Sitting time in adults 65 years and over: behaviour, knowledge, and intentions to change

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Abstract

This study examined sitting time, knowledge and intentions to change sitting time in older adults. An online survey was completed by 494 Australians aged 65+. Average daily sitting was high (9.0hrs). Daily sitting time was the highest during TV (3.3hrs), computer (2.1hrs) and leisure (1.7hrs). A regression analysis demonstrated that women were more knowledgeable about the health risks of sitting compared to men. The percentage of older adults intending to sit less were the highest for TV (24%), leisure (24%) and computer (19%) sitting time. Regression analyses demonstrated that intentions varied by gender (for TV sitting), education (leisure and work sitting), BMI (computer, leisure and transport sitting) and physical activity (TV, computer and leisure sitting). Interventions should target older adults' TV, computer and leisure time sitting, with a focus on intentions in older males and older adults with low education, those who are active and those with a normal weight.

Keywords: sedentary behaviour, sitting time, older adults, intentions, behaviour change

Introduction

Prolonged sitting is detrimental to the health of older adults, 65+ years (Wullems et al., 2016). A recent review found that prolonged sitting leads to a range of health problems in older adults including chronic disease, musculoskeletal problems, low mobility, mental health problems (including cognitive decline) and reduced quality of life (Wullems et al., 2016). A study conducted by Dogra and Stathokostas (2012) suggests that older adults who sit for less than 2 hours or between 2 and 4 hours are 43% and 38% respectively more likely to have improved physical and psychological factors than older adults who sit for more than 4 hours each day. There is a debate in the literature on whether the associations between sitting and disease risk are attenuated by physical activity (Biswas et al., 2015; Ekelund et al., 2016; Pavey, Peeters & Brown, 2015). Experimental evidence does however clearly demonstrate that breaking up sitting with short activity breaks is beneficial for mood, cognition and reducing biomarkers of chronic disease risk (Benatti & Ried-Larsen, 2015; Bergouignan et al., 2016; Dunstan et al., 2012).

Despite the physical and mental health risks of prolonged sitting, over half of older adults (65+ years) sit between 4-8 hours, and a further 18% of adults 65-75 years of age and 23% of adults over 75+ years sit for more than 8 hours per day (Van der Ploeg et al., 2012). This is a public health concern due to the high prevalence of chronic diseases (Australian Bureau of Statistics, 2013) and high rates of mental health issues in older adults (Rodda, Walker & Carter, 2011). The burden of these diseases on the health care system is projected to rise due to the aging population in Australia (Australian Bureau of Statistics, 2012). Therefore, due to the high levels of sitting time in older adults and the health benefits of reducing sitting time, interventions are needed to reduce sitting in older adults.

It is necessary to distinguish between different domains of sitting (TV, computer, other leisure, work and transport) when investigating the correlates of sitting time. Owen et al. (2011) argue that the context of sitting is important as the correlates and determinants of sitting can be different in each context. Prior research suggests that older adults are more likely to have longer TV sitting times, but lower work sitting times compared to younger adults (Clark et al., 2010). However limited research has examined how sitting time differs by domain in older adults. Such information is needed to inform sitting interventions for older adults.

Behaviour change interventions based on a theory, such as the theory of planned behaviour, are more effective than those that are not theoretically based (Lustria et al., 2009). The theory of planned behaviour specifies that attitudes (knowledge of benefits and barriers to performing the target behaviour), social norms (support and modelling from significant others) and perceived behavioural control (confidence to perform the target behaviour) influence intentions, which in turn influence behaviour (Ajzen, 1988). Interventions based on the theory of planned behaviour therefore target attitudes, social norms, perceived behavioural control and intentions to change the target behaviour. Although knowledge of health risks alone is insufficient to initiate behaviour change, it can contribute to attitudes of the target behaviour (Michie et al., 2008) which influences intentions and behaviour (Hobbs et al., 2013; Plotnikoff et al., 2012a). Intention to change behaviour is a strong and consistent predictor of behaviour change (Hobbs et al., 2013; Plotnikoff et al., 2012b). Therefore identifying areas of low knowledge and intentions for reducing sitting time in older adults is required to inform behaviour change interventions (Giles-Corti et al., 2005).

In order for interventions and public health messages to implement effective content, it is important to also investigate how sitting knowledge and intentions differ by demographic factors. Past research demonstrates that health behaviours and their correlates differ by age,

gender and education (Bauman et al., 2012; Nicklett & Kadell, 2013), but we do not know if this is the case for knowledge and intentions in older adults. It is also important to investigate how older adults' knowledge and intentions differ by physical activity and BMI, which are related risk factors for chronic disease and mortality (Conry et al., 2011). Such information will allow interventions to target population groups of older adults with the most appropriate behaviour change strategies.

Aims

This study aims to 1) determine older adults' sitting time across different domains (TV, computer, other leisure, work, transport) by demographics (age, gender, education), body mass index (BMI) status, physical activity, knowledge and intentions, 2) determine older adults' knowledge of the health risks associated with sitting behaviour and assess differences in knowledge by demographics (age, gender, education), BMI status and physical activity and 3) determine older adults' intentions to change their sitting behaviour in each sitting domain and assess differences in intentions by demographics, BMI status and physical activity.

Methods

Sample

Data were collected through the Australian Health and Social Science panel (Hanley & Mummery, 2009). Panel members were recruited through computer-assisted phone calls made to randomly selected households across Australia annually in 2009 – 2012. Australian adults (over 18 years of age) were eligible to become a panel member. Panel members (N = 3,932) were sent links to the web-based survey in August-September 2012, and the measures for this study were completed by 43% of panel members (N = 1,655). Of these, 494 adults aged 65 years and over were included in this study. The final sample size for this study was therefore 494. The data collection complied with approval received from the relevant Human

Research Ethics Committee. Written consent was not possible due to the nature of the phone survey, however verbal consent was received before the survey was carried out.

Measures

Sitting time. Sitting time was measured using the 'Workforce Sitting Questionnaire' which for workday, non-workday and total sitting demonstrated adequate test-retest reliability (ICC=0.46-0.90) and validity compared to accelerometry in women (r=0.22-0.46) and men (r=0.18-0.29) (Chau et al., 2011). The questionnaire assesses weekly sitting time (in minutes) during TV viewing, computer-use outside work, other leisure-time activities, work and transport on work and non-workdays in the last 7 days. Average daily sitting in each domain and average total daily sitting time was then calculated for work and non-work days. This was multiplied by the number of work and non-work days respectively, divided by 7 and converted to hours (minutes/60). This produced average sitting in each domain (hours/day) and average total daily sitting (hours/day).

Knowledge. Respondents rated their agreement (1 = strongly disagree; 5 = strongly agree) with six statements: (1) 'Sitting for long periods of time increases my risk of a) chronic disease, such as cardiovascular disease and diabetes and b) depression and overall poor mental health', (2) 'Even if I do regular physical activity such as brisk walking or exercise for 30 minutes most days of the week, sitting for long periods of time increases my risk of a) cardiovascular disease and diabetes and b) depression and overall poor mental health' and (3) 'When sitting for long periods of time, taking short breaks by standing or slowly moving around for a minute or two to break up my sitting is a good way to reduce my risk of a) cardiovascular disease and diabetes and b) depression and overall poor mental health'. The questions are based on those used in prior research (Duncan, Gilson & Vandelanotte, 2014), and research that demonstrates the mental and physical health risks of sitting for long periods (Wullems et al., 2016), even when already physically active (Biswas

et al., 2015), as well as the physical (Benatti & Ried-Larsen, 2015) and mental (Bergouignan et al., 2016) health benefits of taking breaks from sitting. The percentage of participants who agreed or strongly agreed to the 6 individual correct statements about sitting and health were also calculated.

Intentions. Participants were asked' 'Do you intend to SIT LESS than you do now.' during TV use, computer use, leisure time, work and transport and rated their intentions (yes/no) to change sitting time in each context. A total intentions score was calculated by summing the number of domains each participant intends to reduce their sitting in, divided by the total number of domains relevant to them and multiplied by 100 to create a percentage.

Physical activity. Physical activity was measured using the Active Australia Questionnaire which assesses the duration and frequency of recreational and transport walking, moderate and vigorous intensity physical activity (Australian Institute of Health and Welfare, 2003). Total physical activity was calculated by summing the time spent in walking, moderate activity and vigorous activity (weighted by two), according to specified scoring guidelines (Australian Institute of Health and Welfare, 2003). The Active Australia Questionnaire has demonstrated acceptable reliability (ICC= 0.64)(Australian Institute of Health and Welfare, 2003) and criterion validity (r =0.61)(Fjeldsoe et al., 2013) for total physical activity. In line with the Australian physical activity recommendations, which recommend that older adults engage in at least 150 minutes of physical activity per week over at least 5 sessions (Department of Health and Aging, 2014), participants were classified as insufficiently active (<150 minutes and/or < 5 sessions) or sufficiently active (≥150 minutes and ≥5 sessions).

BMI. BMI (Body Mass Index) was calculated (weight (kg)/height (m^2)) and dichotomised into weight status according to standard cut off scores (normal weight, <25; overweight/obese, ≥25) (Department of Health and Aging, 2009).

Demographic factors. Demographic factors assessed included gender, age (continuous), education (no tertiary education, technical college or university) and employment (full time, part time or casual, unemployed, retired).

Statistical analysis

An exploratory factor analysis was used to guide the calculation of knowledge summary scores. Parallel analyses were conducted to determine factors and summary scores were created from these factors. Data were analysed using SPSS 22. Descriptive statistics for demographics (gender, age, education and employment), BMI status, physical activity (sufficient/insufficient), intentions (yes/no for each domain), knowledge scores and sitting times in each domain were presented. Multivariate analyses of variance and correlation analyses were conducted to compare sitting times by demographics, BMI status, physical activity, intentions and knowledge scores. Multivariate analyses of variance were used as it allows comparisons of multiple outcome variables (e.g. sitting times in each of the five domains), whilst controlling for type 1 error through Bonferroni correction. Seven regression models were then conducted. Two multiple regression models were used to test the relationship of the two knowledge scores with demographics, BMI status and physical activity. Five logistic regression models were used to test the relationship between intentions to sit less in each sitting domain (TV, computer, other leisure, work and transport) and demographics, BMI status and physical activity. Sitting time was entered as a covariate in the analyses on intentions. Lastly, a structural equations model was conducted in AMOS version 24 to test the expected associations between knowledge of the risks of sitting, intentions to reduce sitting and total daily sitting time. The model included the association between knowledge and intentions, the association between intentions and daily sitting and the association between knowledge and daily sitting. The *p*-values were considered significant at .05

Results

Exploratory factor analysis

The exploratory factor analysis demonstrated two factors within the knowledge questions with eigenvalues above the cut offs determined by parallel analysis. The first factor was regarding the health risks of sitting for too long, and the second was regarding the health benefits of breaking up sitting time. The first four questions on the physical and mental health risks of sitting and the physical and mental health risks of sitting even when physically active loaded onto the first factor (variance explained = 50%; Cronbach's alpha= .82) and the last two questions on the physical and mental health benefits of breaking up sitting loaded on to the second factor (variance explained = 20%; Cronbach's alpha= .76) (see supplementary material 1). A health risks score of sitting knowledge was created by summing the scores from the four questions loading onto the first factor (range= 4-20) and a health benefits score of breaking up sitting knowledge was created by summing the scores from the two questions loading onto the second factor (range= 2-10).

Sample demographics

Mean age of the respondents was 71.6 (SD=4.9) years and 55% were female. Respondents were relatively highly educated with 72% completing technical college or a university degree. Over half (65%) were overweight or obese and met the physical activity guidelines of 150 minutes of physical activity over 5 days each week (60%). There were not enough older adults working full time (5%) or part time (15%), to compare knowledge and intentions in working versus non-working older adults. Therefore, employment was not included in analyses. Mean total sitting-time was 9.0 (SD =3.8) hours/day. TV sitting time (M=3.3, SD=2.2 hours/day), non-work computer sitting time (M=2.1, SD=1.9 hours/day) and leisure sitting time (M=1.7, SD=1.7 hours/day) were the highest. Average work sitting time was 1.3 (SD=2.1) hours/day) and transport sitting time was 1.4 (SD=1.8) hours/day. Table 1

presents older adults' sitting time in each domain by age, gender, education, BMI status and physical activity. Age was positively associated with sitting time. Work related sitting was higher in men. TV, computer, transport and total sitting time were higher in older adults with no tertiary education. TV, computer, work and total sitting were higher in older adults who were overweight or obese. TV, computer, leisure and total sitting were higher in inactive older adults. Table 2 presents older adults' sitting time in each domain by knowledge scores and intentions to sit less. Knowledge of the benefits of breaking up sitting was positively associated with total sitting time. Sitting time in each domain were higher in older adults who intended to reduce their sitting in that domain. BMI data was missing for 6 participants. A total of 271, 18 and 10 participants were excluded from any work, TV and computer sitting intention analyses respectively, as they do not participate in these activities.

Knowledge

In total 82% of respondents agreed that sitting for long periods could increase their risk of chronic disease, such as cardiovascular disease and diabetes and over half (55%) agreed that this could also be the case if they were active for 30 minutes/day on most days of the week (i.e. physical activity guidelines). In total 78% agreed that breaking up sitting time reduces risk of chronic disease, such as cardiovascular disease and diabetes. Half (50%) of respondents agreed that sitting for long periods could increase their risk of depression and overall poor mental health and 38% agreed this could also be the case if they met physical activity guidelines. Over half (57%) agreed that breaking up sitting time reduces risk of depression and overall poor mental health. The average sitting health risk knowledge score was 14.16 (SD=2.92) out of 20. The average benefits of breaking up sitting time knowledge score was 7.39 (SD=1.43) out of 10 (Table 2). The multiple regression models revealed that women had higher knowledge scores for both the health risks of sitting and the health benefits of breaking up sitting compared to men (Table 3). There was no significant

relationship between age, education, BMI status or physical activity and the knowledge scores.

Intentions

Less than a quarter of respondents intended to sit less whilst watching TV (24%), when using a computer (19%) or during other leisure-time activities (24%). Fourteen percent of respondents intended to sit less for work and 8% of respondents intended to sit less for transport. Table 4 presents intentions by demographics. As preliminary analyses revealed that people who had intentions to change sitting in a domain were more likely to have longer sitting times in that domain, sitting time was entered as a covariate in each analysis. The results of the logistic regressions revealed that women were more likely to intend to change their TV sitting time compared to men and participants with a tertiary education were more likely to intend to sit less in their other leisure time and work, compared to those with no tertiary education (Table 4 & 5). Participants who were overweight or obese were more likely to intend to change their computer and other leisure sitting, however they were less likely to intend to change their transport sitting, compared to normal weight older adults. Inactive participants were more likely to intend to change their TV, computer or other leisure sitting, compared to active participants.

Associations between knowledge, intentions and sitting behaviour

Increased knowledge of the risks of sitting was associated with greater intentions (unstandardised coefficient = 1.45, p<.001) and increased knowledge of the risks of sitting was associated with less sitting time (unstandardised coefficient = -0.16, p=.21). Intentions was associated with greater sitting time (unstandardised coefficient = 0.04, p<.001) and was a mediator for the association between knowledge of the risks of sitting and sitting time (unstandardised coefficient,95% CI = 0.04, 0.02-0.07). The R2 of the model was 0.05.

Discussion

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The aim of this study was to examine older adults' sitting times and knowledge and intentions to change their sitting behaviour. In line with past research the samples' total sitting time was higher than 8 hours, which is within the at risk range for chronic health problems (Pavey et al., 2015; Van der Ploeg et al., 2012; Wullems et al., 2016). Also in line with past research, TV sitting time made up the highest percentage of older adults' sitting time (Clark et al., 2010). High TV sitting is of particular concern as it is associated with increased consumption of energy-dense foods (Bellisle, Dalix & Slama, 2004), and a review demonstrates that there is strong evidence suggesting that TV sitting time is associated with increased BMI, physical and mental health problems and mortality (Rhodes, Mark & Temmel, 2012).

A high percentage of older adults agreed with the facts about the physical health consequences of sitting (82% & 74%), but only half of the sample agreed with the facts about the mental health consequences of prolonged sitting even when active (50% and 57%). Knowledge of the health risks of prolonged sitting even when active could be improved. In particular knowledge of the mental health risks of prolonged sitting even when active needs to be addressed as only 38% of the sample was aware of this. It was also observed that women have significantly better knowledge on both the health risks of sitting and the benefits of breaking up sitting time, which is in line with past research investigating knowledge of the cardiovascular risks of sitting (Duncan et al., 2014). This could be as women are typically more interested in their health and are more likely to seek health information (Nikoloudakis et al., 2016; Tong, Raynor & Aslani, 2014). In line with past research, sitting time was associated with knowledge about the health benefits of breaking up sitting time (Hobbs et al., 2013; Plotnikoff et al., 2012a). Therefore, interventions targeting prolonged sitting in older adults should improve knowledge in older males.

Whilst older adults' intentions to sit less were low in all domains and need to be addressed, it is promising that intentions to reduce sitting were the highest for TV sitting time, and other leisure time, as they are among the domains with the highest sitting time. However, intentions to reduce computer sitting was low despite the high sitting times in this domain. This may be due to it being difficult to reduce sitting time whilst using a computer, unless older adults have access to a standing desk. Further research is required to investigate reasons for older adults' low intentions to reduce computer sitting. TV and other leisure sitting time are therefore good targets for interventions, as it is most likely to engage older adults and optimise impact on sitting behaviour. Targeting older adults' leisure-time sitting may also provide an opportunity to increase moderate to vigorous physical activity simultaneously which leads to greater health improvements compared to standing or low intensity physical activity (Dinas, Koutedakis & Flouris, 2011; Maher et al., 2014).

The higher intentions to change TV sitting in women compared to men may be due to women's greater knowledge of the health risks of prolonged sitting and that reducing TV sitting is easier than reducing sitting in the other domains such as computer sitting (Nikoloudakis et al., 2016; Tong et al., 2014). Sitting interventions should aim to improve both women and men's low intentions to reduce their TV sitting time, but with a particular focus on men's intentions. One potential reason for the higher work sitting intentions in highly educated older adults could be due to this population group being more likely to have high sitting white collar jobs, which are easier to continue through to older adulthood (Australian Bureau of Statistics, 2015). One potential reason for the higher leisure sitting intentions observed amongst highly educated older adults could be because people with a high education tend to have more means to engage in sport (Allender, Cowburn & Foster, 2006; Breuer & Wicker, 2008) and have greater access to recreational facilities for non-sitting leisure time activities (Moore et al., 2008). It is however also possible that the

associations between intentions and gender and education may be partially explained by social desirability bias inflating intentions in older women and older adults with high education (Cullinan & Cawley, 2016; Dalton & Ortegren, 2011).

It is promising that in line with previous research (Ding et al., 2016; Wang et al., 2016) inactive and overweight older adults, who have an increased risk of chronic disease and mortality, were more likely to intend to improve their sitting behaviour. The lower intentions in people with sufficient physical activity levels may be because they perceive that being active compensates for the health risks of sitting. Although the magnitude of the risks of sitting behaviour independent to physical activity are still being debated in the literature, active older adults still need to be aware of the risks of high sitting time which some studies demonstrate to increase risk of chronic disease and mortality, albeit to a lesser extent in active individuals (Biswas et al., 2015; Pavey et al., 2015). Further, as people age, health problems and lack of mobility can prevent physical activity, which makes healthy sitting habits particularly important (Australian Bureau of Statistics, 2013). The low intentions in older adults of normal weight may be because they think the lack of excess weight means they are already healthy and fit, and that there is less benefit in sitting less. Sitting interventions therefore need to address intentions to reduce sitting in older adults of normal weight and educate older adults of the health risks of prolonged sitting regardless of weight.

The finding that knowledge of the risks of sitting time is associated with increased intentions to reduce sitting and less sitting time is in line with past research and the theoretical underpinnings of this study. The theory of planned behaviour stipulates that knowledge can contribute to attitudes of the target behaviour (Michie et al., 2008) which influences intentions, which in turn influences behaviour (Hobbs et al., 2013; Plotnikoff et al., 2012). However the results demonstrated that intentions to reduce sitting was associated with increased sitting time. This may be due to the cross sectional design of the study where

the people who sit more have higher intentions to change their behaviour as they have a greater need to change their behaviour. It could also be due to the measure of intentions in the current study being the existence of intentions, rather than the strength of intentions. It is well established in the literature that strength of intentions to change sitting time predict reductions in sitting time (Hobbs et al., 2013; Plotnikoff et al., 2012). Findings from this study improve our understanding of older adults' sitting times and their knowledge and intentions to sit less. This information is helpful for future interventions as it highlights areas of high sitting, insufficient knowledge and low intentions to target. It also highlights population groups with particularly low knowledge and intentions. However, whilst previous research has demonstrated that knowledge can impact intentions which in turn predicts behaviour (Hobbs et al., 2013; Plotnikoff et al., 2012a), we cannot determine from our findings if knowledge predicts intentions which in turn predicts behaviour. Strengths of the study are the random sample of older adults with a good representation of both genders. However the sitting data was self-reported which is likely to have a higher error than objective measures and may have resulted in social desirability bias. Older adults' intentions may have also been affected by social desirability bias, particularly women and those with a high education who are typically more affected by social desirability bias (Cullinan & Cawley, 2016; Dalton & Ortegren, 2011). This may partially explain the gender and education differences for intentions to sit less.

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Conclusion

Older Australians spend a large proportion of their day sitting. Interventions to promote activity breaks whilst watching TV and that promote active leisure-time activities could be an effective way to decrease sitting-time in this population group. Knowledge about the physical and mental health risks of sitting and the benefits of breaking up sitting time can be improved, particularly in older males. Men are less likely to be ready to reduce their TV

sitting, older adults with a low education are less likely to be ready to reduce their other leisure and work sitting and older adults who are overweight or obese are less likely to be ready to reduce transport sitting time. Older adults with a normal weight and who are physically active are less likely to intend to change their computer and leisure sitting time and TV, computer and leisure sitting time respectively. Therefore, future sitting interventions are needed to target older adults' sitting times, particularly during TV viewing, computer use and leisure time. Interventions should address low knowledge in males. Interventions should also address the low intentions to reduce sitting in males and older adults with a low education, as well as older adults who are active and have a healthy weight.

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Table 1.

Sitting time (hours/day) in each domain by age, gender, education, BMI and physical activity

	TV	Computer	Leisure	Work	Transport	Total
TOTAL, M (SD)	3.26 (2.21)	2.11 (1.94)	1.69 (1.72)	1.28 (2.11)	1.37 (1.77)	9.04 (3.76)
Age, n=494						
r	.04	.50	.04	-.08	.02	.04
P-value	.41	.27	.33	.06	.66	.30
Gender, M (SD), n=494						
Men	3.26 (2.30)	2.24 (2.05)	1.62 (1.95)	1.47 (2.26)	1.45 (1.84)	9.13 (3.87)
Women	3.28 (2.12)	1.93 (1.79)	1.80 (1.41)	1.04 (1.88)	1.26 (1.69)	8.89 (3.64)
P-value	.94	.07	.25	.02	.21	.39
Education, M (SD), n=494						
No tertiary	4.03 (2.63)	2.34 (3.37)	1.55 (1.38)	1.14 (2.17)	1.65 (2.39)	9.72 (3.93)
Technical college or university	2.97 (1.96)	2.01 (1.75)	1.75 (1.85)	1.33 (2.09)	1.26 (1.46)	8.75 (3.67)
P-value	<001	.10	.24	.34	.03	.01
BMI, M (SD), n=488						
Normal	2.98 (2.23)	1.83 (1.75)	1.60 (1.61)	1.00 (1.76)	1.20 (1.65)	8.19 (3.66)
Overweight or obese	3.41 (2.20)	2.25 (2.02)	1.75 (1.79)	1.42 (2.26)	1.46 (1.84)	9.45 (3.75)
P-value	.04	.02	.39	.04	.13	<.001
Physical Activity, M (SD), n=494						
Sufficient	2.95 (1.92)	1.92 (1.78)	1.56 (1.58)	1.21 (2.01)	1.27 (1.66)	8.46 (3.63)

Not sufficient	3.73 (2.54)	2.38 (2.13)	1.90 (1.92)	1.37 (2.25)	1.52 (1.94)	9.87 (3.81)
P-value	<.001	.01	.03	.44	.11	<.001

Table 2.

Sitting time (hours/day) in each domain by knowledge scores and intentions to sit less

	TV	Computer	Leisure	Work	Transport	Total
Knowledge of sitting health risks, n=494						
r	.01	-.06	.07	-.07	-.05	-.02
P-value	.77	.16	.13	.12	.25	.58
Knowledge of benefits breaking up siting, n=494						
r	.03	.05	.04	.07	.01	.10
P-value	.47	.25	.32	.10	.88	.03
TV Intentions, M (SD), n=476						
Yes	3.93 (2.39)	2.14 (1.78)	1.93 (1.68)	1.39 (2.13)	1.45 (1.66)	9.99 (3.60)
No	3.19 (2.07)	2.13 (2.01)	1.63 (1.74)	1.24 (2.11)	1.35 (1.77)	8.87 (3.74)
P-value	.002	.99	.10	.52	.57	.005
Computer Intentions, M (SD), n=484						
Yes	3.45 (2.41)	2.60 (2.06)	2.06 (2.16)	1.40 (2.08)	1.49 (1.68)	9.85 (3.87)
No	3.20 (2.14)	2.04 (1.89)	1.61 (1.61)	1.21 (2.06)	1.33 (1.79)	8.84 (3.69)
P-value	.32	.01	.02	.43	.42	.02
Leisure Intentions, M (SD), n=494						
Yes	3.61 (2.49)	2.31 (1.95)	2.01 (1.89)	1.79 (2.42)	1.85 (2.20)	10.35 (3.80)
No	3.15 (2.10)	2.05 (1.93)	1.60 (1.66)	1.12 (1.98)	1.22 (1.59)	8.62 (3.66)
P-value	.05	.20	.02	.003	.001	<.001
Work Intentions, M (SD), n=223						
Yes	3.53 (2.58)	2.40 (2.41)	1.79 (1.29)	4.02 (2.62)	1.42 (1.27)	11.44 (3.37)

No	3.04 (2.14)	2.00 (1.94)	1.56 (1.68)	1.86 (2.32)	1.43 (2.04)	9.17 (3.71)
P-value	.25	.29	.47	<.001	.98	.001
Transport Intentions, M (SD), n=494						
Yes	3.54 (2.66)	2.32 (2.18)	2.02 (2.25)	1.84 (2.39)	2.05 (2.56)	10.54 (4.02)
No	3.23 (2.16)	2.09 (1.91)	1.67 (1.67)	1.23 (2.08)	1.31 (1.67)	8.90 (3.71)
P-value	.39	.45	.20	.07	.01	.01

Table 3.

Knowledge scores by age, gender, education, BMI and physical activity

	Sitting health risks n=494		**Benefits breaking up siting n=494**	
	M (SD)	**OR (95%CI)**	**M (SD)**	**OR (95%CI)**
Total	14.16 (2.92)	1	7.39 (1.43)	1
Age		0.97 (0.92-1.03)		1.00 (0.98-1.03)
Gender,				
Men	13.83 (2.73)	1	7.22 (1.36)	1
Women	14.44 (3.00)	1.84 (1.08-3.12)*	7.61 (1.33)	1.53 (1.20-1.96)*
Education,				
No tertiary	13.91 (2.99)	1	7.36 (1.42)	1
Technical college or university	14.18 (2.82)	1.40 (0.79-2.49)	7.41 (1.34)	1.11 (0.84-1.45)
BMI,				
Normal	13.88 (3.04)	1	7.40 (1.34)	1
Overweight or obese	14.23 (2.78)	1.48 (0.85-2.59)	7.38 (1.36)	0.96 (0.74-1.25)
Physical Activity,				
Sufficient	14.12 (3.02)	1	7.33 (1.37)	1
Not sufficient	14.09 (2.62)	0.95 (0.55-1.63)	7.50 (1.34)	1.11 (0.86-1.43)

*p<.05, **p<.001.

Table 4.

Intentions to sit less in each domain by age, gender, education, BMI and physical activity

	TV intentions n=476		**Computer intentions n=484**		**Other leisure intentions n=494**		**Work intentions n=223**		**Transport intentions n=494**	
	No	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
Age, M	70.66	70.85	70.48	71.25	70.76	70.33	70.14	69.94	70.67	70.45
(SD)	(4.91)	(5.08)	(4.93)	(4.85)	(4.97)	(4.84)	(4.56)	(3.92)	(4.92)	(5.18)
Gender, N (%)										
Men	213	52	219	49	207	66	118	73	248	25
	(80.4)	(19.6)	(81.7)	(18.3)	(75.8)	(24.2)	(86.8)	(13.2)	(90.8)	(9.2)
Women	150	61	172	44	169	52	73	14	204	17
	(71.1)	(28.9)	(79.6)	(20.4)	(76.5)	(23.5)	(83.9)	(16.1)	(92.3)	(7.7)
Education, N (%)										
No tertiary	108	27	113	21	113	25	61	5	123	15
	(80.0)	(20.0)	(84.3)	(15.7)	(81.9)	(18.1)	(92.4)	(7.6)	(89.1)	(10.9)
Technical	255	86	278	72	263	93	130	27	329	27
college or	(74.8)	(25.2)	(79.4)	(20.6)	(73.9)	(26.1)	(82.8)	(17.2)	(92.4)	(7.6)
university										
BMI, N (%)										
Normal	129	28	144	19	141	25	61	7	160	6
	(82.2)	(17.8)	(88.3)	(11.7)	(84.9)	(15.1)	(89.7)	(10.3)	(96.4)	(3.6)
Overweight	231	82	243	72	232	90	127	25	286	36
or obese	(73.8)	(26.2)	(77.1)	(22.9)	(72.0)	(28.0)	(83.6)	(16.4)	(88.8)	(11.2)
Physical activity, N (%)										

Sufficient	229	54	245	48	244	52	127	12	276	20
	(80.9)	(19.1)	(83.6)	(16.4)	(82.4)	(17.6)	(91.4)	(8.6)	(93.2)	(6.8)
Not	134	59	146	45	132	66	64	20	176	22
sufficient	(69.4)	(30.6)	(76.4)	(23.6)	(66.7)	(33.3)	(76.2)	(23.8)	(88.9)	(11.1)

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Table 5.

Logistic regressions of intentions to sit less in each domain by age, gender, education, BMI and physical activity

	TV intentions[a]	**Computer intentions[b]**	**Other leisure intentions[c]**	**Work intentions[d]**	**Transport intentions[e]**
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Age	1.01 (0.97, 1.06)	1.04 (1.00, 1.10)	0.97 (0.93, 1.02)	1.05 (0.95-1.16)	1.00 (0.93-1.07)
Gender					
Men	1	1	1	1	1
Women	1.77 (1.13, 2.79)*	1.34 (0.82, 2.17)	0.90 (0.57, 1.41)	1.52 (0.63-3.65)	1.11 (0.56-2.20)
Education					
No tertiary	1	1	1	1	1
Technical college or university	1.60 (0.96, 2.67)	1.60 (0.92, 2.80)	1.94 (1.15, 3.26)*	3.85 (1.26-11.76)*	1.31 (0.66-2.61)
BMI					
Normal	1	1	1	1	1
Overweight or obese	1.64 (1.00, 2.70)	2.35 (1.34, 4.13)*	1.90 (1.14, 3.15)*	1.51 (0.56-4.11)	0.33 (0.13-0.80)*
Physical Activity					
Sufficient	1	1	1	1	1
Not sufficient	1.72 (1.10, 2.70)*	1.42 (0.88, 2.29)*	2.42 (1.55, 3.79)**	3.69 (1.56-8.71)	1.47 (0.76-2.84)

[a]Controlled for TV sitting time, [b]controlled for computer sitting time, [c]controlled for other leisure sitting time, [d]controlled for work sitting time, [e]controlled for transport sitting time.
*p<.05, **p<.001.