physical inactivity, rather than individual behaviour.

Recommendations for future research

It is recommend that future research should consider targeted interventions for particular subgroups, or interventions that operate at organisational, environmental and policy levels, including (1) the feasibility, effectiveness and cost-effectiveness of targeting interventions at micro-sized workplaces, (2) examining the links between the school run and the commute to work, (3) the acceptability, impact and cost-effectiveness of interventions relating to the reduction or relocation of workplace parking and (4) the impact of infrastructure changes to the walking environment on travel mode. Consideration should also be given to research design as studies relating to infrastructure or policy changes may be suited more to good-quality natural experiments and realist evaluation methods than other study designs.

Trial registration

This trial is registered as ISCTRN15009100.

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