

Health Care Restructuring, Work Environment, and Health of Nurses

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Background *In the last 15 years, the health care system has undergone significant restructuring. The study's objective was to examine the psychosocial work environment and the health of nurses after major restructuring in comparison with two reference populations.*

Methods *This cross-sectional study involved 2,006 nurses from 16 health centers. A questionnaire measured current work characteristics: psychological demands, decision latitude, and social support at work from Karasek's Job Content Questionnaire, organizational changes, and health effects. Prevalence ratios and binomial regression were used to examine the associations between current work characteristics, changes and psychological distress (PSI).*

Results *There was a considerable increase in the prevalence of PSI and of adverse psychosocial work factors in comparison to the prevalence reported by a comparable group of nurses in 1994. These adverse factors were also more prevalent among nurses than among Québec working women and they were independently associated with psychological distress.*

Conclusion *Workplace interventions should be based on elements identified by many nurses as being problematic.* Am. J. Ind. Med. 47:54–64, 2005. © 2004 Wiley-Liss, Inc.

KEY WORDS: *job strain; restructuring; psychological distress; nurses; psychosocial work environment*

INTRODUCTION

In the last 15 years, the health care sector in the province of Quebec has undergone important restructuring and

downsizing in order to reduce health care costs and improve the efficiency of the system. This transformation led to mergers and changes in mission statements for many hospitals, from acute care to long-term care. Many community health care centers (CLSC) also merged or were given broader mandates to realize a greater ambulatory mission of the health care system. These structural modifications leading to the departure and retirement of numerous employees generated an unprecedented redistribution of jobs, particularly with respect to job seniority. Hundreds of nurses left their original place of employment in order to work in other acute care hospitals, long-term care institutions, or CLSC. Nurses who remained in their original place of employment also experienced changes. Such changes included changing workstations and often changing specialty or type of practice, needing completely different skills, losing former colleagues or supervisors, and having to work with new ones.

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Contract grant sponsor: Québec Department of Health and Social Services (MSSS); Contract grant number: 97-278; Contract grant sponsor: Québec Social Research Council (CQRS); Contract grant number: RS-3119 097; Contract grant sponsor: Canadian National Health Research and Development Program (NHRDP), Health Canada; Contract grant number: 6605-5313-001.

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Accepted 14 September 2004

DOI 10.1002/ajim.20104. Published online in Wiley InterScience (www.interscience.wiley.com)

Few empirical studies of drastic changes occurring in work environments have been published. Work overload was identified by Jick [1985] as a phenomenon inherent to restructuring. Workstation changes are identified as stressful events because of the breaking up of social relationships, but also because they transform the work routine and the demands placed on individuals [Gerpott, 1990]. These changes could also intensify adverse work conditions already existing in the work environment [Matteson and Ivancevich, 1990]. Hartley et al. [1991] reported changes in the nature of work and in the work environment, increase in job insecurity, and deterioration of relationships between management and employees. Kivimäki et al. [2000] reported that downsizing among municipal employees occasioned changes in work characteristics (increased physical demands and job insecurity, decreased skill discretion and participation), social relationships, and health-related behaviors. Woodward et al. [1999] found that after re-engineering and other cost reduction strategies in a teaching hospital, employees reported significant increase in job demands, decrease in social support from both colleagues and supervisors, deterioration of team work, decrease in role clarity, and increased job insecurity. However, Parker et al. stated that introducing deliberate work organization and change management strategies can combat the negative effects of downsizing. In a longitudinal study among employees in a chemical processing company going through major downsizing, high demands were associated with poorer well-being but an increase in control, clarity, and participation were associated with improved well-being [Parker et al., 1997].

Potential consequences of substantial organizational restructuring on workers' health were reported. Psychosomatic effects [Jick, 1985; Mattiasson et al., 1990], sleeping disorders, depression, and anxiety [Mattiasson et al., 1990; Woodward et al., 1999] as well as psychological distress [Arnetz et al., 1991], emotional exhaustion [Armstrong-Stassen et al., 1995; Woodward et al., 1999], and psychological well-being [Burke and Greenglass, 2000] were observed. An increase in the use of health services [Jick, 1985; Morris and Cook, 1991; Vahtera et al., 2000] and in sickness absence from work was also reported.

In addition, many studies have documented the effect of adverse psychosocial factors at work on the incidence and the prevalence of mental health problems [Sauter et al., 1990; Vézina et al., 1992]. Since 1980, the job strain model developed by Karasek has dominated the empirical research in this field. This model suggests that workers exposed to a combination of high psychological demands and low decision latitude, have a higher risk of developing health problems [Karasek, 1979, 1990]. Johnson and Hall [1988] added social support at work to the 2-dimension model. When social support at work is high, the risk of developing health problems among people exposed to job strain seems to be lower. These psychosocial factors have been associated

with a series of effects on mental health among different group of workers [Stansfeld et al., 1997; Niedhammer et al., 1998; Mausner-Dorsch and Eaton, 2000] and specifically among nurses [Amick et al., 1998; Cheng et al., 2000] and health care workers [Landsbergis, 1988]. However, few studies have tested the model of job strain and social support in a context of organizational change [Pettersson and Arnetz, 1998; Vahtera et al., 2000; Kivimäki et al., 2001].

The purpose of the study was to determine whether the prevalence of psychosocial factors at work and health indicators among nurses having experienced restructuring was higher than that of two reference populations, and measure the association between psychosocial factors at work and psychological distress among nurses after restructuring.

MATERIALS AND METHODS

Study Design, Population, and Data Collection

This cross-sectional study took place in 1998 after 2 years of major restructuring in the health care sector. Data collection consisted of a 30-min telephone questionnaire administered by a survey company during the fall of 1998. The interviewers were trained by the research coordinator, and quality control of the interviews was made through the survey period. This control consisted of regular audits of interviews by the coordinator to check if the questions were asked according to instructions and if the response categories were repeated according to the prescribed frequency.

Subjects were all unionized nurses with permanent status as of September 1, 1997 when the first wave questionnaire was administered. They were employed in 16 acute care hospitals, long-term care institutions, and CLSC in the Québec City area and experienced major changes during health care restructuring. Human Resource Departments provided a list of nurses for the enumeration of all potential subjects. The Commission for Access to Information authorized access to personal information concerning the study participants.

Nurses were compared with two reference groups. The first group was composed of 1,891 nurses from six hospitals in the province of Québec who participated in another study in 1994 [Bourbonnais et al., 1998]. The comparison with this population studied before restructuring and downsizing in the health care sector allows description of the evolution of psychosocial constraints in the work environment and psychological distress among nurses. The second reference group, a general population sample was composed of all workers who participated in a Quebec Health Survey conducted in 1998 [Daveluy et al., 2000]. This survey was a stratified random sample of all Quebecers appearing in the records of the Quebec Insurance Board (which covers

more than 95% of the Quebec population). The weighted sample is representative of non-institutionalized Quebecers at the time the survey was conducted [Daveluy et al., 2000]. A subgroup was selected with characteristics similar to the nurses under study. After excluding men and participants who did not hold a paid job, the sample was restricted to women holding college or university degrees so as to be in the same educational range as the nurses. The reference population thus was comprised of 2,636 women who held various types of jobs in all industrial sectors and services. In this population, the data used for comparison was measured with the same instruments used in the 1994 and 1998 studies. Primary data were available for both reference groups.

Variables

Current psychosocial factors at work

Three main characteristics were measured: psychological demands (five items measuring the quantity of work, the intellectual requirements and the time constraints of the job) (see Appendix 1 for details on items), decision latitude (nine items assessing opportunities to make decisions, to be creative, and to use and to develop one's abilities at work), and social support at work from supervisors and colleagues (eight items). All three dimensions were taken from Karasek's Job Content Questionnaire [Johnson and Hall, 1988; Karasek and Theorell, 1990]. These scales have been used in many studies, have good psychometric properties, and are validated in French [Brisson et al., 1998].

Changes in psychosocial factors at work since the restructuring in the health sector

After a review of the scientific literature and consultation of many researchers studying psychosocial factors at work, no validated measure of change in job demands, decision latitude, or social support could be found. Consequently, the content of three change measures, namely change in job demands (two items), change in decision latitude (three items), and change in social support at work (four items) was developed in collaboration with members of the Steering Committee.¹ It is based on knowledge from organizational change literature showing the importance of the maintenance of well-being through sufficient social support at work, maintaining an optimal workload and using one's skills

[Johnson et al., 1989; Landsbergis and Vivona-Vaughan, 1995]. Content validity of the change measures was tested with three researchers in nursing. Understandability and acceptability of the questions were also pre-tested (see Appendix 2 for an English version of the change measures).

Health was measured by four indicators

Perceived general health status was measured by a validated question from the Québec Health Survey (QHS) [Bellerose et al., 1995] and the 36-item Short-Form Health Survey (SF-36) [Ware and Sherbourne, 1992]. Psychological distress was measured with the Psychiatric Symptom Index (PSI) [Ilfeld, 1976]. The French translation of the PSI has been validated [Préville et al., 1992; Bellerose et al., 1995]. It measures the presence and intensity of anxiety symptoms, aggressiveness, depression, and cognitive disorders during the last week. The use of psychotropic medication (tranquilizers, sedatives, soporifics, or stimulants) in the 2 days preceding the survey was documented by a modified question from the QHS. The wording of the question was adapted by the authors to avoid a declaration bias [Laurier et al., 1990]. Three questions on the use of health or social services during the 2 weeks preceding the questionnaire were likewise taken from the QHS [Bellerose et al., 1995].

Cofactors were taken into account and controlled for in the statistical analyses

Avoidance or control coping strategies to work constraints [Latack, 1986]; social support outside of work [Bellerose et al., 1995]; domestic load [Tierney et al., 1990]; type A behavior [Friedman and Rosenman, 1974]. Finally, a series of personal and socio-occupational characteristics (age, familial status, seniority in the institution, job status, work shift, etc.) were also measured.

Statistical Analyses

The prevalence of current psychosocial factors at work, of changes having occurred since the restructuring and of health problems was measured. The items were grouped in indices for each of these factors. A total score was calculated for each of the indices and the distribution of scores for all nurses was divided at the median (about 50%) in order to determine an exposed and a non-exposed group. For psychological demands and decision latitude, exposure was determined with a threshold at the median of the distribution of the total score in the 1994 nurses study (psychological demands = 0 and decision latitude = 70) [Bourbonnais et al., 1998]. For the comparison with the Quebec Health Survey, the median value of the general population was used (= -2 for demands and = 72 for latitude) [Brisson et al., 1998; Larocque et al., 1998]. Data from the general population

¹ A Steering Committee brought together for the development of the project follows all the research stages. It is composed of nurses, representatives from their professional order and union, from human resource or nursing departments of several participating institutions, from the Québec's Ministry of Health and Social Services and from the Québec City Regional Health and Social Services Board.

sample were first weighted using the method recommended by Santé Québec, 1998 [Daveluy et al., 2000] so as to obtain a sample representative of non-institutionalized Quebecers at the time of the survey. The general population sample was then weighted so as to obtain an educational structure precisely comparable to that of the nurses. Given that in the 1994 study among nurses [Bourbonnais et al., 1998], 63% had a university-college degree and 37% had a university degree, these weights were directly applied to the general population sample.

For the second objective, the analysis compared a group of exposed nurses to a group of non-exposed nurses for each work factor according to psychological distress. The prevalence ratio and 95% confidence interval were used to measure the force and precision of the association [Rothman, 1987]. The potentially modifying or confounding effect of cofactors was evaluated by stratified analysis [Rothman, 1987]. Binomial regression was used to adjust prevalence ratios simultaneously for variables showing a confounding effect in the stratified analysis [Skov et al., 1998]. All analyses were carried out using SAS software [SAS, 1990].

RESULTS

In 1997, of 2,602 eligible nurses, 596 refused to participate in the study, for a participation rate of 77.1%. Based on available data, participating and non-participating nurses were comparable according to work shifts ($P = 0.95$), but were different with respect to job status ($P = 0.007$). There was a greater proportion of full-time nurses among participants. In 1998, 76% of the nurses from the first wave interview (1,527) answered a second telephone interview. A comparison of respondents and non-respondents in 1998 revealed that they did not differ in levels of psychological demands, work social support, and psychological distress reported in 1997. However, non-respondents had declared less job decision latitude in 1997: 60% had reported low latitude versus 50% for the respondents in 1998 ($P = 0.0003$).

The participation rate in the 1994 study was 74% [Bourbonnais et al., 1998]. Overall, participants were representative of the eligible population for seniority, work status, and schedule. However, in one hospital, day nurses participated more than nurses working other schedules. All other comparisons between participants and non-participants were not statistically significant. The response rate in the Quebec Health Survey in 1998 was 84% [Daveluy et al., 2000].

Participants in the 1998 interview were mostly female (94%), between 22 and 59 years of age (mean 43). The vast majority worked in acute care hospitals (90%) and all provided direct care. Most of them (62%) had full time jobs. A majority of nurses worked the day shift (59%); the next largest groups worked the evening (23%) and night (15%) shifts. The mean length of time working in the institution was

18 years with a range from 1 to 38 years. From April 1995 to fall 1998, 54% of nurses had experienced at least one change in their workstation either because of a redeployment of jobs through the health care network or because of bumping in their institution.

Table I shows the distribution of study subjects in 1998 and in the two reference groups, by age and job status. Nurses in 1998 were older than nurses in 1994, and the distribution by job status was comparable in the two samples. However, women workers from the Quebec Health Survey were younger and were more often working full time than nurses in this study.

Psychosocial Factors at Work

All adverse psychosocial work factors were quite prevalent among nurses in 1998 (Table II): high psychological demands were reported by more than 66% of nurses, low decision latitude by 49% of the nurses, a combination of these two factors by more than one-third of nurses (35%), and low social support by half (52%) of the nurses. Four of five nurses reported an increase in workload since the beginning of the restructuring of the health sector, more than a third reported less decision latitude (35%) and two-thirds reported a decrease in social support at work from colleagues and supervisors (data not shown).

Compared to nurses studied in 1994, before the restructuring, there has been in 1998 a considerable increase in the prevalence of psychological demands (PR = 1.31), and in the combination of high demands with both high latitude (PR = 1.41) and low latitude (PR = 1.24). However, low decision latitude was less prevalent during the restructuring than in 1994 (PR = 0.87), even if 35% of the nurses reported less decision latitude when asked directly whether it had

TABLE I. Characteristics of Nurses in Québec Region and of Reference Groups

	Nurses in 1994 (n = 961)		Nurses in 1998 (n = 1,437)		Women from the general worker population 1998 ^a (n = 2,636)	
	n	%	n	%	n	%
Age (year)						
15–34	250	26.5	191	13.3	1,201	45.6
35–44	463	49.1	549	38.2	829	31.4
45 and +	231	24.5	697	48.5	606	23.0
Job status						
Full time	534	55.7	866	61.0	1,726	69.6
Part time	424	44.3	554	39.0	753	30.4

^aWorking women from a national survey (Santé Québec) in 1998 with same level of education as nurses: college or university.

TABLE II. Comparison of Psychosocial Constraints at Work and Health Indicators Among Nurses in Québec Region (Women Only) Before (1994) and After (1998) Restructuring

Constraints	Nurses before restructuring (n = 961)		Nurses after restructuring (n = 1,437)		PR ^a	95% CI
	n	%	n	%		
High psychological demands five items	503	52.7	941	66.4	1.31	1.22–1.41
Low decision latitude	552	58.1	687	48.5	0.87	0.80–0.94
PD ⁻ DL ⁺ ^b	186	19.6	284	20.0	0.95	0.80–1.13
PD ⁻ DL ⁻	265	27.9	192	13.5	0.48	0.40–0.57
PD ⁺ DL ⁺	212	22.3	447	31.6	1.41	1.21–1.63
PD ⁺ DL ⁻	286	30.2	494	34.9	1.24	1.09–1.40
Low social support	472	49.5	726	51.8	1.04	0.96–1.13
Health Indicators						
High psychological distress	370	38.8	505	35.6	0.93	0.83–1.04

^aPrevalence ratio (PR) adjusted for age and job status, reference group: nurses in 1994.

^bPD, psychological demands; DL, decision latitude; -, low; +, high; high PD ≥ 0 ; low DL ≤ 70 .

changed since the restructuring. As for low social support at work, the prevalence was rather stable, around 50% on both occasions.

When data from nurses in 1998 are compared to a sample of Québec women workers, psychosocial constraints at work, adjusted for age and job status, are more prevalent among nurses: high psychological demands (PR = 1.83), low decision latitude (PR = 1.15), and a combination of high demands and low latitude (PR = 2.17) (Table III).

Health Indicators

When compared to the sample of nurses in 1994, there was no difference in the prevalence of psychological distress among nurses after restructuring (Table II). This prevalence of high psychological distress among nurses is, however, much higher than the one found among the sample of working women who participated to the Quebec Health Survey in the same year (21%, PR = 1.84) (Table III). Among the studied nurses, the use of prescribed psychotropic medication during the last 2 days was 8% in 1998, which is higher than for the sample of working women in the Quebec Health Survey in 1998 (4.2% for tranquilizers and 0.02% for stimulants²) (PR = 1.56) (Table III). In the fall of 1998, 16% of the nurses considered their health average or poor compared to people of the same age. This prevalence is much higher than the one reported by working women in the

Quebec Health Survey (5%) (PR = 3.25). Finally, 35% of nurses in 1998 had consulted a health professional during the last 2 weeks. This proportion was not significantly different from the 32% reported by working women in the national survey.

Association Between Psychosocial Factors at Work and Psychological Distress

Nurses who experienced a high level of psychological distress in 1998 also experienced a high level of psychological demands at work (PR = 2.02), low decision latitude (PR = 1.35), a combination of high demands and low (PR = 2.67) or high decision latitude (PR = 2.20), and low social support by supervisors and colleagues (PR = 1.84) (Table IV). Although social support at work had a direct effect on the level of psychological distress, it did not modify the association between job strain and psychological distress (data not shown).

Work changes variables associated with a high level of psychological distress were: an increase in job demands (PR = 2.17), a decrease in social support at work (PR = 1.81), and a change of workstation (PR = 1.21). Among personal factors, low social support outside of work (PR = 1.94), using an avoidance coping strategy (PR = 1.50), having high domestic load (more household responsibilities) (PR = 1.15), and a type A behavior (PR = 1.54) were also associated with more psychological distress. Factors that were not significantly associated with psychological distress were age, gender, marital status, job seniority, work status, job title,

² These proportions in the survey Santé Québec cannot be added because they are not mutually exclusive. In our study, psychotropic medication included (tranquilizers, sedatives, soporifics, or stimulants).

TABLE III. Comparison of Psychosocial Constraints at Work and Health Indicators Between Nurses in Québec Region (Women Only) After Restructuring of the Health Care Sector (1998) and a Sample of Working Women in a National Survey in 1998

Constraints	Santé Québec 1998 ^a (n = 2,636)		Nurses after restructuring (n = 1,437)		PR ^b	95% CI
	n	%	n	%		
High psychological demands five items	1,251	48.1	1,251	88.2	1.83	1.71–1.96
Low decision latitude	1,403	53.6	845	59.6	1.15	1.06–1.25
PD ⁻ DL ⁺⁺ ^c	610	23.4	75	5.3	0.20	0.14–0.27
PD ⁻ DL ⁻	740	28.5	92	6.5	0.24	0.18–0.33
PD ⁺ DL ⁺	601	23.1	498	35.1	1.46	1.25–1.70
PD ⁺ DL ⁻	649	25.0	752	53.1	2.17	1.92–2.46
Health indicators						
High psychological distress	537	20.6	505	35.6	1.84	1.56–2.16
Psychotropic drug use	111	4.2	113	7.9	1.56	1.06–2.30
Health average or poor	118	4.6	228	16.1	3.25	2.34–4.52
Health professional consultation	850	32.3	490	34.7	1.05	0.92–1.21

^aWorking women from a national survey (Santé Québec) in 1998 with same level of education as nurses: college or university.

^bPrevalence ratio (PR) adjusted for age and job status.

^cPD, psychological demands; DL, decision latitude; -, low; +, high; high PD ≥ -2 ; low DL ≤ 72 .

hospital department or CLSC program, work schedules, and coping strategies emphasizing control.

In Table V, multivariate analyses identify work constraints independently associated with psychological distress: high psychological demands in combination with high or low decision latitude, low social support at work, an increase in job demands, and a decrease in social support at work. These associations were adjusted for age, gender, job status, social support outside of work, domestic load, coping strategy, and type A behavior.

DISCUSSION

Since 1994, before the beginning of restructuring, there was a considerable increase in the prevalence of high psychological demands and the combination of high demands and high or low latitude among nurses. This result has to be moderated by the fact that the analyses deal with between groups and not within group comparisons and may thus reflect differences between people in different samples rather than actual changes. It is, however, noteworthy that an increase in decision latitude has been reported between 1992–93 and 1998 in the Quebec Health Survey (QHS) [Daveluy et al., 2000]. There was no data on psychological demands in the 1992–93 survey. It is probable that it has increased in the province of Quebec in the last years as it has in many countries [European Foundation, 1997; Bound et al., 1998]. Despite this assumption, both psychological demands

and low decision latitude were more prevalent among nurses in our study than among women workers from the QHS.

The study revealed no difference in psychological distress of nurses after the restructuring of the health care sector in 1998 in comparison to a sample of nurses studied in 1994 [Bourbonnais et al., 1998, 1999b]. However, the prevalence was quite higher in 1998 than that of Québec women workers [Daveluy et al., 2000]. It also showed a prevalence in the use of prescribed psychotropic medication more important among nurses in 1998 than among working women from the general population [Daveluy et al., 2000]. Also, a bigger proportion of nurses reported their health to be average or poor compared to people of the same age [Daveluy et al., 2000]. Other studies have found effects of downsizing or major changes in hospitals. An Ontario workgroup who examined the effects of hospital downsizing reported frequent complaints of emotional exhaustion among nurses who remained after the cuts [Armstrong-Stassen et al., 1995]. In Canada, it has been demonstrated, through in-depth interviews with nurses in ten Ontario hospitals that they were affected by changes occurring in the nature of their work, they felt less involved in their work, and took more sick leave [White, 1997]. In a longitudinal study among hospital employees going through re-engineering, there was a significant increase in depression, anxiety, emotional exhaustion, and job insecurity [Woodward et al., 1999]. Another study found that hospital downsizing and restructuring tended to be associated with less work satisfaction and poorer psycholo-

TABLE IV. Crude Prevalence Ratios (PR) and 95% Confidence Interval (CI) of Psychological Distress (PSI) According to Different Variables Among 1,527 Nurses in Québec Region (Men and Women) in 1998

Variables	%	PR 1998 (CI 95%)
Job strain model variables		
High psychological demands five items	66.4	2.02 (1.69–2.43)
Low decision latitude	48.7	1.35 (1.18–1.55)
PD ⁻ DL ⁺ ^a	20.0	1.00
PD ⁻ DL ⁻	13.6	1.52 (1.09–2.13)
PD ⁺ DL ⁺	31.3	2.20 (1.68–2.88)
PD ⁺ DL ⁻	35.1	2.67 (2.06–3.46)
Low social support at work	52.0	1.84 (1.59–2.13)
Variables of change in the work context		
Increase in job demands	79.5	2.17 (1.70–2.77)
Decrease in decision latitude	35.1	1.08 (0.94–1.25)
Decrease in social support at work	66.5	1.81 (1.51–2.16)
Change in work situation	23.5	1.21 (1.05–1.41)
Other work-related variables		
Work schedule		
Day	58.7	1.00
Evening	23.4	1.07 (0.91–1.25)
Night	15.1	0.98 (0.80–1.20)
Rotation	2.8	0.94 (0.61–1.46)
Personal variables		
Low social support outside of work	20.9	1.94 (1.70–2.20)
Avoidance coping strategies	59.1	1.50 (1.29–1.74)
High domestic load	49.3	1.15 (1.01–1.32)
Type A behavior	54.0	1.54 (1.33–1.77)

^aPD, psychological demands; DL, decision latitude; -, low; +, high; high PD ≥ 0 ; low DL ≤ 70 .

gical well-being, besides having potentially harmful effects on organizational functioning [Burke and Greenglass, 2000]. An increase in psychological distress in 1997 [from 36% in 1994 to 41% in 1997; PR = 1.17 CI: 1.08–1.27], during the beginning of restructuring has been reported [Bourbonnais et al., 1999b], but this higher prevalence receded after 1 year. It is nevertheless preoccupying that mental health indicators measured in this study are worse among nurses than among a comparable sample from the general population.

The results of the present study support the association between a combination of high psychological demands and low decision latitude, and psychological distress after adjusting for several potentially confounding factors, including several factors specifically associated with network restructuring. These results are consistent with studies having found an association between a combination of high psychological demands and low decision latitude at work, on the one hand, and different psychological symptoms, on the other [Kauppinen-Toropainen, 1981; Braun and Hollander, 1988; Karasek, 1990]. In keeping with the scientific literature, a

direct association between low social support at work and psychological distress was found in the present study. However, contrary to results reported by other researchers [van der Doef et al., 2000], social support did not modify the association between job strain and this mental health indicator. Two previous studies, one among white-collar workers [Bourbonnais et al., 1996] and another among nurses [Bourbonnais et al., 1998, 1999a] reported similar results.

The work constraint reported by the largest number of nurses involved an increase in job demands. This variable was found to be associated with psychological distress. Since restructuring, hospitalized and ambulatory clientele have become more burdensome, presenting more complex health problems that require acute care from nurses. The setting up of a systematic follow-up of patients with standardized care programs might have increased work pace. The duration of the care period has been reduced to a minimum, delegating as much as possible pre- and post-operative steps to the ambulatory network resulting in an intensification of acute care. Budget restrictions make it more difficult to efficiently care for patients, if only with respect to available material or the non-replacement of absent colleagues, leaving the daily workload to fewer nurses [Bourbonnais et al., 2000].

A large proportion of the study nurses noted a decrease in social support at work. This variable was also found to be associated with psychological distress. The importance of daily support by colleagues and supervisors in the adaptation of newly transferred employees has been documented [Gerpott, 1990; Nelson, 1990]. A Canadian study carried out among nurses going through downsizing in their hospital showed that the perception of support from the hospital management affected the nurses' reactions to this decrease. Those who felt support from the hospital personnel reported lower job insecurity and higher overall satisfaction as well as higher satisfaction with the amount of work and career future [Armstrong-Stassen et al., 1995].

Limitations of the Study

The cross-sectional design of the study where the exposures and health outcomes were measured at the same time limits the interpretation of causal relationships. Furthermore, a possible selection bias in this study pertains to the healthy worker effect (HWE), which is frequent in a cross-sectional study. This bias is created by the fact that sick people get out of the workforce either by retirement or sick leave and do not participate in the study, which is usually realized in the workplace, among workers present during the study period. This bias would entail an underestimation of the prevalence of health problems. We have diminished this kind of bias in choosing the telephone interview, which reached all active nurses including nurses who were temporarily out of work. In fact, 7% of respondents (n = 141)

TABLE V. Adjusted Prevalence Ratios and 95% Confidence Intervals for Psychological Distress According to Psychological Factors at Work Among 1,527 Nurses in Québec Region (Men and Women) in 1998

Psychosocial factors at work	Model 1 ^a		Model 2 ^b		Model 3 ^c	
	PR	95% CI	PR	95% CI	PR	95% CI
Bloc 1						
PD ⁻ DL ^{++d}	1.00		1.00		1.00	
PD ⁻ DL ⁻	1.49	1.07–2.07	1.35	0.97–1.87	1.30	0.93–1.82
PD ⁺ DL ⁺	1.93	1.48–2.52	1.79	1.37–2.34	1.62	1.22–2.14
PD ⁺ DL ⁻	2.25	1.73–2.92	1.97	1.51–2.57	1.70	1.28–2.24
Social support						
Low	1.66	1.43–1.92	1.52	1.31–1.76	1.34	1.16–1.56
Bloc 2						
Increase in job demands	1.92	1.51–2.45	1.91	1.47–2.47	1.55	1.19–2.03
Decrease in decision latitude	1.04	0.91–1.18	1.06	0.93–1.20	1.02	0.92–1.19
Decrease in social support	1.61	1.35–1.2	1.48	1.24–1.77	1.30	1.08–1.56

^aEach factor adjusted for outside of work variables (avoidance coping strategy, type A behavior, social support outside of work, domestic load) + age, gender, job status (five models).

^bAll variables in each bloc + outside of work variables + age + gender + job status (two models).

^cAll variables in the same model + outside of work variables + age + gender + job status.

^dPD, psychological demands; DL, decision latitude; -, low; +, high; high PD ≥ 0 ; low DL ≤ 70 .

reported that they had been absent from work for a prolonged period at time of interview. For 54 respondents (3%), this was due to sickness. We have also realized a short telephone interview among 374 nurses who had left their employment since the beginning of restructuring, between April 1995 and September 1997. The purpose of this interview was to investigate the health status and the reason for work cessation among those nurses. The response rate for the interview was 73%. From an open question pertaining to the main reason, which motivated them to leave their job, 35% left because of early retirement offers by the government, 27% because of bad working conditions or difficulty of adaptation to the restructuring, 13% because of physical and/or emotional exhaustion, 7% for other health problems. Another selection bias may have occurred if nurses who participated in the telephone survey were not representative of all the nurses eligible for the study. This bias would have entailed either an over- or underestimation of the prevalence of either health problems or work psychosocial factors. However, we achieved a good participation rate, therefore minimizing the possibility and the magnitude of this selection bias. The comparison of respondents and non-respondents revealed that less part-time nurses participated in the study. This lesser participation remains hard to explain and the direction of the effect is unknown. Also, nurses who had declared low decision latitude in 1997 were less likely to participate to the second survey in 1998. Since decision latitude was associated with psychological distress in this study, the prevalence of high PSI found in 1998 may have been an underestimation of

the true prevalence and could explain the fact that the high prevalence found in 1997 (41%) had receded by 1998 (36%).

Informational bias could have occurred, since the work-related variables were actually based on perceptions rather than objective measures. However, no objective measures were available in this context of change, and the perceived work constraints were possibly more important in the development of mental health problems than objective constraints that may not be perceived as such [Lindstrom, 1994]. In addition, Semmer et al. [1996] reported that in studies which address this methodological issue, self-reports have been found to be “better than is often assumed.”

There may also be confounding if variables not measured in the study were associated with both health and work characteristics and influenced the associations found. In fact, many of the factors that contribute to the development of mental health problems are related to work. We have examined a broad range of such factors that were most often mentioned by nurses and are likewise documented in the scientific literature, and we have adjusted the associations between psychosocial factors at work and psychological distress for these factors when required. Other demographic and social factors have also been included in the study and have been taken into account in the analyses.

Concluding Remarks

The comparison with two reference populations showed an increase in psychological risk factors at work among

nurses after restructuring of the health care sector and a higher prevalence of high job demands, low decision latitude, and job strain among nurses compared to a representative sample of working women from the QHS. This research also showed a high prevalence of psychological distress among nurses compared to working women from the QHS. Such a high level of distress may lead to short- or mid-term health problems. Several occupational factors were associated with psychological distress among nurses in this study. Future workplace interventions should be based on work conditions identified by many nurses as being problematic. This would be in line with studies that point out the relevance of organizational interventions to eliminate negative work stressors and to promote organizational and staff health and well-being [Petterson and Arnetz, 1998; Bond and Bunce, 2001].

ACKNOWLEDGMENTS

We thank all nurses who participated in this study, the members of the steering committee, and the persons from human resources management and unions responsible for its realization in each health center. We are also thankful to Marcel and Karl-Erik Giner for data collection, Caroline Arsenault for the coordination of data collection, Myrto Mondor, Jean-Sébastien Brien, Julie Jacques, and Éric Demers for data processing, and Richard Whelan for reviewing the English version of this paper.

REFERENCES

- Amick B, Kawachi I, Coakley E, Lerner D, Levine S, Colditz G. 1998. Relationship of job strain and iso-strain to health status in a cohort of women in the United States. *Scand J Work Environ Health* 24(1): 54–61.
- Armstrong-Stassen M, Keil J, Cameron SJ, Horsburgh ME. 1995. Predictors of nurses' reactions following hospital downsizing. Presented at the conference, Work, Stress, and Health '95: Creating Healthier Workplaces, Washington, DC.
- Arnetz BB, Brenner SO, Levi L, Hjelm R, Petterson IL, Wasserman J, Petrini B, Eneroth P, Kallner A, Kvetnansky R, Vegas M. 1991. Neuroendocrine and immunologic effects of unemployment and job insecurity. *Psychother Psychosom* 55:76–80.
- Bellerose C, Lavallée C, Chénard L, Lévasseur M. Health and social survey report 1992–1993. Vol. 1. Montréal: Santé Québec, Ministère de la Santé et des Services sociaux, Gouvernement du Québec (in French).
- Bond F, Bunce D. 2001. Job control mediates change in a work reorganization intervention for stress reduction. *J Occup Health Psychol* 6(4):290–302.
- Bound T, Galinsky E, Swanberg J. 1998. The 1997 national survey of the changing workforce. New York: Family and Work Institute.
- Bourbonnais R, Brisson C, Vézina M, Moisan J. 1996. Job strain and psychological distress in white collar workers. *Scand J Work Environ & Health* 22(2):139–145.
- Bourbonnais R, Comeau M, Dion G, Vézina M. 1998. Job strain, psychological distress, and burnout in nurses. *Am J Ind Med* 34(1): 20–28.
- Bourbonnais R, Comeau M, Vézina M. 1999a. Job strain and evolution of mental health among nurses. *J Occup Health Psychol* 4(2): 95–107.
- Bourbonnais R, Comeau M, Viens C, Brisson C, Laliberté D, Malenfant R, Vézina M. 1999b. Professional life and health of nurses since health network restructuring. *Santé mentale au Québec* 24(1):136–153 (in French).
- Bourbonnais R, Malenfant R, Viens C, Vézina M, Côté N. 2000. Nursing under strain. A comprehensive approach to nurses work during a transition period. Québec: Équipe RIPOST, CLSC-CHSLD Haute-Ville-des-Rivières et Université Laval (in French).
- Braun S, Hollander RB. 1988. Work and depression among women in the Federal Republic of Germany. *Women & Health* 14(2):3–26.
- Brisson C, Blanchette C, Guimont C, Dion G, Moisan J, Vézina M, Dagenais G, Mâsse B. 1998. Reliability and validity of the French version of the 18-item Karasek Job Content Questionnaire. *Work & Stress* 12(4):322–336.
- Burke R, Greenglass E. 2000. Effects of hospital restructuring on full time and part time nursing staff in Ontario. *Intern J Nurs Studies* 37:163–171.
- Cheng Y, Kawachi I, Coakley E, Schwartz J, Colditz G. 2000. Association between psychosocial work characteristics and health functioning in American women: Prospective study. *Br Med J* 320:1432–1436.
- Daveluy C, Pica L, Audet N, Courtemanche R, Lapointe F. 2000. Social and health survey 1998. Québec: Institut de la statistique du Québec (in French).
- European Foundation. 1997. Time constraints and autonomy at work in the European Union. Dublin: European Foundation for the Improvement of Living and Working Conditions.
- Friedman M, Rosenman R. 1974. Type A Behavior and Your Heart. London: Wildwood House.
- Gerpott TJ. 1990. Intracompany job transfers: An exploratory two-sample study of the buffering effects of interpersonal support. *Prev Hum Serv* 8(1):113–137.
- Hartley J, Jacobson D, Klandermans B, Vuuren V. 1991. Job insecurity: Coping with job at risk. London: Sage.
- Ilfeld FW. 1976. Further validation of a psychiatric symptom index in a normal population. *Psychol Rep* 39:1215–1228.
- Jick TD. 1985. As the ax falls. Budget cuts and experience of stress in organizations. In: Beehr TA, Bhagat RS, editors. Human stress and cognition in organizations. An integrated perspective. Chichester, UK: John Wiley & Sons. pp 83–114.
- Johnson JV, Hall EM. 1988. Job strain, workplace social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. *AJPH* 78(10):1336–1342.
- Johnson JV, Hall EM, Theorell T. 1989. Combined effects of job strain and social isolation on cardiovascular disease morbidity and mortality in a random sample of the Swedish male working population. *Scand J Work Environ Health* 15:271–279.
- Karasek R. 1979. Job demands, job decision latitude, and mental strain: Implications for job redesign. *Adm Sc Quart* 24:285–308.
- Karasek R. 1990. Lower health risk with increased job control among white collar workers. *J Organiz Behav* 11:171–185.
- Karasek R, Theorell T. 1990. Healthy work: Stress, productivity and the reconstruction of working life. New York: Basic Books.
- Kauppinen-Toropainen K. 1981. Job demand and job content: Effects on job dissatisfaction and stress. Helsinki: Department of Psychology Institute of Occupational Health.

- Kivimäki M, Vahtera J, Pentti J, Ferrie J. 2000. Factors underlying the effect of organisational downsizing on health of employees: Longitudinal cohort study. *Br Med J* 320:971–975.
- Kivimäki M, Vahtera J, Pentti J, Thomson L, Griffiths A, Cox T. 2001. Downsizing, changes in work, and self-rated health of employees: A 7-year 3-wave panel study. *Anx Stress Cop* 14:59–73.
- Landsbergis PA. 1988. Occupational stress among workers: A test of the job demands-control model. *J Org Behav* 9:217–239.
- Landsbergis PA, Vivona-Vaughan E. 1995. Evaluation of an occupational stress intervention in a public agency. *J Org Behav* 16:29–48.
- Larocque B, Brisson C, Blanchette C. 1998. Internal consistency, factorial and discriminant validity of the French translation of the psychological demands and decision latitude of the Job Content Questionnaire. *Rev Epidem Pub Health* 96:371–381.
- Latack JC. 1986. Coping with job stress: Measures and future directions for scale development. *J Appl Psychol* 71(3):377–385.
- Laurier C, Dumas J, Grégoire JP, Duval L. 1990. Use of tranquilizers, sedatives and sleeping pills: Analysis of data from Santé Québec survey. Montréal: Gouvernement du Québec, Ministère de la Santé et des Services sociaux (in French).
- Lindstrom K. 1994. Psychosocial criteria for good work organization. *Scand J Work Envir Health* 20:123–133.
- Matteson MT, Ivancevich JM. 1990. Merger and acquisition stress: Fear and uncertainty at mid-career. *Prev Hum Serv* 8(1):139–158.
- Mattiasson I, Lindgarde F, Nilsson JA, Theorell T. 1990. Threat of unemployment and cardiovascular risk factors: Longitudinal study of quality of sleep and serum cholesterol concentrations in men threatened with redundancy. *BMJ* 301:461–466.
- Mausner-Dorsch H, Eaton WW. 2000. Psychosocial work environment and depression: Epidemiologic assessment of the demand-control model. *AJPH* 90(11):1765–1770.
- Morris JK, Cook DG. 1991. A critical review of the effect of factory closure on health. *Br J Indus Med* 48:1–8.
- Nelson DL. 1990. Adjusting to a new organization: Easing the transition from outsider to insider. *Prev Hum Serv* 8(1):61–86.
- Niedhammer I, Goldberg M, Leclerc A, Bugel I, David S. 1998. Psychosocial factors at work and subsequent depressive symptoms in the Gazel cohort. *Scand J Work Environ Health* 24(3):197–205.
- Parker S, Chmiel N, Wall T. 1997. Work characteristics and employee well-being within a context of strategic downsizing. *J Occup Health Psychol* 2(4):289–303.
- Petterson IL, Arnetz BB. 1998. Psychosocial stressors and well-being in workers. The impact of an intervention program. *Soc Sci Med* 47(11):1763–1772.
- Préville M, Boyer R, Potvin L, Perreault C, Légaré G. 1992. Psychological distress: reliability and validity of the measure used in Santé Québec. Montréal: Santé Québec (in French).
- Rothman K. 1987. *Modern epidemiology*. Toronto: Little Brown and Company.
- SAS. 1990. *SAS/ Stat User's Guide*. Version 6 (4th edition ed. Vol. 2). Cary: SAS Institute.
- Sauter SL, Murphy LR, Hurrell JJ. 1990. Prevention of work-related psychological disorders: A national strategy proposed by the National Institute for Occupational Safety and Health (NIOSH). *Am Psychol* 45(10):1146–1158.
- Semmer N, Zapf D, Greif S. 1996. “Shared job strain”: A new approach for assessing the validity of job stress measurements. *J Occup Org Psychol* 69:293–310.
- Skov T, Deddens J, Petersen MR, Endahl L. 1998. Prevalence proportion ratios: Estimation and hypothesis testing. *Int Epidem Assoc* 27:91–95.
- Stansfeld SA, Fuhrer R, Head J, Ferrie J, Shipley M. 1997. Work and psychiatric disorder in the Whitehall II Study. *J Psychosom Res* 43(1):73–81.
- Tierney D, Romito P, Messing K. 1990. She ate not the bread of idleness: Exhaustion is related to domestic and salaried working conditions among 539 Québec hospital workers. *Women & Health* 16(1):21–42.
- Vahtera J, Kivimäki M, Pentti J, Theorell T. 2000. Effect of change in the psychosocial work environment on sickness absence: A seven years follow up of initially healthy employees. *J Epidem Comm Health* 54(7):484–493.
- van der Doef M, Stan M, Diekstra R. 2000. An examination of the Job Demand-Control-Support model with various occupational strain indicators. *Anxiety Stress Coping* 13:165–185.
- Vézina M, Cousineau M, Mergler D, Vinet A, Laurendeau M. 1992. How to give meaning to work. Boucherville: Gaétan Morin.
- Ware JE, Sherbourne CD. 1992. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 30(6):473–483.
- White JP. 1997. Health care, hospitals, and reengineering: The Nightingales sing the blues. In: Duffy A, Glenday D, Pupo N, editors. *Good jobs, bad jobs, no jobs. The transformation of work in the 21st Century*. Toronto: Harcourt Brace. pp 117–142.
- Woodward C, Shannon H, Cunningham C, McIntosh J, Lendrum B, Rosenbloom D, Brown J. 1999. The impact of re-engineering and other cost reduction strategies on the staff of a large teaching hospital: A longitudinal study. *Med Care* 37(6):556–569.

APPENDIX 1

Psychological demands nine-item scale

Five items on general psychological demands:

- Work fast^a
- Work hard^a
- No excessive work^a
- Enough time^a
- Hectic job

One item on role ambiguity:

- Conflicting demands^a

One item on concentration:

- Intense concentration

Two items on mental work disruption:

- Task interrupted
- Wait on others

All analyses presented in this study were also made with the nine-item version of psychological demands because the added items put emphasis on hectic work, and work disruption that are characteristic of nurses' work. The results with both the five- and nine-item versions were all in the same direction, and the conclusions identical. The results with the five-item scale giving more conservative results are thus presented in this study.

^aItems included in the five item version.

APPENDIX 2

Measures of changes in psychosocial factors at work

Changes in job demands (three items)

At present, tensions in my professional life are . . . * than before restructuring in the health care sector?

At present, the amount of work is . . . than before restructuring in the health care sector?

Change in decision latitude (three items)

At present, the use of my abilities is . . . than before restructuring in the health care sector?

At present, the possibility to use my clinical judgement is . . . than before restructuring in the health care sector?

At present, the possibility to decide how to organize my work is . . . than before restructuring in the health care sector?

Change in social support (four items)

At present, the availability of my immediate superior is . . . than before restructuring in the health care sector?

At present, the support from my colleagues is . . . than before restructuring in the health care sector?

At present, isolation in my work is . . . than before restructuring in the health care sector?

At present, communication between nurses in my team is . . . than before restructuring in the health care sector?

Note: The translation in English has been done by the main author for the reviewers' comprehension only and has not been validated since the study population was entirely francophone.

*The response category for all items were: greater, equal, or less than before restructuring in the health care sector.