

## MUSCULOSKELETAL DISORDERS AND PSYCHOSOCIAL FACTORS AMONG NEWSPAPER AND COMMERCIAL PRINT WORKERS

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#### Abstract

Results of a survey of physical and psychosocial factors associated with musculoskeletal disorders are compared between 3 work types in 6 newspaper and printing operations in B.C. (n=190) and office workers are compared to data from a major Ontario newspaper. In B.C., pain recurring  $\geq 3$  times/year or lasting  $\geq 5$  days was reported for 56%. Among office workers, upper limb symptoms were similar between B.C. (57%) and Ontario (54.6%). In B.C. higher levels of symptoms among office workers than other work types appears associated with static and repetitive work combined with high pressures from deadlines and psychological demands. Bindery workers had the lowest prevalence of pain (34%) despite highest physical demands. They had less skill discretion, decision authority, and empowerment, but the greatest job security and least psychological demands and deadlines/pressures. Compared with Ontario, B.C. office workers had less skill discretion, decision authority and social support, perhaps reflecting a more fractious labour climate.

**Key words:** work-related musculoskeletal disorders, psychosocial factors, newspaper/printing

## INTRODUCTION

In 1998 a 2-year study was funded by the Workers' Compensation Board of British Columbia (B.C.) to determine ergonomic and psychosocial risk factors for musculoskeletal disorders (MSD) in the newspaper and commercial printing industry, to develop ergonomics programs, and to evaluate these post-implementation. The Communications, Energy and Paperworkers Union (CEP local 2000) represents 1000 workers in B.C. in 35 operations in three work types: offices who predominately use computers (reporters, editors, compositors); bindery who assemble, cut and package; and press workers who feed paper, inks and run presses.

The objective of this paper is to present results of a questionnaire survey of physical and psychosocial risk factors associated with MSD symptoms and compare these results with those from a similar survey conducted at a major metropolitan Ontario newspaper.

## LITERATURE REVIEW

Several studies have been conducted on MSDs in the newspaper sector (1,2,3,4). A 1996 survey of over 1000 office employees in Ontario found that 20% reported moderate or worse upper limb pain recurring at least monthly or lasting greater than one week over the previous year (1). Most commonly affected was the neck, followed by shoulder, wrist/hand and elbow, consistently across case definitions constructed with different frequency, duration and severity of pain/discomfort (2). Bernard and colleagues (3) have argued that while computers in the newspaper industry have increased ease of information retrieval and processing, they have also likely increased WMSDs among workers. Only one study compared work types finding a higher prevalence of symptoms in production workers vs. office workers (4).

Variables independently associated with WMSD of the upper limb in the Ontario study included female gender, working with frequent deadlines, high psychological demands, low skill discretion, low social support, more time spent keyboarding and having the computer screen in a non-optimal position (1). Conceptually, researchers are arguing for examination of both biomechanical and psychosocial factors associated with MSD in the workplace (5).

## METHODS

Six newspaper and printing operations agreed to participate in B.C., including: three small local newspapers (offices only); selected departments of a metropolitan newspaper (offices only); and a large area newspaper and commercial printing operation (both with office, bindery and press workers).

The B.C. questionnaire built on the one used in Ontario (1). Questions were asked about: time spent each day on the telephone, in a vehicle, standing, and lifting; sitting continuously, missing work breaks and deadlines/quotas. Job satisfaction and psychosocial variables were based on Karasek (6), Siegrist and Peters (7) and questions about empowerment and work culture from Ontario (1). Questions on symptoms during the past year and week were from a variety of sources (2, 8,9). Questionnaires were pilot tested by labour and employer representatives and administered by CEP representatives during work.

Job Content Questionnaire scales were computed and effort-reward imbalance calculated (7,8). Pain cases were defined using Hunting (2), as those experiencing pain  $\geq 3$  times in the previous year or having pain lasting  $\geq 5$  days. BC and Ontario prevalences were compared. Prevalence of exposures and pain outcomes were compared across BC work types, testing

differences with either chi square or one-way ANOVA. Completeness of data and results of the bi-variate analysis guided choice of variables for inclusion in logistical regression models to determine the predictors of caseness. A backward stepwise technique was used to eliminate redundant variables, retaining those at  $p < 0.1$ .

## RESULTS AND DISCUSSION

Of 311 B.C. employees, 190 completed the questionnaire (61% response versus 84%, Ontario). Results of demographic data showed significant gender differences between work types -7.7% of B.C. press workers being women compared to 52.6% in bindery and 66.7% in the office ( $p < 0.001$ ) (Ontario, 44.4% women). There were also significant differences in experience with 61% of press workers having more than 10 years compared with 39.5% of bindery and 33.3% of B.C. office workers ( $p = 0.0002$ ), (Ontario, 34.6%). Age was not statistically different between B.C. work types or regions (B.C., 42.5 years; Ontario, 43.5).

Table 1 presents descriptive results of exposures by work type and region. Note that 'n's' vary only slightly across variables, except JCQ and ERI scales (refused at one company 'n'=98). Bindery workers reported significantly more hours standing and lifting/handling and the most physical exertion. They also needed permission to leave the workplace more often than other work types. Bindery workers had lower skill discretion, decision authority, empowerment but the greatest job security and least psychological demands. They have fewer deadlines and pressures and rarely missed taking breaks. On open-ended questions, bindery workers had concerns over fatigue due to long hours and multiple shifts. Press workers had significantly more skill discretion and empowerment than bindery workers. Their main concern was equipment breakdowns and changes causing psychological stress.

Office workers in B.C. spent significantly more hours on the telephone, sitting at a desk, in a vehicle, keyboarding, and using a mouse than bindery or press. They reported more deadlines and psychological demands and the least job security but significantly less physical exertion and more decision authority, empowerment and flexibility in leaving their workstation. Comparing B.C. and Ontario office workers, B.C. workers spent less time in a vehicle and slightly more time keyboarding. They had substantially lower skill discretion, decision authority and social support, perhaps reflecting a more fractious labour climate in B.C. newspapers. In open-ended questions, B.C. office workers shared frustrations about staying creative under time pressures, stress due to hardware and software problems, the need for better communication between departments and more management support.

Fifty-six percent of B.C. respondents were Hunting cases, most commonly hand/wrist (38%), neck (32%), shoulder (30%) and low back (27%) (Table 2). Of these, 78% sought medical treatment, and 51% reported the pain at the workplace. Significant differences in pain occurred across B.C. work types for most body areas. Bindery workers had the lowest prevalences, despite higher physical demands. Perhaps the lower psychological demands and fewer pressures and deadlines were protective. However, they were significantly more likely to report their symptoms at work, perhaps reflecting difficulties in returning to work.

Prevalence of neck and upper limb case-ness was similar among Ontario (54.6%) and B.C. (57.1% overall) office workers. The generally higher levels of pain in the office appear to be associated with a combination of static and repetitious work activities (keying and mouse work) combined with high pressures from deadlines, psychological demands and computer/telephone technology problems (based on above exposure and open-ended comments). When compared with bindery and press workers, office workers felt they were

not encouraged to report symptoms. Interestingly, both prevalence of reporting symptoms to the workplace and seeking health care were higher among all work types in B.C. compared to Ontario office workers, perhaps reflecting differences in either the timing of the survey (1999 versus 1996) with the secular change in recognition of MSD, more openness to seeking care among BC workers or a different labour-management climate in Ontario .

**Table 1. Exposures by work types in British Columbia (\*p<0.05 for differences) and for Ontario office work**

Exposure Variables	British Columbia			Ontario
	Press	Bindery	Office	Office
<b>Continuous - Mean (standard deviation)</b>				
Hours on telephone per day	0.1 (0.26)	0.0 (0.1)	3.0 (2.6)*	2.6 (2.0)
Hours sitting at a desk per day	1.3 (2.5)	0.05 (.3)	5.7 (2.3)*	5.3 (1.8)
Hours in a vehicle per day	0.1 (0.37)	0.25 (1.1)	0.6 (1.1)*	2.3 (1.4)
Hours standing in one spot per day	3.3 (3.2)	6.8 (2.9)	0.5 (0.99)*	n/a
Hours keyboarding per day	0.5 (1.1)	0.2 (1.2)	4.2 (2.9)*	3.4 (2.1)
Hours using a mouse per day	1.1 (2.2)	0.0 (0.15)	1.98 (2.7)*	2.2 (2.0)
Hours lifting/handling items per day	3.65 (3.6)	7.4 (2.4)	0.7 (1.6)*	n/a
Times away from a workstation per day	9.0 (17.7)	3.9 (3.3)	13.7 (11.7)*	10.6 (9.4)
Skill discretion	4.3 (1.6)	6.9 (2.5)	5.0 (1.99)*	10.35 (2.16)
Decision authority	3.3 (1.6)	4.7 (1.97)	3.1 (1.8)*	6.79 (1.88)
Psychological demands	5.1 (1.3)	3.8 (1.6)	5.8 (1.4)*	7.27 (1.58)
Job insecurity	1.3 (0.7)	1.0 (0.7)	1.9 (1.15)*	2.82 (1.02)
Physical exertion	2.1 (1.2)	3.3 (0.65)	1.6 (1.16)*	2.35 (0.95)
Social support	5.2 (1.7)	5.7 (2.2)	5.1 (2.1)	10.77 (2.11)
Empowerment	5.2 (3.1)	2.1 (2.5)	5.5 (2.9)*	n/a
Management support	6.3 (2.3)	5.9 (2.6)	6.2 (2.5)	n/a
	<b>British Columbia</b>			<b>Ontario</b>
<b>Categorical – Percent</b>	<b>Press</b>	<b>Bindery</b>	<b>Office</b>	<b>Office</b>
Sitting more than 2 hours	7.5	0	29.5*	24.4
Frequency of skipped breaks (≥1/week)	79.6	13.6	60.6*	62.3
Work with deadlines/quotas/pressures	90.2	68.2	97.1*	92.2
Job satisfaction: not too/not at all	17.1	15.9	15.8	11.2
Need permission to leave workplace: sometimes/always	59.0	81.8	37.7*	25.2
Workers take part in decision making: rarely/never	34.6	58.4	31.2	32.1
Ideas listened to by management: disagree/strongly	38.4	50.0	37.7	20.2
Health/safety equal to productivity: rarely/ never	38.4	50.0	40.0	19.6
Encouraged to report symptoms: disagree/strongly	24.8	21.4	32.3*	12.4
Management change job to help RTW: disagree/strongly	9.8	11.9	6.8*	7.7
Effort/Reward (binary): imbalanced	0	18.2	11.3	n/a

Regression modeling revealed independent associations with case-ness for work type (press & office > bindery), more years on current job, more time sitting continuously, and working with quotas. The model was able to correctly classify 69% of the variance, which is an improvement over the baseline of 56%.

## CONCLUSION

Newspaper and print workers have unique pressures, deadlines and psychological demands. Among B.C. newspaper workers, time related variables and psychosocial work demands appeared to be more important than heavy physical demands, as best exemplified by the contrasts between bindery and other workers. The bindery is not characteristically under the same magnitude of production pressure from deadlines and equipment breakdowns as the press or office. Yet measures of physical demand variables by questionnaire are traditionally less accurate than direct measures, not possible in this study. Further, time variables often reflect duration or intensity of both physical and psychosocial exposures. CEP believes that some reasons for pain among office workers include increased computer technology, reorganization and fewer workers, and the popularity of morning newspapers increasing pressures and deadlines due to a reduced window for work to be done. Relevant work design responses include minimizing monotonous tasks, high job demands, work pressure and fear of job loss while increasing reliability of technology, use of employee skills, job control and improving supervisory relationships (10)

**Table 2. Prevalence of pain caseness (>3 times/year or >than 5 days) and associated variables by BC work types ( $p \leq 0.05$  for differences) and region for office workers**

Outcome Variables	British Columbia			Ontario
	Press	Bindery	Office	Office
Pain any body part	65.9	34.1	61.0*	n/a
Pain upper limbs	51.2	31.8	57.1*	54.6
Pain upper/lower back	36.6	13.6	31.4*	n/a
Neck	29.3	6.8	43.8*	37.7
Shoulder	29.3	15.9	36.2*	32.5
Elbow	12.2	11.4	23.8	22.3
Hand/wrist	36.6	27.3	42.9	37.8
Upper back	7.3	4.5	21.9*	n/a
Lower back	34.1	22.7	26.7	n/a
Thigh/leg	26.8	9.1	9.5*	n/a
Ankle/foot	12.2	13.6	10.5	n/a
Seeking health care	74.1	93.8	75.4	45.9
Reporting in workplace	51.9	87.5	48.5*	34.9

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