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## Job strain and psychological distress in white-collar workers

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**Objectives** In line with Karasek's job strain model, the objective of the study was to determine whether workers submitted to high job strain, a combination of high psychological demand and low decision latitude, develop more psychological distress than workers not submitted to high job strain. A second objective was to determine whether social support at work modifies the association between job strain and psychological distress.

**Methods** The design was cross-sectional and included white-collar workers in the Québec city area. A self-administered 26-item questionnaire (the Job Content Questionnaire) measured psychological demand, decision latitude, and social support at work. Psychological distress was measured by the Psychiatric Symptom Index, a 14-item self-administered instrument.

**Results** Among the 2889 participants, the prevalence of psychological distress was 27.8%. High job strain was present in 20.5% of the subjects. The crude odds ratio (OR) of high job strain with psychological distress was 3.52 [95% confidence interval (95% CI) 2.54—4.88]. The OR adjusted for age, gender, employment status, occupation, social support at work, nonwork social support, cynicism, hostility, domestic load, and stressful life events during the last 12 months was still significant (OR 2.45, 95% CI 1.66—3.62).

**Conclusions** Our results support the association between job strain and psychological distress. Social support at work, although significantly associated with psychological distress, did not modify the association between job strain and psychological distress.

**Key terms** mental health, occupation, occupational epidemiology, psychological stress.

In the United States, worker's compensation claims for stress-related problems tripled between 1980 and 1989 (1). No such data are available for the province of Québec in Canada, since stress-related claims are not recognized or compensated in this province. Some data exist however concerning the prevalence of psychological distress among Québec workers. A provincial survey, the Québec Health Survey (QHS), reported that in 1987 nearly 18% of working people declared a high level of psychological distress (2). Unpublished data from the 1992—1993 QHS reveal an important increase in the prevalence of reported psychological distress symptoms: from 20% to 26.3% in the general population and from 18% to 25.5% in the working population. In 1980, an epidemiologic study among Québec City white-collar workers revealed that 18.9% of workers declared having a mental health problem: psychiatric disease, somatization, minor de-

pressive troubles, insomnia, fatigue, nervousness. Their level of well-being was lower than that of the comparable Canadian population, and they also took more tranquilizers and sleeping pills (3).

In concordance with Karasek's job strain model (1), our hypothesis is that psychological distress is associated with high job strain from a combination of high psychological demand and low decision latitude at work. Furthermore, social support, which refers to helpful social interaction available on the job from co-workers and supervisors, should reduce the effect of job strain on mental health (1).

The effects of job strain on cardiovascular disease have been consistently demonstrated (4). There is, however, conflicting evidence on the association between job strain and mental health<sup>3</sup> (1, 5—10). Using national samples of the male work force, Karasek found that job

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<sup>3</sup> Authors have used different measures of mental health problems such as minor depressive troubles, depression, psychological distress. Throughout the text, we kept the terms used by the authors even if they measured mostly the same health effect which is very close to our psychological distress variable.

strain was associated with a fourfold increase in the prevalence of depressive symptoms in the United States in 1972 and Sweden in 1968. He also found similar associations in a longitudinal study of the Swedish population from 1968 to 1974 and in data from the national quality of employment surveys in the United States in 1972 and 1977 (1). Similar associations were found in a large representative sample of male and female workers in Finland (5) and the Federal Republic of Germany (6). In a survey among hospital employees, Landsbergis reported a significant correlation between job strain, depression, and burnout (7). Other studies have shown a modifying effect of locus of control (8) and career stages (9) on the association between job strain and mental health problems. In a longitudinal study among office workers, Carayon found no association between job strain and depressive symptoms (10).

As for social support, Johnson found that iso-strain (high demand, low latitude, and low social support) is associated with an elevated prevalence of cardiovascular morbidity and an elevated relative risk of mortality from cardiovascular diseases (11). In a combined male and female population, Karasek found lower levels of depression among workers submitted to job strain but who had good social support at work compared with similarly exposed workers who had less social support (1).

In conclusion, there are inconsistent results and, up to now, the empirical evidence does not provide strong support for the effect of job strain on psychological distress. This trend may be due to the diversity of measures used to evaluate job strain or mental health, the rarity of longitudinal study design, and the lack of adjustment for potentially confounding mental health risk factors (10). Our study used a validated measure of job strain and social support at work, a validated indicator of psychological distress, and controlled for many potential confounding factors.

The study's objective was to determine whether white-collar workers submitted to high job strain (defined as a combination of high psychological demand and low decision latitude) had a higher prevalence of psychological distress than white-collar workers not submitted to high job strain. A second objective was to determine if social support at work modifies the association between job strain and the prevalence of psychological distress in that population.

## **Subjects and methods**

The study population consisted of 4467 white-collar workers employed in eight public organizations in the Québec city area. The subjects were recruited on a voluntary basis to participate in a prevention program of

cardiovascular risk factors. All the participants were met during workhours, between May 1992 and May 1993. They filled out a questionnaire on cardiovascular risk factors, psychological distress and associated risk factors, sociodemographic variables, and job characteristics.

### *Psychological distress*

A 14-item self-administered questionnaire, the Psychiatric Symptom Index (PSI), was used to measure the presence and intensity of anxiety, aggressivity, depressive symptoms, and cognitive trouble during the last week (12). It is a French version of an extensively used and validated American instrument (13). The French PSI has been validated in its 14-item version and used in a national population-based survey, the QHS (12). The PSI is not a diagnostic tool but showed good concomitant validity in regard to four other measures of mental health status during the 12 months preceding the PSI measure: health professional consultation for a mental health problem, hospitalization for this type of problem, presence of suicidal thoughts or suicide attempt, and use of certain psychoactive drugs (12).

A total score of psychological distress was calculated from the answers to the 14 items of the PSI. The PSI score was then dichotomized at the highest quintile of the distribution of psychological distress in the population of the QHS (2). Respondents over the fifth quintile were considered to have a high level of psychological distress symptomatology.

### *Job strain*

A self-administered 18-item questionnaire, the Job Content Questionnaire (JCQ), recommended by Karasek was used to measure psychological demand and decision latitude (14). Psychological demand evaluates the quantity of work, the intellectual requirements, and the time constraints of the job. Decision latitude evaluates the possibility to make decisions, to be creative on the job, and to use and develop one's abilities. The validity of the JCQ has been documented in national American studies on the general population (1, 14). The French version was validated with a population of 8263 white-collar workers from 20 organizations in Québec city (unpublished observations). Its internal consistency based on Cronbach's coefficient alpha was 0.83 for decision latitude at work and 0.73 for psychological demand at work. A factor analysis supported the construct validity of the measure and the discriminant power was also supported by significant differences in the mean scores and prevalences by age, gender, and occupation.

The exposure to psychological demand and decision latitude was determined by a threshold fixed at the median of the distribution of the total score of each of these

constraints among a reference population composed of a random sample of all workers in the province of Québec (15). This procedure allowed workers to be classified into four exposure groups in regard to job strain. Workers exposed to a combination of high psychological demand and low decision latitude were the more exposed group (PD+DL-), workers exposed to high psychological demand but having high decision latitude were a group moderately exposed (PD+DL+); workers exposed to low decision latitude but not exposed to high psychological demand were also moderately exposed group (PD-DL-); and, finally, workers exposed to none of these constraints were the unexposed group (PD-DL+).

### *Social support at work*

Social support at work was measured by eight items from the JCQ (14). These items measure supervisor and colleague support and are computed in a unique score. The Cronbach internal consistency coefficient for the scale is 0.89 for men and 0.84 for women (1). The Cronbach internal consistency coefficient for the total score of the French version is 0.80 (unpublished observations). The median of the distribution of the total score for social support in our study population was used to create a variable with two values: high and low social support at work.

### *Sociodemographic variables and psychological distress risk factors*

The participants gave information on age, gender, education, income, employment status (temporary or permanent), and occupation. Cynicism and hostile affect were measured by subsets of the Cook-Medley Hostility Scale (16). A domestic load index was constructed from an adapted version of an instrument developed by the National Institute of Child Health and Human Development (17). It measures the number of children, their age, and the sharing of family responsibilities and domestic chores. Recent stressful life events which happened during the past 12 months were measured by a seven-item scale adapted from the Social Readjustment Rating Scale (18). Nonwork social support was measured by 16 items from the Québec Cardiovascular Health and Nutrition Survey (15), which measures the nature of a social network and the satisfaction that it generates.

### *Data analysis*

Odds ratios were calculated with their 95% confidence intervals for the association between job strain and psychological distress. The modifying effect of social support was evaluated by stratification (19). Logistic regression was used to adjust for potential confounding factors (20).

## **Results**

There was an overall response rate of 65%; 1491 men and 1398 women participated in the study. However, among the 3246 subjects who agreed to participate in the cardiovascular prevention program (73% of the eligible subjects), 89% agreed to answer the supplementary questions on mental health. The participants were representative of the eligible population for age and gender.

A high PSI value was determined for 27.8% of the workers. The workers were distributed into the four job-strain exposure groups as follows: unexposed workers (PD-LD+) represented 14.2% of the study participants, the most exposed workers (PD+DL-) represented 20.5%, and the workers moderately exposed represented 23.1% (PD+DL+) and 42.2% (PD-DL-).

A combination of high psychological demand and low decision latitude was associated with psychological distress with an odds ratio (OR) of 3.52. When the workers were exposed to high psychological demand only and when they were exposed to low decision latitude only, the OR for psychological distress was 2.04 and 1.96, respectively (table 1). Other factors were associated with psychological distress: having low social support at work (OR 1.97), being a woman (OR 1.70), being less educated (OR 1.49), having a family income lower than CAD 40 000 (OR 1.62), being a clerical worker (OR 1.85), having a high score for the hostility (OR = 3.26) and cynicism index (OR 2.01), having low nonwork social support (OR 2.51), and having experienced stressful life events in the last 12 months (OR 1.84). Employment status showed a borderline association (OR 1.24), temporary employees having a higher prevalence of psychological distress. Finally, age and domestic load were not associated with psychological distress in this study.

A logistic regression analysis was performed to adjust simultaneously for several potential confounders. Table 2 shows crude and adjusted odds ratios for each level of exposure to job strain. The association remained significant for each level of exposure even after adjustment for age, gender, employment status, occupation, nonwork social support, cynicism and hostility, domestic load, and the incidence of stressful life events in the last 12 months. Stratified analyses permitted the confounding effect of education and income to be examined separately. Since these variables are highly correlated with occupation and since the inclusion of this last variable in the regression model leads to a greater change in the odds ratio than the inclusion of either one of the others, education and income were not retained for the final analysis.

We evaluated the modifying effect of social support at work on the association between job strain and psychological distress. As shown in table 3, social support

**Table 1.** Crude odds ratios (OR) and 95% confidence intervals (95% CI) for psychological distress among white-collar workers, Québec region in 1992—1993. (PD = psychosocial demand, DL = decision latitude, + = high level, - = low level)

Variable	Psychological symptom index		Crude OR	95% CI
	Low score (N)	High score (N)		
<b>Job strain</b>				
PD- DL+	315	58	1.00	.
PD+ DL-	341	221	3.52	2.54—4.88
PD+ DL+	457	172	2.04	1.47—2.84
PD- DL-	825	297	1.96	1.43—2.67
<b>Social support at work</b>				
High	1339	390	1.00	.
Low	618	354	1.97	1.66—2.34
<b>Age</b>				
15—34 years	469	180	1.00	.
35—44 years	902	341	0.99	0.80—1.22
45—54 years	480	207	1.12	0.89—1.42
≥ 55 years	136	36	0.69	0.46—1.04
<b>Gender</b>				
Male	1089	318	1.00	.
Female	898	446	1.70	1.44—2.01
<b>Education</b>				
University	989	329	1.00	.
College	491	182	1.11	0.90—1.38
Primary & secondary	498	246	1.49	1.22—1.81
<b>Family income</b>				
≥ CAD 40.000	1482	496	1.00	.
< CAD 40.000	483	262	1.62	1.35—1.94
<b>Employment status</b>				
Permanent	1720	639	1.00	.
Occasional	263	121	1.24	0.98—1.56
<b>Occupation</b>				
High manager	135	38	1.00	.
Intermediate manager	75	28	1.34	0.76—2.33
Professional	736	212	1.02	0.69—1.51
Teacher, technician, other	443	173	1.38	0.93—2.07
Clerical worker	591	308	1.85	1.26—2.72
<b>Hostility</b>				
No	1259	265	1.00	.
Yes	709	486	3.26	2.73—3.88
<b>Cynicism</b>				
No	1360	396	1.00	.
Yes	608	356	2.01	1.69—2.39
<b>Nonwork social support (satisfactory)</b>				
Yes	1610	496	1.00	.
No	315	244	2.51	2.07—3.06
<b>Domestic load</b>				
Low	906	345	1.00	.
High	967	368	1.00	0.84—1.19
<b>Stressful life events</b>				
No	1237	364	1.00	.
Yes	683	370	1.84	1.55—2.19

did not modify the association. The OR did not vary meaningfully with the level of social support for any of the exposure groups. Analyses conducted separately for supervisor and co-workers support (not shown) produced similar results.

**Table 2.** Crude and adjusted odds ratios (OR) and 95% confidence intervals (95% CI) for psychological distress at each level of job strain among the white-collar workers, Québec region in 1992—1993. (PD = psychological demand, DL = decision latitude, + = high level, - = low level)

Job strain level	Crude OR (N = 2686 <sup>a</sup> )	95% CI	Adjusted OR <sup>b</sup> (N = 2319 <sup>a</sup> )	95% CI
PD- DL+	1.00		1.00	
PD+ DL-	3.52	2.54—4.88	2.45	1.66—3.62
PD+ DL+	2.04	1.47—2.87	2.16	1.46—3.18
PD- DL-	1.96	1.43—2.67	1.44	0.99—2.09

<sup>a</sup> 203 missing data for the crude data and 570 missing data for the adjusted model.

<sup>b</sup> Adjusted for age, gender, employment status, occupation, social support at work, nonwork social support, cynicism, hostility, domestic load, stressful life events during the last 12 months.

**Table 3.** Crude odds ratios (OR) and 95% confidence intervals (95% CI) for psychological distress and each level of exposure to job strain by level of social support at work, 2645 white-collar workers,<sup>a</sup> in the Québec region in 1992—1993. (95% CI = 95% confidence interval, PD = psychosocial demand, DL = decision latitude, + = high level, - = low level)

Job strain level	High social support	95% CI	Low social support	95% CI
PD- DL+	1.00		1.00	
PD+ DL-	3.19	2.08—4.87	3.08	1.66—5.70
PD+ DL+	2.08	1.39—3.11	2.14	1.12—4.09
PD- DL-	1.86	1.26—2.73	1.85	1.01—3.39

<sup>a</sup> 244 missing data from the 2889 subjects who participated to the study.

## Discussion

In our study, 27.8% of the participants reported symptoms corresponding to a high level of psychological distress. The QHS revealed a 26.3% prevalence for reported psychological distress symptoms in the general population in the 1992—1993 survey.

A few studies have found that working people usually have a better psychological health status than non-working people (2, 21). This finding may be due to the negative health effects of unemployment and to the healthy worker effect (22). The healthy worker effect may be partly explained by the fact that the nonworking population has more chronic or debilitating illnesses and that this factor may influence its mental health. Consequently, we should expect working subjects to be in better psychological health than nonworking subjects. Specific work conditions may be responsible for the elevated prevalence of psychological distress observed in our study population.

A selection bias might be possible if the cardiovascular program of our study had attracted people with cardiovascular problems who may be more sensitive to job stress. This potential bias would overestimate the association. However, the participation rate of the car-

diovascular program was 73%, and the participants were comparable to the eligible subjects for age, gender and occupation, a selection bias thus being unlikely.

Another selection factor may have biased the results of the study. The participation rate being 65%, a selection bias resulting from a greater participation of people with mental health problems is possible. The effect of such a bias on the association between job strain and psychological distress is unknown; it could underestimate or overestimate the association measured. However, these subjects represent 89% of the participants in the cardiovascular prevention program for which they were recruited, selection bias thus being reduced.

The use of a self-report questionnaire to measure job characteristics instead of measures of the objective environment may be criticized because it is subject to response bias (1). In addition, when the dependent variable is also measured by a self-administered questionnaire, at the same time, as in this study, it may cause an overestimation of the association. This bias cannot be ruled out, it is however important to mention that for job characteristics, no adequate objective measurement strategy is available. Even expert ratings of job characteristics cannot be taken as objective since expert ratings of job title in general underestimate the job-characteristic variance that is associated with psychological strain (1). In addition, perceptual measures may be better predictors of psychological distress than objective stressors that might not be perceived or felt like stressors by workers. Finally, the formulation of questions in the JCQ gives them an objective focus (23). As for the dependent variable, the measure of psychological distress used is a nonspecific indicator of mental health disorders, which is thought to be more appropriate than specific disorders such as depression for the study of the impact of job strain on workers' health (24).

Our results showed that more women than men declared a high level of symptoms of distress, as did less educated subjects, those with a family income less than CAD 40 000 and clerical workers. The Québec Health Survey also revealed that in the general population, women, the less educated, and those of lower socioeconomic status more often reported a high level of psychological distress, while there was no significant effect of age. In our results, there was no association between domestic load and psychological distress. In a study among white-collar workers of a large labor union federation, Karasek has found many significant negative associations between the number of children at home (which is part of our domestic load concept) and mental and physical outcomes (23). Karasek also noted that job factors appear more salient than family stressors in explaining both psychological and physical illness (23).

Our results provide support for an association between job strain and psychological distress among white-collar workers. This association tended to be stronger when there was a combination of high psychological demand and low decision latitude. However, exposure to one or the other of these constraints was also associated with an elevated level of psychological distress. It is notable that the association between job strain and psychological distress remained important even after adjustment for variables often pointed out to explain mental health problems at the discharge of work conditions: age, gender, employment status, occupation, social support at work and nonwork social support, cynicism, hostility, domestic load, and stressful life events during the last 12 months.

These results are consistent with studies which have found an association between a combination of high psychological demand and low decision latitude at work and psychological symptoms (1, 5—7). They are also consistent with the results of many studies which have found an effect of high psychological demand on psychological distress or depressive symptoms (23, 25—27) or an effect of low decision latitude on these psychological problems (25, 26, 28, 29).

In our study, social support at work was significantly associated with psychological distress, but it did not modify the association between job strain and psychological distress. While many researchers have studied the main effect of social support at work on health (30), very few have addressed the modifying effect of social support at work on the association between a combination of high demand and low latitude at work and mental health. In a Swedish study, workers had a 131% increase in age-adjusted mental fatigue from low-strain jobs to high-strain jobs under conditions of high social support at work and a 225% increase for the high-strain jobs under low social support (1). In another study, Karasek found that, when social support was low, depressive symptoms varied from 17% for the less exposed to high demand and low control to 41% for the more exposed. When social support was high, these percentages were 9% and 27%, respectively (1).

Other studies have failed to find any reliable evidence that the effects of various occupational stressors on mental health outcomes are modified by social support from co-workers or supervisors (31). Support for the buffering hypothesis appears to be more prevalent in studies concerning life events as sources of stress than in studies concerning work stressors (32).

Data will be obtained on a longitudinal basis for this population of white-collar workers for a period of five years after the first collection of information. Objective measures of the exposure should be added to the perceptual measures to reduce the possibility of an information bias.

### Concluding remarks

Our results showed an association between each level of job strain and psychological distress even after adjustment for potentially confounding factors. This association is stronger for a combination of high psychological demand and low decision latitude, but the exposure to high demand or to low latitude alone is also associated with a high prevalence of psychological distress. Social support at work, although associated with psychological distress, did not modify the association between job strain and psychological distress.

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