Can a multi-component intervention reduce sitting time among office workers? A randomized controlled workplace trial

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Introduction

Office workers sit about 11 hours per day (Tudor-Locke et al. 2011). Prolonged sitting time has been associated with several chronic diseases, musculoskeletal disorders and mortality (Dunstan et al. 2012; Owen et al. 2010; Gupta et al. 2015). Studies have observed a lowered disease risk by reducing sitting time or breaking up prolonged periods of sitting (Dunstan et al. 2012; Owen et al. 2010). Interventions reducing prolonged sitting time at work may therefore promote public and occupational health.

The effectiveness of single armed interventions, such as introducing sit-stand desk has been questioned (Neuhaus et al. 2014). Multicomponent interventions, including organizational, environmental and individual elements for reducing or breaking up prolonged sitting time at work have therefore been recommended (Healy et al. 2012).

Therefore, we investigated the effects of a multi-component participatory randomized controlled workplace intervention on sitting time among office workers from both private and public sector in the “Take a Stand” study. The hypothesis was that the intervention would reduce total sitting time, reduce the number of prolonged sitting periods (>30 min), and increase the number of sit-to-stand-transitions.

Method

Take a Stand is a cluster randomized controlled trial conducted at four office-based workplaces in Denmark (n=3) and Greenland (n=1). Clusters were physically well defined office units. Randomisation was done within each workplace, where 19 clusters were randomly allocated to intervention (n=173) or control (n=144). The multicomponent intervention was composed of appointment of local ambassadors, management support, environmental changes, a lecture, and a workshop regarding reductions in sitting time. Total time spent sitting at work per 8-h workday, number of prolonged sitting periods (>30 min) at work per 8-h workday, and number of sit-to-stand transitions per hour of sitting were measured with ActiGraph GT3X+ accelerometer on the thigh at baseline, and follow-up after 1 and 3 months. The data was analysed with Acti4 software which provides valid information on posture and activity (i.e. lying, sitting, standing still, moving, walking, running, walking stairs and cycling) (Skotte et al. 2014). Data were statistically analysed in a multilevel general linear model, with workplaces as fixed effect and offices within workplaces as random effect. Baseline values of each respective outcome measure were included in the statistical models to account for differences between clusters at baseline.

Results

Adjusted for baseline sitting time, sitting time was 62 minutes (95% CI -83 to -41) and 43 minutes (CI 95% -63 to -22) per workday lower in the intervention group compared to the control group after 1 and 3 month respectively. Accordingly, the number of prolonged sitting periods was significantly lower (-0.56, CI 95% -0.88 to -0.23, p=0.001) and sit-to-stand transitions were significantly higher (+12 %/sitting hour, CI 95% 3 to 22%, p=0.007) in the intervention compared to the control group after 1 month. After 3 months, these tendencies persisted, but did not remain statistically significant.
**Discussion**

The positive effects of the intervention on sitting time, number of prolonged sitting periods, and sit-to-stand transitions may be a result of the multi-component intervention strategy applied, including elements at organizational, environmental and individual levels.

The study included a variety of office-based workplaces, an intervention-duration of 3 months, and objective valid measurements of sitting time which support that a multicomponent intervention is able to reduce sitting time among office workers. Future research should investigate interventions for long-term maintenance of reductions in sitting time among office workers.

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**References**


