Using technology to reduce sedentary behaviour in the workplace

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Overview

Current evidence on sedentary behaviour at work

Can technology help to positively change sedentary behaviour?

My research journey

What does the future hold?
How do you spend your day?
8 hours

Leisure

LIPA

MVPA

Transport

Occupation

54-63% \(^{1,2}\)

8 hours

1 Clemes et al., 2014
2 Kazi et al., 2014
Is sedentary behaviour a problem?
Sedentary Behaviour (SB)

Prolonged sitting is a risk factor for all-cause and CVD mortality,\textsuperscript{3-5} obesity,\textsuperscript{6} type II diabetes,\textsuperscript{6} certain cancers,\textsuperscript{7,8} metabolic syndrome,\textsuperscript{9} ... independent of physical activity.

Limited evidence for link with obesity in adulthood?

Changes in SB impact on cardiometabolic risk factors.\textsuperscript{10,11}

High dose of PA (60-75 min per day) eliminates risk of death associated with high levels of SB.\textsuperscript{12}
Occupational SB

Office workers can spend 81% of the working day sedentary.\textsuperscript{13}

Occupational sitting has been linked with increased mortality,\textsuperscript{14} diabetes mellitus,\textsuperscript{14} and obesity.\textsuperscript{15}

Reducing SB alleviates musculoskeletal discomfort, increases worker productivity\textsuperscript{16}, improves fatigue\textsuperscript{17} and may be beneficial for mental health.\textsuperscript{18}
Technology

Wearable technology = ACSM’s number 1 fitness trend in 2017

76% of UK adults own a smartphone.

Smartphone apps are being used to help change health behaviours.

Smartphone apps\textsuperscript{19} and wearable devices\textsuperscript{20,21} have been shown to positively change SB in the general population.
My research journey so far...
Using technology to deliver and monitor exercise interventions

Reducing sedentary behaviour using digital health technology

- What’s the evidence for technology to help reduce SB?
- What will work in a workplace setting?
- How do we develop the right intervention?
- What is the feasibility of the intervention?

Diagram:
- Development
  1. Identifying the evidence base
  2. Identifying/developing theory
  3. Modelling process and outcomes
- Implementation
  1. Dissemination
  2. Surveillance and monitoring
  3. Long term follow-up
- Evaluation
  1. Assessing effectiveness
  2. Understanding change process
  3. Assessing cost-effectiveness
- Feasibility/piloting
  1. Testing procedures
  2. Estimating recruitment/retention
  3. Determining sample size
Interventions using computer, mobile and wearable technologies can be effective in reducing SB by approximately 41 min/day.

Effectiveness appeared most prominent in the short-term and lessened over time.

Need to improve reporting of BCTs within interventions and address the methodological flaws identified within the review through the use of more rigorously controlled study designs with longer-term follow-ups, objective measures of SB and the incorporation of strategies to reduce attrition.
*warning!
Barriers, facilitators and strategies to reduce occupational sedentary behaviour

Knowledge
Productivity
The Organisation
Health
Culture
The Environment
Motivation

Well the desks we have are all standard desks, so sit down desks, so there is no option to have a standing desk if you want one.

It’s just this career that you have chosen - you have to sit a lot of time at desks and if you’re not at your desk your sitting eating your lunch, you know, it’s a lot of sitting. A lot of time at desks and if you were at a meeting you would need to sit down.

I feel if you were at a meeting you would need to sit down.

[Technology] makes you more aware of time because certainly when I am sitting and looking at something time just flies by...

you won’t get much work done if you’re up and down all day as well.

[Technology] makes you more aware of time because certainly when I am sitting and looking at something time just flies by...

environment  productivity  culture  knowledge
Worktivity

Self-monitoring
Goal setting
Feedback
Educational prompts
Reminders
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Feasibility cluster RCT

Outcomes of interest:
Time spent sitting, standing and stepping (activPAL device)
Productivity (Likert scale) and Mood (BRUMS)
Recruitment and reach
App engagement and intended use
End-user satisfaction
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the messages to say "move" sometimes its not possible and you almost feel guilty

unable to reduce my sitting by much as I have to stop working to do so

too difficult to integrate phone app into routine

app + desk

although it made me more aware I cant spend 2 hours during work wandering around doing nothing

app only

I was very keen at the beginning and my sitting time reduced substantially...as time went on I used the standing desk less and less. Sometimes I was too busy, sometimes I forgot and sometimes I just wanted to sit

app + desk

app only

*unpublished data
Summary

- Primacy of work
- Cultural changes are necessary
- Environmental facilitators seem to be most important
- Technology may work best alongside other facilitators

Keeping up with the rapidly evolving digital health technology market is a challenge!!
What next?

• Better understanding of the association between sedentary behaviour and health is needed.

• How can we best measure sedentary behaviour at work?

• What are the determinants and correlates of sedentary behaviour in different domains and in different populations?

• What are the best interventions to reduce sedentary behaviour in the workplace?

• How do we implement and up-scale these interventions for impact?
Acute responses to breaks in sedentary behaviour

• Physiological and psychological responses to breaking sitting with standing and walking
  • free-living glucose, ABP and PA
  • endothelial dysfunction, vascular function
  • Cognition – executive function
Thank you

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References


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