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[Intervention Review]

Workplace interventions for reducing sitting at work

Nipun Shrestha¹, Katriina T Kukkonen-Harjula², Jos H Verbeek³, Sharea Ijaz⁴, Veerle Hermans⁵, Zeljko Pedisic¹

¹Institute for Health and Sport (IHES), Victoria University, Melbourne, Australia. ²Rehabilitation, South Karelia Social and Health Care District Eksote, Lappeenranta, Finland. ³Cochrane Work Review Group, Finnish Institute of Occupational Health, TYÖTERVEYSLAITOS, Finland. ⁴NIHR CLAHRC West at University Hospitals Bristol NHS Foundation Trust, Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK. ⁵Faculty of Psychology & Educational Sciences, Faculty of Medicine & Pharmacy, Vrije Universiteit Brussel, Brussels, Belgium

Contact address: Nipun Shrestha, Institute for Health and Sport (IHES), Victoria University, Melbourne, Victoria, Australia.
drnipunsth@gmail.com, shrestha.nipun@live.vu.edu.au.

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ABSTRACT

Background

A large number of people are employed in sedentary occupations. Physical inactivity and excessive sitting at workplaces have been linked to increased risk of cardiovascular disease, obesity, and all-cause mortality.

Objectives

To evaluate the effectiveness of workplace interventions to reduce sitting at work compared to no intervention or alternative interventions.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, CINAHL, OSH UPDATE, PsycINFO, ClinicalTrials.gov, and the World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) search portal up to 9 August 2017. We also screened reference lists of articles and contacted authors to find more studies.

Selection criteria

We included randomised controlled trials (RCTs), cross-over RCTs, cluster-randomised controlled trials (cluster-RCTs), and quasi-RCTs of interventions to reduce sitting at work. For changes of workplace arrangements, we also included controlled before-and-after studies. The primary outcome was time spent sitting at work per day, either self-reported or measured using devices such as an accelerometer-inclinometer and duration and number of sitting bouts lasting 30 minutes or more. We considered energy expenditure, total time spent sitting (including sitting at and outside work), time spent standing at work, work productivity and adverse events as secondary outcomes.

Data collection and analysis

Two review authors independently screened titles, abstracts and full-text articles for study eligibility. Two review authors independently extracted data and assessed risk of bias. We contacted authors for additional data where required.

Main results

We found 34 studies — including two cross-over RCTs, 17 RCTs, seven cluster-RCTs, and eight controlled before-and-after studies — with a total of 3,397 participants, all from high-income countries. The studies evaluated physical workplace changes (16 studies), workplace policy changes (four studies), information and counselling (11 studies), and multi-component interventions (four studies). One study included

both physical workplace changes and information and counselling components. We did not find any studies that specifically investigated the effects of standing meetings or walking meetings on sitting time.

Physical workplace changes

Interventions using sit-stand desks, either alone or in combination with information and counselling, reduced sitting time at work on average by 100 minutes per workday at short-term follow-up (up to three months) compared to sit-desks (95% confidence interval (CI) -116 to -84, 10 studies, low-quality evidence). The pooled effect of two studies showed sit-stand desks reduced sitting time at medium-term follow-up (3 to 12 months) by an average of 57 minutes per day (95% CI -99 to -15) compared to sit-desks. Total sitting time (including sitting at and outside work) also decreased with sit-stand desks compared to sit-desks (mean difference (MD) -82 minutes/day, 95% CI -124 to -39, two studies) as did the duration of sitting bouts lasting 30 minutes or more (MD -53 minutes/day, 95% CI -79 to -26, two studies, very low-quality evidence).

We found no significant difference between the effects of standing desks and sit-stand desks on reducing sitting at work. Active workstations, such as treadmill desks or cycling desks, had unclear or inconsistent effects on sitting time.

Workplace policy changes

We found no significant effects for implementing walking strategies on workplace sitting time at short-term (MD -15 minutes per day, 95% CI -50 to 19, low-quality evidence, one study) and medium-term (MD -17 minutes/day, 95% CI -61 to 28, one study) follow-up. Short breaks (one to two minutes every half hour) reduced time spent sitting at work on average by 40 minutes per day (95% CI -66 to -15, one study, low-quality evidence) compared to long breaks (two 15-minute breaks per workday) at short-term follow-up.

Information and counselling

Providing information, feedback, counselling, or all of these resulted in no significant change in time spent sitting at work at short-term follow-up (MD -19 minutes per day, 95% CI -57 to 19, two studies, low-quality evidence). However, the reduction was significant at medium-term follow-up (MD -28 minutes per day, 95% CI -51 to -5, two studies, low-quality evidence).

Computer prompts combined with information resulted in no significant change in sitting time at work at short-term follow-up (MD -10 minutes per day, 95% CI -45 to 24, two studies, low-quality evidence), but at medium-term follow-up they produced a significant reduction (MD -55 minutes per day, 95% CI -96 to -14, one study). Furthermore, computer prompting resulted in a significant decrease in the average number (MD -1.1, 95% CI -1.9 to -0.3, one study) and duration (MD -74 minutes per day, 95% CI -124 to -24, one study) of sitting bouts lasting 30 minutes or more.

Computer prompts with instruction to stand reduced sitting at work on average by 14 minutes per day (95% CI 10 to 19, one study) more than computer prompts with instruction to walk at least 100 steps at short-term follow-up.

We found no significant reduction in workplace sitting time at medium-term follow-up following mindfulness training (MD -23 minutes per day, 95% CI -63 to 17, one study, low-quality evidence). Similarly a single study reported no change in sitting time at work following provision of highly personalised or contextualised information and less personalised or contextualised information. One study found no significant effects of activity trackers on sitting time at work.

Multi-component interventions

Combining multiple interventions had significant but heterogeneous effects on sitting time at work (573 participants, three studies, very low-quality evidence) and on time spent in prolonged sitting bouts (two studies, very low-quality evidence) at short-term follow-up.

Authors' conclusions

At present there is low-quality evidence that the use of sit-stand desks reduce workplace sitting at short-term and medium-term follow-ups. However, there is no evidence on their effects on sitting over longer follow-up periods. Effects of other types of interventions, including workplace policy changes, provision of information and counselling, and multi-component interventions, are mostly inconsistent. The quality of evidence is low to very low for most interventions, mainly because of limitations in study protocols and small sample sizes. There is a need for larger cluster-RCTs with longer-term follow-ups to determine the effectiveness of different types of interventions to reduce sitting time at work.

PLAIN LANGUAGE SUMMARY

Workplace interventions (methods) for reducing time spent sitting at work

Why is the amount of time spent sitting at work important?

Time spent sitting and being physically inactive at work has increased in recent decades. Long periods of sitting may increase the risk of obesity, heart disease, and premature death. It is unclear whether interventions that aim to reduce sitting at workplaces are effective.

The purpose of this review

We wanted to find out the effects of interventions aimed at reducing sitting time at work. We searched the literature in various databases up to 9 August 2017.

What trials did the review find?

We found 34 studies conducted with a total of 3,397 employees from high-income countries. Sixteen studies evaluated physical changes in the workplace design and environment, four studies evaluated changes in workplace policies, 10 studies evaluated information and counselling interventions, and four studies evaluated multi-category interventions.

Effect of sit-stand desks

The use of sit-stand desks seems to reduce workplace sitting on average by 84 to 116 minutes per day. When combined with the provision of information and counselling, the use of sit-stand desks seems to result in similar reductions in sitting at work. Sit-stand desks also seem to reduce total sitting time (including sitting at work and outside work) and the duration of workplace sitting bouts that last 30 minutes or longer. One study compared standing desks and sit-stand desks but due to the small number of employees included, it does not provide enough evidence to determine which type of desk is more effective at reducing sitting time.

Effect of active workstations

Treadmill desks combined with counselling seem to reduce sitting time at work, while the available evidence is insufficient to conclude whether cycling desks combined with the provision of information reduce sitting at work more than the provision of information alone.

Effect of walking during breaks or length of breaks

The available evidence is insufficient to draw conclusions about the effectiveness of walking during breaks in reducing sitting time. Taking short breaks (one to two minutes every half hour) seems to reduce time spent sitting at work by 15 to 66 minutes per day more than taking long breaks (two 15-minute breaks per workday).

Effect of information and counselling

Providing information, feedback, counselling, or all of these reduces sitting time at medium-term follow-up (3 to 12 months after the intervention) on average by 5 to 51 minutes per day. The available evidence is insufficient to draw conclusions about the effects at short-term follow-up (up to three months after the intervention). The use of computer prompts combined with providing information reduces sitting time in the medium-term on average by 14 to 96 minutes per day. The available evidence is insufficient to draw conclusions about the effects in the short-term.

One study found that prompts to stand reduce sitting time more than prompts to step, on average by 10 to 19 minutes per day.

The available evidence is insufficient to conclude whether providing highly personalised or contextualised information is more or less effective than providing less personalised or contextualised information in reducing sitting time at work. The available evidence is also insufficient to draw conclusions about the effect of mindfulness training and the use of activity trackers on sitting at work.

Effect of combining multiple interventions

Combining multiple interventions seems to be effective in reducing sitting time and time spent in prolonged sitting bouts in the short-term and the medium-term. However, this evidence comes from only a small number of studies and the effects were very different across the studies.

Conclusions

The quality of evidence is low to very low for most interventions, mainly because of limitations in study protocols and small sample sizes. At present there is low-quality evidence that sit-stand desks may reduce sitting at work in the first year of their use. However, the effects are likely to reduce with time. There is generally insufficient evidence to draw conclusions about such effects for other types of interventions and for the effectiveness of reducing workplace sitting over periods longer than one year. More research is needed to assess the effectiveness of different types of interventions for reducing sitting at workplaces, particularly over longer periods.