Changes in Job Stressors in the Canadian Working Population

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ABSTRACT

Objectives: To determine the changes in levels of work stressors in a nationally representative sample of Canadian workers from 1994/95 to 2000/01.

Methods: We compared responses for an abbreviated version of the Job Content Questionnaire in two waves of the National Population Health Survey (NPHS). Other items and scales related to work and health were also analyzed. Data were transformed to range from 0 to 10. Comparisons of the 2000/01 data were also made with the Canadian Community Health Survey (CCHS) conducted in 2000.

Results: There were only very small absolute differences between NPHS 2000/01 data and CCHS 2000 data. The NPHS comparison from 1994/95 to 2000/01 showed an increase in job security (change in means = 0.49, 95% CI 0.39 to 0.58) and a decrease in job physical demands (change in means = 0.45, 95% CI 0.35 to 0.54). Other changes in work characteristics were small in absolute value. The combined "overall work stressors" index dropped by 0.12 (95% CI 0.08 to 0.15).

Conclusions: Levels of work stressors did not increase over the period. Some subscales showed an improvement.

MeSH terms: Community surveys; workplace; longitudinal studies; stress, psychological

La traduction du résumé se trouve à la fin de l'article.

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Work stress has been receiving increasing attention in the media and in research journals. It is common to hear and read in the press about the problems faced by working people, due to factors such as work reorganization and changing employment relationships. For example, the Canadian Labour and Business Centre conducted a "Leadership Survey" of private sector business leaders, public sector management and labour leaders.¹ The survey found that management and labour considered "the degree of stress in the workplace to have deteriorated in the last two years." In contrast, Burr et al.² found some improvement in Danish work environments from 1990 to 2000. However, they noted that long work hours and noise exposure increased. As well, the increase they observed in job control was explained by changes in the distribution of subjects across occupations.

From the perspective of health, concerns arise given the evidence linking job stressors with poorer health outcomes.³ An obvious question is whether the evidence indeed supports the notion that levels of work stress are rising. Some studies have been conducted in specific organizations or work groups, but few, if any, reports are available for the full spectrum of the workforce. In Canada, Mendelsohn⁴ reviewed data from surveys in which identical questions were asked of nationally representative samples at different times. In the General Social Survey, the proportion of respondents stating they were very or somewhat satisfied with their "main activity" fell from 83% in 1991 to 79% in 1998. The Survey also asked about sources of job stress. In 1994 and 2000, the most common source was too many demands or work hours, cited by 34% of working Canadians in both years.⁵ One source has reported that the percentage of Canadian workers who reported a high level of stress at work rose from 45% in 2000 to 62% in 2001,⁶ but such a sharp increase over one year seems highly implausible.

An opportunity to examine changes in work stressors over time is provided by the National Population Health Survey (NPHS). We used data from 1994/95 and 2000/01 to understand differences over this six-year period. As well, since the NPHS was longitudinal and did not account for workforce changes due to, e.g., immigration or unemployment, we also

TABLE I

Mean Scores (and Standard Deviations) for Work Characteristics Comparing Respondents in the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS)*

Variable/Scale†	NPHS 2000/01		CCHS 2000/01		Test for Differences in Means	
	Mean	SD‡	Mean	SD‡	p-value for t-test	Normalized Differences§
Overall work stressors	3.96	0.95	3.98	1.07	0.23	-0.02
Job control	6.36	1.50	6.35	1.67	0.71	0.01
Psychological demands	5.68	2.11	5.60	2.22	0.03	0.04
Work social support	6.56	1.53	6.54	1.67	0.46	0.01
Physical demands	4.66	2.98	4.83	3.21	<0.01	-0.06
Job security	6.99	2.32	6.99	2.63	1.00	0.00

* Data limited to those aged 21-70 at the time of survey

† Scores rescaled from 0 to 10

‡ SD = standard deviation

§ Normalized difference was calculated by dividing the difference in means (NPHS – CCHS) by the NPHS standard deviation

|| Sample size for NPHS is 3,449 and for CCHS 47,553 for all work variables. Restricted to provinces and regions in which overall work stressors scale was included in CCHS

TABLE II

Mean Scores (and Standard Deviations) for Work Characteristics Comparing Responses to the National Population Health Survey in 1994/95 and 2000/01* (N=4771)

Variable/Scale†	NPHS 1994/95		NPHS 2000/01		Differences in means	
	Mean	SD‡	Mean	SD‡	95% Confidence Interval	Normalized Differences§
Overall work stressors	4.08	1.11	3.96	0.96	-0.15 to -0.08	-0.10
Job control	6.28	1.73	6.34	1.51	0.01 to 0.11	0.02
Psychological demands	5.88	2.25	5.72	2.11	-0.23 to -0.08	-0.07
Work social support	6.68	1.73	6.61	1.54	-0.12 to -0.01	-0.04
Physical demands	5.15	3.31	4.70	2.99	-0.54 to -0.35	-0.14
Job security	6.53	2.89	7.02	2.29	0.39 to 0.57	0.17
Job satisfaction	7.93	2.41	8.06	2.26	0.04 to 0.21	0.05

* Analysis restricted to those answering items on both waves of the survey, aged 15-64 in 1994/95, or 21-70 in 2000/01

† Scores rescaled from 0 to 10

‡ SD = standard deviation

§ Normalized difference was calculated by dividing the difference in means (2000/01 NPHS – 1994/95 NPHS) by the 1994 standard deviation, and is equivalent to "effect size"

analyzed the cross-sectional Canadian Community Health Survey data from 2000. We hypothesized that if work stress had indeed increased, we would see an increase in work stressors in the NPHS.

METHODS

The National Population Health Survey began in 1994/95 and interviewed a nationally representative sample of Canadians, using a stratified, multi-stage sample. The survey, which is repeated every two years, covers household and institutional residents in all provinces and territories, excluding those living on Indian reserves, on Canadian Armed Forces bases, and in some remote regions of Ontario and Quebec. The longitudinal cohort consists of 17,276 randomly chosen respondents interviewed in the first wave in 1994 or 1995. The response rate in the initial survey was 83.6% and the follow-up response rate was 84.8% in the fourth wave (2000/01) for the full cohort. Respondents were included in this analysis

if they were aged 15 to 64 years old in 1994/95, were in paid employment in Waves 1 and 4 of the survey, and completed an abbreviated version of Karasek's Job Content Questionnaire (JCQ)⁷ on both occasions. There were 9,290 people in the labour force in 1994/95, of whom 7,168 answered the work stressor questions. Of these, there were 5,278 respondents in the labour force in 2000, and 4,777 answered the work stress questions. Missing data on education reduced our sample to 4,771. Further details are provided by Statistics Canada.^{8,9}

The same questions on work stress were included in the 1994/95 wave and the 2000/01 wave. Relevant items for our analyses were: demographic data and work characteristics. The abbreviated JCQ contained work stressor questions (work characteristics). Twelve items were included, creating 3 scales: job control, psychological demands, and social support, as well as including single items which asked about job security and the physical effort of the job (Appendix). A five-point Likert scale

from Strongly Agree to Strongly Disagree was used. Statistics Canada used all 12 items to create an index they labelled 'work stress'. We use the term 'overall work stressors'. They reverse-scored items as necessary. A further single item using a four-point scale measured job satisfaction. We transformed linearly all scores so the possible range of values was 0 to 10. Higher scores represent greater levels of the construct being measured.

The reliability scores at each wave for the three subscales of work stressors were calculated. As would be anticipated, the values for the psychological demands (0.33 in 1994/95 and 0.36 in 2000/01) and social support scales (0.41 and 0.43) are low, as they included only two and three items, respectively. The values for job control (five items) are modest (0.63 and 0.58), below the 0.7 recommended by Streiner and Norman.¹⁰

As noted above, we also analyzed data from the Canadian Community Health Survey Cycle 1.1 – a cross-sectional nationally-representative survey with data

Figure 1. Mean scores for overall work stressors by year of interview, gender and age group
The four lines show mean scores for men and women for responses in 1994/95 and 2000/01. The age group is determined by age in 2000/01.

Figure 2. Mean scores for overall work stressors by year of interview, gender and education

collected from September 2000 to November 2001.¹¹ This interviewer-administered survey also included the abbreviated JCQ, although not in all provinces. We compared the CCHS JCQ means with those from the NPHS in 2000/01, restricting the NPHS sample to those provinces that included these questions on the CCHS.

Comparisons over time in the NPHS were analyzed using the paired t-test.

Comparisons between the NPHS and CCHS used the two sample t-test.

RESULTS

Table I shows the cross-sectional comparison of the CCHS and NPHS 2000/01. Overall, differences were small, even for psychological demands (0.08) and physical demands (0.17) which were both statistically significant. Since the differences were

very small, we concluded that we could indeed use the longitudinal NPHS to determine how job stressors have changed.

The comparison over time for individuals who responded to the NPHS in both 1994/95 and 2000/01 is shown in Table II. The overall work stressors mean dropped from 4.08 to 3.96. While statistically significant, this difference is very small, representing just one eightieth of the overall scale. (The difference divided by the standard deviation for the 1994/95 data, equivalent to "effect size", was 0.10, a value generally regarded as small.¹²) The job control, psychological demands, and work social support scales, and the job satisfaction item also showed very minor differences. There was, though, a greater difference for physical demands and job security. The mean for physical demands dropped from 5.15 to 4.70, roughly half a point on the ten-point scale. Similarly, job security increased by about half a point.

We examined the overall work stressors index by age and sex for both waves of the survey. Since there was a six-year gap between the waves that asked these questions, we divided age into six-year groups. Figure 1 shows the means. Levels were slightly higher in women and there was generally a slight decline in the mean scores with age. While there were some larger changes at both ends of the age spectrum, the numbers of respondents in those groups were small. The graph confirms that the slight drop in the overall work stressors index mean is not explained by the aging of the cohort. For most age-sex groups, the score in 2000/01 was lower than the score for the same age-sex group in 1994/95.

A similar graph showing patterns for men and women by education level for each wave showed lower stressor levels with more education (Figure 2). As well, within each education level, stressor levels were lower in 2000/01 than in 1994/95 for men and for women, apart from men with less than secondary education.

DISCUSSION

Given the attention that work stress has received in the media, there were surprisingly small differences between the two waves of the NPHS. Indeed, in most cases, the level of stressors was, if anything,

reduced over this period. Even for job security and physical demands, the normalized differences, equivalent to effect sizes, are less than what Cohen considers small.¹²

Part of the difference that did occur is an improvement in job security, a variable that we believe is highly dependent on the economic conditions at the time of the survey. Canadian unemployment was roughly 11% in 1994, but down to 7% in 2000.¹³ Further support is provided by the General Social Survey: in 1994, 22% of employees stated that fear of layoff or job loss was a source of job stress, compared with 13% in 2000.⁵ The drop in physical demands may reflect a combination of a change in jobs across Canada and some decline in physical demands of work as individuals age.

Regarding the implications for the workplace, we note that apart from physical demands and job security, there has been little decline in work stressors. Ideally, given the attention that has been paid to work stress, we would have hoped to see lower levels.

There are several other explanations for the results. If job stressors have increased universally, the workforce's expectations of the quality of work conditions may have been lowered so that poorer conditions in Wave 4 might have been rated the same as better work conditions at Wave 1. Alternatively, while many jobs may have added pressure, some workplaces have introduced programs to improve stressor levels or workers' coping strategies, so that the net effect has been no difference over time in the work stressors measures. Such polarization, though, would have led to an increase in the standard deviation of scale and item scores, but in fact a decrease was seen (Table I).

It is possible that there was a 'healthy cohort effect' – those who responded at Wave 1 but not at Wave 4 may have left employment because of high and increasing stressor levels, leaving for our analysis only those whose levels had not changed. We cannot rule out this possibility, although we have compared the levels of overall work stressors at Wave 1 in the two groups – those not responding at Wave 4 had a mean overall stressors level just 0.09 higher than those who completed the scale at both Waves. Furthermore, the similarity of the NPHS Wave 4 and the cross-sectional CCHS results (Table II) indicates

Appendix

Items in abbreviated Job Content Questionnaire

Item	Subscale
1. Your job requires that you learn new things	CONTROL
2. Your job requires a high level of skill	CONTROL
3. Your job allows you freedom to decide how you do your job	CONTROL
4. Your job requires that you do things over and over	CONTROL
5. You have a lot to say about what happens in your job	CONTROL
6. Your job is very hectic	DEMANDS
7. You are free from conflicting demands that others make	DEMANDS
8. Your job security is good	JOB SECURITY
9. Your job requires a lot of physical effort	PHYSICAL EXERTION
10. You are exposed to hostility or conflict from the people you work with	SOCIAL SUPPORT
11. Your supervisor is helpful in getting the job done	SOCIAL SUPPORT
12. The people you work with are helpful in getting the job done	SOCIAL SUPPORT

Response scale from 1 to 5 (Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree)
Items 4, 6, 9, 10 reverse-scored in computation of overall work stressors scale. Items reversed as necessary in creation of subscales.

that any healthy cohort effect must have been only slight.

Another possible reason for the lack of increase in stressor levels is that there have been changes in the distribution of the workforce across jobs and sectors. More detailed analyses (data not shown), though, found this was not the explanation. Of 16 industry categories, the overall stressors scale had decreased in 13, and increased in only 3.

Finally, we note that the scales may be insensitive to change,¹⁰ yet we know of no data that have examined how well the abbreviated version of the JCQ used in the NPHS is able to detect differences in work conditions over time. However, even the single items of physical demands and job security showed quite large changes, suggesting that the instrument can detect change. As well, full versions of the demand and social support scales and an abbreviated version of the control scale have all shown change in response to organizational change.^{14,15} There may also have been changes in work stressors not included in the NPHS, such as effort-reward imbalance¹⁶ or organizational justice.¹⁷

There are several strengths and weaknesses of this analysis. Strengths include the nationally representative sample and the very high response rate – even after several waves of the survey – that is remarkable in comparison with other longitudinal studies. As well, the sample size was large, allowing for stable estimates of the means of the scales.

One weakness is the low reliability values for the scales, which were abbreviated from the original instrument. Yet even the mean for job control, a scale with alphas of

0.63 and 0.58, showed virtually no change over the six years. As well, we do not have intervening values of the scales, as they were not included in the second and third waves of the survey (1996/97 and 1998/99).

Despite these weaknesses, the finding of little change in the scales seems robust. There was certainly no evidence that workers reported an increase over this period in these stressors at work, contrary to media reports and our own expectations when beginning this analysis.

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RÉSUMÉ

Objectifs : Déterminer l'évolution des niveaux de facteurs de stress professionnel au sein d'un échantillon représentatif national de travailleurs canadiens entre 1994-1995 et 2000-2001.

Méthode : Nous avons comparé les réponses à une version abrégée du *Job Content Questionnaire* dans deux des cycles de l'Enquête nationale sur la santé de la population (ENSP). D'autres articles et échelles liés au travail et à la santé ont aussi été analysés. Les données ont été adaptées à une échelle de 0 à 10. Nous avons aussi comparé les données de 2000-2001 avec celles de l'Enquête sur la santé dans les collectivités canadiennes (ESCC) menée en 2000.

Résultats : Nous n'avons relevé que de très faibles écarts absolus entre les données de l'ENSP 2000-2001 et celles de l'ESCC 2000. En comparant les données de 1994-1995 et de 2000-2001 de l'ENSP, nous avons constaté une augmentation de la sécurité d'emploi (changement des moyennes = 0,49, IC de 95 % = 0,39-0,58) et une baisse des exigences physiques au travail (changement des moyennes = 0,45, IC de 95 % = 0,35-0,54). Les autres changements dans les caractéristiques de l'emploi étaient petits en valeur absolue. L'indice composite des « facteurs globaux de stress professionnel » a diminué de 0,12 (IC de 95 % = 0,08-0,15).

Conclusions : Les facteurs de stress professionnel n'ont pas augmenté au cours de la période à l'étude. Certaines sous-échelles font même état d'une amélioration.

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