Upper-extremity musculoskeletal disorders (UEMSD): What is the role of psychological distress? How do psychosocial work factors influence the relation between UEMSD and prolonged computer work?

Nektaria Nicolakakis\textsuperscript{a,b,c}, Susan Stock\textsuperscript{a,b,c}

\textsuperscript{a}Department of Social and Preventive Medicine, University of Montreal, Montreal, Quebec, CANADA; \textsuperscript{b}University of Montreal Hospital Research Centre, Montreal, Quebec, CANADA; \textsuperscript{c}Scientific Group on Work-related Musculoskeletal Disorders, Quebec Institute of Public Health, Montreal, Quebec, CANADA

1. Introduction
It is increasingly recognized that non-traumatic upper extremity musculoskeletal disorders result from interplay between biomechanical work exposures, psychosocial and organizational work factors and personal factors (Andersen et al., 2011; Hauke et al., 2011; IJmker et al., 2007; Bongers et al., 2006; NRC & IOM, 2001). But the relations between these factors and musculoskeletal disorders are complex and the underlying mechanisms remain largely uncharacterized. We tested the hypothesis that: (i) psychological distress mediates the relation between certain psychosocial work factors and non-traumatic upper extremity musculoskeletal problems (UEMSP), thus providing a mechanism linking these psychosocial work exposures to UEMSP, and (ii) certain psychosocial factors moderate the association between the duration of computer use at work and UEMSP, either strengthening or attenuating the effect of computer exposure on UEMSP.

2. Methods
Data was from the 2007-2008 Quebec Survey on Working and Employment Conditions and Occupational Health and Safety on 1,289 men and 1,189 women. Analyses were stratified by gender. We carried out four analytic steps in order to establish that psychological distress mediated the effect of a work exposure on UEMSP (Kenny, 2014): (i) we identified the work exposures that were associated with UEMSP in multivariate logistic regression models, (ii) for these work exposures, we established those that were also associated with psychological distress in linear regression models, and retained their linear regression coefficients (path a), (iii) we estimated the association between psychological distress and UEMSP (path b) by entering psychological distress in the multivariate models of UEMSP, and retaining its logistic regression coefficient, (iv) we determined whether associations between work exposures and UEMSP disappeared or were reduced in magnitude following adjustment for psychological distress, respectively indicating complete and partial mediation. The mediated effect was calculated as the product of paths a and b. We considered mediated effects > 15% as clinically important. Moderating effects of psychosocial factors were estimated by analysing their two-way interaction with the duration of computer work in logistic regression models, and retaining interactions that had a significant effect on UEMSP at \( p \leq 0.1 \).

3. Results
Psychological distress partly mediated the effects of emotionally demanding work in both genders, and additionally in women, of workplace sexual harassment and tense situations when dealing with clients. Depending on the work exposure, the mediated effect was associated with a 16% to 31% increase in the odds of UEMSP. In women, duration of computer use at work was significantly associated with UEMSP. This association was stronger in women with low supervisor support, contradictory work demands, low recognition at work, and emotionally demanding work. In men, an association between the duration of computer work and UEMSP emerged only in the presence of low recognition at work.

4. Discussion
Results support the hypothesis that a plausible mechanism by which certain work exposures are associated with UEMSP is through an effect mediated by psychological distress. Results also support that several
psychosocial work factors acts as moderators of the association between computer work and UEMSP, amplifying the effect of computer use on UEMSP. Some of the mediating and moderating associations were present in either men or women, highlighting the importance of considering gender in studies of UEMSP. If these findings are corroborated in longitudinal studies, they would have implications for UEMSP prevention, suggesting that interventions should focus, not only on the physical work environment and biomechanical exposures, but also on mitigating psychological distress, and consider the interplay between computer use and the psychosocial and organizational work environment.

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References