

## **Physical work demands, health behaviors and sickness absence in the BELSTRESS Cohorts**

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### **1. Introduction**

Even in modern service economies, a considerable proportion of workers is still exposed to heavy physical demands on the job. Increasing attention in literature is going to the harmful cardiovascular and overall health impact of occupational physical activities in contrast to the well known beneficial effects of leisure time physical activity. Physical work activities are also a well known risk factor for musculoskeletal disorders, which are major causes of sickness absence. There is however growing evidence showing that both physical and psychosocial risk factors at work may interact with one another in affecting worker health. With this study we overall aimed to obtain more insight into the health implications of physical activities at work, by investigating a large-scale sample of Belgian workers. The first specific study objective was to investigate the general health behavior profile of workers with high physical job demands. Secondly, we assessed the impact of physical job demands on sickness absence while taking into account musculoskeletal symptoms and psychosocial job resources (job control and social support).

### **2. Methods**

We used pooled data from the BELSTRESS I (1994-1998) and BELSTRESS III (2004) cohorts, in total including 23.673 workers from 32 companies from the productive, service and public sector. Within the participating companies, all eligible workers were personally invited to participate; the overall response rate was 45%. Baseline data collection was done through self-administered questionnaires, including the Job Content Questionnaire for assessing physical and psychosocial work factors. The physical job demands scale was composed of the sum of three items assessing physical exertion and two items assessing isometric loads. We defined high physical demands as a minimum score of 13 on the summary scale ranging from 5 to 20, which generally corresponds to an exposure to three up to five of the individual items. Job control was composed of the sum score of nine items relating to skill discretion and decision authority, while social support at the workplace included 8 items regarding supervisor and co-worker support level. Dichotomous variables (low vs high) were created for both job resources based on the median values. Musculoskeletal symptoms were assessed with single items from the Current Health Index: back pain and bone/muscle pain. Data were also collected on leisure

time physical activity, smoking and overweight/obesity. Objective sickness absence data were prospectively registered during 1-year follow-up. High sickness absence duration was defined as a total of at least 10 sick leave days during follow-up. Statistical analyses were conducted using SPSS 20.0 software and mainly included multiple logistic regressions.

### 3. Results

Participants were aged 30 to 60 years (mean 45), 28% was female. About one in three participants were blue-collar workers. The overall prevalence of high physical job demands in this cohort was 18%, but varied largely between socio-demographic groups. After adjusting for sex, age, education, occupation and sector of employment, workers with high physical job demands were significantly more likely to be smokers, overweight and obese, but were less likely to have a low physical activity level in leisure time. Physical job demands were a significant independent risk factor of musculoskeletal symptoms: workers with high physical demands had almost two times higher odds for back pain and for bone/muscle pain.

A high level of sickness absence duration was present in about 27% of the sample. In the fully adjusted statistical model, physical job demands (OR 1.24; 95% CI 1.12-1.33), musculoskeletal symptoms (back pain OR 1.24; 95% CI 1.16-1.34) (bone/muscle pain OR 1.52; 95% CI 1.42-1.63) and psychosocial job resources (low control OR 1.24; 95% CI 1.16-1.34) (low support OR 1.24; 95% CI 1.16-1.32) were all independent predictors of high sickness absence rates, with very similar effect estimates in both genders. However, when assessing the interplay among these different exposures we observed synergistic effects showing gradually increasing sickness absence rates when workers are simultaneously exposed to more risk factors. Workers who reported to have high physical job demands, combined with musculoskeletal symptoms and low job resources, had 2 to 3 times higher odds for having high sickness absence. We did not find evidence for buffering effects of psychosocial job resources on the relation between physical demands and sickness absence. Nonetheless, within the subgroup of workers having physically demanding jobs and reporting musculoskeletal symptoms, modest protective effects were observed from psychosocial job resources.

### 4. Discussion and Conclusion

A generally more adverse health behavior profile and higher levels of musculoskeletal symptoms were observed in workers having high physical job demands. Both independent and synergistic effects of physical job demands, musculoskeletal symptoms and psychosocial job resources were observed in relation to high sickness absence duration. These findings show a complex interplay among symptoms, physical and psychosocial risk factors at the workplace. The main implication is that prevention of high sickness absence in physically demanding jobs should also account for the psychosocial work environment. An integrated prevention approach is needed and particular attention should go to high risk groups of workers who are exposed to both physical and psychosocial risk factors, especially if they also report musculoskeletal problems. We need more longitudinal studies to verify whether adding psychosocial job resources could be beneficial to counter the impact of physical job demands and related musculoskeletal symptoms. The main strengths of this study are the large sample size, and the prospective follow-up of registered sickness absence data.