



Houdmont, Jonathan and Clemes, S. and Munir, F. and Wilson, K. and Kerr, Robert and Addley, Ken (2015) Psychosocial work environment and leisure-time physical activity: the Stormont Study. *Occupational Medicine*, 65 (3). pp. 215-219. ISSN 0962-7480

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Houdmont, J., Clemes, S., Munir, F., Wilson, K., Kerr, R., & Addley, K. (2015). Psychosocial work environment and leisure-time physical activity: The Stormont Study. *Occupational Medicine*, 65, 215-219. doi:10.1093/occmed/kqu208

### **Abstract**

*Background:* Research findings are equivocal on relations between the psychosocial work environment and leisure-time physical activity (LTPA). This might be partly due to studies having focused on a restricted set of psychosocial dimensions, thereby failing to capture all relevant domains.

*Aims:* First, to examine cross-sectional associations between seven psychosocial work environment domains and LTPA in a large sample of UK civil servants. Second, to profile LTPA and consider this in relation to UK government recommendations on physical activity.

*Method:* in 2012, Northern Ireland Civil Service employees completed a questionnaire including measures of psychosocial working conditions (Management Standards Indicator Tool) and LTPA. We applied bivariate correlations and linear regression analyses to examine relations between psychosocial working conditions and LTPA.

*Results:* Of ~26,000 civil servants contacted, 5,235 (20%) completed the questionnaire. Twenty-four per cent of men and 17% of women reported having undertaken  $\geq 30$  minutes of physical activity on five or more days in the past week.

Job control (-0.08) and peer support (-0.05) were weakly but significantly negatively correlated with LTPA in men. Job role (-0.05) was weakly but significantly negatively correlated with LTPA in women. These psychosocial work characteristics accounted for 1% or less of the variance in LTPA.

*Conclusions:* Longitudinal research to examine cause-effect relations between psychosocial work characteristics and leisure-time physical activity might inform the potential for psychosocial job redesign to increase employees' physical activity during leisure time.

*Keywords:* Civil Servants; Leisure-time Physical Activity; Management Standards Indicator Tool; Psychosocial Work Environment; Work-Related Stress.

## Introduction

There is value in identifying modifiable factors that might influence physical activity, given its importance for health [1] and work ability [2]. The psychosocial work environment might be such a factor, possibly due to reduced availability of time associated with high job demands, fatigue and associated need for recovery [3]. Certain psychosocial working conditions, particularly passive, unchallenging jobs with low demands and control, might lead to reduced self-efficacy and more passive lifestyles [4-5]. Employees with low job control may have less time to plan for leisure-time physical activity (LTPA) or fewer opportunities to adjust their work time in order to participate in physical activity [6].

Some studies have found an association between poor psychosocial work environment and a slightly increased risk of physical inactivity, while others found null results [7-14]. This inconsistency might be partly due to studies having focused on a restricted set of psychosocial dimensions (primarily job demands, control, effort, and reward) and failing to capture all relevant domains. Moreover, the findings of these exclusively Scandinavian studies might not generalize well to the United Kingdom (UK); cultural and climactic differences possibly influencing relevant variables. The only UK study we found that explored these variables, found an association between low job demands and control and a slight increase in risk of low LTPA in male but not female civil servants [15].

Given the paucity of UK-specific data, this study offers an examination of associations between a diverse set of psychosocial working conditions and LTPA in a

large sample of UK civil servants. Associations between the psychosocial work environment and LTPA may inform the targeting of workplace interventions to promote LTPA. This study also profiles LTPA in relation to the UK government recommendation that adults aged 19-64 should “aim to be active daily. Over a week activity should add up to at least 150 minutes (2½ hours) of moderate intensity activity in bouts of ten minutes or more – one way to approach this is to do 30 minutes on at least five days a week” [16]. This most recent recommendation, issued in 2011, is consistent with the previous 2004 recommendation for at least 30 minutes per day of at least moderate intensity physical activity on five or more days of the week [17].

### **Methods**

We used data gathered in 2012 as part of the Stormont Study, which is tracking a large cohort of employees through their career with the Northern Ireland Civil Service (NICS). This includes staff of the 12 devolved Northern Ireland ministerial departments and the Public Prosecution Service for Northern Ireland. We emailed an invitation to participate in the study and a link to an online survey to all NICS employees with an occupational email address (~26,000 of 27,507). The research was commissioned by the NICS Workplace Health Committee and ethical approval granted by the Ethics Committee of the University of Ulster.

We used the 35-item version of the UK Health and Safety Executive Management Standards Indicator Tool (MSIT) [18] to measure psychosocial work environment. Each item has a 5-point response scale: either 1 (*never*), 2 (*seldom*), 3 (*sometimes*), 4

(often), and 5 (always), or 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). Example items from each of the seven scales include: “I have unachievable deadlines” (demands), “I have a say in my own work speed” (control), “I am given supportive feedback on the work I do” (managerial support), “If work gets difficult my colleagues will help me” (peer support), “I am subject to bullying at work” (relationships), “I am clear what my duties and responsibilities are” (role) and “Staff are always consulted about change at work” (change). High scores indicate high (and potentially harmful) exposures.

We measured Leisure-Time Physical Activity by asking “In the past week, on how many days have you done a total of 30 minutes or more physical activity which was enough to raise your breathing rate? This may include sport, exercise, and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job.” We used a 7-point response scale from zero to seven days. This self-report measure has been shown to be a valid and reliable measure of physical activity [19]. We dichotomized responses into sufficient (five or more days per week) and insufficient (four or fewer days per week) physical activity.

We conducted bivariate correlations to explore relations between the study variables. We applied linear regression analyses to explore the association between the psychosocial work environment and LTPA. We conducted separate analyses for males and females because earlier research indicated that the relationship between psychosocial working conditions and LTPA might vary between the sexes [3,15]. We

did not control for socio-demographic and occupational variables in the analysis because they were not significantly correlated with the dependent variable (LTPA).

## Results

Of ~26,000 civil servants contacted, 5,235 (20%) comprising 2,305 men and 2,930 women, completed the questionnaire. Approximately 5,000 additional employees logged off the online survey platform before completing the questionnaire. Table 1 compares participants' demographic and occupational characteristics to the total NICS workforce. There were no significant differences in gender or age, but the Deputy Principal grade was over-represented in the sample (14% versus 9%) and the Administrative Officer or Assistant grade was under-represented (25% versus 36%). We excluded non-permanent, non-full time, and manual workers, and analysed a final sample of 1,727 male and 2,068 female permanent, full-time, office-based workers.

[insert table 1 here]

Four hundred and eight men (24%) and 356 (17%) women reported having undertaken  $\geq 30$  minutes of physical activity on five or more days in the past week. Table 2 shows correlations between variables. In men, job control (-0.08) and peer support (-0.05) were weakly but significantly negatively correlated with LTPA. When we regressed LTPA onto control and peer support, significant models emerged ( $F(1, 1727)=12.20, p<.01$  and  $F(1, 1727)=5.08, p<.05$  respectively). In women, job role (-0.05) was weakly but significantly negatively correlated with LTPA. When we regressed LTPA onto role, a significant model emerged ( $F(1, 2068)=4.77, p<.05$ ).

However, the models were weak and these psychosocial work characteristics accounted for 1% or less of the variance in LTPA.

[insert table 2 here]

### **Discussion**

We found that 24% of men and 17% of women in our sample of civil servants in Northern Ireland reported having undertaken  $\geq 30$  minutes of physical activity on five or more days in the past week. In men, job control and peer support were weakly but significantly negatively correlated with LTPA. In women, job role was weakly but significantly negatively correlated with LTPA. These psychosocial work characteristics accounted for 1% or less of the variance in LTPA.

Given the large sample size and relatively small differences in the representation of the deputy principle and administrative officer or assistant grades, we considered our sample broadly representative of the NICS workforce. Although the response rate was low, the large sample size may have facilitated the detection of weak effects. Previous studies focused on demand, control, effort, and reward, but we explored a broader range of psychosocial working conditions that might be associated with LTPA, by using the MSIT. This study relates MSIT scores to health behaviours; previous studies involving the MSIT having focused on psychological health and job performance outcomes.

The study also has some limitations. The low response rate and the number of employees who failed to complete the online questionnaire, suggest that the survey



instrument may have been too time consuming. Previous NICS surveys of similar length had higher response rates, but survey fatigue may have developed in the workforce. We have therefore devised a shorter questionnaire for future surveys. Self-report data may be prone to recall bias and affect correlations between variables. The study's cross-sectional design limits inferences about causation and mechanisms of association between the psychosocial work environment and LTPA. Although most existing literature suggests that psychosocial working conditions predict health behaviours rather than the other way round [20], some prospective research has suggested a bidirectional relationship, physically inactive employees being more likely to move into high strain or passive jobs [21]. Future studies could use time-lagged data to test causality.

Approval for the questionnaire used in our study was granted before the 2011 UK guidelines on physical activity. The previous 2004 recommendation was for at least 30 minutes per day of at least moderate intensity physical activity on five or more days of the week [17]. Our use of this measure permitted comparison with previous studies, but some respondents might have achieved the recommended number of minutes of physical activity through alternative combinations of moderate and vigorous intensity activity or through longer but fewer periods of activity.

Our findings suggest that a minority of working adults is likely to achieve UK government recommendations on physical activity, i.e. at least 150 minutes per week of moderate intensity activity. However, a large study of Finnish adults found that around three-quarters of public sector workers achieved  $\geq 30$  minutes of

physical activity on five or more days in the past week [7]. Our finding of weak relationships between psychosocial work environment dimensions (job control and peer support in men; job role, in women) and slightly lower levels of LTPA is consistent with previous UK research [15]. Further research could explore how these findings might generalize in public and private sector workplaces and also the mechanisms linking aspects of the psychosocial work environment with LTPA. This could inform the design of interventions to promote LTPA, but longitudinal studies would need to establish causality between aspects of the psychosocial work environment and LTPA before conclusions can be drawn on whether job redesign can effectively promote physical activity.

**Key Points:**

- A minority of civil servants in our sample reported having undertaken  $\geq 30$  minutes of physical activity on five or more days in the past week.
- A set of psychosocial work characteristics was weakly but significantly negatively associated with leisure time physical activity.
- Longitudinal research to examine cause-effect relations between psychosocial work characteristics and leisure-time physical activity might inform the potential for psychosocial job redesign to increase employees' physical activity during leisure time.

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Table 1

*Comparison of Respondents' Demographic and Occupational Characteristics against Northern Ireland Civil Service Population*

	Survey Respondents (October 2012) N (%)	Total NICS Staff (April 2012) N (%)
<i>Gender</i>		
Male	2,305 (44)	13,698 (50)
Female	2,930 (56)	13,809 (50)
<i>Age</i>		
≤25	93 (2)	655 (2)
25–34	1,018 (20)	6,517 (24)
35–44	1,356 (26)	7,198 (26)
45–54	1,981 (38)	9,506 (34)
≥55	787 (14)	3,863 (14)
<i>Work Pattern</i>		
Full time	4,329 (83)	22,654 (82)
Part time, job share, term time	906 (17)	5,085 (18)
<i>Job Grade (in descending order)</i>		
Senior Civil Servant/Assistant Secretary (Grade 5 or above)	40 (1)	236 (1)
Senior Principal/Principal (Grades 6 and 7)	383 (7)	1,391 (5)
Deputy Principal	750 (14)	2,382 (9)
Staff Officer	992 (19)	3,288 (12)
Executive Officer Levels 1 and 2	1,627 (31)	7,828 (28)
Administrative Officer or Assistant	1,293 (25)	10,037 (36)
Industrial (manual worker)	49 (1)	1,057 (4)
Other	101 (2)	1,520 (5)

Table 2

Descriptive Statistics and Correlations Between Study Variables

	Mean	SD	$\alpha$	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.Age	44.32 (43.79)	9.73 (9.79)	-	1											
2.BMI	27.97 (27.88)	14.34 (17.56)	-	.02 (.01)	1										
3.Job Grade	--	--	-	-.27** (-.32**)	.00 (.06*)	1									
4.Salary Band	--	--	-	.36** (.39*)	-.01 (.03)	-	1								
5.Demands	2.41 (2.37)	.58 (.63)	.80 (.82)	.01 (.01)	.03 (.04)	-.03 (.01)	.03 (.00)	1							
6.Control	2.43 (2.46)	.67 (.68)	.82 (.82)	.02 (.03)	-.01 (.03)	-.01 (.02)	.01 (.01)	.32** (.37*)	1						
7.Managerial Support	2.53 (2.48)	.82 (.90)	.88 (.90)	.01 (.01)	-.01 (.01)	-.02 (.03)	0.3 (.02)	.33** (.35*)	.47** (.51*)	1					
8.Peer Support	2.33 (2.24)	.68 (.71)	.82 (.85)	.04 (.02)	-.03 (.01)	-.04 (.04*)	.02 (.04*)	.34** (.33*)	.45** (.42*)	.67** (.63*)	1				
9.Relationships	1.97 (2.02)	.72 (.77)	.80 (.82)	.03 (.00)	.03 (.01)	-.02 (.03)	.02 (.02)	.42** (.37*)	.35** (.35*)	.52** (.56*)	.53** (.57*)	1			
10.Role	2.11 (2.04)	.64 (.64)	.79 (.78)	.00 (.04)	.00 (.00)	-.02 (.01)	.01 (.02)	.24** (.25*)	.40** (.38*)	.49** (.47*)	.43** (.41*)	.38** (.33*)	1		
11.Change	3.09 (3.00)	.85 (.85)	.78 (.80)	.03 (.02)	-.04 (.00)	-.03 (.03)	.02 (.01)	.29** (.36*)	.44** (.47*)	.60** (.63*)	.52** (.49*)	.45** (.47*)	.51** (.45*)	1	
12.LTPA	2.84 (2.40)	2.09 (1.99)	-	-.03 (.00)	.00 (.03)	-.04 (.00)	-.02 (.00)	-.04 (.01)	-	-.04 (.00)	-.05* (-.02)	-.02 (.03)	-.03 (.05*)	-.02 (.01)	1

\*p<0.05, \*\*p<0.01, Females in parenthesis.