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Cross-sectional associations between sitting at work and psychological distress: Reducing sitting time may benefit mental health

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ABSTRACT

Problem: Evidence is emerging of adverse associations between prolonged sitting at work and physical health, yet little is known about occupational sitting and mental health. This study examined associations between occupational sitting and psychological distress in employed adults, independent of leisure-time physical activity.

Methods: A survey of 3367 state government employees (mean age 46.2 years, 71.9% women) was conducted in Tasmania, Australia, during 2010 as part of an evaluation of workplace health and wellbeing programs. The Kessler Psychological Distress Scale (K10) was used to measure psychological distress, and participants reported time spent sitting at work on a typical day. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ). Ratios of prevalence (PR) for categories of psychological distress were estimated by log multinomial regression separately for men and women, and with adjustment for age, marital status, effort-reward imbalance and leisure-time physical activity.

Results: Average reported occupational sitting time was 4.8 (Standard Deviation SD = 2.5) hours for men and 4.2 (SD = 2.7) hours for women. Compared to those sitting at work less than 3 h/day, men sitting more than 6 h/day had increased prevalence of moderate psychological distress (adjusted PR = 1.90, 95% CI 1.22, 2.95), and women sitting more than 6 h/day had an increased prevalence of moderate (adjusted PR = 1.25, 95%CI 1.05, 1.49) and high (adjusted PR = 1.76, 95%CI 1.25, 2.47) distress.

Conclusion: The current study found an association between occupational sitting and intermediate levels of psychological distress, independent of leisure-time physical activity. Reducing occupational sitting time may have mental health benefits.

1. Introduction

Sedentary behaviour was long considered to represent the absence of physical activity, yet it is now accepted that physical inactivity and sedentariness are distinct phenomena with different physiological consequences (Dunstan, Howard, Healy, & Owen, 2012). Defined by the Sedentary Behaviour Research Network (2013) as any waking behaviour characterised by an energy expenditure ≤1.5 METS while in a sitting or reclining posture, sedentary behaviours have been associated with overweight and obesity (Chau, van der Ploeg, Merom, Chey, & Bauman, 2012b), cardiovascular disease (CVD), Type 2 diabetes, (Grontved & Hu, 2011; Katzmarzyk, Church, Craig, & Bouchard, 2009; Wilmot et al., 2012), adverse cardio-metabolic markers (Healy, Matthews, Dunstan, Winkler, & Owen, 2011), depression (Breland, Fox, & Horowitz, 2013; Teychenne, Ball, & Salmon, 2010b; Vallance et al., 2011), mental well-being (Atkin, Adams, Bull, & Biddle, 2012) and prospectively linked to all-cause and CVD-related mortality (Proper, Singh, van Mechelen, & Chinapaw, 2011; van der Ploeg, Chey, Korda, Banks, & Bauman, 2012). Such findings are typically independent of the amount of physical activity people engage in during their leisure time. Consequently, individuals may be meeting recommended levels of health promoting physical activity, yet their physical and mental health may remain at risk if they are also sedentary for prolonged periods.

The mechanisms underlying why sedentariness has been inversely associated with mental health remain unclear, and a recognised difficulty in elucidating the relationship is the possibility of reverse causality (Faulkner & Biddle, 2013). Impaired mental health

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may promote increased time spent engaging in sedentary behaviours, or conversely, sedentary behaviours may negatively impact mental health. Moreover, evidence is emerging that the contexts within which active and sedentary behaviours occur exhibit differential associations with mental health, and show distinct corollaries for men and women (Cerin, Leslie, Sugiyama, & Owen, 2009; McKercher et al., 2009; Nihill, Lubans, & Plotnikoff, 2013; Proper, Picavet, Bemelmans, Verschuren, & Wendel-Vos, 2012; Rhodes, Mark, & Temmel, 2012; Teychenne, Ball, & Salmon, 2010a).

Sitting occurs in occupational, transport, leisure and domestic domains (Owen, Healy, Matthews, & Dunstan, 2010). Despite this, research into sedentariness has focused on leisure-time sitting, incorporating estimates of reading, TV viewing, computer or generic screen time (Rhodes et al., 2012). Time spent sitting at work, however, has been found to account for approximately half the average weekly sitting time across all domains (Miller & Brown, 2004), and many workers spend the majority of their workday seated (Jans, Proper, & Hildebrandt, 2007; Mummery, Schofield, Steele, Eakin, & Brown, 2005). Evidence is now emerging linking occupational sitting with adverse physical health outcomes, including higher risk for Type 2 diabetes, mortality and increased BMI (Chau et al., 2012b; van Uffelen et al., 2010), yet limited extant research has explored sitting at work and mental health. Research by Proper et al. (2012) examining occupational sitting found no evidence of a relationship between time sitting at work and mental well-being. Participants in their study were drawn from the fifth wave of a Dutch prospective population-based study. Consequently, the analyses included data from working adults aged 40 and over ($n = 513$), precluding the consideration of work-related sitting in younger workers. Adjustment was made for physical activity levels, but there was no consideration of stress associated with work. Where possible, it is optimal to include psychosocial factors such as job-related stress as potential confounders, as dissatisfaction or strain associated with employment, including mundane, lower-skilled desk-based work, role demands or poor psychosocial climate can influence levels of employee stress. As such, there is a need to further explore sedentariness and mental health in the work domain, studying populations that span the customary age spectrum of working adults and addressing job stress as a possible confounder.

Public and workplace health campaigns, which have historically emphasised the importance of being physical active, are beginning to acknowledge the physical health benefits of also lessening exposure to prolonged and continuous sedentary behaviours (Plotnikoff & Karunamuni, 2012). Moreover, nascent intervention studies have assessed techniques to reduce and interrupt sitting in the workplace, with the focus to date restricted to office-based settings and physiological and behavioural outcomes (Evans et al., 2012; Gilson et al., 2009; Gilson, Suppini, Ryde, Brown, & Brown, 2012; Verweij, Proper, Weel, Hulshof, & van Mechelen, 2012). The omission of the assessment of psychological implications in intervention research is likely to endure while the relationship between mental health and prolonged sitting at work remains unclear. Thus, the aim of the current research was to investigate the association between occupational sitting and psychological distress, independent of leisure-time physical activity.

2. Methods

2.1. Participants

Partnering Healthy@Work is a collaboration between the State Government of Tasmania, Australia, the Menzies Research Institute Tasmania, and the University of Tasmania to evaluate Healthy@Work, a state government initiative designed to assist its departments to develop and implement workplace health and well-being programs. This study used data collected in the 2010 Partnering Healthy@Work baseline survey of state government employees. The study population was a stratified random sample of employees with stratification by government agency, employment contract (permanent, casual/fixed term) and work type (full-time, part-time). The eligible sample consisted of 12,179 Tasmanian State Service employees. With a response proportion of 28% (3408/12179), 3408 participants provided informed consent and completed the paper-based questionnaire distributed by mail. The final study sample for analysis of 3367 excluded 41 persons with missing data on key study factors.

2.2. Measurements

2.2.1. Sociodemographic characteristics

Information collected on sociodemographic and health characteristics included sex, age, level of education, marital status and physical functioning. Self-reported physical functioning was assessed using responses to the 12 Short-Form Health Survey questions that relate to physical health (SF-12; e.g. 'During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?). A Physical Component Summary Score (PCS) was derived for each respondent, with higher scores indicating better physical functioning. The PCS was chosen because the summary scores provide an estimation of physical functioning that is distinguished from aspects of mental health, and the SF-12 is a reliable and widely used measure (Ware, Kosinski, & Keller, 1996). Body mass index (BMI) was calculated from self-reported weight (kg) and height (m) as BMI = weight/height^2, and weight status was categorised as underweight/normal (BMI $<$ 25 kg/m^2), overweight (25 $\leq$ BMI $<$ 30 kg/m^2) and obese (BMI $\geq$ 30 kg/m^2). Effort-Reward Imbalance, an indicator of work stress that compares occupational effort against perceived intrinsic and extrinsic rewards, was calculated according to responses on the Effort-Reward Imbalance scale (ERI) (Siegrist et al., 2004). Example questions, in reference to the respondent's work situation, include 'I experience adequate support in difficult situations' and 'I am treated unfairly at work'. Response options are 'Agree' or 'Disagree', and where applicable responders indicate their level of distress attributable to the statement (not at all distressed to very distressed). A ratio of the 'effort' and 'reward' scales is calculated, and scores over 1.0 represent an 'imbalance' theorised to place individuals at risk of work stress. For the current analyses, the continuous ERI ratio scores were categorised into five groups (<0.400, 0.400–0.599, 0.600–0.799, 0.800–0.999, 1.000+).

2.2.2. Psychological distress

Psychological distress was measured using the Kessler Psychological Distress scale (K10). It has demonstrated validity and reliability (Furukawa, Kessler, Slade, & Andrews, 2003), and is predictive of respondents meeting criteria for a diagnosable depression- or anxiety-related disorder (Slade, Grove, & Burgess, 2011). The scale uses 10 items to assess the level and severity of distress, and is based on questions concerning anxiety and depression symptoms experienced during the previous four weeks (e.g. 'In the last four weeks, about how often did you feel depressed?'). A five-point response scale is used for each symptom with scores ranging from 1 = "None of the time" to 5 = "All of the time". Total scores vary from 10 to 50, with higher scores indicating increased levels of psychological distress. Based on cut-points used by the Australian Bureau of Statistics in population-based surveys, the total scores were grouped for analysis into ordered categories of low distress (K10 total score 10–15), moderate distress (16–21), high distress (22–29) and very high distress (30–50) (Australian Bureau of Statistics, 2012).