



“Some People Sit, Some People Stand, That’s Just What We Do”: a Qualitative Exploration of Sit-Stand Desk Use in Naturalistic Settings

Elizabeth Deery^{1,4} · John Buckley² · Michael Morris¹ · Lynne Kennedy^{1,3}

Received: 18 July 2023 / Revised: 8 February 2024 / Accepted: 15 February 2024 /

Published online: 11 March 2024

© The Author(s) 2024

Abstract

Prolonged sedentary behaviour is associated with poor health. Office-based workers spend much of the working day sitting. Sit-stand desks have become a popular intervention, but real-life experiences of the value of sit-stand desks remain relatively unexplored outside of research-led interventions. A qualitative study was therefore undertaken to explore real-life experiences, including perceived barriers, and facilitators of using sit-stand desks. Six focus-group interviews were undertaken with a total of 34 desk-based employees in North-West England. Interviews were transcribed and analysed using thematic analysis. Three main themes emerged: *The Sedentary Office*, *Motivators*, and *The Active Office*. The *Sedentary Office* highlighted participants’ frustration with an increasingly sedentary office environment. *Motivators* to reducing sitting time were knowledge of the health consequences of prolonged sitting, previous (ill) health, and the potential benefits expected. *The Active Office* highlighted the importance of control, choice, enhanced interaction with colleagues, and the benefits associated with moving more and enhancing an overall sense of workplace wellbeing. Perceived benefits, facilitators, and barriers - experienced and observed - from sit-stand desk use in the real world were examined, thus contributing to important discussions of transferability. Overall, the study shed light on the perceived facilitators, benefits, and drawbacks of sit-stand desk work whilst also giving evidence of the real-world acceptability and research translation of sit-stand desk use. Future research should examine this in multiple contexts and should explore implications of an increasing prevalence in home working.

Keywords Sit-stand desk · Active working · Occupational sitting · Sedentary · Qualitative · Focus-groups

Introduction

The workplace is recognised as an important setting to promote and maintain workers' wellbeing (World Health Organization, 2013). Promoting movement and physical activity (PA) through work environments have been shown to benefit wellbeing (Abdin et al., 2018). Such benefits include, self-perceived health behaviours, reduced presenteeism and thus productivity (Edwardson et al., 2018; Unsal et al., 2021). In more recent years there has been a shift from solely promoting PA or movement in the workplace, to also reducing sedentary behaviour in the workplace (Shrestha et al., 2018).

Sedentary behaviour is defined as any waking behaviour with an energy expenditure ≤ 1.5 metabolic equivalents (METs) while in a sitting, reclining, or lying posture (Tremblay et al., 2017). Objective data from high income countries shows that adults spend approximately 8.2 h/day sedentary (Bauman et al., 2018; Wilms et al., 2022) and self-report data show this has increased by an average of 16% following the Covid-19 pandemic (Wilms et al., 2022). This is of concern as prolonged sedentary behaviour is associated with an increased risk of obesity, type II diabetes mellitus and all-cause mortality (Patterson et al., 2018). Furthermore, a positive association has been reported between mentally passive sedentary behaviour and depression (Huang et al., 2020). The physical health risks of being sedentary are attenuated with relatively high levels (30–40 min) of moderate to vigorous physical activity (MVPA) daily (Ekelund et al., 2019). As global and UK data suggests however, few people achieve 30–40 min MVPA daily (Dempsey et al., 2020; Guthold et al., 2018; Sport England, 2022). Therefore, interventions targeting prolonged sedentary behaviour are warranted to reduce health risks.

Given that 60–80% of working hours are spent sedentary, workplace interventions to reduce sedentary behaviour have become increasingly common (Clemes et al., 2014; Morris et al., 2020; Owen et al., 2010; Ryan et al., 2011; Shrestha et al., 2018). Both the nature of desk-based computer work, and the design of office furniture encourage workplace sitting (Hadgraft et al., 2016; Withagen & Caljouw, 2016). Sit-stand desks have been proposed as a solution, and have been shown to reduce occupational sitting in interventions between three and 12 months in duration (Edwardson et al., 2018, 2022; Graves et al., 2015; Healy et al., 2013, 2016). Importantly, the benefits in terms of reducing sitting time have been reported without any detrimental effect on productivity (Chau et al., 2016; Commissaris et al., 2016; Karakolis & Callaghan, 2014; Peterman et al., 2019). In an Australian sample ($N=66$), a multi-component intervention - including sit-stand desks - reduced sitting by approximately 60 min/day after short-term (three month) and long-term (12 month) follow up (Healy et al., 2016). Similarly, a UK cluster randomised controlled trial (RCT; $N=756$, 78 clusters) compared a multi-component intervention, both with and without the inclusion of a sit-stand desk. The authors found that both interventions led to subjective improvements in reducing stress levels, enhancing mental well-being, and promoting vigour. However, the inclusion of a sit-stand desk proved to be three times more effective in

reducing overall sitting time. Furthermore, it was associated not only with reductions in lower back pain but also with increased social acceptance and the normalization of standing at work (Edwardson et al., 2018). These findings suggest sit-stand desk interventions are potentially acceptable and effective in helping reduce workplace sitting time and improving self-perceived mental and physical wellbeing.

Whilst studies suggest sit-stand desks may encourage standing, and thereby reduce time spent sedentary, employers will need strong evidence of cost-benefits before widescale adoption. Researchers have undertaken cost-benefit analysis, with suggestions of cost savings due to lower absenteeism and improved productivity (Ben et al., 2020; Munir et al., 2020). Despite clear behavioural and business outcomes, the health impacts of such interventions are ambiguous and have been debated within the literature. A scoping review of 47 studies reported that whilst sit-stand desks effectively improved sitting behaviours, this had only a mild effect on health outcomes (Chambers et al., 2019). Others have concluded that the evidence of an impact of sit-stand desks on health is both limited, and inconclusive (Shrestha et al., 2018; Tew et al., 2015). Despite this, the expanding body of literature highlights the popularity of sit-stand desks and offers evidence that such interventions can reduce occupational sitting time, and potentially improve subjective perceptions of physical and mental wellbeing. Developing a better understanding of employees' experiences using sit-stand desks, including what may encourage social acceptability, and transferability into real world practice, would be beneficial in helping to address sedentary workplace behaviour.

There is limited qualitative literature examining experiences of sit-stand desk use. Where these experiences have been investigated, this has been following researcher led interventions, rather than with participants who have had access to sit-stand desks in a naturalistic setting (Chau et al., 2014; Cole et al., 2015; Grunseit et al., 2013; Hadgraft et al., 2016). One Australian study ($N=42$) reported that perceived health and work benefits were initial key motivators for engaging with a sit-stand desk intervention (Chau et al., 2014). Similarly, health interests were identified as key motivators for UK university staff to enrol on a 12-week sit-stand desk intervention (Dewitt et al., 2019). Interpersonal support and peer support were reported as key facilitators to sit-stand desk use in a 12-week intervention (Morris et al., 2020) and similarly, some UK studies have reported changes in sitting practice to be facilitated by normalisation of standing over 12- and 13-week interventions (Dewitt et al., 2019; Morris et al., 2020). Taken together these findings suggest that in the short term, health and feeling good at work, including improvements to perceived productivity, are initial drivers of interest in sit-stand desks. Interpersonal factors and normalisation of standing in the office may be key facilitators to longer-term change.

This concurs with a synthesis of qualitative research into the office working environment, where several factors served as barriers and facilitators to sitting less, including desk-based work tasks, and time-pressures, both affecting whether employees perceived they could feasibly take action to reduce their sitting time (Hadgraft et al., 2018). Support from co-workers and managers was considered a key facilitator to reducing sitting, while traditional office customs and practice (the normalisation of sitting) discourages standing and movement about the desk and

were prominent barriers. Perceived benefits reported included improved physical health and mental well-being, and work-related benefits such as increased concentration, efficiency, and productivity. However, the review by Hadgraft included only five studies investigating sit-stand desks specifically. Furthermore, the results from the sit-stand desk studies were not distinctly segregated from the broader “sit less” interventions, thus making it difficult to discern outcomes that may be uniquely attributable to sit-stand desk interventions.

Additionally, all studies within the review included participants of a research intervention. Whilst tightly controlled intervention studies are crucial in understanding the impact of the independent variable (the variable manipulated) on outcomes of interest, there are limitations associated with this type of research in understanding the experiences and perceptions of users in a naturalistic setting. In controlled trials, the intervention setting may not represent the complexity and dynamics of a workplace, and for this reason, intervention studies should be complemented by field research that explores the behaviour in a naturalistic setting, thus offering further insight into real-world impacts (Aziz, 2017). The perceptions and experiences of naturalistic sit-stand users and observers will therefore be useful in developing a greater understanding about the acceptability and sustainability of prolonged sit-stand desk use within the workplace and in informing future practice.

The present study aimed to explore the views and experiences of office workers who have experienced more than one year of vicariously accessing either seated or sit-stand desks in the workplace and have therefore used or observed sit-stand desk use in the real-world context.

Methods

Study Design

Ethical approval for the study was granted by the institution’s Faculty Research Ethics Committee (1203-LP-CSN). A qualitative study was chosen to provide insight, context and interpretation of emerging phenomena which may not yet have been adequately explored, with respect to the experiences of using, or observing others use, sit-stand desk in the office environment (Patten, 2013). Focus group interviews were selected for two reasons. Firstly, focus groups are known to gather rich data from many people in a relatively short period of time, and are therefore convenient and time-efficient to be used in a workplace setting. Secondly, focus groups are attractive to individuals who may be hesitant to express individual opinions. They are well-regarded for their ability to foster group discussions where participants share not only their own views, but explore and discuss the reasons behind those views. Participants are also prompted to question and challenge each other’s perspectives. This dynamic interaction often results in the collection of richer and more diverse data, as the discussion among group members unfolds (Kitzinger, 1995). This collaborative environment helps to identify points of agreement and disagreement which serve as valuable insights to the topic being explored (Krueger, 2014).

Participants and Recruitment

A sample size of 30–60 was aimed for, based on the recommendation that four to six focus groups of between five and ten participants, would be sufficient to generate rich data (Krueger, 2014). Recruitment efforts continued until data saturation, i.e., no new information or data arising, which was decided in consultation with authors and co-investigators (ED, LK).

Purposive convenience sampling (Etikan et al., 2016) was used to recruit potential individual participants from three large (total employees > 900) organisations in neighbouring English counties, known to the Researchers as having purchased sit-stand desks. This approach was chosen to ensure that organisations were sufficiently large to host employees of various socio-demographic backgrounds and to include both seated and sit-stand desk users, thus maximising variation in the sample characteristics (Patten, 2013). All employees of the three organisations were invited to participate in the study. The Human Resource departments shared the invitation via organisation email and staff discussion boards.

Respondents received a participant information sheet (PIS) and invitation to attend one of several scheduled focus groups, available on a range of dates, again to encourage maximum variation in sampling. The PIS explained clearly that participation was entirely voluntary and that participants could withdraw at any time, without consequence. Eligibility was defined as full-time employee, employed in a predominantly sedentary desk-based role (i.e. either seated, or sit-stand desk, for at least 80% of their day and for at least one year) within large organisations where sit-stand desks were available to people on request, or rotation. Of sit-stand desk users, there was no lower limit for the time participants spent in the stand position, this was decided to avoid participant bias (i.e. by including only those who use their sit-stand desk to stand regularly, and not those who have access to a sit-stand desk but don't use it to stand often) and hence promote authenticity of the data collected. Participants were required to be able to understand written and spoken English. Participants gave written informed consent following which they were asked to give details of desk type (seated/ sit-stand desk), current workstation, and period working at sit-stand workstation. This information was later used to categorise participants in the reporting of the data using SD for seated desk, and SSD for sit-stand desk user. Participants were provided with a buffet lunch before the focus group commenced.

Data Collection

A largely deductive approach was adopted when designing the focus group interview schedule, using knowledge of prior research. However, we also strived to encourage an inductive, participant led dialogue in the structuring of our questions and the style of questioning used. We therefore used open questions and lines of enquiry, to encourage participants to express experiences in their own terms (Patten, 2013). Semi-structured questions were designed for the focus-group interviews, to ensure we addressed all research outcomes, whilst also allowing for flexibility

Table 1 Questioning Guide

Section	Question	Prompts if needed
Introductory/Transition	Question 1) How long do you spend sitting daily? 2) How long do you spend standing daily?	
Perceived Barriers & Facilitators	3) Are you interested in having/do you have a SSD at work? 4) What did/might have motivated you to accept a SSD? 5) What did, or might have, encouraged you to stand up more during your working day? 6) What did, or might have, stopped you from standing up more than you did?	a. What, if anything, might or does encourage you to use the SSD daily b. What, if anything, might be or is a barrier to you using the SSD daily? c. What, if any, drawbacks to using SSD would you expect or have you experienced?
Benefits & Drawbacks	7) What, if any, potential benefits of using a SSD are you aware of/have you experienced? 8) What, if any, negative impacts of using a SSD are you aware of/have you experienced? 9) Do you have any concerns around using SSD?	
Ending questions	10) Is there anything else you'd like to say about your experiences of seated desk work or SSD?	
SSD sit-stand desk		

and participant led discussion (Krueger, 2014). The questioning guide can be found in Table 1. The key areas explored were relevant to our research questions, which sought to better understand perceived barriers and facilitators, benefits, consequences, and general experiences of seated and sit-stand desk work in these three organisations.

Six focus groups were undertaken and completed by May 2017. Focus-groups were facilitated by the primary investigator (PI; ED) and recorded on a Dictaphone, following written informed consent taken at the outset of the session. Notes were taken during interviews by one of two colleagues (moderator), both experienced in qualitative research, for referral during transcription and analysis. These notes included observation and contextual points such as non-verbal cues of agreement/disagreement, whether questions elicited particular interest or discussion, and general atmosphere. This process served as a reminder to the research team during transcription, to capture aspects not reflected in verbatim notes. All recordings were transcribed verbatim into Microsoft (MS) Word by the PI, and a sample checked for accuracy by the moderator, as part of internal quality procedures. Transcription and analysis processes were carried out as soon as possible following each focus group. Regular meetings were held with the PI and moderators to discuss the interviews and collected data, for example cross-checking themes and sub-themes, level of fit within and between themes, and whether new data was emerging or not (saturation). Data collection ceased after no new findings emerged.

Data Analysis

Data were analysed using thematic analysis (TA), following the framework provided by Clarke and Braun (2021). This inductive analysis was chosen to align with an interpretivist research philosophy, which acknowledges that truth and knowledge are subjective, and are based on peoples' experiences, and their understanding of these (Ryan, 2018). The analytical procedure consisted of six distinct steps. In Step 1, two of the authors (ED and LK) became acquainted with the data. In Step 2, initial codes were generated, deliberated upon, and either sustained or dismissed as deemed appropriate. In Step 3, potential themes were formulated, and scrutinised to combine or expand overlapping themes. In Step 4, an overarching review of salient themes and sub-themes was carried out, involving input from both moderators and members of the research team. Step 5 saw the refinement, definition, and naming of identified themes. Finally, in Step 6, a conclusive write-up of the data analysis was undertaken.

The analysis process was undertaken by two researchers (ED & LK), who simultaneously coded a sample of the data to generate initial codes, which were then compared to the coding of the co-researcher, then considered for inter-rater agreement. Where there was discrepancy in interpretation and themes, the wider research team were consulted, and a consensus was reached. This served to encourage dialogue, reflexivity, and critique of interpretation of the data, to help strengthen trustworthiness, rigor and accuracy. Once initial codes ($n=32$) were agreed upon, they were examined once more and similar codes were clustered together to form candidate

themes ($n = 11$). Maher et al. (2018) recommend that, to enhance rigor the researcher surround themselves with the data in a variety of forms including visual representations for a period during analysis. For this reason, evolving themes and sub-themes were presented on a white-board in the researcher's office which served to immerse the researchers in the data and facilitated peer-debriefing of emerging data. Themes were then reviewed by the authors to ensure they reflected coded extracts and the entire dataset. Following this the final themes and subthemes were selected. In the text that follows, where quotes are presented, this will be followed by focus group number, participant number and whether the participant was a seated desk (SD) or sit-stand desk (SSD) worker, e.g., FG 1, P1, SD.

Results

A sample of 34 participants (19 sit-desk users and 15 sit-stand-desk users), from three organisations, volunteered for the study. The organisations were one local council, one government ombudsman and one University centre. All participants had at least one-year of sit-stand desks use, or direct observation of colleagues using sit-stand desks within their organization and were employed within desk-based roles. The roles of participants are presented in Table 2. Whilst interviews were planned to last at least 60 min, participants attended during their lunchbreak and as such were time-conscious, thus meaning the average duration of each focus group was 45 min.

Three themes and nine subthemes emerged from the data. Figure 1 outlines the themes and subthemes emerging. The three themes encompassed: (1) *The Sedentary Office*; reasons for and symptoms of occupational sedentarism; (2) *Motivators*

Table 2 Participant Roles

Role	N
Administrator	4
Marketing	4
Public Health	3
Team leader	3
Academic	3
Outdoor recreation	2
Planning and Architecture	2
Design engineer	2
Active partnership	2
Investigation manager	2
Deputy assistant	2
Contracts manager	1
Asset and estate management	1
Corporate Health and Safety	1
Social care	1
Communications officer	1
Total	34

[to reducing sitting-time], which often stemmed from symptoms of The Sedentary Office and (3) *The Active Office*; participants' perceptions and experiences of reducing sitting-time at work. Themes, subthemes and representative quotes are illustrated in Table 3.

Theme One: The Sedentary Office

The notion of The Sedentary Office was acknowledged by all participants, who discussed that sedentary behaviour had increased considerably in the workplace, arising from the changing nature of work, the office environment, culture, and norms. Much of the discussion in the themes relating to The Sedentary Office offered examples of causes of workplace sitting and barriers to sit-stand desk use.

Office Culture

A pervasive sedentary office culture was acknowledged by all focus groups; participants reminisced about interactions with colleagues 'before the days of email' and there was a strong sense that technological advances and a digital culture were key drivers of this shift to increasingly sedentary work. A high volume of email traffic was also acknowledged as encouraging sedentary behaviour. There was discussion about how matters could be dealt with more efficiently if people left their desks and talked to colleagues instead of emailing: *"if someone had just got off their backside, walked 50/60yds down the corridor and spoken to someone"*. This participant went on to offer some reasoning for this practice, saying: *"a lot of that [emailing colleagues] is about not wanting to interrupt people"* (FG 1, P1, SSD).

The office or workplace custom and practice was particularly salient in these discussions and office norms were cited by some as barriers to the successful uptake or acceptability of standing in the workplace, and in acceptance of sit-stand desks. There was a consensus around this, since in five of the six focus groups, participants discussed feeling self-conscious when using a sit-stand desk, and standing if everyone else in the office were sitting. As one sit-stand desk user explained, if they were the only person standing it was "fairly uncomfortable". Participants also discussed how widespread use increased as visibility of sit-stand desk and office culture changed, and standing was normalised: *"in the environment that we've worked, it's completely normal [standing]"* (P2, FG2, SSD) and in the same group another sit-stand desk user added:

"Scale would be important...[if] there's only one person [in a team] doing it [standing], that would be enough to stop me... But culturally if it's across a whole dept. as it was with us...it was easier, we were all doing it at the same time...For things to benefit on the ground...change needs to happen at the top, it needs to be a policy decision" (P2, FG2, SSD)

Acceptability and normalisation was clearly associated with observing peers or others using sit-stand desks (standing) and this was a motivator for others: *"when I see other people in the office [standing] ...it does make me think 'ah I should be*

Table 3 Themes, Subthemes and Representative Quotes

Theme	Subtheme	Representative Quote(s)
The Sedentary Office	Office Culture	"In the early days there was quite a lot of walking going on because we were going out to people in various departments... the preference [now] is people want you to talk online". (FG 1, P1, SD)
		"It would be that [feeling of] standing in a meeting, when you get up and everybody looks at you...you feel fairly uncomfortable" (P3, FG2, SSD)
		"I think I might get self-conscious about it... [but] I'm thick skinned... it won't stop me using it...I think as more of them appear that feeling goes away". (P7, FG1, SD)
		"I do think now there is more of it [sit-stand desk use] ... it's not so quirky, not so odd and I think it's more acceptable ... (P6, FG4, SD).
		"You just get engrossed in something ...you don't realise that you're sat there for ages, and you don't think about having those breaks" (P3, FG1, SSD).
Motivators	Feeling Engrossed	"Sometimes you've got to carry on what you're doing but you just don't want to sit in that position anymore, and I think that [choice] would be good". (P4, FG1, SD)
		"I don't like sitting down all day, I get more tired and achy". (P3, FG2, SSD).
		"I have been told [by a medical professional] 'you can't sit still for too long' [refers to back injury] ...most of the time I was in a position where I could actually work wise get up, have a wander around and sit back down again but if you're in meetings and things it's a bit more difficult". (P4, FG1, SD)
Motivators	Siting Slump	"I think my back issues are caused by two things- desk working and being overweight, two factors combined...I'm conscious of it [sitting] and aware of it 'cos of my previous injury". (P1, FG4, SD)
		"Cardio health and general health are really important to me, so when I found out that sit-stand desk was available I asked for one". (P1, FG6, SSD)
		"All of the links that it's been shown to things like diabetes, stroke, heart attack ... they weren't the reasons why I started to have it [a sit-stand desk]" (P3, FG5, SSD).
Motivators	Health History	

Table 3 (continued)

Theme	Subtheme	Representative Quote(s)
Active Office	Control and Communications	<p>"It [SSD work] kind of gives you some choice, whereas sitting at your desk, you're chained to it really, so you don't have any choice...you have a choice [with a SSD] and that's a very important thing for me." (P5, FG1, SD)</p> <p>"It helps you feel more confident and in control [of difficult phone calls] ...if you stand up it's sort of like immediately you're taking more control and having a bit more confidence in the situation". (P2, FG5, SSD)</p> <p>"I email less when I can just go and speak to someone because I'm already up ...and that has been quicker and more beneficial than always putting things into email". (P2, FG 6, SSD) "When people come into the room and you're already standing... it's much easier to engage, whereas if you're sat down...perhaps it's to do with intimidation I don't know, being lower than someone who's talking to you [if you're sitting] ...if we're standing there's no physical barrier between us so it's easier to communicate with colleagues in that way". (P1, FG6, SSD)</p> <p>"When you're standing up, you're both on the same level...when you're sitting behind screens you don't see people as much" (P1, FG2, SSD)</p>
	Move More, Feel Better	<p>"I feel more positive and energised when I'm standing...you're slumped when you're sitting" (P2, FG6, SSD).</p> <p>"It motivates you to do other things-get up and have a walk...I don't feel as lethargic." (P6, FG2, SSD).</p> <p>"I get a lot of pain sitting down ... but it's what you end up doing most of your day [sitting down] and I find standing up alleviates that pain". (P1, FG2, SSD)</p> <p>"When I used to sit down for a long time, I would get quite bad pain... I don't get them anymore, they've totally disappeared" (P6, FG2, SSD).</p> <p>"if you feel good about yourself, you know it is distraction isn't it; if you do have a pain, but your wellbeing is quite good, then the pain is not as bad as you thought it was- there is probably something in it!" (P2, FG2, SSD)</p>
	Feel Better, Work Better	<p>"I suppose ... the biggest [cost-benefit] is staff absence/staff sickness in terms of musculoskeletal disorders or you know poor wellbeing or whatever. (P2, FG2, SSD)</p> <p>"I'm actually more productive when I'm stood up 'cos I'm just more energised and paying attention to what I'm doing." (P2, FG5, SSD),</p> <p>"it's quite productive. I don't know why just because you're standing up you just don't want to hang about, just get things done!" (P6, FG3, SSD)</p> <p>"if you've got less aches and pains then you're more productive" (P1, FG4, SD).</p>
	A Sense of Value	<p>"I really appreciate it, I feel really grateful that they [the employer] bought these for us- they didn't have to, but it does make a difference to our day-to-day work". (P3, FG2, SSD)</p> <p>"It [sit-stand desk] contributes to a more positive feeling about the workplace ... you know the kind of engagement with the work... you know it's a workplace that to some extent looks after its employees because they're providing this great resource, I do have that more positive feeling about the workplace which in my role helps me to do my job more effectively." (P2, FG5, SSD)</p>

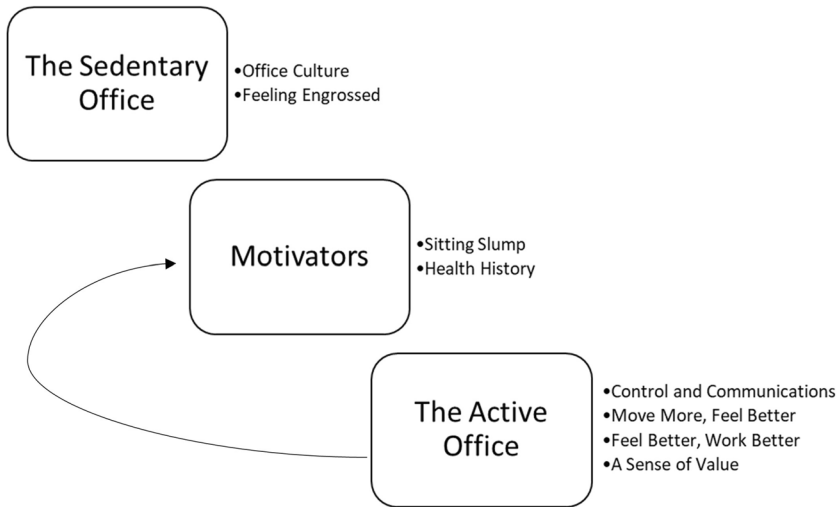


Fig. 1 Graphical overview of themes and subthemes

standing””, (P3, FG3, SSD) with another agreeing: “it’s a good prompt actually, someone else using theirs” (P8, FG3, SSD) and: “one person will go up and I’ll think ‘oh yeah!’...it’s a bit of a trigger” (P2, FG6, SSD). There was agreement on this sense of culture and normalisation by SD users with one, explaining “I’d probably be more likely to do it when I saw somebody else do it! So if everybody was doing it then...” (P3, FG6, SD). Another SD participant explained they would feel more comfortable with time, as standing became the norm: “you might [feel self-conscious] if you’d just joined the organisation.... [but] especially if we’re talking about the benefits of it. It becomes part of the culture really” (P6, FG4, SD).

Feeling Engrossed

Participants identified “feeling busy” and “engrossed” as barriers to sitting less at work. This was discussed even amongst those with access to a sit-stand desk. One seated-desk user explained that they got lost in their work, and before they knew it, several hours had passed: “You stand up and you can’t move, and suddenly realise – ‘I sat down at 9 o’clock and I haven’t moved!’ ...” (P1, FG1, SD). Seated-desk users explained that whilst they were conscious of sitting-time, they had no other option but continue sitting to complete their work. This theme of being engrossed in one’s work was discussed by both seated desk users and sit-stand desk users, however, was more salient among seated desk users. Sit-stand desk users discussed that whilst they also experienced being engrossed in their work, they could continue with work tasks whilst standing, such as the flexibility offered by a sit-stand desk. Some sit-stand desk users explained that tasks such as emails or phone calls served as a reminder to stand at their desk: “[I] stand up to answer the telephone ... just to move about really” (P1, FG6, SSD).

Theme Two: Motivators

Motivators to reduce sitting time included negative physical symptoms of sitting, a history of previous health issues, perceived health benefits of standing, and curiosity to try new working positions. Two sub-themes were identified under this theme: Sitting Slump and Health History. One participant explained that long periods of time spent sitting were “*very uncomfortable physically but...[also] very uncomfortable mentally*” (P5, FG1, SD). This quote speaks to the essence of both subthemes of the Motivators theme and was echoed by discussions within all focus groups.

Sitting Slump

The concept of a ‘sitting slump’ was discussed in all groups and encompassed both mental discomfort (fatigue, lethargy, and restlessness) and physical fatigue (stiffness, soreness and musculoskeletal [MSK] pains) associated with prolonged sitting. A seated-desk user added that the MSK discomfort they experienced whilst at work was only felt at work, not outside of work, and may lead to “*actually finishing work totally or going part time*” (P5, FG4, SD). For many, the motivation to sit less was borne out of negative experiences associated with sitting and a common experience of lethargy coined as a ‘sitting slump’, including lethargy, restlessness, and stiffness. Several participants talked about strategies to break up sitting time, which involved any type of movement whilst remaining at the desk. For example, participants explained how they would “*fidget...to keep things moving*” (P1, FG6, SSD), or “*stand up on phone calls*” (P5, FG4, SD). Participants also took opportunities to have a physical break away from their desk, such as printing, and rest breaks: “*I’ll go up two or three [flights of] stairs to find a toilet*” (P1, FG1, SD). The latter was more frequently reported amongst seated-desk users, likely because they had limited options for standing, unlike sit-stand desk users.

For some, taking breaks from sitting at the desk, particularly for non-work tasks such as making refreshments, was considered a privilege for many who stated how they do not have the permission and therefore opportunity for breaks within their roles. As previously highlighted, the discussion on this was driven by seated-desk users, likely owing to the fact that sit-stand desk users aren’t relying on breaks from the desk or their work task to reduce their sitting time. There was a clear distinction between working and non-working breaks amongst all employees, who feared judgement by managers about productivity. One participant explained that managers might ask, or think “*what are you doing standing there or talking to somebody [instead of emailing]*” (P2, FG1, SD), explaining how they first needed permission to move away from their desks during working hours: “*that ‘OK’ to do it*” (P2, FG1, SD). This varied depending on different staff grade, or levels of autonomy within the office environment. Some felt more comfortable taking short non-working breaks if the opportunities arose, whilst others did not. As covered in a later subtheme “*Feel Better, Work Better*”, this slump was alleviated by SSD use: “*...it does help so much with your afternoon slump*” (P1, FG5, SSD) and: “*I don’t get an afternoon slump which I did after every lunch*” (P2, FG5, SSD).

Health History

This category related mainly to a history of physical health concerns, particularly back or MSK pain, which appeared to be a key motivator for many to use sit-stand desks. Whilst one participant with a history of cardiovascular illness explained how this was a motivating factor to use a sit-stand desk this was the exception and generally cardio-metabolic conditions were not discussed as being a deciding factor in choosing or intending to use sit-stand desk. Participants with a history of back pain discussed how this led to them being mindful of sitting time. This was discussed by both seated and sit-stand desk users, with an overwhelming majority commenting they try to, have been advised to, or feel that they should limit sitting-time because of previous back pain. As one seated-desk user commented: *“I had a back injury, so I know the value of having to stand up”* (P7, FG1, SD), with another seated-desk user adding: *“I do try to stand up and take breaks ... because I’ve got a bad back, which I think a lot of us do in the office”* (P1, FG4, SD). Many participants attributed this back pain to sitting at work, and it was acknowledged as lower on days off when they are more active. Another seated-desk user explained: *“I’ve got a bit of a back problem...sometimes it would be good to be standing up”* (P4, FG1, SD).

Numerous sit-stand desk users concurred that previous seated work was *“causing quite bad pain down the back and sides of my neck and shoulder”* (P2, FG6, SSD), citing this as the reason for accepting a sit-stand desk. Furthermore, in those who had previously used and experienced MSK benefits of a sit-stand desk, there was discussion as to how this benefit was reversed following removal of access to the sit-stand desk. This is covered in the later subtheme *“Move More, Feel Better”*.

Amongst those participants who hadn’t used a sit-stand desk before, there was an element of curiosity and novelty: *“I’d like to try it just to see if I can see those benefits”* (P4, FG5, SD) with another adding: *“it’s worth a try and I have got loads of other health problems so it might help them so, it’s worth a try”* (P4, FG4, SD). As already explored in the previous subtheme *Health History*, such curiosity might be beneficial to uptake of sit-stand desks, and this was echoed by sit-stand desk users and may serve to help motivate employees to sit less.

Theme Three: The Active Office

Control and Communications

Control and choice were discussed in the context of individual workstations, communication, and office design. The lens through which these were discussed varied slightly between seated-desk and sit-stand desk users; for those currently using a sit-stand desk, discussions focused on how sit-stand desks offer a greater sense of control over one’s workspace. For those seated desk users, the discussion was in the context of the control they *would* or *could* feel if they had access to sit-stand desk. The importance of choice regarding workstation was highlighted by one participant who explained: *“I think the chance to move to a different way of doing it [the work*

task] ... just really refocuses you” (P6, FG4, SD). Numerous participants discussed the impact that standing at work may have on confidence and assertiveness in communications, particularly when dealing with challenging phone calls: “You are more assertive on the phone if you’re standing up” (P6, FG4, SD). This was echoed by others, with one sit-stand desk user explaining: “[when I am] dealing with an issue from a team...or maybe I’m having a disagreement with someone over email, I’ll stand up always to deal with that. It just helps me to feel a bit more in control” (P4, FG5, SSD). This was especially apparent amongst those in public facing roles, suggesting relevance to call centre and client facing occupations.

For the majority, a further benefit of sit-stand desks was the opportunity to improve communications between colleagues. Participants felt that sit-stand desks not only allowed for more efficient and effective interactions with colleagues, but also provided enhanced control over sitting time, as previously discussed. One participant explained, that having discussions at a sit-stand desk felt “more like passing in the corridor...it’s easier to have shorter conversations if you’re both standing” (P1, FG6, SSD). Whilst others described how standing meetings are “more efficient, because people want to get it over quicker” (P7, FG1, SD). Although as one participant commented, the converse can also be true for some employees: “[to a sit-stand desk user] I find it more awkward to approach you when you’re stood up, I don’t know why” (P4, FG5, SD). Interestingly, the colleague they addressed had previously explained how “[standing work] makes me more accessible to my team” further highlighting potential subjectivity. As another sit-stand desk user explained it can be “a bit awkward continually talking down to people” (P1, FG6, SSD) when using the standing position. Further consideration as to whether the use of sit-stand desk would help or hinder communication and approachability of team members in the workplace is therefore recommended.

Move More, Feel Better

Many discussed how incidental movement when using a sit-stand desk, such as fidgeting and shuffling, felt beneficial, mainly in helping reduce lethargy from prolonged sitting. Some perceived an “incremental value of those moves” (P2, FG1, SD) as beneficial to their physical health referring to improved “circulation”, “posture”, “calorie burn” and “[prevention of] cancer and heart disease” despite evidence to substantiate this. One participant commented: “standing up... [it] just sounds healthier!” (P6, FG4, SD).

Increased incidental movement and potential benefits to health and well-being were discussed by participants who found this encouraged further movement and helped alleviate lethargy. This was a perception echoed by sit-stand desk users across the focus groups: “that’s been the biggest bit that I’ve noticed, it’s your energy levels” (P4, FG5, SSD). Another added: “when I’m stood up, I’m just more energised” (P2, FG5, SSD) and: “not getting too tired, because ... if you’re sitting all day, I think you can get very tired” (P3, FG2, SSD). The idea that sit-stand desks would promote movement and therefore discourage sedentary behaviour, was also perceived by seated desk users: “you’d actually be more likely to walk away from your desk and take a break because you’re already on your feet” (P1, FG1, SD)

which concurs with a sit-stand desk user who explained: “*you have the potential to be on the move very quickly and easily*” (P1, FG6, SSD). This was another example of how seated-desk users and sit-stand desk users talked to the essence of the same theme, often discussing through two different lenses; the seated-desk users talked about the *potential* impacts they would *expect* to have whilst sit-stand desk users spoke to their actual experiences of using a sit-stand desk.

As mentioned, physical health and disability caused by MSK pain was cited as a powerful motivation for taking interest in using a sit-stand desk. Additionally, sit-stand desk use was linked with reduced MSK discomfort. According to one participant, a previous sit-stand desk user, after returning to seated work their MSK discomfort returned: “*I would love to get back standing...now [that I’m sitting again] I’m getting shoulder pain again*” (P5, FG2, SD). Some individuals placed value on reducing sitting time, for wider health benefits. Three groups discussed how sitting less reportedly helps decrease cancer and cardiovascular disease risk. Another explained how they felt standing up could “*preserve your [physical] balance*” (P1, FG6, SSD). Whilst most of the participants discussed health benefits in terms of the absence of physical ill health, mental health and wellbeing was also mentioned. As one sit-stand desk user explained: “*there is a sense that you’re doing good for yourself, you get that sense of wellbeing*” (P2, FG2, SSD) with another, in a separate focus-group, adding: “*I can stand up and feel that I’m being healthier...taking care of my health*” (P2, FG6, SSD).

Feel Better, Work Better

In every focus group the benefits of sit-stand desks on energy levels, sense of well-being and the productivity at work were raised by participants themselves. Within this theme, seated desk and sit-stand desk users agreed that there would be a work-based improvement owing to feeling better, and once again seated-desk users tended to speak of vicarious experiences (that they had observed in colleagues) or expected benefits, whilst sit-stand desk users spoke of the benefits they had experienced. Standing when feeling tired helped overcome fatigue and lethargy, with one sit-stand desk user explaining: “*you just stand up and just shake it out and get on with your work!*” (P1, FG5, SSD), and another adding: “*[if I’m] feeling a little bit lethargic in the legs ... I’ll stand up again*” (P9, FG3, SSD). Another suggested how having a sit-stand desk “*varies the day*” (P1, FG3, SSD), helping enhance focus and productivity. The previously discussed MSK benefits of sitting less were also linked to productivity: “*if you’ve got less aches and pains then you’re more productive...that can only have benefit as well*” (P1, FG4, SD). This perceived link was illustrated with the viewpoint that “*happy staff are generally more productive*” (P2, FG1, SD). One seated-desk (SD) user described recognising greater productivity in a colleague with a history of MSK, when they started using a sit-stand desk: “*she was at her [sit-stand] desk more and not having to walk around [to relieve back pain]*” (P3, FG4, SD). A seated-desk user mentioned, although the health impact of using a sit-stand desk is still unequivocal, there appears to be a placebo effect observed in those who use sit-stand desk, which appears to provide users with a greater sense of well-being and productivity:

“I wonder if it would make an improvement to the way we work, because we just feel better, as opposed to doing the job particularly faster?” (P1, FG1, SD)

Whilst a consensus existed surrounding the perceived benefits in terms of productivity associated with SSD use, one isolated comment suggested the contrary is also possible: i.e. resulting in staff “wandering off” (P4, FG5, SD). In three of the focus-groups reduced absenteeism was identified as beneficial. One seated-desk user explained how one colleague who used a sit-stand desk had experienced notable improvement in their health, which may help reduce sickness absence: “...they don’t think they’re going to have more sick leave because of it [the sit-stand desk], you know, they’re [physically] comfortable at work [station] for the first time” (P7, FG1, SD). Whilst interesting absenteeism was discussed less compared with productivity and wellbeing.

A Sense of Value

Another benefit of SSD use in the workplace was a sense of feeling valued by the employer: “somebody’s cared enough to get me a sit-stand desk” (P1, FG6, SSD). Discussions around feeling valued at work focused on a positive organisational culture, and a perception that employers care about the wellbeing of staff, all of which were described as likely to lead to increased workplace satisfaction and hence productivity.

Discussion

This study aimed to explore the perspectives and experiences of UK office workers who had access to sit-stand desks in their workplace for at least one year, and to our knowledge was the first to do so with participants who were not part of a research intervention. Insight into this population group is deemed important to help understand the real-world transferability of occupational sitting time interventions (Hadgraft et al., 2018). Consistent with previous research, we found that most respondents perceived prolonged sitting as negatively impacting their physical, mental, and overall wellbeing, workplace productivity and performance. Whilst this was cited as a motivator to reduce sitting time at work, prolonged sitting was common. It appeared to embody the dominant sedentary office culture, characterized by workers feeling deeply engrossed in their work and desk-based communication, with limited opportunities to move away from their desks. Sit-stand desks were observed or experienced by all participants and cited as a potential solution to the prevailing sedentary, and largely dissatisfying, office experience. Our results provide qualitative understanding regarding the potential adaptability and long-term acceptance of incorporating sit-stand desks in a standard office work setting.

The Sedentary Culture

A salient finding of this study was the unanimous dissatisfaction with the prevailing or ubiquitous sedentary office culture. Although daily sitting time was included as an opening and contextualising question, it triggered passionate and detailed discussions. Participants criticised the normalisation of excessive sitting-time at work as a major dissatisfaction and frustration, directly affecting their overall sense of health and wellbeing. *The Sedentary Office* emerged as a key theme, emphasising the sedentary work environment as a pervasive culture, that many of our respondents desired they could change. These findings concurred across all focus groups, suggesting this feeling was present regardless of the organisation employing individuals, and whether they have access to a sit-stand desk or not. Workplace office culture has previously been cited as important, with managerial support and ‘champions’ for change deemed vital in promoting uptake and adherence to sit-less interventions (Brakenridge et al., 2018; Gilson et al., 2011; Morris et al., 2019). This has been previously reported by seated-desk workers, or those following a research-led intervention. Therefore, our findings add to the current literature, offering evidence that with time, a mixture of sitting and standing work is feasible and can be institutionalised or normalised. Again, this sense of changing culture was discussed across all focus groups, suggesting it was not dependent upon the culture or environment of just one organisation. This offers support for longer-term interventions (more than one year) which aim to change office-culture to one which accepts sit-stand desk use as the norm. Despite the extensive literature on sedentary interventions and their effectiveness and acceptability, our findings, consistent with existing research, highlight that office workers persistently perceive the office as a space of enforced and unwelcome sedentariness. This suggests that widespread implementation or scaling-up of relevant occupational health and ergonomic interventions from research to practice have not emerged on a significant enough scale. As expressed by respondents here, this may contribute to the frustration not only about the sedentary nature of work, and working environments, but moreover their inability, or personal agency, to reduce sitting time. It is clear therefore, that there is a continued need for interventions that focus on reducing occupational sedentary time. More research into practical options to reduce sedentary office work are recommended.

Increased Sense of Agency and Control

Control was discussed by both seated desk users and sit-stand desk users, either in the context of the control they would feel if they were given a sit-stand desk, or indeed the control they do feel over their workspace if they have a sit-stand desk. The importance of individual agency in decisions affecting one’s health is also fundamental to health promotion practice. Our findings support the importance of agency and control for office and desk-based employees, with respect to the negative experience of increasingly sedentary working environments. As participants in the present study discussed, access to a sit-stand desk would, or indeed had, enhanced

feelings of agency and control. This was described as partially helping overcome frustration associated with the ‘sedentary office’, providing possibilities for movement and therefore actioning change without impacting upon their ability to work. There was a sense of increased control over one’s own personal workspace, and a feeling of not being “chained” to a sitting position, when using a sit-stand desk. This “*freedom to be able to stand or sit*” was similarly cited as a positive outcome following a 13 week sit-stand desk intervention (Brierley et al., 2022).

Autonomy and relatedness have both been shown to predict intrinsic motivation in the workplace, suggesting that at the organisational level, policies aimed at improving the use of employee initiative and independence would have positive outcomes on meaningful work (Autin et al., 2022). This has in turn shown to have well-being benefits, thus suggesting an intervention which improves autonomy would have beneficial impacts on both the organisation, and the employee (Autin et al., 2022). This agrees with research which suggests that increasing levels of job autonomy have positive impacts upon psychological wellbeing, particularly amongst those with low levels of job-autonomy (Clausen et al., 2022). These findings suggest that sit-stand desk use might be a means by which to contribute to enhanced workplace autonomy, which may in turn enhance wellbeing and work satisfaction. Considering the economic and social costs associated with employee ill health, as well as the impact of sickness absence among office workers and the insights gained from the adoption of more flexible working patterns following the Covid-19 pandemic, it is worthwhile to explore the potential contributions of sit-stand desks to overall health and mental well-being.

Perceived productivity literature has shown a positive association between employee satisfaction and productivity (Shobe, 2018) and amongst our participants, much discussion was given to perceived productivity and work performance benefits of sit-stand desk use. This came mainly from the experiences of sit-stand desk users but were also cited by seated desk users who speculated about being more productive at certain tasks if standing up. These findings agree with previous research which showed a four week sit-stand desk intervention to improve perceived productivity and vigour at work (Dutta et al., 2015; Pronk et al., 2012). The SMARt cluster-RCT also showed self-rated job performance improved in the intervention group and worsened in the control group from baseline to six months and 12 months (Munir et al., 2020). Participants in the present study, both sit-stand desk and seated desk users, attributed perceived improvements in productivity to feeling more energised and less lethargic in the workplace. This concurs with previous research by Kowalsky et al. (2018) who reported lower discomfort, sleepiness, and physical fatigue in a sit-stand intervention, and by Munir (2020) who reported improved recovery from occupational fatigue at six and 12 months.

Our study participants shared their experiences of increased confidence when using sit-stand desks, particularly in handling challenging situations via phone or email. Standing provided a heightened sense of assurance and job control. Additionally, participants noted feeling more open to face-to-face communication with office colleagues while standing, fostering approachability, and contributing to the perception that certain tasks could be completed more efficiently. These findings echo the findings of Dewitt (2019) and Engelen et al. (2019) who both reported modes of

active working to have positive impacts on interaction, communication, control of time and space and workspace satisfaction.

Perceived benefits, however, must be explored with caution, as it is generally difficult to measure such outcomes (Karakolis & Callaghan, 2014). Our findings, and the findings of others regarding subjective productivity or work-performance improvement, are conflicting with objective findings which have demonstrated no changes to productivity measures when using sit-stand desks (Chau et al., 2016; Pronk et al., 2012). However, it is widely acknowledged within occupational health that subjective outcomes such as perceived control and subjective wellbeing are important determinants of employee wellbeing. Moreover, there is a consensus that sit-stand desk interventions have no detrimental impact on productivity (Chau et al., 2016; Commissaris et al., 2016; Karakolis & Callaghan, 2014; Peterman et al., 2019). Future research might therefore use a mixed-method approach to explore further the potential impact on work output or productivity of sit stand desks in the real world.

Perceived Physical Benefits

Despite the ambivalent evidence of health benefits associated with sit-stand desks, participants in this study enthusiastically described perceived improvements to wellbeing with sit-stand desk use. This included feeling more energised, and improvements in MSK symptoms. This aligns with prior research on sit-stand interventions. Hadgraft (2018) found a reduction in lower back pain after a three-month occupational sitting time intervention. Additionally, Pronk et al. (2012) reported a 54% decrease in upper back and neck pain following a four-week sit-stand desk intervention. A recent meta-analysis by Dzakpasu et al. (2021) reported an association between self-reported workplace sitting and lower back pain, consistent with findings of Agarwal et al. (2018), where changing posture using a sit-stand desk was linked to improved lower back pain. Taken together, these findings suggest sit-stand desk interventions may be a means to alleviate the MSK discomfort often reported by office workers. Therefore, incorporating sit-stand desks into office environments could potentially contribute to reducing the prevalence of MSK discomfort and improving overall employee health.

The qualitative findings from respondents in the present study concur with the wider literature suggesting a sense of improved mental and physical wellbeing with the use of sit-stand desks. These findings are important besides the benefits to individual health and wellbeing, because MSK and mental health were amongst the top five reasons for sickness absence in the UK in 2022 (Office for National Statistics, 2023). Interventions that improve MSK and mental health may therefore help reduce costs associated with absenteeism. However, whilst research has suggested that sit-stand desks may be beneficial in terms of helping to increase productivity, the evidence for reducing absenteeism is equivocal (Ben et al., 2020; Munir et al., 2020). Some researchers have posited that sit-stand desk use in the workplace can positively affect users, and this has been shown to correlate with a more positive workplace attitude (Czajka, 1990). Keramat et al. (2020)

found that long-term health affects job satisfaction, and this resonates with the views of participants in the present study, who clearly articulated a strong sense of improved wellbeing and more positive outlook to work, providing potential benefits for employees and employers. Clearly, since a sense of wellbeing is an important outcome of public and occupational health interventions, and current evidence is tenuous and ambivalent therefore, further research into the subjective benefits of sit-stand desks is warranted.

Considerations in a Post-Covid Era

To date, most of the research on this topic has been carried out in workers who travel to their place of work, however, there has been an increase in homeworking following the Covid-19 pandemic with 24% of workers now reporting to follow a hybrid model of working (Office for National Statistics, 2022). In a study of home-working (tele-working) university employees, staff spent almost 90% of their working time sitting (Niven et al., 2022) therefore strategies which can be employed to reduce prolonged sitting in the home-working environment are clearly required to reduce sedentary behaviour and associated ill health and disease risk. There has been research exploring the use of treadmill desks when working from home, which reports similar motivators to those found in our study, including an overwhelming desire to sit less and to ‘feel healthier’ (Scisco et al., 2023). Clearly there are pragmatic limitations to treadmill desks at home, however, another study evaluated the interest and acceptability of low-cost standing desks in the home environment, finding 75% of participants used the desk weekly after four weeks, and at 6 months 30% were still using the desk weekly (Rudecki et al., 2019). This finding is promising because it is also noted that the costs of implementing and scaling up sit-stand desk use in the office environment is prohibitive (Rudecki et al., 2019), therefore offering support for lower-cost models might widen the accessibility of such interventions. The role of peer support, and seeing others using a sit-stand desk, is deemed important for driving behaviour change in the office environment. This has been expressed by participants in the present study and is supported by the wider literature (Brierley et al., 2022; Morris et al., 2020). However, this would be irrelevant in the home environment due to the absence of colleagues, and it is unknown whether working-at-home would positively or negatively influence effectiveness of a sit-stand desk. Future research is therefore needed to explore sedentary behaviour strategies in the homeworking environment, over longer periods of time, and to explore both objective and subjective measures of impact.

The current study has highlighted potential avenues for future research, especially around the areas of perceived control and autonomy for reducing excessive sitting time through access to sit-stand desks; this may help to reduce the internal frustration of not having the choice to act. This directly links with applied research increasingly found within the fields of health promotion, including the importance of positive psychology or strength-based approaches to understanding and enhancing the work or occupational health aspects of reducing sedentary behaviour.

Limitations

It must be acknowledged that participants volunteered to join this study which may influence recruitment bias, i.e., participants with an interest in a less sedentary workplace may have volunteered themselves for the study. Nonetheless, as no participants were aware of the current guidelines on sitting (Buckley et al., 2015) social desirability bias is unlikely. As with any qualitative research, instrumental/researcher bias must be acknowledged. The lead author (ED) acknowledges a background in physical activity and health, which could influence interpretation of the findings. Therefore, steps were taken to assure the credibility, dependability, and validity of the research. These steps included providing all details of the research process in this paper to allow for repeatability; conducting audit reviews with co-authors; and practicing reflexivity throughout the data analysis.

Our study was carried out with a sample from the United Kingdom and therefore it is important to recognise the role that context may play in extrapolating our findings to other countries. Furthermore, demographic information of the participants was not collected. This decision was made to avoid unconscious bias in data interpretation, to respect participant privacy, and to minimize the burden on participants, particularly considering the research was conducted during the working day. We acknowledge that this is a potential limitation to the work, and that demographic information could be valuable to contextualising our findings and enhancing transferability. Transferability, or proximal similarity, is the consideration of how research might be extrapolated across environments and is important to consider within qualitative research (Polit & Beck, 2010). Transferability is concerned with how alike people, places, socio-political contexts, and times are as compared to the focal study in which the findings were reported and allows the reader the opportunity to make judgements about the likeness to their own contexts (Brunner, 1987; Polit & Beck, 2010). Geertz (1973) argued that the main goal of interpretive theory isn't to provide all the answers, but to share insights and answers that people from different cultures and backgrounds have offered. Therefore, to allow readers to make informed decisions regarding the transferability of our findings to their own settings, the authors have attempted to provide detailed description about the research settings, the methods followed and the exchanges resulting from these. It is our hope that readers will be able to take our findings and apply them to their own contexts, and indeed to add to these findings in contexts outside of those explored within this study to add further to the literature base and understanding of reducing sedentary behaviour in naturalistic studies.

Conclusion

At the time of writing, no qualitative studies have been undertaken in the UK that have focused on individuals' long-term experience using sit-stand desks, outside of research-led interventions. We provide insight into the acceptability and real-world application of sit-stand desk use in the UK context.

Office workers faced with working in a highly sedentary office environment are cognisant of the negative impact of this on their health, yet have limited options to reduce sitting time. This contributes to a strong sense of frustration, and lack of agency or control, over their health and mental wellbeing. Conversely, having an option to sit or stand during work hours may help regain some sense of control, resulting in feeling a greater sense of autonomy, which is known to be associated with better mental workplace wellbeing. Workplace environment and tasks act as key barriers to reducing sedentary behaviour, and sit-stand desks may offer opportunity for reducing sitting time, bringing about perceived improvements to personal health and productivity.

Managerial support was found to be important to cultivate a supportive culture and to facilitate change, aligning with previous research (Brakenridge et al., 2018; Chau et al., 2014; Gilson et al., 2011; Morris et al., 2020). Notably, our study reveals a shift in culture over time, suggesting that sit-stand desks can become normalized. Furthermore, participants reported enhanced agency, control, energy levels, perceived well-being, and improved communication with colleagues. Future research should quantitatively assess the impact of sit-stand desks on well-being and productivity to justify interventions, strategies, policies, and practices. Finally, considering the rise in home-working due to the Covid-19 pandemic, it is essential to examine the feasibility of such interventions in home-working environments.

Acknowledgements Authors wish to acknowledge the support of all participants and gate-keepers at participating organisations who assisted with recruitment of participants to the study.

Author contributions All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Elizabeth Deery and Lynne Kennedy. The first draft of the manuscript was written by Elizabeth Deery and Lynne Kennedy commented on versions of the manuscript. All authors read and approved the final manuscript.

Funding Not applicable.

Declarations

Ethical Approval All participants provided written informed consent to take part in the research. This research study was granted ethical approval by the University of Chester Faculty Research Ethics Committee (FREC reference number: 1203/16/EP/CSN).

Conflict of Interest None declared.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Abdin, S., Welch, R. K., Byron-Daniel, J., & Meyrick, J. (2018). The effectiveness of physical activity interventions in improving well-being across office-based workplace settings: A systematic review. *Public Health*, *160*, 70–76.
- Agarwal, S., Steinmaus, C., & Harris-Adamson, C. (2018). Sit-stand workstations and impact on low back discomfort: A systematic review and meta-analysis. *Ergonomics*, *61*(4), 538–552.
- Autin, K. L., Herdt, M. E., Garcia, R. G., & Ezema, G. N. (2022). Basic psychological need satisfaction, autonomous motivation, and meaningful work: A self-determination theory perspective. *Journal of Career Assessment*, *30*(1), 78–93.
- Aziz, H. A. (2017). Comparison between field research and controlled laboratory research. *Archives of Clinical and Biomedical Research*, *1*(2), 101–104.
- Bauman, A. E., Petersen, C. B., Blond, K., Rangul, V., Hardy, L. L. (2018). The descriptive epidemiology of sedentary behaviour. In: M. Leitzmann, C. Jochem, & D. Schmid (Eds.), *Sedentary Behaviour Epidemiology*. Springer Series on Epidemiology and Public Health. Springer, Cham. https://doi.org/10.1007/978-3-319-61552-3_4
- Ben, A. J., Jelsma, J. G., Renaud, L. R., Huysmans, M. A., van Nassau, F., van der Beek, A. J., van der Ploeg, H. P., van Dongen, J. M., & Bosmans, J. E. (2020). Cost-effectiveness and return-on-investment of the dynamic work intervention compared with usual practice to reduce sedentary behavior. *Journal of Occupational and Environmental Medicine*, *62*(8), e449–e456.
- Brakenridge, C. L., Healy, G. N., Hadgraft, N. T., Young, D. C., & Fjeldsoe, B. S. (2018). Australian employee perceptions of an organizational-level intervention to reduce sitting. *Health Promotion International*, *33*(6), 968–979.
- Brierley, M. L., Smith, L. R., Bailey, D. P., Ojo, S. O., Hewson, D. J., Every, S. A., Staines, T. A., & Chater, A. M. (2022). Evaluating a multi-component intervention to reduce and break up office workers' sitting with sit-stand desks using the APEASE criteria. *BMC Public Health*, *22*(1), 1–15.
- Brunner, R. D. (1987). The principle of proximal similarity. *Knowledge*, *9*(1), 145–160. <https://doi.org/10.1177/107554708700900106>
- Buckley, J. P., Hedge, A., Yates, T., Copeland, R. J., Loosemore, M., Hamer, M., Bradley, G., & Dunstan, D. W. (2015). The sedentary office: An expert statement on the growing case for change towards better health and productivity. *British Journal of Sports Medicine*, *49*(21), 1357–1362.
- Chambers, A. J., Robertson, M. M., & Baker, N. A. (2019). The effect of sit-stand desks on office worker behavioral and health outcomes: A scoping review. *Applied Ergonomics*, *78*, 37–53.
- Chau, J. Y., Daley, M., Srinivasan, A., Dunn, S., Bauman, A. E., & Van Der Ploeg, H. P. (2014). Desk-based workers' perspectives on using sit-stand workstations: A qualitative analysis of the Stand@ Work study. *BMC Public Health*, *14*(1), 1–10.
- Chau, J. Y., Sukala, W., Fedel, K., Do, A., Engelen, L., Kingham, M., Sainsbury, A., & Bauman, A. E. (2016). More standing and just as productive: Effects of a sit-stand desk intervention on call center workers' sitting, standing, and productivity at work in the opt to stand pilot study. *Preventive Medicine Reports*, *3*, 68–74.
- Clarke, V., & Braun, V. (2021). *Thematic analysis: A practical guide*. Sage.
- Clausen, T., Pedersen, L. R. M., Andersen, M. F., Theorell, T., & Madsen, I. E. (2022). Job autonomy and psychological well-being: A linear or a non-linear association? *European Journal of Work and Organizational Psychology*, *31*(3), 395–405.
- Clemes, S. A., O'connell, S. E., & Edwardson, C. L. (2014). Office workers' objectively measured sedentary behavior and physical activity during and outside working hours. *Journal of Occupational and Environmental Medicine*, *56*(3), 298–303.
- Cole, J. A., Tully, M. A., & Cupples, M. E. (2015). They should stay at their desk until the work's done: A qualitative study examining perceptions of sedentary behaviour in a desk-based occupational setting. *BMC Research Notes*, *8*(1), 1–9.
- Commissaris, D. A., Huysmans, M. A., Mathiassen, S. E., Srinivasan, D., Koppes, L. L., & Hendriksen, I. J. (2016). Interventions to reduce sedentary behavior and increase physical activity during productive work: a systematic review. *Scandinavian Journal of Work Environment & Health*, *42*(3), 181–191. <http://www.jstor.org/stable/43999217>
- Czajka, J. (1990). *The relation of positive and negative affectivity to workplace attitudes*. Academy of Management Best Papers Proceedings, pp. 201–205. <https://doi.org/10.5465/AMBPP.1990.4978706>


- Dempsey, P. C., Biddle, S. J., Buman, M. P., Chastin, S., Ekelund, U., Friedenreich, C. M., Katzmarzyk, P. T., Leitzmann, M. F., Stamatakis, E., & van der Ploeg, H. P. (2020). New global guidelines on sedentary behaviour and health for adults: Broadening the behavioural targets. *International Journal of Behavioral Nutrition and Physical Activity*, *17*(1), 1–12.
- Dewitt, S., Hall, J., Smith, L., Buckley, J. P., Biddle, S. J., Mansfield, L., & Gardner, B. (2019). Office workers' experiences of attempts to reduce sitting-time: An exploratory, mixed-methods uncontrolled intervention pilot study. *BMC Public Health*, *19*(1), 1–10.
- Dutta, N., Walton, T., & Pereira, M. A. (2015). Experience of switching from a traditional sitting workstation to a sit-stand workstation in sedentary office workers. *Work*, *52*(1), 83–89.
- Dzakpasu, F. Q., Carver, A., Brakenridge, C. J., Cicuttini, F., Urquhart, D. M., Owen, N., & Dunstan, D. W. (2021). Musculoskeletal pain and sedentary behaviour in occupational and non-occupational settings: A systematic review with meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, *18*(1), 1–56.
- Edwardson, C. L., Yates, T., Biddle, S. J., Davies, M. J., Dunstan, D. W., Esliger, D. W., Gray, L. J., Jackson, B., O'Connell, S. E., & Waheed, G. (2018). Effectiveness of the stand more AT (SMARt) work intervention: Cluster randomised controlled trial. *Bmj*, *363*.
- Edwardson, C. L., Biddle, S. J. H., Clemes, S. A., Davies, M. J., Dunstan, D. W., Eborall, H., et al. (2022). Effectiveness of an intervention for reducing sitting time and improving health in office workers: Three arm cluster randomised controlled trial. *Bmj*, *378*:e069288. <https://doi.org/10.1136/bmj-2021-069288>
- Ekelund, U., Tarp, J., Steene-Johannessen, J., Hansen, B. H., Jefferis, B., Fagerland, M. W., Whincup, P., Diaz, K. M., Hooker, S. P., & Chernofofsky, A. (2019). Dose-response associations between accelerometer measured physical activity and sedentary time and all cause mortality: Systematic review and harmonised meta-analysis. *Bmj*, *366*, 14570. <https://doi.org/10.1136/bmj.14570>
- Engelen, L., Chau, J., Young, S., Mackey, M., Jeyapalan, D., & Bauman, A. (2019). Is activity-based working impacting health, work performance and perceptions? A systematic review. *Building Research & Information*, *47*(4), 468–479.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–4.
- Geertz, C. (1973). Thick description: Toward an interpretive theory of culture. *The interpretation of cultures*, selected essays. New-York/N.Y./USA etc. Basic Books, pp. 3–30
- Gilson, N. D., Burton, N. W., Van Uffelen, J. G., & Brown, W. J. (2011). Occupational sitting time: Employees? Perceptions of health risks and intervention strategies. *Health Promotion Journal of Australia*, *22*(1), 38–43.
- Graves, L., Murphy, R., Shepherd, S., Cabot, J., & Hopkins, N. (2015). Evaluation of sit-stand workstations in an office setting: A randomised controlled trial. *BMC Public Health*, *15*(1), 1–14.
- Grunseit, A. C., Chau, J. Y., Van der Ploeg, H. P., & Bauman, A. (2013). Thinking on your feet: A qualitative evaluation of sit-stand desks in an Australian workplace. *BMC Public Health*, *13*(1), 1–10.
- Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: A pooled analysis of 358 population-based surveys with 1·9 million participants. *The Lancet Global Health*, *6*(10), e1077–e1086.
- Hadgraft, N. T., Brakenridge, C. L., LaMontagne, A. D., Fjeldsoe, B. S., Lynch, B. M., Dunstan, D. W., Owen, N., Healy, G. N., & Lawler, S. P. (2016). Feasibility and acceptability of reducing workplace sitting time: A qualitative study with Australian office workers. *BMC Public Health*, *16*, 1–14.
- Hadgraft, N. T., Brakenridge, C. L., Dunstan, D. W., Owen, N., Healy, G. N., & Lawler, S. P. (2018). Perceptions of the acceptability and feasibility of reducing occupational sitting: Review and thematic synthesis. *International Journal of Behavioral Nutrition and Physical Activity*, *15*(1), 1–18.
- Healy, G. N., Eakin, E. G., LaMontagne, A. D., Owen, N., Winkler, E. A., Wiesner, G., Gunning, L., Neuhaus, M., Lawler, S., & Fjeldsoe, B. S. (2013). Reducing sitting time in office workers: Short-term efficacy of a multicomponent intervention. *Preventive Medicine*, *57*(1), 43–48.
- Healy, G. N., Eakin, E. G., Owen, N., Lamontagne, A. D., Moodie, M., Winkler, E. A., Fjeldsoe, B. S., Wiesner, G., Willenberg, L., & Dunstan, D. W. (2016). A cluster randomized controlled trial to reduce office workers' sitting time: Effect on activity outcomes. *Medicine and Science in Sports and Exercise*, *48*(9), 1787–1797.
- Huang, Y., Li, L., Gan, Y., Wang, C., Jiang, H., Cao, S., & Lu, Z. (2020). Sedentary behaviors and risk of depression: A meta-analysis of prospective studies. *Translational Psychiatry*, *10*(1), 26.
- Karakolis, T., & Callaghan, J. P. (2014). The impact of sit–stand office workstations on worker discomfort and productivity: A review. *Applied Ergonomics*, *45*(3), 799–806.

- Keramat, S. A., Alam, K., Gow, J., & Biddle, S. J. H. (2020). Obesity, long-term health problems, and workplace satisfaction: A longitudinal study of Australian workers. *Journal of Community Health*, 45(2), 288–300. <https://doi.org/10.1007/s10900-019-00735-5>
- Kitzinger, J. (1995). Qualitative research: Introducing focus groups. *BMJ*, 311(7000), 299–302.
- Kowalsky, R. J., Perdomo, S. J., Taormina, J. M., Kline, C. E., Hergenroeder, A. L., Balzer, J. R., Jakicic, J. M., & Gibbs, B. B. (2018). Effect of using a sit-stand desk on ratings of discomfort, fatigue, and sleepiness across a simulated workday in overweight and obese adults. *Journal of Physical Activity and Health*, 15(10), 788–794.
- Krueger, R. A. (2014). *Focus groups: A practical guide for applied research*. Sage Publications.
- Maher, C., Hadfield, M., Hutchings, M., & De Eyto, A. (2018). Ensuring rigor in qualitative data analysis: A design research approach to coding combining NVivo with traditional material methods. *International Journal of Qualitative Methods*, 17(1), 1609406918786362.
- Morris, A. S., Murphy, R. C., Shepherd, S. O., Healy, G. N., Edwardson, C. L., & Graves, L. E. (2019). A multi-component intervention to sit less and move more in a contact centre setting: A feasibility study. *BMC Public Health*, 19(1), 1–17.
- Morris, A. S., Mackintosh, K. A., Dunstan, D., Owen, N., Dempsey, P., Pennington, T., & McNarry, M. A. (2020). Rise and recharge: Effects on activity outcomes of an e-health smartphone intervention to reduce office workers' sitting time. *International Journal of Environmental Research and Public Health*, 17(24), 9300.
- Munir, F., Miller, P., Biddle, S. J., Davies, M. J., Dunstan, D. W., Eslinger, D. W., Gray, L. J., O'Connell, S. E., Waheed, G., & Yates, T. (2020). A cost and cost-benefit analysis of the stand more at work (SMArT work) intervention. *International Journal of Environmental Research and Public Health*, 17(4), 1214.
- Niven, A., Baker, G., Almeida, E. C., Fawkner, S. G., Jepson, R., Manner, J., Morton, S., Nightingale, G., Sivaramakrishnan, D., & Fitzsimons, C. (2022). Are we working (too) comfortably? Understanding the nature of and factors associated with sedentary behaviour when working in the home environment. *Occupational Health Science*, 7, 71–88. <https://doi.org/10.1007/s41542-022-00128-6>
- Office for National Statistics. (2022). *Is hybrid working here to stay?* <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/isahybridworkingheretostay/2022-05-23>, Retrieved May 24, 2023, from <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/isahybridworkingheretostay/2022-05-23>
- Office for National Statistics. (2023). *Sickness absence in the UK labour market: 2022*. Office for National Statistics. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/latest#reasons-for-sickness-absence>. Accessed 1 Jun 2023.
- Owen, N., Healy, G. N., Matthews, C. E., & Dunstan, D. W. (2010). Too much sitting: The population-health science of sedentary behavior. *Exercise and Sport Sciences Reviews*, 38(3), 105.
- Patten, M. L. (2013). *Understanding research methods: An overview of the essentials* (9th ed.), Routledge. <https://doi.org/10.4324/9781315266312>
- Patterson, R., McNamara, E., Tainio, M., de Sá, T. H., Smith, A. D., Sharp, S. J., Edwards, P., Woodcock, J., Brage, S., & Wijndaele, K. (2018). Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: A systematic review and dose response meta-analysis. *European Journal of Epidemiology*, 33, 811–829.
- Peterman, J. E., Healy, G. N., Winkler, E. A., Moodie, M., Eakin, E. G., Lawler, S. P., Owen, N., Dunstan, D. W., & LaMontagne, A. D. (2019). A cluster randomized controlled trial to reduce office workers' sitting time. *Scandinavian Journal of Work, Environment & Health*, 45(5), 483–492.
- Polit, D. F., & Beck, C. T. (2010). Generalization in quantitative and qualitative research: Myths and strategies. *International Journal of Nursing Studies*, 47(11), 1451–1458. <https://doi.org/10.1016/j.ijnurstu.2010.06.004>
- Pronk, N. P., Katz, A. S., Lowry, M., & Payfer, J. R. (2012). Reducing occupational sitting time and improving worker health: The take-a-stand project, 2011. *Preventing Chronic Disease*, 9, E154. <https://doi.org/10.5888/pcd9.110323>
- Rudecki, J., Weatherston, K., & Faulkner, G. (2019). Evaluating the acceptability of low-cost standing desks in the home environment: An exploratory study. *Journal of Physical Activity and Health*, 16(5), 375–379.
- Ryan, G. (2018). Introduction to positivism, interpretivism and critical theory. *Nurse Researcher*, 25(4), 14–20.

- Ryan, C. G., Dall, P. M., Granat, M. H., & Grant, P. M. (2011). Sitting patterns at work: Objective measurement of adherence to current recommendations. *Ergonomics*, *54*(6), 531–538.
- Scisco, J. L., Meyers, E., Miceli, A., & Powell, J. (2023). It's been a game changer: Examining Treadmill desk use when working from Home. *Occupational Health Science*, 1–22.
- Shobe, K. (2018). Productivity driven by job satisfaction, physical work environment, management support and job autonomy. *Business and Economics Journal*, *9*(2), 1–9.
- Shrestha, N., Kukkonen-Harjula, K. T., Verbeek, J. H., Ijaz, S., Hermans, V., & Pedisic, Z. (2018). Workplace interventions for reducing sitting at work. *Cochrane Database of Systematic Reviews*, (6), [CD010912]. <https://doi.org/10.1002/14651858.CD010912.pub4>
- Sport England (2022). *Active Lives Adult Survey November 2020–21 Report*. Sport England: London, UK (2022). <https://sportengland-production-files.s3.eu-west-2.amazonaws.com/s3fs-public/202304/Active%20Lives%20Adult%20Survey%20November%202021-22%20Report.pdf?VersionId=ln4PN2X02DZ1LFI8btgaj5KFHx0Mio9o>. Accessed 1 May 2023.
- Tew, G. A., Posso, M. C., Arundel, C. E., & McDaid, C. M. (2015). Systematic review: Height-adjustable workstations to reduce sedentary behaviour in office-based workers. *Occupational Medicine*, *65*(5), 357–366.
- Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., & Chinapaw, M. J. (2017). Sedentary behavior research network (SBRN)–terminology consensus project process and outcome. *International journal of behavioral nutrition and physical activity*, *14*, 1–17
- Unsal, N., Weaver, G., Bray, J. W., Bibeau, D., & Saake, G. (2021). Return on investment of workplace wellness: Evidence from a long-term care company. *Workplace Health & Safety*, *69*(2), 81–90.
- Wilms, P., Schröder, J., Reer, R., & Scheit, L. (2022). The impact of home office work on physical activity and sedentary behavior during the COVID-19 pandemic: A systematic review. *International Journal of Environmental Research and Public Health*, *19*(19), 12344.
- Withagen, R., & Caljouw, S. R. (2016). The end of sitting?: An empirical study on working in an office of the future. *Sports Medicine*, *46*, 1019–1027.
- World Health Organization. (2013). *WHO global plan of action on workers health (2008–2017): Baseline for Implementation*. Accessed at: <https://iris.who.int/bitstream/handle/10665/341021/WHO-FWC-PHE-2013.01-eng.pdf?sequence=3>. Accessed 25 May 2019.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Authors and Affiliations

Elizabeth Deery^{1,4}  · John Buckley² · Michael Morris¹ · Lynne Kennedy^{1,3}

✉ Elizabeth Deery
l.deery@ulster.ac.uk

- ¹ Department of Clinical Sciences and Nutrition, University of Chester, Chester, UK
- ² School of Allied Health Professions, Keele University, Keele, UK
- ³ Department of Public Health, Qatar University, Doha, Qatar
- ⁴ School of Sport, Ulster University Derry/Londonderry, Londonderry, UK