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## Relationship of job strain and iso-strain to health status in a cohort of women in the United States

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**Objective** This study examined the relationships of job strain and iso-strain psychosocial work-environment exposures to health status in a cohort of working women in the United States.

**Methods** In a cross-sectional survey, 33 689 women responded to the Karasek job content and the MOS SF-36 health status questionnaires. The psychosocial work-environment exposures were characterized using the job strain and iso-strain frameworks. Health status was assessed with the following 6 scales: physical functioning, vitality, freedom from pain, mental health, role limitations due to physical health, and role limitations due to emotional health.

**Results** When compared with active work, high-strain work (high job demands and low job control) was associated with lower vitality, mental health, higher pain, and increased risks of both physical and emotional role limitations. Iso-strain work (high strain and low work-related social support) increased the risks further. Job insecurity was also associated with lower health status.

**Conclusions** The analyses supported the hypothesis that the psychosocial work environment is an important determinant of health status among working women. The findings suggest that incorporating social conditions at work into the measurement of psychosocial work-environment exposure improves the identification of high-risk work arrangements.

**Key terms** gender, job control, job demands, mental health, physical health, social support.

Work high in psychological demands and low in level of control has been associated with a variety of deleterious health consequences (1, 2). These elements have been combined into a 2-dimensional job strain model characterizing psychosocial work exposure (figure 1). An extension of this model, called the iso-strain model, posits that the most hazardous work occurs when high job strain is combined with low levels of supportive social interaction at work (figure 2) (3–7). Tests of these models have been carried out more often in studies of men than in studies of women, and therefore some authors question their applicability to women (8). The few prospective studies of working women found that high strain at work increased the risk of cardiovascular disease in the United States (9) and Sweden (10) and increased the risk of

stroke (10), problem drinking (10), and elevated blood pressure (11, 12). Less is known about the impact of iso-strain on women's health because prospective evidence is only available for men (4).

The public health significance of these psychosocial work exposure models lies in their capacity to identify hazardous (eg, high strain and iso-strain), as well as health-enhancing (eg, active) work settings. To date, research has focused on high-strain work as an occupational health hazard, while generally overlooking the potential health promoting effects of some work arrangements (13). This perspective is a consequence of using measures of morbidity and mortality and not measures capturing the spectrum of a person's health status. In the present study, a multidimensional health status mea-

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		Psychosocial job demands	
		Low	High
Job Control	Low	Passive work (N = 10564)	High-strain work (N = 8091)
	High	Low-strain work (N = 7241)	Active work (N = 7793)

Figure 1. Two-dimensional model for job strain.

sure was used to examine the relationships of all categories of job strain and iso-strain work to health status in a cohort of working women in the United States. In addition, by controlling for biomedical factors and health behavior predictive of health status, this research builds on an earlier study (14) that demonstrated an association between job strain and health status.

## Subjects and methods

### Nurses' health study cohort

The nurses' health study cohort was established in 1976, when 121 700 female registered nurses between the ages of 30 and 55 years completed a postal questionnaire about risk factors for cancer and cardiovascular disease, including current and past smoking habits and personal history of hypertension, diabetes mellitus, hypercholesterolemia, and other diseases. Since 1976, follow-up questionnaires have been sent every 2 years to the entire cohort to update information on risk factors and the occurrence of major illnesses. All reports of major illnesses, such as cancer, coronary heart disease (CHD) and stroke, are independently confirmed by physician review of medical records following preestablished diagnostic criteria (15). Altogether 5 mailings, including certified mail, are sent out during each questionnaire cycle. A follow-up rate of over 90% has been maintained throughout the 20-year period of the study.

The 1992 questionnaire cycle included items from the Karasek job content questionnaire (16) and the SF-36 health status measure (17). Altogether 75 434 women returned the first mailing (65.2% response rate). Although 104 064 women eventually responded to the 1992 questionnaire (90.0% cumulative response rate), the job content questionnaire and the SF-36 instruments were only included in the first cycle to minimize respondent burden. Women who did not complete the job content questionnaire and SF-36 were somewhat older, heavier, more sedentary, and less likely to have graduate training than nurses who completed the full questionnaire. However, the differences between the 2 groups were small.

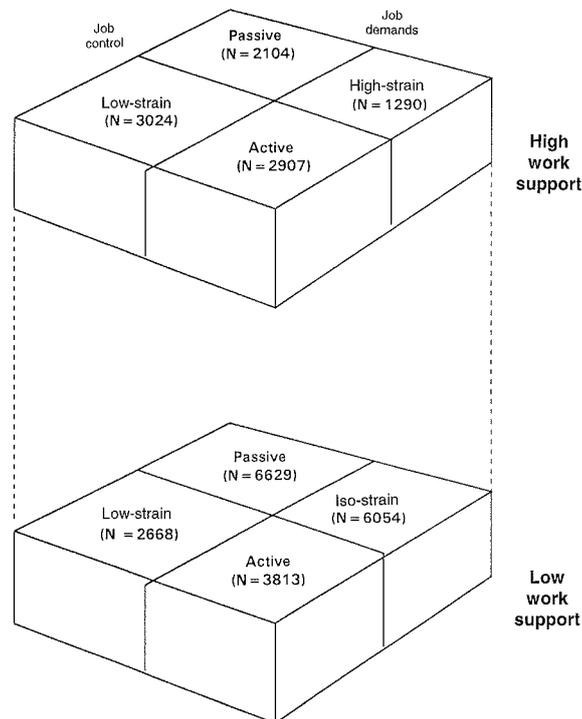


Figure 2. Extension of the two-dimensional model for job strain.

To minimize the potentially confounding effect of major illness on the relationship between psychosocial work exposure and health status, we excluded 12 701 women who had a clinically confirmed history of CHD (defined as myocardial infarction or angina pectoris), cancer, or stroke through 1992. We also excluded 24 056 women who were retired, living in a nursing home, or were otherwise not in the paid work force in 1992. Finally, we excluded 4988 women with missing information on the exposure, outcome, or covariate measures. Our final study population therefore was 33 689 women engaged in paid work who were free of diagnosed CHD, stroke, and cancer.

### Measurement of exposure

Job demands and job control were measured with the job content questionnaire (16). The job demands scale is the sum of 5 items that measure the level of psychological demands at work (excessive work, conflicting demands, insufficient time to do work, fast work pace, working hard). The job control scale is the sum of 2 subscales: skill discretion as measured by 6 items (continual learning of new things on the job, ability to develop skills, job requiring skill, task variety, work not repetitious, job requiring creativity) and decision authority measured by 3 items (freedom to make decisions, choice about how to perform work, having a lot of say on the job). For each demand and control item, the respondents could choose from 1 of 4 responses varying from strongly disagree to strongly agree. A comparison found no differences for job demands and job control medians in this cohort of

primarily nurses with national data comprised of many occupations (14).

To measure job strain, the job demands and job control scales were converted to dichotomous measures by splitting them on the median. A cross-classification of these 2 measures produces the 2 × 2 matrix shown in figure 1, which defines 4 exposure categories (14). Persons on the median were classified as having less severe exposure (low demands or high control), resulting in a conservative exposure assessment. Four variables (1 = yes, 0 = no) indicating the type of work — high strain, low strain, passive, and active — were created.

For the measurement of iso-strain, first, a work-related support scale was constructed by summing 2 scales: support from co-workers (they take a personal interest in me, are friendly, helpful in getting the job done, and competent in doing work) and support from supervisors (concerned about the welfare of those under her, pays attention, helpful in getting the job done, successful in getting people to work together). The response choices for each item varied on a 4-point scale from strongly disagree to strongly agree (16). A "not applicable" response was added to the supervisor support questions. Next, work-related support was split on the median with persons above the median classified as receiving high support. Finally, work-related support was cross-classified with job strain to create 8 exposure groups (figure 2) (3). Eight variables (1 = yes, 0 = no) indicating the 8 exposure groups were created. It should be noted that the population sizes are different for our job strain and iso-strain models because we excluded 5200 women who checked "not applicable" to the questions about support received from their supervisors from the iso-strain analysis. Exclusion of these women from multivariate job strain analyses did not change the results.

#### Measurement of health status

Health status was measured using a modified version of the medical outcomes study SF-36 health survey — a short, comprehensive measure of 8 dimensions of general health (18). These scales were derived from general health status scales designed to represent 2 major dimensions of health: physical and mental (19–21). Detailed descriptions of the conceptual background, development and psychometric validity, and the reliability of the SF-36 can be found elsewhere (17, 18, 20, 22, 23). The SF-36 was modified in 2 ways. The item order was changed, and 1 item assessing general health perception was omitted. We included 6 of the 8 multi-item scales. A 2-item social functioning scale was excluded because of the use of social support as a predictor of health status in our iso-strain models, and the 1992 questionnaire did not include all items necessary to construct the general health perceptions scale. The 6 remaining scales measured both the physical and mental components of health status. Physical functioning (10 items) measured the ability to perform a variety of daily activities and tasks which require

physical effort, such as climbing stairs. Role limitations due to physical problems (4 items) assessed the limitations a person has in performing work and other usual activities as a result of physical health problems. Freedom from bodily pain (2 items) assessed self-reported bodily pain and discomfort. Vitality (4 items) measured the perceived level of energy and fatigue. Role limitations due to emotional problems (3 items) measured the limitations a person has performing work and other usual activities as a result of emotional problems. Finally, mental health (5 items) assessed both positive and negative emotional states. The response choices varied from yes or no (eg, role limitation scales) to 6-point likert-type responses (eg, mental health, vitality). All the scale scores were standardized to vary between 0 and 100 to facilitate comparability across scales and with other studies (17). A higher score indicated better health, well-being, or functioning. For the respondent to be included in the analysis, data had to be available on at least half of the items within each health status scale. Where responses were missing for items on any scale, we substituted a respondent's average response to all other items on the scale (17). Because of the extreme skewness of the role limitation scales (mean and median 100), both were recoded with 1 indicating "any limitation" (scores of < 100) and 0 as "no limitation" (score of 100).

#### Measurement of covariates

Several covariates were identified as confounders of the relationship between job strain and health status. A set of variables indicated (1 = yes, 0 = no) whether or not a respondent had a chronic illness (diabetes, high blood pressure, hypercholesterolemia, osteoarthritis, rheumatoid arthritis), never smoked, was a current smoker, was a former smoker, had a confidante, and had a spouse. Work status (1 = full-time, 0 = part-time) and the woman's socioeconomic status (1 = advanced or graduate degree, 0 = registered nurse or bachelor's degree) were rescored to indicate status. Age, body mass index (weight in kilograms divided by squared height in meters), alcohol intake (grams of ethanol per day), and recreational exercise (average amount of time per week over the last year a person engaged in 7 common activities: jogging, running, lap swimming, bicycling, rowing, calisthenics, and racquet sports) were all measured continuously. However, to avoid making the assumption that these variables were linearly related to health status, we categorized them according to their empirical distributions. Age was grouped into quintiles, exercise into quartiles, and body mass index into categories (<21, 23–25, 25–29, >29) used by Willett (24). About 60% of the sample reported no alcohol consumption; the remaining 40% were grouped into 2 approximately equal categories (1–15 g of ethanol per day and >15 g of ethanol per day). In this cohort, the validity of alcohol intake, recreational exercise, and body weight reporting have been previously established (24–26). Finally, we included 2 additional measures of self-reported work conditions assessing physical demands (1 = have a physically de-

manding job, 0 = does not have a physically demanding job), and job security (1 = does not have job security, 0 = has job security) (16).

### Data analysis

The first phase of analysis examined the crude (ie, unadjusted) means for each health status measure. To determine whether the nurses' means differed from those of a comparably aged sample of the general female population of the United States, the z-test was used (27). Next, with the focus solely on the nurses' sample, the mean health status scores were compared across the 4 job-strain groups. One-way random effects analysis of variance (ANOVA) (SAS PROC GLM) was used to compare the group means for normally distributed health status measures (physical functioning, pain, vitality, mental health). For the 2 role limitation measures, which had skewed distributions, the nonparametric Kruskal-Wallis test (SAS PROC NPARIWAY) was used instead (27).

The distribution of the other health and life-style variables (eg, chronic conditions, smoking, marital status, etc) were also compared across the job strain categories. Age-adjusted means (using a direct standardization method) were computed for the total sample and each job strain category (28). Percentages were calculated for dichotomous variables.

Four multiple linear regression models (using SAS PROC REG) were developed for the following dependent variables measured on a continuous scale and normally distributed: physical functioning, vitality, freedom from pain, and mental health. Eight models were estimated — 4 with job strain as the primary exposure and 4 with iso-strain as the primary exposure. All of these models also controlled for the potential confounding factors of co-morbid conditions, body mass index, smoking status, physical activity, alcohol intake, full-time or part-time, marital status, confidante, nurses' education, job insecurity, and physical demands of the work.

The regression coefficients and 95% confidence intervals of the main psychosocial work variables are presented. The regression coefficients can be interpreted as the average dif-

ference in health status scores compared with the reference group when controlled for potential confounders (29). The regression intercept value represents the average score for the reference group (active work in the job strain models and high social support and active work in the iso-strain models).

Multiple logistic regression models were similarly fitted (using SAS PROC LOGISTIC) for both of the role limitation scales. Logistic models were necessary because the role limitation measures were recoded to 0/1 due to the extreme skewness. A parallel set of 8 logistic models was developed with exactly the same set of independent variables as the linear models. The regression coefficients were exponentiated (base e) so they could be interpreted as odds ratios (active as the comparison group in the job strain models and high social support and active in the iso-strain models). The odds ratios and 95% confidence intervals are reported for all the work-related variables (30).

We verified the model fit of the linear regression models by examining the distribution of studentized residuals across different levels of job strain (29). We verified the fit of the logistic regression models with the Hosmer-Lemeshow goodness-of-fit test (30). In all cases, the models fit well.

## Results

### Characteristics of the sample and the distribution of covariates

Table 1 shows the age-standardized distribution of the health-status scale scores for the total sample, work exposure categories, and American norms. Compared with norms for employed women in the United States for the SF-36 (17), the levels of physical functioning and freedom from pain were significantly higher for employed women in the nurses' health study; this result possibly reflects a healthy worker effect. The American norms also included women with any preexisting major illness which contributed to the lower health status scale scores. Women in the nurses' cohort who engaged in high-strain work had the lowest mean scores for

**Table 1.** Distribution of the mean health status scores by job strain groups and in comparison with US norms for working women between the ages of 45–72 years. (US = United States, NHS = nurses' health study)

	Job-strain group <sup>a</sup>					
	Female US norm (N = 234)	Total NHS sample (N = 33 689)	Low strain (N = 7 241)	High strain (N = 8 091)	Active (N = 7 793)	Passive (N = 10 564)
Physical functioning	82.0	89.0	89.7	88.3	90.4	88.2
Vitality	61.8	63.6	68.1	58.9	64.3	63.5
Pain (freedom from)	72.0	76.0	78.5	72.9	76.8	76.1
Mental health	75.9	76.1	80.0	72.0	76.2	76.5
Role – emotional	84.5	84.2	87.3	78.6	84.2	85.1
Role – physical	83.2	80.5	84.7	75.1	82.9	80.0

<sup>a</sup> Differences among the job-strain groups (NHS) tested with 1-way, random effects analysis of variance (rows 1–4,  $P < .001$  for all 4 rows) and Kruskal-Wallis test (rows 5–6,  $P < .001$  for both rows). Differences between normative data and NHS sample tested with 2 sample z-test of means ( $P < .001$  for rows 1 and 3,  $P > .05$  for all other rows). US normative data based on a reanalysis of data appearing in the *SF-36 Health Survey Manual and Interpretation Guide* (17).

**Table 2.** Age-standardized distribution of covariates by job strain exposure group (N = 33 689). (MET = multiples of basal metabolic rate, RN = registered nurse, BA = bachelor of arts, NHS = nurses' health study)

	Total (N = 33 689)	Low strain (N = 7 241)	High strain (N = 8 091)	Active (N = 7 793)	Passive (N = 10 564)
Standardized means <sup>a</sup>					
Alcohol (g/day in 1990)	13.8	14.8	12.0	13.7	14.1
Body mass index (kg/m <sup>2</sup> )	26.1	26.4	25.9	25.9	26.1
Recreational exercise (MET hours/week)	17.4	18.1	16.6	18.6	16.6
Standardized percents <sup>a</sup>					
Part-time worker (%)	43.7	36.6	45.3	24.5	57.0
Current smoker (%)	14.0	13.3	14.7	15.2	13.2
Past smoker (%)	40.8	41.4	40.5	38.8	41.2
Diabetic (%)	4.1	4.1	4.0	4.3	4.3
High cholesterol (%)	35.1	35.1	35.6	34.4	35.0
High blood pressure (%)	29.3	29.3	29.8	28.0	29.8
Arthritis (%)	35.8	33.9	37.6	34.6	36.1
RN/BS degree (%)	87.3	79.2	93.1	79.8	92.9
Married (%)	77.7	77.6	77.1	77.6	78.8
Confidante present (%)	93.8	95.8	92.5	93.8	93.4
Agree have good job security (%)	83.0	88.2	77.8	86.2	81.4
Agree job requires physical effort (%)	38.4	22.9	63.6	53.9	24.6

<sup>a</sup> Standardized to the age distribution of the entire NHS cohort, using the direct method.

5 health status scales and a level of physical functioning similar to women in passive work. Table 2 shows the age-standardized distribution of the covariates for the total sample and across the job strain categories. Modest differences were noted in the socioeconomic status of the women, especially high-strain work compared with low-strain work, the former being less likely to hold graduate degrees (beyond registered nurse or bachelor's degree). Overall, women in the cohort reported high job security (83.0%); however, the women in high-strain work were the least likely to agree that they had good job security (77.8%). Part-time workers were the least likely to be engaged in active work and the most likely to be engaged in passive work. No major differences were apparent in the distribution of health behavior across categories of psychosocial work-environment exposure. However, women in high-strain work were the most likely to agree that their work required physical exertion; they also had the highest prevalence of self-reported arthritis.

#### *Job strain, iso-strain, functional health status and well-being*

Compared with active work, high-strain work was associated with a modest, but statistically significant, reduction in physical functioning (1.0 point decrement) (table 3). High-strain work was also associated with a 4.4-point reduction in vitality, a 3.3-point reduction in mental health, and a 2.4-point reduction in bodily pain (indicating higher levels of pain). By contrast, women in low-strain work showed the highest levels of mental health, vitality, and freedom from pain when compared with any other group.

Data for iso-strain are shown in the lower half of table 3. The data consistently indicate that iso-strain work (heavy demands, low control, and low support) was associated with the lowest levels of health status. The effects of iso-strain were the most pronounced for vitality [7.0-point reduction,

95% confidence interval (95% CI) 6.2—7.8] and mental health (5.6-point reduction, 95% CI 5.0—6.2). A difference of 5 points or more in the SF-36 scores is regarded as clinically and socially significant (17).

#### *Job strain, iso-strain and role limitations*

Table 4 presents the logistic regression models for role limitations due to physical and emotional problems. After multivariate adjustment, the women in high-strain work were more likely to report role limitations due to physical problems [odds ratio (OR) 1.42, 95% CI 1.32—1.52], as well as emotional problems (OR 1.34, 96% CI 1.25—1.44). The effects on role limitations of working in high-strain work was comparable in magnitude to the effects of having rheumatoid or osteoarthritis (data not shown). Compared with women in active work, women in low-strain work were at lower risk of being limited due to physical problems (OR 0.82, 95% CI 0.76—0.88) and emotional problems (OR 0.63, 95% CI 0.58—0.68). Women in iso-strain work were at even higher risk of role limitations (bottom half of table 4). Conversely, working in low strain or socially supportive work environments was associated with the lowest risks.

#### *Discussion*

With the use of the Karasek job strain exposure measure (16), the psychosocial work environment has been shown to be an important determinant of health status among working women in the United States. Both job strain and iso-strain were predictive of poorer health in the 6 dimensions of health status examined. A more pervasive effect of job strain on the SF-36 scales was found as compared with another similar study (14). While the job strain framework suggests active

**Table 3.** Linear regression of health status on work organization.<sup>a, b</sup>

	Physical function		Pain (freedom from)		Vitality		Mental health	
	Regression coefficient	Standard error						
<b>Model 1: job strain (N = 33 689)</b>								
Intercept	91.2***	0.6	80.1***	0.8	57.7***	0.7	72.5***	0.6
High strain	-1.0***	0.2	-2.4***	0.3	-4.4***	0.3	-3.3***	0.2
Low strain	-0.2	0.2	1.5***	0.3	3.2***	0.3	3.4***	0.2
Passive	-0.5*	0.2	0.2	0.3	-0.6*	0.3	0.5*	0.2
Job insecurity	-0.9***	0.1	-1.4***	0.1	-2.3***	0.1	-2.7***	0.1
Physical effort	0.6***	0.2	-0.7***	0.2	0.8***	0.2	0.5***	0.2
R <sup>2</sup> <sub>adj</sub>	17.8%		14.6%		15.6%		10.4%	
F-test	229.3***		181.4***		194.8***		123.1***	
<b>Model 2: iso-strain (N = 28 489)</b>								
Intercept	91.4***	0.7	80.7***	0.9	59.0***	0.8	73.7***	0.6
Iso-strain	-1.1***	0.3	-3.6***	0.4	-7.0***	0.4	-5.6***	0.3
High strain/high support	-0.9*	0.5	-2.1**	0.6	-4.3***	0.6	-2.3***	0.5
Low strain/low support	-0.5	0.4	0.5	0.5	0.7	0.4	1.2**	0.4
Low strain/high support	0.1	0.4	1.1*	0.5	1.9***	0.4	2.1***	0.4
Passive/low support	-0.7*	0.3	-0.6	0.4	-2.9***	0.4	-1.5***	0.3
Passive/high support	-0.6	0.4	-0.9	0.5	-1.8***	0.5	-0.5	0.4
Active/low support	-0.1	0.3	-1.4**	0.4	-3.5***	0.4	-2.9***	0.3
Job insecurity	-1.0***	0.1	-1.3***	0.2	-2.0***	0.1	-2.6***	0.1
Physical effort	0.6***	0.2	-0.8***	0.2	0.6**	0.2	0.5**	0.2
R <sup>2</sup> <sub>adj</sub>	17.7%		14.7%		15.7%		10.7%	
F-test	171.6***		136.9***		148.4***		95.7***	

<sup>a</sup> All models control for part/full-time work status, age, body mass index, exercise, smoking, diabetes, arthritis, hypertension, high cholesterol, alcohol, nurse's education, currently married, presence of a confidante.

<sup>b</sup> Regression coefficients with (standard errors).

\* 0.01 < P < 0.05, \*\* 0.001 < P < 0.01, \*\*\* P < 0.001.

work should be associated with the best health status, low-strain work was associated with better functioning. Both low strain and active work share high levels of decision latitude, suggesting that higher levels of control may be particularly important in promoting health (31). In the only other study of job strain using the same outcome measure (14), the authors did not detect a significant job security effect on health status. A sense of security was protective in this analysis. This difference may be due in part to growing labor market instability in the health care field in 1992, when this survey was conducted, as compared with 1990, when the earlier study (14) was conducted. However, the cross-sectional design of both studies limits causal interpretations.

To our knowledge, this is the first study to examine the association of iso-strain work with the health status of working women in the United States. Iso-strain work was associated with the poorest health status and the greatest risks of role limitations. Whereas Johnson & Hall's study of Swedish women (3) found only an increased risk for blue-collar jobs, these results point to the hazards within service sector jobs. Studies of employed men found that iso-strain work was associated with higher age-specific cardiovascular morbidity and mortality rates (4) and an increased risk for hypertension (6). Previous studies of job strain in women did not have exposure information on work-related social support (7, 8, 32–38), examined only 2-way interactions (11) or only main effects (13, 39–42) or did not disaggregate the data by gender (7, 14, 43). These findings suggest that

**Table 4.** Logistic regression of role limitations on work organization.<sup>a</sup> (95% CI = 95% confidence interval)

	Role-emotional		Role-physical	
	Odds ratio	95% CI	Odds ratio	95% CI
<b>Model 1: job strain (N = 33 689)</b>				
High strain	1.34	1.25–1.43	1.42	1.32–1.52
Low strain	0.63	0.58–0.68	0.81	0.75–0.88
Passive	0.89	0.83–0.95	1.04	0.97–1.11
Job insecurity	1.37	1.33–1.42	1.24	1.20–1.29
Physical effort	0.97	0.92–1.02	1.08	1.03–1.14
<b>Model 2: iso-strain (N = 28 489)</b>				
Iso-strain	1.69	1.53–1.88	1.64	1.48–1.81
High strain/high support	1.19	1.02–1.38	1.35	1.17–1.56
Low strain/low support	0.77	0.68–0.88	0.92	0.82–1.04
Low strain/high support	0.68	0.60–0.77	0.85	0.75–0.96
Passive/low support	1.08	0.97–1.20	1.18	1.07–1.31
Passive/high support	1.00	0.87–1.14	1.15	1.01–1.31
Active/low support	1.39	1.24–1.55	1.18	1.06–1.32
Job insecurity	1.35	1.30–1.40	1.23	1.18–1.27
Physical effort	0.95	0.90–1.00	1.10	1.04–1.16

<sup>a</sup> Models control for part/full-time work status, age, body mass index, exercise, smoking, diabetes, arthritis, hypertension, high cholesterol, alcohol, nurse's education, currently married, presence of a confidante.

incorporating social conditions at work into the measurement of psychosocial work-environment exposure improves the identification of high-risk work arrangements.

There were several limitations to this study. Data were not available on past work organization exposure. Current

exposure status may not necessarily reflect past exposure in this cohort of middle-aged and older women. Moreover, a selection bias could have arisen if women changed nursing jobs due to their health status. As a partial correction for this possibility, women with major disease conditions that might influence job shifts were excluded from the analysis. Future studies should incorporate life-course exposure models and compare the job strain and iso-strain models with other psychosocial work-environment exposure models.

The potential limits of self-reported exposure data have been extensively discussed elsewhere (44). Other job strain research among nurses found that variance in self-reported work load was explained by objective indicators of work load (eg, patient load and patient contact) (45). The stability of self-report work assessments over time in the Cornell work and health study lends support to the utility of the job content questionnaire in epidemiologic research; for job decision latitude the correlation between assessments taken 3 years apart is 0.62 and for job demands it is 0.61 (Joseph Schwartz, personal communication). These values are comparable with the 0.73 correlation obtained in the same study for ambulatory blood pressure.

The generalizability of the results was assessed by comparing the nurses' health study respondent mean SF-36 scale scores to national norms for the SF-36 (17). Overall, the employed participants in the nurses' health study were comparable with working women in the United States for each of the 6 health status scales (table 1). The respondents in the nurses' health study reported higher levels of physical functioning and freedom from pain, a finding reflecting some selection of women out of an often physically demanding occupation (46). Overall, the data from the nurses' health study (SF-36) are reasonably generalizable to the general population of working women.

Our findings, along with those of other studies of health care professionals (13, 47), particularly nurses (41, 45, 48), suggest that those who are restructuring the health care sector should consider the potential health hazards of certain psychosocial work environments, as well as the opportunities for health improvements presented by alternative work arrangements.

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