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Manager support for work/family issues and its impact on employee-reported pain in the extended care setting

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Abstract

Objective—Supervisor-level policies and the presence of a manager engaged in an employee's need to achieve work/family balance, or “supervisory support,” may benefit employee health, including self-reported pain.

Methods—We conducted a census of employees at four selected extended-care facilities in the Boston metropolitan region (n= 368). Supervisory support was assessed through interviews with managers and pain was employee-reported.

Results—Our multilevel logistic models indicate that employees with managers who report the lowest levels of support for work/family balance experience twice as much overall pain as employees with managers who report high levels of support.

Conclusions—Low supervisory support for work/family balance is associated with an increased prevalence of employee-reported pain in extended-care facilities. We recommend that manager-level policies and practices receive additional attention as a potential risk factor for poor health in this setting.

Introduction

Substantial changes in the American labor force have occurred in recent decades and, increasingly, employees are required to balance the demands of both work and home simultaneously [1]. According to the National Study of the Changing Workforce (NSCW), a nationally representative sample of employed Americans, nearly three-quarters of women with children under 18 years of age reported working outside the home in 2007, compared to 50% in 1975 [2]. The survey also indicates that 79% of married and partnered employees reported living in dual-earner households in 2008, with women earning almost half (44%) the income in these households. Concurrent with these shifts, fathers also spend more time with their children today than they did thirty years ago. The NSCW reveals that they spent two hours in 1977, compared with three hours in 2008; women consistently averaged 3.9 hours with children throughout both periods. Young children are not the only family members requiring caretaking. In an aging population, the odds are increasing that working age men and women will also have caretaking responsibilities for older family members [3,

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4]. Together, these social and economic demographic and family transitions present a scenario in which the wellbeing of employed men and women may be compromised.

As the landscape of work and home life evolves, it is critical to identify strategies that maintain and improve the wellbeing of employed individuals by addressing concurrent demands of work and family. Greenhaus and Beutell introduced the term 'work-family conflict' twenty-five years ago, referring to "a form of interrole conflict in which the role pressures from the work and family domains are mutually incompatible in some respect" [5], with work and family balance serving as the absence of these competing pressures. Supervisor-level policies and the presence of a direct manager who is sympathetic to and engaged in an employee's need to achieve work/family balance, which we will refer to here as "supervisory support," may be one method for addressing the rivaling demands of work and home life [6]. In the healthcare setting, the context for findings presented here, Thomas and Ganster assessed flexible scheduling as a form of supportive supervision and found that it was associated with beneficial effects on employee's depression, somatic complaints, and blood cholesterol [7]. Similarly, Berkman demonstrated that managers' family-friendly attitudes and practices were negatively correlated with risk of cardiovascular disease and positively associated with sleep duration in the extended care setting [8]. In this same study of nursing homes, Ertel highlighted the beneficial effect of support from supervisors on depressive symptoms [9]. Other research on healthcare professionals has revealed the importance of schedule control and social support from managers and colleagues on employee psychological and physical health [10–13]. Finally, organizational and supervisory support may improve job outcomes. Years ago, research revealed that flextime (a work schedule in which starting and quitting times are flexible) reduced tardiness, absenteeism, job turnover and work/family interference as well as increased satisfaction and time spent with family and on household tasks [7, 14, 15].

The current study focuses on the relation between supervisory support and employee-reported pain at extended-care facilities. Healthcare is one of the largest and fastest expanding industries in the United States [16], and the incidence of workplace injury and illness in hospitals is higher than that for private industry, with the most elevated rates in nursing home facilities [16]. Among an ethnically diverse sample of registered nurses in the U.S., nearly half of all nurses reported neck and back pain and 35% reported shoulder pain [17]. Yet, to our knowledge, research has not specifically evaluated the relation between manager-level support for work and family balance and pain experienced by the healthcare employees that they supervise. To address this gap in the literature, the current study is largely based in the tradition of job strain theory, specifically the Demand-Control-Support model [18]. Building on Karasek's model of job stress [19, 20], which considers the combination of job demands and control that produce job strain, this particular framework also incorporates workplace social support. Research utilizing this multidimensional model of job strain has identified low social support at work as an important predictor of worse health outcomes, including higher prevalence of cardiovascular disease [18], as well as worse job-related outcomes including lower job satisfaction [21].

In conceptualizing the current study, we hypothesize that the health benefits of supervisory support as they specifically relate to work/family balance may affect employee-reported pain through physical as well as psychosocial pathways. A recent review of the U.S. and European research identified both heavy physical work and high psychosocial work demands among the primary causes of work-related musculoskeletal disorders in a variety of work settings [22]. In healthcare, frequent lifts and transfers of patients, long periods of standing or walking, staff density, work satisfaction, night shift work, perceived lack of support of supervisors and perceived negative work culture have all been associated with low-back pain specifically [23–25]. Psychosocial factors, including decision authority, skill

discretion, work demands, and support from colleagues and supervisors, have also been linked to physical injury and disability in two Dutch samples, one of which included healthcare professionals only [26] and another with nurses and other professionals [27].

Through interviews of both employees and their direct supervisors, our study is particularly aimed at understanding the contribution of supervisory support related to work/family balance and the outcome of employee-reported pain. Specifically, we seek to address the following hypotheses in the context of the extended care setting:

1. Employees supervised by managers who report little supervisory support for work/family balance will report more pain than employees with higher levels of manager support.
2. Because both physical and psychosocial strain may have a role in pain etiology, employees in direct patient care roles will report more pain than employees who do not work in a direct patient capacity, controlling for ergonomic work factors.
3. Work/family conflict, as measured by employees' self-reported work to home and home to work spillover, may account for the relationship between supervisory support and employee-reported pain.

Method

Sample and Data Collection

Subjects were employees at four extended care facilities in Massachusetts who took part in a cross-sectional survey of employee experiences with workplace policies and informal practices. After referral from the Massachusetts Extended Care Federation, researchers contacted administrators at extended care facilities within a 50-mile radius of Boston to gauge interest in participating in the current study. We identified four extended care facilities with varied characteristics and developed an approach to census each facility. Upon approval by upper management at each enrolled facility, researchers distributed flyers to recruit employees. Research assistants trained in interview techniques and biomarker collection administered the survey in English, Spanish, and Haitian Creole between September 2006 and July 2007. All interviews were conducted during employees' work shifts. Interviews required approximately 40 minutes, and debit cards in the amount of \$15 were distributed to all respondents as an incentive to participate. All eligible employees at each work site were invited to participate in the survey, with a response rate of 76.6% (N = 452). Complete data for all covariates of interest yielded a total sample of 368 in the current analysis. No substantial differences in employee characteristics were apparent in this reduced sample.

Measures

Outcome – Employee Rated Pain—Employees were asked whether, in the past four weeks, they experienced any bodily pain. If so, they were asked whether this pain was experienced once or twice, a few times, fairly often, very often or every day. An employee was considered to experience pain often (coded *yes*) if they answered fairly often, very often or every day and not often (*no*) if they answered once, twice or a few times in the past four weeks. If any pain was experienced, the survey also assessed employee back, neck and shoulder pain at work through questions asking whether an employee experienced on-the-job pain in these areas during the same four week period (*yes/no*). We include data on a combined and dichotomized measure of back, neck and shoulder pain at work reflecting whether employees experienced any pain at work in these areas or not (*yes/no*).

Supervisory Support Score—Our independent variable of interest was supervisory support. Managers of employees included in this study were asked about their supervisory practices in qualitative interviews. Two researchers participated in and subsequently coded interviews with managers to assess flexibility as part of two domains of supervisory support - openness and creativity for work/family balance. To measure openness, managers were asked whether he/she helps employees with their jobs when needed, adjusts employees' schedules to suit their work and family needs, and discusses family leave with job security. Similarly, to assess creativity, each manager was asked whether he/she acknowledges the possibility of creatively applying current policies as well as reports doing so. Managers received a score of either a 0 or 1 according to whether they reported that they did (*I*) or did not (*O*) exhibit these characteristics. To weight supervisory support for openness and creativity equally, we multiplied each work/family balance score on openness by 2 and each manager's score on creativity by 3, leading to a total possible score of 12 (6 for each domain). As done in previous research [8], we divided these scores into tertiles to create a supervisory support score that is low, mid, or high, with high showing the most creativity and openness to work/family balance. Chi-square tests indicate that the two supervisory support domains, creativity and openness are, indeed, associated ($p < 0.01$). It is important to note that the supervisory support score was derived from interviews with the managers, whereas employee data were obtained from interviews and physical examinations of employees. Therefore, employee characteristics are not expected to bias the association between this score and employee-reported pain or other employee-reported health outcomes. From this point forward, we also use the term *supervisory support score* to refer to the manager's tertile score to support work/family balance

Work/family conflict, direct patient care and other covariates—Other variables relevant to the study's hypotheses included work/family conflict and the provision of direct patient care. Consistent with previous work [9], we assessed the role of work/family demands through a question about spillover (preoccupation about work at home and home at work). Similar questions assessing the frequency of work interfering with home responsibilities (and vice versa) have been used elsewhere in the work/family literature to assess work/family conflict [28]. Specific items pertaining to work/family spillover (things at home do not get done because of job demands and vice versa) have also shown to correlate strongly and significantly with a validated scale to measure work/family conflict employed in the second phase of the current Work, Family and Health Network Study [29] indicating that the spillover construct is an effective measure of work/family conflict (For work to home and home to work spillover, chi-square $p < 0.001$). Direct patient care employees were considered health care practitioners. Included here are registered and licensed practical nurses and health care support staff, such as certified nursing assistants. Staff persons with managerial or office-based roles or those working in service and maintenance were not included as direct patient care employees.

Other covariates conceptualized to be associated with supervisory support for work/family balance and employee-rated pain were also included in this analysis: job strain, depressive symptoms, age, hourly wage, obesity, male gender, and Non-Hispanic race. Job strain was assessed using survey items about job demands and job control based on the work of Karasek and colleagues [30, 31]. In response to questions pertaining to physical activity, heavy lifting and awkward body positions (job demands) as well as degree of skill, task variability and autonomy (job control) at work, subjects strongly disagreed, disagreed, agreed or strongly agreed (valued 1 – 4, respectively) that these elements were part of their jobs. Consistent with other research, we calculated the sum of these ordinal responses for job control and job demands separately and dichotomized each measure at the highest 50th percentile (*yes/no*). Depressive symptoms, measured by the Iowa Short Form of the Center for Epidemiologic Studies Depression Scale [32], age and hourly wage at the current job

were measured continuously, centered around their respective means. To measure obesity, we employed the traditional cut point of a BMI greater than or equal to 30 (*yes/no*) [33]. Male gender (*yes/no*) and Non-Hispanic White race (*yes/no*) were measured dichotomously.

Statistical Analysis—We examined the bivariate relation between pain (any self-reported pain and self-reported pain at work, in the past four weeks), supervisory support score and relevant covariates through frequency tables and analyses of variance and corresponding F-statistics. Subsequently, we employed multilevel logistic regression models to account for the nested nature of our data (employees within managers) and assessed relevant odds ratios and corresponding 95% confidence intervals for statistical significance. These findings are shown in Table 3 for any pain and Table 4 for pain at work. To test our primary hypothesis that employees with low supervisor support for work/family balance will report more pain than employees whose supervisors report more support, we included supervisory support score and sociodemographic characteristics such as age, sex and race for both pain outcomes (Model 1). In model 2, we test a second hypothesis that employees in direct patient care roles will report more pain than employees who do not work in a direct patient capacity and include work characteristics such as direct patient care, hourly wage, job strain (demand and control) and as well as depressive symptoms and obesity. To assess whether work/family conflict could account for the relationship between supervisory support score and employee-reported pain, we assessed whether the work/family spillover variable attenuated this relationship by building on Model 2 and including spillover from home-to-work and work-to-home in Model 3. Finally, because pain and depression are correlated, we assessed another model building on Model 3 without depressive symptoms (not presented in Tables 3 or 4). With each multilevel model, we also examined manager-level variation.

Results

Sample Characteristics

This sample consisted of 368 employees employed at extended care settings (310 women and 58 men) who participated in our study survey and had complete data on the aforementioned variables of interest (Table 1). Roughly one-half (45%) and one-quarter (26%) reported any pain and pain at work in the past four weeks, respectively. In analyses of variance, both pain measures were significantly associated with supervisory support and provision of direct patient care, before controlling for other covariates ($p < 0.01$ for both). In bivariate analyses, Non-Hispanic White race, high job control and obesity were associated only with overall pain (all $p < 0.01$), whereas high job demands were associated with pain at work ($p = 0.03$) (For data on covariates by exposure level, see Table 2.). Over 70% of the employees in the sample had managers who reported low or mid supervisory support. With 71% employed in direct patient care, fifty-seven percent and 51% reported high job control and high job demand, respectively. Nearly one-third of the sample report being obese and 43% Non-Hispanic White race, compared to Non-Hispanic Black, Hispanic and other races. The mean depressive score of the sample was 6.69 (SD = 4.80; range 0 to 25) and subjects averaged an age of 41 years and an hourly wage just under \$16.

Any pain in past four weeks

Employees supervised by managers who report low and mid levels of supervisory support for work/family balance experience more overall pain than employees with managers who report high levels of support. As described previously, we built a series of multilevel logistic regression models to test our primary hypothesis. In Model 1 (Table 3), controlling for age, sex, and race, supervisory support score was associated with increased likelihood of employee-reported pain in the past four weeks (mid supervisory support score: OR=2.56, CI= (1.45–4.53); low supervisory support score: OR=1.85, CI=(1.08, 3.16)). A small

amount of between-manager variation was present (not shown in Table 3). However, this variability disappears in Model 2, in which low supervisory support scores were, again, associated with increased likelihood of overall employee-reported pain (mid supervisory support score: OR=2.17, CI= (1.17, 4.03); low supervisory support score: OR=1.90, CI= (1.05, 3.44)). Working in a direct patient capacity has an odds ratio of 1.72 but is not statistically significant (CI= (0.94, 3.15)). Contrary to our final hypothesis, results suggest that work/family conflict does not diminish the effects of supervisory support (or other variables) on employee pain (Model 3). Despite the fact that depressive symptoms are highly correlated with pain, removal of the depressive symptoms variable from Model 3 did not affect our findings and, therefore, these results are not presented.

Pain at work in the past four weeks

Similarly to our analysis with overall pain reported in the past four weeks, employees with low and mid supervisory support scores experience more pain at work than employees with managers who report high levels of supervisory support. In Model 1 (Table 4), controlling for sociodemographic characteristics of the employee only, the lowest supervisory support scores are associated with roughly twice the risk of pain at work (mid supervisory support score: OR=2.78; CI=(1.41, 5.49); low supervisory support score: OR=2.31; CI=(1.19, 4.49)), and between-manager variation is not present. These odds ratios attenuate slightly in Model 2. (mid supervisory support score: OR=2.10; CI=(0.96, 4.57); low supervisory support score: OR=2.30; CI=(1.09, 4.88)). A small and non-significant amount of between-manager variation is present and remains with the addition of spillover variables in Model 3. These work/family conflict variables, however, do not impact regression results between Model 2 and Model 3 (mid supervisory support score: OR=2.10; CI= (0.96, 4.57)); low supervisory support score: OR = 2.30; CI= (1.09, 4.88)). Again, building on Model 3, the removal of depressive symptoms did not alter our findings (results not included). Direct patient care is not associated with supervisory support score in these models.

Discussion

Consistent with previous findings, the current study suggests that supervisors may play a role in the health of their employees [7, 10, 34]. Research has supported the association between manager behaviors and employee health outcomes especially related to cardiovascular disease, sleep-related problems, digestive issues, depressive symptoms, psychological distress and musculoskeletal problems [8, 9, 35], and our findings further indicate that supervisory support are also related to risk of employee-reported pain. Specifically, employees whose managers report the lowest supervisory support scores, reflecting low levels of creativity and openness about work/family balance, may experience roughly twice as much overall pain and pain at work. These results account for a wide variety of physical and psychosocial characteristics of the employee, including, job control job demands, direct patient care, obesity and depressive symptoms, as well as age, gender, wage and race/ethnicity.

While identifying specific causal mechanisms is beyond the scope of this study and the cross-sectional data available, we did examine the hypothesis that the association between of manager's level of supervisor support for work family issues and employee pain may be partially explained by the employee perception of work/family conflict or spillover. As described previously, we assessed this notion with the inclusion of a variable that addresses preoccupation about work at home and home at work. We found that employee-reported spillover did not alter any of our results, suggesting the work/family conflict does not account for the reported relationship between supervisory support and employee pain association. While similar work/family spillover questions have been shown to correlate strongly with validated scales of work/family conflict [29], the absence of a work/family

conflict scale in the current study precludes us from validating the spillover measures employed here. Therefore, it is possible that the spillover questions presented here do not fully and adequately tap into the domain of work/family conflict, despite very similar questions being used in previous research [9, 28]. As Berkman and colleagues posit, another explanation for this finding is that, in measuring manager openness and creativity, we have discovered a new domain of supervisory support that affects health (in this case, employee pain), one that is not currently reflected in traditional models of job or inter-role strain [8]. It is also plausible that individual perceptions of work/family conflict are conceptually distinct from actual provision of work/family benefits and, therefore, unrelated to actual pain outcomes, a notion for which there is support in other health literature. For example, work on racial discrimination suggests that individuals may not necessarily need to perceive prejudice for these experiences to be internalized and result in poorer health [36]. Thus, in the current study, it is possible that employee health may be driven more so by objective measures of supervisory practices than subjective perceptions of work and home life stressors. An additional explanation for the finding that work/family conflict does not appear to account for the relation between supervisory support and employee-reported pain concerns selection. It is certainly possible that employees with better health simply seek managers that offer more support and, thus, work/family conflict would not be expected to alter any existing association between supervisory support and employee pain. Given the cross-sectional nature of this study, we cannot confirm this possibility. However, we can look forward to testing this hypothesis further in the next phase of this research, an ongoing randomized control trial sponsored by the National Institutes of Health and the National Institutes of Occupational Safety and Health, in order to further elucidate the role, if any, of work/family conflict on supervisory behaviors and pain.

Our analysis also offers preliminary, albeit descriptive, insight into other risk factors of employee pain. Our results indicate that employees with high job control reported significantly higher odds of any pain over the past four weeks as employees with low job control (OR= 2.03, CI: (1.15, 3.58 in Model 3)), a finding somewhat disparate from previous research that suggests a beneficial health effect of having a high control job [18, 37, 38] even in the hospital setting [39]. Further investigation of our sample reveals that almost 70% of employees who report high control jobs fall into the occupational categories of health care practitioners and health care support staff, or direct patient care. These positions are also overwhelmingly the most ergonomically taxing, relative to office-based, food service and maintenance roles, and constitute almost 80% of employees reporting high levels of physical activity, lifting and awkward body positions, as measured by job demands.

Because our analyses have controlled these ergonomic demands our findings prompt us to speculate that these employee characteristics - high control and direct patient care positions – may not be correlated with heightened reports of pain due to physical demands but, instead, potentially because of psychosocial demands (for example, emotional burnout instead of patterns of heavy lifting). Hoogendoorn and colleagues suggest that psychosocial strains in the workplace – perhaps more so than in private life - are, indeed, associated with back pain. Their study called for further evaluation to determine the precise role of specific workplace factors, including job satisfaction [40]. Other research on the psychosocial etiology of work-related pain points toward mixed evidence, in large part due to the wide range of predictors and outcomes considered and variation in how they were conceptualized and measured [41] as well as the particular importance psychosocial factors may have in the pain recovery process, as opposed to pain onset [42]. A study of intensive-care unit nurses also found that nurses who reported high control as well as active coping experienced increased emotional exhaustion, compared to nurses with different control and coping profiles [43], which suggests that interactions between workplace and psychosocial characteristics may affect employee health. Taken together, it is possible that psychosocial

demands on the job may play an important role in the relation between manager flexibility and employee-reported pain in our sample. While deciphering the specific causal mechanisms involved is beyond the scope of this particular analysis and challenging to do given the cross-sectional nature of our study and variables in our dataset, we believe the topic begs further investigation.

Overall, our results suggest an important role of supervisory support for work family balance as well as other workplace experiences in shaping patterns of employee-reported pain. While we believe these findings enhance knowledge about current work/family practices, specifically by suggesting ways in which manager's practices may relate to employee health, we do acknowledge some limitations in the current study. Our sample was drawn from four extended care facilities in the state of Massachusetts near Boston that agreed to take part in our survey. Selection of nursing homes was not systematic and depended on the approval of facility administration. Therefore, our sample of worksites is not likely to be representative of all extended care facilities in the region. Importantly, however, we did obtain a complete listing of all employees at the facilities and invited all eligible employees to participate. We received a response rate of 76.6% in our extended care facilities. Secondly, our study is cross-sectional and we are unable to draw causal inferences about work/family oriented manager practices and self-reported pain. It is possible that employees with better health select managers who are more skilled and responsive to their needs, however, we believe this to be relatively rare. The use of a number of self-reported measures, including job strain and depressive symptoms, instead of objective markers may also bias the results presented here. To improve the quality of our data, we utilized validated scales (such as Karasek's classic job strain questionnaire and the CES-D, respectively) whenever possible. Again, it is important to note that our major 'exposure' condition in this study is supervisor support related to work family issues and is a measure developed from the reports of managers themselves, *not* employees. Finally, we are limited in our ability to differentiate between the physical and psychosocial mechanisms driving the supervisory behavior and employee pain relation due to the temporal sequencing and variables included in our data. For instance, it may be that managers who have low levels of support for work family issues also ask more physically strenuous or stressful tasks of employees. This analysis also exhibits a number of strengths. Our statistical approach using multilevel methods accounts for the clustering of data by workgroups as well as the nested nature of employees within managers. As alluded to earlier, manager support for work/family balance, measured as willingness to help employees with their jobs, schedules and work/family needs as well as apply workplace policies with creativity to accommodate employees, was ascertained through qualitative interviews with managers. Thus, as described elsewhere [8], it is unlikely for issues of reverse causation (ie: that employees experiencing pain report perceive managers as being less flexible) or selection (ie: that employees with pain are unable to perform jobs that are likely to have more flexible leadership) are at play.

Today, it is increasingly common for employees to simultaneously juggle the demands of work as well as young children and older family members who may require special care at home [3, 4]. Particularly in the ever-expanding healthcare sector, it is imperative that successful workplace policies to address and improve employee wellbeing be identified. To that end, the current study suggests that supervisory support for work and family balance may reduce the risk of employee-reported pain in the extended care setting. To further promote employee wellbeing in healthcare and other sectors, we recommend that subsequent research examine the temporal nature of this association as well as the pathways that relate supervisory support to employee health in order to, ultimately, identify strategies that that benefit the wellbeing of the American workforce.

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Table 1

Descriptive Statistics (N=368)

Categorical Variables	Any Pain				Pain at Work (shoulder, neck and back)				p-value*
	Frequency	Percent	% report -ing pain	Standard Deviation	Frequency	Percent	% report -ing pain	Standard Deviation	
Supervisory Support									<0.01
Low	142	38.6	0.5	0.50	142	38.6	0.3	0.45	
Medium	119	32.3	0.6	0.49	119	32.3	0.3	0.46	
High	107	29.1	0.3	0.47	107	29.1	0.1	0.35	
Male									0.15
No	310	84.2	0.5	0.50	310	84.2	0.3	0.44	
Yes	58	15.8	0.4	0.49	58	15.8	0.2	0.38	
Non-Hispanic White race									0.26
No	209	56.8	0.4	0.49	209	56.8	0.2	0.42	
Yes	159	43.2	0.5	0.50	159	43.2	0.3	0.45	
Direct patient care provider									<0.01
No	108	29.4	0.3	0.48	108	29.4	0.2	0.36	
Yes	260	70.6	0.5	0.50	260	70.6	0.3	0.45	
High Job control									0.42
No	159	43.2	0.4	0.48	159	43.2	0.2	0.42	
Yes	209	56.8	0.5	0.50	209	56.8	0.3	0.44	
High Job demands									0.03
No	179	48.6	0.5	0.50	179	48.6	0.2	0.40	
Yes	189	51.4	0.5	0.50	189	51.4	0.3	0.46	
Obese									0.17
									<0.01

Categorical Variables	Any Pain					Pain at Work (shoulder, neck and back)				
	Frequency	Percent	% report -ing pain	Standard Deviation	p-value*	Frequency	Percent	% report -ing pain	Standard Deviation	p-value*
No	252	68.5	0.4	0.49		252	68.5	0.2	0.42	
Yes	116	31.5	0.6	0.50		116	31.5	0.3	0.46	
Spillover work-to-home					0.26					0.06
No	337	91.6	0.4	0.50		337	91.6	0.2	0.42	
Yes	31	8.4	0.6	0.51		31	8.4	0.4	0.50	
Spillover home-to-work					0.75					0.52
No	315	85.6	0.4	0.50		315	85.6	0.2	0.43	
Yes	53	14.4	0.5	0.50		53	14.4	0.3	0.45	
Continuous Variables	Frequency	Percent	Mean	Standard Deviation	p-value*	Frequency	Percent	Mean	Standard Deviation	p-value*
Age					0.79					0.75
Pain: No	202	54.9	40.9	13.52		277	75.3	40.9	13.62	
Pain: Yes	166	45.1	40.5	13.11		91	24.7	40.4	12.44	
Hourly Wage					<0.01					0.13
Pain: No	202	54.9	14.7	6.90		277	75.3	15.9	7.26	
Pain: Yes	166	45.1	17.4	7.73		91	24.7	17.0	7.75	
Depressive Symptoms					<0.01					<0.01
Pain: No	202	54.9	5.7	4.21		277	75.3	5.9	4.31	
Pain: Yes	166	45.1	7.9	5.16		91	24.7	9.1	5.36	

* p-value for F-statistic

Table 2

Categorical covariates by exposure (N=368)

Categorical Variables	Supervisory Support					
	Low		Mid		High	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Male						
No	122	85.9	105	88.2	83	77.6
Yes	20	14.1	14	11.8	24	22.4
Non-Hispanic White race						
No	83	58.5	65	54.6	61	57.0
Yes	59	41.5	54	45.4	46	43.0
Direct patient care provider						
No	31	21.8	20	16.8	57	53.3
Yes	111	78.2	99	83.2	50	46.7
High Job control						
No	71	50.0	43	36.1	45	42.1
Yes	71	50.0	76	63.9	62	57.9
High Job demands						
No	71	50.0	49	41.2	59	55.1
Yes	71	50.0	70	58.8	48	44.9
Obese						
No	93	65.5	80	67.2	79	73.8
Yes	49	34.5	39	32.8	28	26.2
Spillover work-to-home						
No	129	90.1	110	92.4	98	92.6
Yes	13	9.1	9	7.6	9	8.4
Spillover home-to-work						

Categorical Variables	Supervisory Support					
	Low		Mid		High	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
No	127	89.4	99	83.2	89	83.2
Yes	15	10.6	20	16.8	18	16.8

Table 3

Regression results, any pain, past 4 weeks (N=368)

	Model 1		Model 2		Model 3	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
Supervisory Support						
Low	1.85	1.08 3.16	1.90	1.05 3.44	1.90	1.05 3.45
Mid	2.56	1.45 4.53	2.17	1.17 4.03	2.16	1.16 4.02
High	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Age	0.99	0.97 1.00	0.99	0.97 1.00	0.99	0.97 1.00
Male						
Yes	0.83	0.45 1.52	1.28	0.64 2.55	1.29	0.64 2.58
No	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Non-Hispanic White						
Yes	1.91	1.23 2.96	2.06	1.17 3.61	2.05	1.17 3.61
No	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Direct Patient Care						
Yes			1.72	0.94 3.15	1.75	0.95 3.20
No			1.00	1.00 1.00	1.00	1.00 1.00
Hourly Wage			1.02	0.99 1.06	1.02	0.99 1.06
Job Control High						
Yes	2.02	1.15 3.56	3.56	2.03 1.15	2.03	1.15 3.58
No	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Job Demands High						
Yes	0.90	0.55 1.46	1.46	0.89 0.55	0.89	0.55 1.45
No	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Depressive Symptoms						
Obese	1.15	1.09 1.22	1.22	1.15 1.09	1.15	1.09 1.22
Yes	2.43	1.46 4.03	4.03	2.44 1.46	2.44	1.46 4.05
No	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Spillover work-to-home						
Yes					1.20	0.50 2.87

	Model 1		Model 2		Model 3	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
No			1.00	1.00	1.00	1.00
Spillover home-to-work						
Yes			1.13	0.57	2.23	
No			1.00	1.00	1.00	1.00

Table 4

Regression results, pain at work, past 4 weeks (shoulder, back and neck) (N=368)

	Model 1		Model 2		Model 3	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
Supervisory Support						
Low	2.31	1.19 4.49	2.30	1.09 4.88	2.30	1.07 4.91
Mid	2.78	1.41 5.49	2.10	0.96 4.57	2.12	0.96 4.65
High	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Age	0.99	0.97 1.01	0.99	0.97 1.01	0.99	0.97 1.01
Male						
Yes	0.66	0.31 1.39	0.97	0.42 2.23	0.99	0.43 2.27
No	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Non-Hispanic White						
Yes	1.33	0.81 2.17	1.79	0.95 3.39	1.76	0.93 3.35
No	1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.00 1.00
Direct Patient Care						
Yes			1.64	0.79 3.41	1.66	0.79 3.48
No			1.00	1.00 1.00	1.00	1.00 1.00
Hourly Wage			1.02	0.98 1.07	1.02	0.98 1.06
Job Control High						
Yes			1.21	0.64 2.29	1.21	0.64 2.30
No			1.00	1.00 1.00	1.00	1.00 1.00
Job Demands High						
Yes			1.54	0.88 2.69	1.53	0.87 2.68
No			1.00	1.00 1.00	1.00	1.00 1.00
Depressive Symptoms			1.16	1.10 1.23	1.16	1.10 1.23
Obese						
Yes			1.77	1.01 3.10	1.71	0.97 3.03
No			1.00	1.00 1.00	1.00	1.00 1.00
Spillover work-to-home						
Yes					1.68	0.69 4.07

	Model 1		Model 2		Model 3	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
No			1.00	1.00	1.00	1.00
Spillover home-to-work						
Yes			1.00	0.47	2.12	
No			1.00	1.00	1.00	1.00