

Conversations about sitting:

are we and should we be telling patients to sit less?

CONVERSATIONS ABOUT SITTING

Eat well. Eat moderately. Exercise regularly. These are messages we hear and repeat as doctors. But how often do we advocate sitting less in our health promotion information and lifestyle advice? Sedentary behaviour is defined as any waking behaviour with low energy expenditure equivalent to ≤ 1.5 metabolic equivalents (METs).¹ Less than 1.5 MET is thought to be the amount of energy we use when resting. Not surprisingly, sitting is the commonest sedentary behaviour. The UK 2011 *Start Active, Stay Active* document² advises avoiding lengthy periods of sitting. It should, therefore, perhaps be entering conversations in the consultation room. Yet are we facilitating this and are we equipped to? Do we know the detrimental effects of the inconspicuous pastime of sitting? Even if being sedentary is detrimental, will advice from the primary care team change this behaviour?

NEGATIVE OUTCOMES OF SEDENTARY BEHAVIOUR

There has been a dramatic societal change increasing our likelihood of spending time being sedentary. Older adults are thought to be particularly vulnerable to spending prolonged time being sedentary. A meta-analysis of 22 studies utilising objective measures by Harvey *et al* reported that older adults (aged ≥ 60 years) spend an average of 9.4 hours daily being sedentary, equating to 65–80% of their waking day.³

There is emerging evidence of worse metabolic health outcomes associated with spending prolonged periods being sedentary.⁴ It has also been suggested that excess sedentary time may be associated with adverse effects on physical capability, grip strength, quality of life, mental health, and cognitive performance. In their meta-analysis, Biswas *et al* report associations with risk of cardiovascular disease (hazard ratio [HR] 1.14, 95% confidence interval [CI] = 1.00 to 1.73), cancer (HR 1.13, 95% CI = 1.05 to 1.21), and type 2 diabetes (HR 1.91, 95% CI = 1.64 to 2.22) and mortality from cardiovascular disease (HR 1.18, 95% CI = 1.11 to 1.26), cancer (HR 1.17, 95% CI = 1.11 to 1.24), and all causes (HR 1.24, 95% CI = 1.09 to 1.41).⁴

However, 46 of the 47 studies in this meta-analysis utilised subjective proxy measures of sedentary time such as self-reported

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sitting time and TV viewing time. The disadvantages of these measures are their vulnerability to recall bias, self-report bias, and confounding (for example, by snacking). The increasing use of objective measures such as accelerometers is changing the landscape of sedentary behaviour research, and there is now greater evidence utilising these measures in large prospective cohort studies supporting associations with adverse metabolic outcomes and all-cause mortality.^{5–7} In a large cohort of US adults aged >50 years higher, levels of sedentary time (median of >8.60 hours/day) were associated with increased risk of all-cause mortality (relative risk [RR] 2.03, 95% CI = 1.09 to 3.81).⁵

Although adjustment in these epidemiological studies suggests that moderate-to-vigorous physical activity (MVPA) does not confound the relationship between sedentary behaviour and adverse outcomes, emerging evidence suggests that MVPA may moderate it instead. A recent meta-analysis of more than one million individuals examined the joint associations of self-reported MVPA and self-reported sitting time with all-cause mortality. They reported that high MVPA levels attenuated the association between sitting time and all-cause mortality, and very high levels of MVPA (60–75 minutes per day) seem to eliminate sitting risk.⁸ This bolsters the need for joint consideration of these modifiable behaviours.

PRIMARY CARE INTERVENTIONS

So if sedentary behaviour is prevalent and harmful, is there a threshold over which this harm starts? There are only a few studies that have considered this. They do seem to support a threshold but do not agree on what this threshold might be. Reports vary widely from a 7- to a 10-hour threshold

above which risk of death increases.^{9–11} More work will be needed to clarify this.

What might an intervention in primary care look like? A feasible brief intervention (<20 minutes) might consist in raising the issue of sedentariness, screening patients regarding their level of sedentariness (several brief, validated questionnaires exist),¹² providing feedback on current levels, and advice on strategies for behaviour change, reinforced with leaflets or web pages. Similar approaches targeting smoking have led to small effects at the individual level but potentially important changes at the population level; the overall impact of an intervention at a population level is determined by its effectiveness and importantly also by its reach.¹³

What effective behavioural change techniques have been evaluated and could these potentially be used in primary care? A recent review of 26 interventions targeting sedentary behaviour in adults found that the most frequently used techniques were setting behavioural goals, providing unspecified forms of social support, self-monitoring of activity, and altering the environment (for example, sit-stand desks).¹⁴ Behaviour is determined by capability, opportunity, and motivation.¹⁵ Thus far, interventions have focused on improving capability (for example, goal setting) and opportunity (modifying the environment to be more conducive), with few studies focused on motivation (for example, education or information giving). Of the commonly trialled interventions, brief advice including goal setting (standing while watching TV once per day, a 'reduced TV watching prescription') and opportunity reminders (providing a 'standing' prompt card to be put on the sofa and lending activity monitors) could be feasible in a primary care setting.

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Is there any evidence that we can make a difference with a brief intervention that is feasible in primary care? There has been little research on brief interventions of this type, but there is promising evidence of potential effectiveness of longer interventions consisting of multiple contacts. Two recent meta-analyses suggest such interventions have reduced sedentary time but not increased physical activity.^{16,17} Gardner *et al* reviewed 26 trials of interventions targeting sedentary behaviour in adults and found 39% of interventions were very promising [significant reductions in at least one sedentary behaviour indicator].¹⁴ However, only seven studies (27% of all studies) were in a community, non-workplace setting and none involved brief interventions that could be feasibly carried out in a single consultation. Similarly, in their meta-analysis of 34 studies, Martin *et al* reported that interventions reduced sedentary time by 22 minutes/day (95% CI = -35 to -9 min/day, $n = 5868$),¹⁷ although none of these interventions was brief. Although small, these changes could potentially translate to important effects at the population level.

CHALLENGES TO DELIVERING ADVICE

Although there is limited evidence suggesting that we can change behaviour with brief interventions regarding physical activity, we still continue to give advice on this. In the same way, should we be waiting for evidence for the effectiveness of brief interventions regarding sedentariness before we start delivering advice about this harmful behaviour? The task of doing this is made harder with the limited guidance that currently exists, and the opportunity cost in an increasingly time-constrained primary care environment.

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REFERENCES

1. Sedentary Behaviour Research Network. Letter to the editor: standardized use of the terms 'sedentary' and 'sedentary behaviours'. *Appl Physiol Nutr Metab* 2012; **37**(3): 540-542.
2. Department of Health. *Start active, stay active: a report on physical activity for health from the four home countries' Chief Medical Officers*. London: DH, 2011. <https://www.gov.uk/government/publications/start-active-stay-active-a-report-on-physical-activity-from-the-four-home-countries-chief-medical-officers> [accessed 22 Aug 2017].
3. Harvey JA, Chastin SF, Skelton DA. How sedentary are older people? A systematic review of the amount of sedentary behavior. *J Aging Phys Act* 2014; **23**(3): 471-487.
4. Biswas A, Oh PI, Faulkner GE, *et al*. Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. *Ann Intern Med* 2015; **162**(2): 123-132.
5. Schmid D, Ricci C, Leitzmann MF. Associations of objectively assessed physical activity and sedentary time with all-cause mortality in US adults: the NHANES study. *PLoS One* 2015; **10**(3): e0119591.
6. Koster A, Caserotti P, Patel KV, *et al*. Association of sedentary time with mortality independent of moderate to vigorous physical activity. *PLoS One* 2012; **7**(6): e37696.
7. Brocklebank LA, Falconer CL, Page AS, *et al*. Accelerometer-measured sedentary time and cardiometabolic biomarkers: a systematic review. *Prev Med* 2015; **76**: 92-102.
8. Ekelund U, Steene-Johannessen J, Brown WJ, *et al*. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. *Lancet* 2016; **388**(10051): 1302-1310.
9. Biddle SJH, Bennie JA, Bauman AE, *et al*. Too much sitting and all-cause mortality: is there a causal link? *BMC Public Health* 2016; **16**: 635.
10. Chau JY, Grunseit AC, Chey T, *et al*. Daily sitting time and all-cause mortality: a meta-analysis. *PLoS One* 2013; **8**(11): e80000.
11. Lee PH. Examining non-linear associations between accelerometer-measured physical activity, sedentary behavior, and all-cause mortality using segmented Cox regression. *Front Physiol* 2016; **7**: 272.
12. Atkin AJ, Gorely T, Clemes SA, *et al*. Methods of measurement in epidemiology: sedentary behaviour. *Int J Epidemiol* 2012; **41**(5): 1460-1471.
13. Zhu S-H, Lee M, Zhuang Y-L, *et al*. Interventions to increase smoking cessation at the population level: how much progress has been made in the last two decades? *Tob Control* 2012; **21**(2): 110-118.
14. Gardner B, Smith L, Lorencatto F, *et al*. How to reduce sitting time? A review of behaviour change strategies used in sedentary behaviour reduction interventions among adults. *Health Psychol Rev* 2016; **10**(1): 89-112.
15. Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci* 2011; **6**: 42.
16. Prince SA, Saunders TJ, Gresty K, Reid RD. A comparison of the effectiveness of physical activity and sedentary behaviour interventions in reducing sedentary time in adults: a systematic review and meta-analysis of controlled trials. *Obes Rev* 2014; **15**(11): 905-919.
17. Martin A, Fitzsimons C, Jepson R, *et al*. Interventions with potential to reduce sedentary time in adults: systematic review and meta-analysis. *Br J Sports Med* 2015; **49**(16): 1056-1063.