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Sedentary behaviour in NHS staff: implications for organisations

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Abstract

Background: Prolonged sitting is associated with an increased risk of chronic ill-health. Although high levels of sedentary behaviour are documented in desk-based workers, there are few data examining this in organisations with greater job diversity such as the National Health Service (NHS).

Aims: To assess the association of occupational and non-occupational sedentary behaviours with key demographic and occupational characteristics of NHS workers to help inform policy development.

Methods: A cross-sectional survey conducted in a large NHS teaching hospital in the north of England. Volunteer members of staff were asked to complete a web- or paper-based version of the Workforce Sitting Questionnaire. Demographic and occupational data collected included age, gender, ethnicity, educational attainment, occupational group; full or part-time status and whether the participant reported their job as desk-based. Descriptive statistics and 95% confidence intervals were calculated to compare sedentary behaviour across demographic and job characteristics.

Results: Clerical and desk-based NHS workers were more sedentary at work than other colleagues. New findings identified that NHS workers aged under 30 and those without educational qualifications had high levels of sedentary behaviour outside work. After adjusting for working hours, part-time employees were significantly more likely to be sedentary.

Conclusions: Our results have implications for those developing strategies to reduce sedentary behaviour in the NHS workforce. Whilst standing desks have received much interest, alternative approaches may be attractive to NHS employers in reducing workplace and non-occupational sitting time. These may also be relevant to other organisations.

Key words: Sedentary jobs, NHS workforce, occupational

Introduction

Workplace health and wellbeing has attracted significant political interest in recent years (1). The main drivers for this include an ageing workforce and concerns over the link between adverse lifestyle behaviours, ill-health, impaired work performance, sickness absence and lost productivity (2). A number of strategies have been developed in the United Kingdom (UK) to address these concerns, such as the Workplace Wellbeing Charter in England to encourage organisations to commit to programmes and initiatives that improve the health of their staff (1). In part this includes addressing relevant lifestyle factors that determine health, such as smoking, alcohol consumption, dietary patterns, physical inactivity and sedentary behaviour.

Sedentary behaviour is defined as any waking behaviour with energy expenditure less than 1.5 metabolic equivalents (METs) whilst in a sitting or reclining posture (3). Evidence suggests that prolonged sitting is associated with an increased risk of cardiovascular disease (4), metabolic syndrome (5,6), certain cancers (7), depression (8) and musculoskeletal problems (9). Personal leisure activities such as screen viewing time and sedentary commuting are substantial contributors (6). Prolonged sitting is thought to exert a health risk that is independent of physical activity, thus reinforcing the need to address both behaviours in health promotion interventions (10,11).

Occupational sitting has become a concern in recent years, mainly due to an increase in desk-based jobs (12), with many workers spending as much as 60% of their waking hours in the workplace (13,14). Previous studies have shown that office workers sit for an average of six hours per day at work (15,16). As well as the links between sedentary behaviour and poor health, some have indicated an association with reduced productivity (17), but this has not been widely confirmed. If productivity is diminished however it would provide an additional incentive for organisations to reduce occupational sedentary behaviour. Several studies have assessed the utility of workplace interventions to reduce occupational sitting time, including worker education through workplace physical activity programmes (18), management and peer support initiatives (19) and ergonomic adaptations such as standing desks (20). Nevertheless the prevalence and distribution of sedentary behaviour among employees in many sectors is largely unknown. Broadly profiling the workforce to understand the nature of the working population should therefore be the first step in informing the nature of workplace interventions designed to improve employees' health and wellbeing.

The UK National Health Service (NHS) is one of the largest employers in the world, with over 1.5 million employees (21). Among UK public sector organisations sickness absence is greatest for those working in the health sector, with around 3.4% of workers' hours lost to sickness in 2013 (22). Consequently the NHS Five Year Forward View (23) commits "to ensure the NHS as an employer sets a national example in the support it offers its own staff to stay healthy" so that safe, sustainable and effective care can be provided to patients. Reducing sedentary behaviour is part of this challenge, since a large proportion of the NHS workforce have administrative and clerical jobs (24). One study found that 30% of NHS employees reported being inactive at work (25) but data was not broken down by demographics or job role, so providing no direction in how NHS organisations should target interventions to reduce sedentary behaviour. Although one may assume administrative and clerical workers are likely to spend more time sitting at work there may be other groups of NHS staff who are sedentary during work hours. Changes to working practices, such as the use of digital images and electronic patient records, may also increase sedentary behaviour in affected workers. Furthermore non-occupational sitting behaviour in NHS workers has not been widely studied. The aim of this study was to assess the association of occupational and non-occupational sedentary behaviour with key demographic and occupational characteristics of NHS workers, and thereby to help inform policy development.

Methods

This cross-sectional study was conducted at an NHS Foundation Trust in a city in the north of England. The Trust comprises two main hospital sites and three smaller satellite hospitals covering maternity, dental and cancer services. It employs over 15,000 staff in over 70 clinical and non-clinical professions. Volunteer staff participants were asked to complete a web- or paper-based version of the Workforce Sitting Questionnaire (26). This captures data on time spent sitting, both in and outside the workplace, across various domains (e.g. commuting to work, at work and watching television). The questionnaire has moderate criterion validity against an objective measurement of sedentary behaviour known as accelerometry ($r=0.45$) (26). We also captured demographic and occupational data, including age, gender, ethnicity and educational attainment. Educational attainment was based on self-report of the highest qualification and was categorised as: "university degree", "A-levels", to "GCSE/NVQ/O-levels", with an option for "no qualifications" for school leavers without exams or those with no secondary or college education. Occupational data included

professional group; hours worked (full/part-time) and whether the respondent viewed their job as predominantly desk-based. We defined “full-time” as greater than or equal to 37 hours per week. As our interest in this study was to quantify sedentary behaviour we did not capture physical activity information or related health and lifestyle data such as body mass index, smoking habits or alcohol intake. Furthermore we were not ethically permitted to capture full postcode information due to data confidentiality concerns.

An e-mail containing a link to the questionnaire was sent to staff via the hospital’s communications e-bulletin. One author (SB) based in the occupational health department contacted relevant line managers asking them to distribute the questionnaire to workers without computer access. KM and SB also distributed copies to participants at both hospital canteens. Data collection took place during September and October 2015. Data analysis was conducted using Microsoft Excel and produced sedentary behaviour profiles and 95% confidence intervals (CIs) across the workforce. 95% CIs were calculated to assess the association between self-reported occupational and non-occupational sitting time and demographic or occupational characteristics. Volunteers were provided an information sheet explaining the purpose of the study. No personally identifiable data was collected. All questionnaire responses were destroyed following analysis. Consent was assumed through completion of the questionnaire. Ethical approval was provided by the Clinical Effectiveness Unit at Sheffield Teaching Hospitals.

Results

1047 responses were received. There were approximately 8000 active e-mail accounts at the time of the study, although some may have been assigned to individuals who had recently left the trust (up to one year previously) and were not yet deactivated, while other accounts, for example community staff accounts, may not have been checked due to infrequent access. However we were able to determine that 4537 staff opened our electronic invitation sent through the trust’s communication e-bulletin. SB also asked line managers to distribute the questionnaire to staff to estimate the number to whom they had distributed it, about 500 in total. Therefore we believe the total number of staff approached was 5037, giving a response rate of approximately 20%.

The average reported occupational sitting time in our sample was 4 hours and 41 minutes, with a mean reported sitting time of 6 hours on non-work days. The mean reported sitting time during commuting to and from work was 49 minutes. The age profile of our responders roughly reflected that of the hospital as a whole. 1% of our sample was under 20, compared to 2% of all hospital staff. The corresponding percentages for other age bands were 14% in our sample vs. 20% in the trust for those aged 20-30, 17% vs. 22% for those aged 30-40 and 29% vs. 26% for those aged 40-50. Reported occupational sitting time was longest in those aged 40-50 (mean 318 minutes; 95% CI: 292 to 323 minutes) and 50-60 years (mean 301 minutes; 95% CI: 277 to 308 minutes) and this was significantly higher than those aged 30-40, 20-30 and under 20 (Table 1). Those aged under 20 reported a statistically significant lower occupational sitting time compared to all other age groups, an average of only 111 minutes per day (95% CI: 41 to 181 minutes).

Of concern however was that younger age groups (30 and below) reported sitting for long periods on days when they were not at work. In those under 20 this reached close to 10 hours per day. Differences in non-work day sitting time were statistically significant between those aged under 20 (mean 589 minutes; 95% CI: 452 to 725 minutes) and those aged 20-30 (mean 432 minutes; 95% CI: 395 to 465 minutes) compared to all other age groups.

Insert Table 1 here

Responses by gender (Table 2) also reflected the profile of the trust (females 80% in our sample vs. 81% in Trust), with mean occupational and non-work day sitting time being broadly similar. Data suggested that individuals who reported no educational qualifications were significantly less likely to be sedentary at work (mean 132 minutes; 95% CI: 47 to 217 minutes) compared to those with qualifications (mean 284 minutes; 95% CI: 275 to 293 minutes). Mean non-workday sitting time in those without qualifications was reported to be higher (mean 497 minutes; 95% CI: 322 to 672 minutes) than those with qualifications (mean 357 minutes; 95% CI: 346 to 368 minutes), although this difference was not statistically significant.

Most of our sample (93%) reported being Caucasian, and when compared to staff from all other ethnic backgrounds, this group reported sitting in the workplace significantly longer (mean 287 minutes; 95% CI: 278 to 296 minutes) than non-Caucasian staff members (mean 209 minutes; 95% CI: 170 to 248 minutes). However, on non-workdays, non-Caucasian staff members reported sitting for significantly longer (mean 432

minutes; 95% CI: 378 to 486 minutes) than Caucasian staff members (mean 354 minutes; 95% CI: 342 to 366 minutes).

Approximately two-thirds of our sample were full-time staff members. Reported occupational sitting time was longer for full-time (mean 296 minutes; 95% CI: 285 to 307 minutes) when compared to part-time staff (mean 255 minutes; 95% CI: 239 to 271 minutes), but when adjusted for hours spent at work, this relationship reversed (part-time staff mean: 43 minutes per hour, 95% CI: 40 to 45 minutes; full-time staff mean: 36 minutes per hour, 95% CI: 34 to 37 minutes). Most of our sample worked in desk-based occupations (71%). As expected, occupational sitting time was significantly different in those with (mean 358 minutes; 95% CI: 351 to 365 minutes) and without (mean 94 minutes; 95% CI: 84 to 104 minutes) such jobs. Furthermore a marginally significant difference between the amount of time spent sitting on non-workdays was noted between these two groups: those with desk-based jobs sitting longer (mean 370 minutes; 95% CI: 357 to 383 minutes) than those without desk-based jobs (mean 334 minutes; 95% CI: 312 to 356 minutes).

Insert Table 2 here

Our results according to NHS occupational groups (Table 3) were more varied when compared to the hospital profile. Administrative and clerical staff were more highly represented in our sample than in the hospital as a whole (39% vs 21% in the hospital). Other groups, such as estates and ancillary staff, were slightly under-represented (8% vs 14% in the hospital). Mean occupational sitting time in the administrative and clerical group was significantly higher (mean 368 minutes; 95% CI: 359 to 377 minutes) than all other occupational groups. Conversely, mean occupational sitting time for the estates and ancillary staff group was significantly lower (mean 126 minutes; 95% CI: 91 to 167 minutes) than all other groups. No significant differences in reported mean non-workday sitting times were found between these occupational groups.

Insert Table 3 here

Discussion

This study supports the notion that staff members with desk-based jobs or working in clerical roles are amongst the most sedentary in the workforce (28). However we also identified other sedentary groups which are of relevance to those concerned with designing programmes to reduce sedentary behaviour in this

workforce. Firstly, our results indicate that NHS workers aged under 30 were significantly more likely to be sedentary outside work. Secondly, staff with no educational qualifications, whilst less likely to be sedentary in work, reported being more sedentary on non-work days, although this was not a statistically significant difference, possibly due to the small number of such staff in our sample. Nevertheless this is a potential concern, since these workers are also likely to be at higher risk of developing chronic illnesses associated with sedentary lifestyles due to exposure to other adverse health behaviours, such as smoking, poor diet and physical inactivity (28). Such illnesses may eventually impair work performance and attendance, reducing productivity at an organisational level. Thirdly, Caucasian staff members were significantly more likely to be sedentary within the workplace than non-Caucasian staff, but outside the workplace non-Caucasian staff members were more sedentary. Finally, our finding that part-time staff members were more sedentary than full-time after adjusting for hours spent in the workplace is of interest. This relationship could be explained by an exhaustive lifestyle outside work (e.g. due to childcare commitments and domestic responsibilities), which could be compensated by higher levels of sedentary behaviour at work. Another explanation is that part-time workers may be more likely to suffer from chronic health conditions and/or musculoskeletal problems and as a consequence may prefer more sedentary roles.

Our work has several limitations. A large section of staff did not receive the questionnaire, particularly those who did not regularly use a computer as part of their job. Hence, we may not have accessed those staff members who are more active in the workplace, resulting in an over-representation in our sample of more sedentary workers. We attempted to address this bias by using other means of distributing the questionnaire via line managers and face-to-face by visiting hospital canteens at lunchtimes, but this was unlikely to have entirely attenuated this bias. Furthermore it is possible that of those who did receive the questionnaire; only those most interested responded, such as those aware of the extent of their sedentary behaviour and keen to make a change, thereby introducing self-selection bias. This bias may again mean that our sample is not representative of the entire workforce's sedentary behaviour. Nonetheless a particular strength is that our sampled staff groups seemed to be broadly similar to the workforce as a whole in terms of basic demographic details such as gender and age. Small numbers in certain occupational and demographic sub-groups meant that data trends could only be suggested and formal analysis should be interpreted with caution. Finally, our analysis could have been strengthened in terms of identifying other socio-economic factors associated with

sedentary behaviour in the workplace if full postcode data had been collected. Despite these limitations, we have identified several new findings which can be used by NHS organisations to target interventions for the most sedentary workers.

Whilst the role of standing desks in reducing occupational sedentary behaviour has received substantial academic interest both in the UK and abroad (20) our results indicate that it is not only administrative and clerical desk-based staff who have high levels of sedentary behaviour, and wider initiatives to reduce sedentary behaviour within the NHS workforce may also be valuable. A starting point could be an organisational policy to reduce sedentary behaviour in at-risk groups. Programmes co-designed between managers and employees to reduce sedentary behaviour in the workplace have shown promise (19). Relevant interventions include computer-based reminders to stand-up from one's desk, communicating with colleagues verbally rather than electronically and organising work duties and the layout of the workplace to promote standing and walking. Such interventions, if effective, may be particularly attractive to organisations with a high-staff turnover, given the significant financial investment needed for standing desks and the potentially limited return. Similar interventions may be useful in reducing sedentary behaviour outside work, perhaps using the workplace as an exemplar.

A related issue is to consider the delivery of interventions to reduce sedentary behaviour. It is unclear at this stage whether these should be implemented in a 'stand-alone' fashion or coupled with other lifestyle behaviour initiatives such as physical activity, dietary intake and weight management programmes. NHS England recently announced the launch of a prevention strategy stating that health systems should lead by example to improve workplace wellness and prevent ill health (29). As part of this strategy a staff wellness programme has been established which is currently being rolled out in 12 hospital trusts. Our study has shown that some groups of NHS staff are sedentary and further work with more structured methodological approaches should examine whether our findings apply to other NHS organisations. Given this clear focus on workplace health and wellbeing in the NHS and the known links between sedentary behaviour and poor health the development of interventions designed to reduce sedentary behaviour both in and outside the workplace need to be prioritised.

These findings have directly informed the development of a sedentary behaviour reduction policy at the participating trust, which forms part of a wider suite of policies aimed to improve the health and wellbeing of staff. These also include increasing rates of physical activity as part of a larger 'Move More' campaign in the city, improving access to healthy food, particularly for night staff, health checks for staff over the age of 40 to include blood pressure, weight and cardiovascular disease and tackling adverse lifestyle behaviours such as smoking and alcohol misuse. Several of the proposed programmes are supported by local organisations, including the local council and universities, and will be informed by ongoing evaluation as to their clinical and cost-effectiveness.

Key Points

- Although administrative and clerical staff had high levels of workplace sitting time other occupational and demographic groups were also sedentary, both within and outside the workplace.
- NHS organisations should develop policies and interventions to reduce sedentary behaviour in their workforces.
- Further work should establish if our findings are applicable to other NHS organisations.

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Age	Responses <i>n</i> (%)	Mean occupational sitting time in minutes (95% CI)	Mean non-workday sitting time in minutes (95% CI)
Under 20	7 (1)	111 (41 to 181)	589 (452 to 725)
20-30	145 (14)	250 (226 to 275)	432 (395 to 465)
30-40	176 (17)	281 (233 to 278)	354 (328 to 380)
40-50	302 (29)	318 (292 to 323)	342 (322 to 360)
50-60	345 (33)	301 (277 to 308)	350 (322 to 361)
60+	72 (7)	263 (225 to 302)	371 (320 to 422)

Table 1: Sitting time profiles by age group

Variable	Responses <i>n</i> (%)	Mean occupational sitting time in minutes (95% CI)	Mean non-workday sitting time in minutes (95% CI)
Female	837 (80)	282 (272 to 293)	358 (345 to 371)
Male	210 (20)	279 (260 to 298)	366 (341 to 391)
Qualifications (University/ A-Level/GCSE or equivalent)	1028 (98)	284 (275 to 293)	357 (346 to 368)
No qualifications	19 (2)	132 (47 to 217)	497 (322 to 672)
Caucasian	977 (93)	287 (278 to 296)	354 (342 to 366)
Non-Caucasian	70 (7)	209 (170 to 248)	432 (378 to 486)
Full-time	672 (64)	296 (285 to 307)	378 (364 to 392)
Part-time	375 (36)	255 (239 to 271)	326 (307 to 345)
Desk-based	744 (71)	358 (351 to 365)	370 (357 to 383)
Not desk-based	303 (29)	94 (84 to 104)	334 (312 to 356)

Table 2: Sitting time profiles by demographic and occupational variables

Occupational group	Responses <i>n</i> (%)	Mean occupational sitting time in minutes (95% CI)	Mean non-workday sitting time in minutes (95% CI)
Additional clinical services	12 (1)	259 (169 to 349)	405 (272 to 538)
Additional professional scientist/technical	31 (3)	307 (265 to 349)	339 (287 to 391)
Admin and Clerical	410 (39)	368 (359 to 377)	386 (367 to 405)
Allied health professional	157 (15)	236 (214 to 358)	330 (301 to 359)
Estates and ancillary	79 (8)	126 (91 to 167)	390 (343 to 437)
Healthcare scientist	49 (5)	312 (280 to 344)	372 (331 to 423)
Medical and dental	77 (7)	233 (201 to 265)	325 (279 to 371)
Nursing and midwifery	193 (18)	214 (192 to 236)	323 (302 to 344)
Other/student	39 (4)	244 (199 to 289)	374 (319 to 429)

Table 3: Sitting time by healthcare group