

Workstyle and overcommitment in relation to neck and upper limb symptoms

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Abstract

In former studies associations were found between a high-risk workstyle and neck and upper limb symptoms. A high-risk workstyle implied: taking shorter or fewer breaks or even skip breaks, working through pain, anticipating the possible negative reactions of colleagues, and making high demands on one's own performances at work. In the present study we examined in a population of European office workers whether a high-risk workstyle was a mediator in the relation of work-related exposure (job demands and VDU-work) and overcommitment with neck and upper limb symptoms. The Sobel Test was applied to test the intermediate effects of four different workstyle dimensions and of the total workstyle score. It showed that most mediated effects were statistically significant, meaning that the workstyle dimensions acted as a mediator in the relation between work-related exposure and symptoms as well as in the relation between overcommitment and symptoms. Given the results with the total workstyle score, 34% of the effect of prolonged VDU-work, 64% of the effect of Job demands and 84% of the effect of overcommitment was mediated by workstyle. However, due to possible bias in the assessment of the workstyle factor Working Through Pain, the results should be drawn with care.

Keywords: workstyle, VDU-work, overcommitment, job demands, mediation, neck and upper limb symptoms

1. Introduction

Initially, most research on neck and upper limb symptoms focused on work-related physical exposure. Nowadays psychosocial factors receive more attention and are considered as independent risk factors for musculoskeletal symptoms [1]. Next to psychosocial work characteristics and physical factors, it has been suggested that personality traits could contribute to the onset of neck and upper

limb symptoms: associations have been found between musculoskeletal symptoms and type A behavior [2], neurotic perfectionist traits [3] and overcommitment [4].

It is unknown how a personality trait could lead to symptoms. It probably will not cause these effects directly, but the relation might be mediated through unhealthy behavior. A concept that operationalizes this kind of behavior is "workstyle". The concept of workstyle is derived from the

workstyle model that was introduced by Feuerstein and colleagues. This model is based upon the hypothesis that how an individual performs his work in reaction to increased work demands may influence the occurrence or persistence of musculoskeletal symptoms [5,6].

Workstyle is mainly a behavioral aspect and should not be confused with personality. It is conceptualized as a learned and reinforced strategy for coping with job demands that may affect musculoskeletal health [1]. Therefore, workstyle may not only be determined by personality traits, but also by working conditions, perceived organizational factors or organizational culture. Although it is assumed that work-related risk factors, such as high job demands, have a direct relation with musculoskeletal symptoms, this relation might also be mediated through a high-risk workstyle.

In a study aimed at the prevention of work-related stress and neck and upper limb symptoms in a European company with long hours of computer work we explored the relationship of overcommitment and workstyle with neck and upper limb symptoms, and in particular the mediating role of workstyle. The aim of this study was to examine whether a high-risk workstyle was a mediator in the relation of work exposure (job demands and duration of VDU-work) and overcommitment with neck and upper limb symptoms.

2. Methods

2.1 Study population

Data were used from a survey in a European company, as part of a project aimed at the prevention of work stress and upper limb symptoms. The survey was conducted in three languages, English, French and German, and was administered at four offices, two in Germany, one in Austria and one in the Netherlands. The overall response rate (returned questionnaires) was 73%. For the present analyses, only data were used from respondents who returned the questionnaires with complete data. This concerned 65% (= 3,855) of all employees. Employees in this company performed relatively much VDU-work: 86% for more than 4 hours per day and 49% for more than 6 hours per day.

2.2. Workstyle

A measure of workstyle has been developed by Feuerstein and colleagues [7]. The original workstyle measure reflected a wide range of responses to high work demands, including physical symptoms and distress. Since we were particularly interested in behavior and attitude a selection of items was made with the criteria that the items had to reflect aspects of behavior or attitude towards work and were not overlapping with other concepts in the questionnaire. The four scales constructed with these items were: breaks (2 items, e.g. "I take time to pause or stretch during a typical day at work"), social reactivity (5 items, e.g. "I can't take off from work because other people at work will think less of me"), self-imposed workload (3 items, e.g. "I push myself and have higher expectations than my supervisor and others that I have to deal with at work") and working through pain (3 items, e.g. "I continue to work with pain and discomfort so that the quality of my work won't suffer"). Cronbach's alpha of these scales were 0.77 (breaks), 0.82 (working through pain), 0.89 (social reactivity) en 0.64 (self imposed workload). Apart from these scales, a total workstyle score was constructed, consisting of all 13 items of the separate scales. This scale had a Cronbach's alpha of 0.86.

2.3. Overcommitment

Overcommitment was assessed with the short version of a standard questionnaire [8]. Subjects were asked if they strongly disagreed, disagreed, agreed or strongly agreed on 6 items (e.g. I get easily overwhelmed by time pressures at work). Scores were dichotomized (agree versus disagree) and the added scores on these items resulted in an overcommitment score ranging from 0 to 6. As scores higher than 3 were scarce (< 10%), the categories 3, 4, 5 and 6 were combined. Cronbach's alpha of this scale was 0.72.

2.4. Job demands

Job demands were assessed using the NOVA WEBA. The NOVA WEBA is originally a Dutch questionnaire, containing scales based on the main concepts of Karasek's Demand-Control Model [9]. Subjects were asked 5 questions referring to their amount of work and time pressure, which they

could answer with yes or no. The added scores resulted in scale from 0 to 5, but scores of 4 and 5 were combined, since few respondents reached a score of 5 (< 10%). The Cronbach's alpha of this scale was 0.71.

2.5. Duration of VDU-work

Subjects were asked how long they usually worked with a computer. They could choose between the following categories: 0-1 hour, 1-2 hours, 2-4 hours, 4-6 hours, 6-8 hours or more than 8 hours per day. In this population, neither VDU-work for less than 4 hours, nor for more than 8 hours was reported often (< 10%). Therefore, this variable was categorized into 0-4 hours, 4-6 hours and > 6 hours.

2.6. Outcome measure

Subjects were asked to rate the occurrence of pain in neck, shoulders, elbows, wrists or hands in the previous 12 months on a four-point scale: "no, never", "yes, sometimes", "yes, regularly", "yes, prolonged". Subsequently, subjects were asked to estimate whether these symptoms were related to their work, which they could answer with "yes, completely", "yes, partly", "possibly" or "no". Subjects were defined as cases if they reported regular or prolonged pain in one or more of the regions mentioned, and if they did not answer 'no' at the question concerning the relation of the symptoms with their work. Finally, 8 possible specific causes of these symptoms were summed: sport injuries, accidents, skin diseases, a twist or sprain, a cut or burn, a congenital defect, rheumatic disorders and a slipped disc. Subjects reporting that their symptoms were related to one of these causes were not defined as cases.

2.7. Analysis

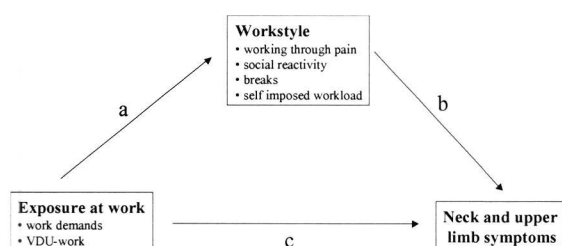


Figure 1:

Model of the association between exposure at work and neck and upper limb symptoms as mediated by workstyle

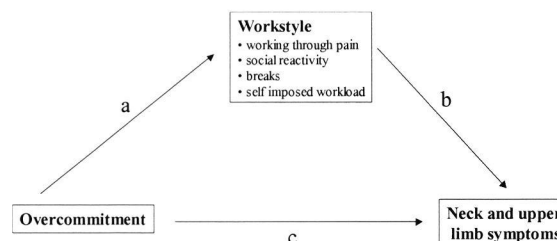


Figure 2:
Model of the association between overcommitment and neck and upper limb symptoms as mediated by workstyle

If workstyle functions as a mediator in the associations between work exposure and neck and upper limb symptoms, the following conditions should be met: (1) work exposure should be associated with workstyle (path a; figure 1), (2) workstyle should be associated with neck and upper limb symptoms (path b; figure 1), (3) work exposure should be associated with neck and upper limb symptoms (path c; figure 1), (4) the association between work exposure and neck and upper limb symptoms should decrease, if the analysis is adjusted for workstyle [10]. Similar conditions should be met for the mediator function of workstyle in the relation between overcommitment and neck and upper limb symptoms (figure 2). As it was not clear on beforehand if overcommitment and workstyle are similar concepts, correlations were checked first to control for collinearity.

Tests have been developed to estimate if the change in effect of the independent variable is statistically significant. The most well-known test is the so-called Sobel Test [11]. We applied software, available on the internet, to carry out this test [12].

First, we had to perform linear and logistic regression analyses to examine if the conditions for mediation were met and to obtain the following statistics, needed for the test: the unstandardized regression coefficient for the association between the independent variable and the mediator (α), the standard error of α , the unstandardized regression coefficient for the association between the mediator and the dependent variable, adjusted for the

independent variable (β), the standard error of β . Finally, to obtain a measure of the extent of mediation, the percentage of the total effect that is mediated by the workstyle scales was computed with the formula $\alpha\beta/[\alpha\beta + \tau']$, in which τ' is the coefficient for the association between the independent variable and the outcome, adjusted for the mediator [13].

3. Results

The results of the analyses are presented in Table 1. The first column (α) shows the association between work demands, prolonged VDU-work and overcommitment with the workstyle dimensions, the second column (β) shows the association between workstyle dimension and neck and upper

limb symptoms. Almost all associations were statistically significant, which was the first and second condition for mediation. The exception was the association between Self Imposed Workload and duration of VDU-work. The beta coefficients between brackets show the association between work exposure and overcommitment with neck and upper limb symptoms. They were all statistically significant, which was the third condition for mediation. The difference between the adjusted and unadjusted beta coefficients shows if the fourth condition of mediation was met: a decrease in the effect after the addition of workstyle factors in the model. Correlation coefficients of overcommitment with workstyle scales ranged from -0.24 to 0.37 . This means that these variables can be analyzed in one model, as no collinearity is expected.

Table 1: Beta coefficients of the associations between the independent variables and workstyle (α), between workstyle and neck and upper limb symptoms (β), the indirect effect ($\alpha\beta$) the direct effect (τ'), and the extent of mediation ($\alpha\beta/[\alpha\beta + \tau']$). Between brackets the association between job demands, duration of VDU-work and overcommitment with neck and upper limb symptoms, without adjustment for the workstyle dimensions.

	α	β	$\alpha\beta$	τ'	$\alpha\beta/[\alpha\beta + \tau']$
<i>Job Demands</i>				(0.201)	
Breaks	-0.256	-0.108	0.028	0.175	0.14
Working Through Pain	0.619	0.222	0.137	0.083	0.62
Social Reactivity	0.802	0.074	0.059	0.145	0.29
Self Imposed Workload	0.483	0.065	0.031	0.170	0.16
Total Workstyle Score	2.160	0.063	0.136	0.075	0.64
<i>Duration of VDU-work</i>				(0.211)	
Breaks	-0.199	-0.128	0.025	0.188	0.12
Working Through Pain	0.376	0.228	0.086	0.147	0.37
Social Reactivity	0.496	0.081	0.04	0.175	0.19
Self Imposed Workload	0.095	0.091	0.009	0.205	0.04
Total Workstyle Score	1.165	0.066	0.077	0.147	0.34
<i>Overcommitment</i>				(0.265)	
Breaks	-0.394	-0.099	0.039	0.228	0.15
Working Through Pain	0.946	0.221	0.209	0.080	0.72
Social Reactivity	1.538	0.069	0.106	0.162	0.40
Self Imposed Workload	0.761	0.054	0.041	0.225	0.15
Total Workstyle Score	3.638	0.064	0.233	0.043	0.84

The third column shows the mediated or indirect effect ($\alpha\beta$), which is the product of the coefficient relating the independent variable to the mediator (α) and the coefficient relating the mediator to the outcome, adjusted for the independent variable (β). It also shows the nonmediated or direct effect (τ'), expressed as the coefficient relating the independent variable to the outcome, adjusted for the mediator. Furthermore, a measure of the extent of mediation is given, expressed as the percentage of the total effect that is mediated.

The Sobel Test indicated that all mediated effects ($\alpha\beta$ -coefficients) were statistically significantly different from zero, with the exception of the indirect effect of Self Imposed Workload in the association between the duration of VDU-work and neck and upper limb symptoms. All τ' -coefficients were statistically significant, with the exception of the association between overcommitment and neck and upper limb symptoms, adjusted for the Total Workstyle Score. Given the results with the Total Workstyle Score, it seems that 34% of the effect of VDU-work, 64% of the effect of Job Demands, and even 84% of the effect of overcommitment was mediated by workstyle.

4. Discussion

Results of this study show that a high-risk workstyle was associated with high Job Demands, prolonged VDU-work, overcommitment and neck and upper limb symptoms. The association of Job Demands, duration of VDU-work and overcommitment with neck and upper limb symptoms decreased after adjustment for workstyle scales, in particular for the scales Working Through Pain and Social Reactivity. Given the results with the Total Workstyle Score, 34% of the effect of prolonged VDU-work, 64% of the effect of Job demands and 84% of the effect of overcommitment was mediated by workstyle.

Conclusions have to be drawn with care as these data are from a cross-sectional study. The use of the method applied in this study presumes that the mediator is not caused by the dependent variable [10]. With respect to the association between workstyle and symptoms, it is possible that symptoms are (partly) caused by a high-risk workstyle, but it is also possible that symptoms have affected the workstyle. The association

between overcommitment and symptoms suffers from the same limitations: symptoms might be caused by overcommitment, but it is also possible that symptoms influenced the answers to the questions on overcommitment. Furthermore, workstyle, overcommitment and symptoms might all be influenced by another factor. It is also possible that workstyle and overcommitment measure more or less the same concept. The reduction of the effect of overcommitment after adjustment for workstyle factors could be caused by this similarity of concepts. However, if workstyle and overcommitment were measurements of the same concept, they would be highly correlated. The results showed that correlation coefficients of overcommitment with workstyle scales only ranged from -0.24 to 0.37. Finally, there is a possibility that workstyle did not mediate between job demands and symptoms but affected both perception of job demands and symptoms. Longitudinal research is needed to establish the direction of possible causality.

The analyses showed that the workstyle factor Working Through Pain was identified as a substantial mediator of the relation between job demands and overcommitment and neck and upper limb symptoms. However, there is a serious drawback involved in this conclusion, as the presence of pain will probably influence the response on questions about pain behavior. This could bias the results leading to an overestimation of the effect of the mediator. Therefore, conclusions concerning the workstyle factor Working Through Pain should be drawn with care. In symptomatic subjects with persistence of pain as an outcome measure, this problem would not occur.

Although the results of this study should be regarded with care, they offer new points of interest in the prevention of work-related musculoskeletal symptoms. Main message is that, besides physical and psychosocial exposure, behavioral aspects might deserve attention as well.

5. Conclusion

Most workstyle factors functioned as mediators in the relation between job demands and overcommitment and neck and upper limb symptoms. Due to possible bias, the results concerning the workstyle factor Working Through Pain should be drawn with care.

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