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Managers' Practices Related to Work–Family Balance Predict Employee Cardiovascular Risk and Sleep Duration in Extended Care Settings

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Abstract

An increasing proportion of U.S. workers have family caregiving responsibilities. The purpose of this study was to determine whether employees in extended care settings whose managers are supportive, open, and creative about work–family needs, such as flexibility with work schedules, have lower cardiovascular disease (CVD) risk and longer sleep than their less supported counterparts. From semistructured interviews with managers, we constructed a work–family balance score of manager openness and creativity in dealing with employee work–family needs. Trained interviewers collected survey and physiologic outcome data from 393 employees whose managers had a work–family score. Employee outcomes are sleep duration (actigraphy) and CVD risk assessed by blood cholesterol, high glycosylated hemoglobin/diabetes, blood pressure/hypertension, body-mass index, and tobacco consumption. Employees whose managers were less supportive slept less (29 min/day) and were over twice as likely to have 2 or more CVD risk factors (ORs = 2.1 and 2.03 for low and middle manager work–family scores, respectively) than employees whose managers were most open and creative. Employees who provide direct patient care exhibited particularly elevated CVD risk associated with low manager work–family score. Managers' attitudes and practices may affect employee health, including sleep duration and CVD risk.

Keywords

job strain; work–family conditions; cardiovascular risk; sleep; socioeconomic status

Over the next several decades, the composition of the workforce in the United States, as in most industrialized and industrializing countries, will complete a substantial demographic shift. The workforce is increasingly composed of women, many of whom have young

children; dual wage-earning couples; single parents; and older men and women who are increasingly likely to be caregivers (Bond, Galinsky, & Swanberg, 1998; Bond, Thompson, Galinsky, & Prottas, 2003; Fields & Casper, 2001; Moen, 2003; Riche, 2005). In addition, demographers forecast an increasingly ethnically diverse population of men and women, some of whom will be recent immigrants with responsibilities in their countries of origin as well as in their new countries (Karoly & Panis, 2004). This diversified population has great potential to contribute important skills needed to maintain a healthy workforce in the coming years, yet they simultaneously have competing needs and responsibilities to care for their families. In recent labor force surveys, over half the workforce in the United States had to attend to family caregiving needs in the past year (Sparks, Faragher, & Cooper, 2001).

As the workforce in industrialized countries continues this major demographic transition, it will be critical to understand how workplace policies and practices can provide flexibility and resources to enable workers to manage productive employment and family matters (Glass & Estes, 1997). In many Western European countries, there is already a host of workplace policies in place to accommodate this growing issue (Earle & Heymann, 2006; Kelly, 2006). Public and private policies in the United States, however, have been much slower to incorporate work–family practices that would reduce stress in employees and enable them to attend to family issues (Gornick & Meyers, 2004). This is especially true for low- and middle-wage workers who often lack job flexibility to balance home and work tasks in addition to lacking most basic benefits, such as paid sick days (Blair-Loy & Wharton, 2002; Eaton, 2003). A recent study documents that up to 53% of low-wage workers with young children have no job flexibility with regard to sick or vacation leave or short-term job flexibility (Heymann, 2000). We hypothesize that this is a very stressful situation for employees and, for a number of reasons, will lead to poor health and increased absence from work.

Even where public and private sector family responsive policies exist, these policies are routinely interpreted as requiring the consent of supervisors. Employees may be reluctant to use benefits such as paid parental leave for fear of retributions from supervisors (Bowen & Orthner, 1991; Glass & Fujimoto, 1985; Raabe, 1990). Consequently, managers often become the gatekeepers of family responsive policies and practices, thus determining how much work–family strain employees actually experience. Supporting this argument, studies have found that by providing or withholding social support, particularly instrumental support, supervisors can influence employees' perception of control over and level of work–family strain in their workplaces (Frone, Russell, & Cooper, 1997; Lapierre & Allen, 2006; Thomas & Ganster, 1995; Warren & Johnson, 1995).

This work builds on theories of job strain developed by Karasek and others (Karasek, 1979; Siegrist, 1996) in which supervisor support interacts with other dimensions of work strain related to job control and demands to affect health and well-being by increasing stress, which may directly alter cardiovascular disease (CVD) risk, as well as by influencing behaviors such as tobacco consumption, diet, and physical activity, which in turn affect CVD risk. Many of the original job strain studies found that job control, demand, and support were strongly related to employees' CVD risk (Bosma et al., 1997; Kivimaki et al., 2002; Marmot, Bosma, Hemingway, Brunner, & Stansfeld, 1997; Theorell et al., 1998). Given the job strain literature, we hypothesized that employees who experience supervisory practices that do not support work–family balance would have increased CVD risk factors including higher levels of blood pressure, atherogenic indices reflective of lipid profiles, and higher rates of glycosylated hemoglobin (HbA1c) reflective of diabetes risk. Supervisor support related to work–family issues adds a new dimension to general measures of supervisor support (Frye & Breaugh, 2004; Thomas & Ganster, 1995) and can be viewed as an additional component of job strain. Even more generally, social support has been related

to a host of health outcomes ranging from CVD risks to mortality (Berkman, 2000; Cohen, 2004; Uchino, 2006). Models of supervisory support and health relate to these sets of social support theories (Carlson & Perrewé, 1999) in which it is hypothesized that low levels of social support affect health outcomes through multiple domains, including (a) an increase in high-risk health behaviors, including tobacco and alcohol consumption; and (b) increased risk of disorders that are related to physiological stress responses involving neuroendocrine dysregulation and metabolic dysfunction. Most of these physiological pathways relate directly to the development of CVD and sleep disruption. Supervisor support for work–family balance may also affect health outcomes by impacting employee assessments of work–family conflict, which in turn influence CVD risk and sleep. This hypothesis rests on ecosocial theory, which states that managers shape opportunities for work–family interactions and provide these resources to employees whom they supervise, which, if denied, create work–family conflict (Krieger, 2001). In this scenario, employee outcomes may be mediated by their assessments and perceptions of work–family conflict.

We are especially interested in CVD risk given that earlier studies have found strong relationships with CVD risk and job strain. We hypothesized that supervisor support for work–family issues would be negatively associated with CVD risk, including tobacco consumption, cholesterol, body mass, blood pressure, and diabetes risk. Second, we hypothesized that manager support around work–family issues would have an impact on sleep disruption in employees. This is a novel hypothesis based on the recent findings linking sleep both to job strain and to CVD and metabolic risks. We also tested whether these associations between managers' attitudes and practices and employee health outcomes would be mediated by employee reports of work–family conflict or higher levels of job strain as assessed by the Karasek job strain measures.

We tested these hypotheses for specific subgroups. Specifically, we were interested in whether associations would be stronger for those working in nursing care (vs. all other occupations) to see whether manager practices are of particular importance for direct patient care workers whose jobs are often characterized by high demands and limited flexibility. We hypothesized that the effects would be greater among employees in direct care positions. Second, we were concerned about employees who had children under the age of 18 living at home. We also hypothesized that the associations between managers' practices and employee health outcomes would be greater for employees who have children under the age of 18 living with them because they would have higher home demands than many others (Artazcoz, Borrell, & Benach, 2001).

To test our hypotheses, we interviewed low- and middle-wage workers and their immediate supervisors in four extended care facilities in Massachusetts. Our aim was to understand the ways in which work-place policies and practices and attitudes of midlevel managers might influence risk for CVD and sleep patterns of employees. To do this, we interviewed both managers and employees in these extended care facilities, and we collected clinical data related to biomarkers as well as self-reported data on CVD risk factors in employees. In addition, we assessed sleep using objectively measured actigraphy methods because quality and duration of sleep have become increasingly understood as factors in shaping metabolic (Buxton & Marcelli, 2007; Knutson & Van Cauter, 2008), cardiovascular (Buxton & Marcelli, 2007; Gottlieb et al., 2006; Mallon, Broman, & Hetta, 2002), and mental health risks (Hale, Peppard, & Young, 2007), and mortality (Wingard & Berkman, 1983).

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 work-place policies and informal practices. We chose the extended care sector because of interest in small-sized businesses that employ lower wage and racially/ethnically diverse workforces. Trained research assistants administered the survey in English, Spanish, and Haitian Creole between September 2006 and July 2007. We conducted interviews during employees' work shifts. Interviews took approximately 40 min, and subjects were given debit cards as incentives. We invited all eligible employees at each work site to participate in the survey ($N = 590$), with a response rate of 76.6% ($n = 452$).

Independent of the employees' survey, a qualitative researcher conducted semistructured interviews of all managers at the nursing homes. The managers' interview guide had 33 close-ended and 16 open-ended questions on five family responsive policies (scheduling, parental leave, health insurance, vacation/sick time, and child/eldercare). The close-ended questions, which asked about the presence of specific family responsive policies, were followed by open-ended questions that asked the respondents about specific experiences with each policy. All managers were invited to participate ($N = 62$), and 56 (92%) completed the interview. The analysis for this article includes scores from the 45 managers who were identified through managers' and employees' surveys and facility records as the direct supervisors of the employees in the study.

Measures

Manager work–family balance score—Our independent variable, manager work–family balance score, was collected independent of employee data. Using transcripts of qualitative interviews of the managers, two qualitative researchers with training in occupational health coded the interviews for supervisory practices toward work–family conflict. The managers' practices identified in the interviews were placed under two equal domains: openness and creativity. The researchers then reread the transcripts to code for openness and creativity and scored each manager on the basis of the criteria below. The final score for each manager was discussed and agreed on by the two qualitative researchers.

Openness: Each manager received a score of either 0 or 1 according to whether they reported that they did (1) or did not (0) do the following: (a) help employees with their jobs when needed, (b) adjust employees' schedules to suit their work–family needs, and (c) discuss family leave with job security.

Creativity: Each manager received a score of either a 0 or 1 according to whether they reported that they did (1) or did not (0) do the following: (a) acknowledge the possibility of creativity in applying current policies, and (b) report experience applying formal policy creatively.

To weight openness and creativity equally, we multiplied each manager's 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). Further analysis revealed that the two domains were correlated ($r = .62$, $p = .0001$). The mean manager work–family balance score was 6.22 ($SD = 3.39$, range: 0 – 12). We divided these scores into tertiles to create the primary dependent condition: manager work–family balance score that is low, mid, or high, with high showing the most creativity and openness to work–family balance. Hereafter, we use the term *manager score* to refer to the manager's work–family balance score tertile.

Employee outcomes—Presence of two or more CVD risk factors was the primary outcome. We assessed five modifiable CVD risk factors on the basis of the risk factor categories developed in the Framingham Study (Wilson et al., 1998): current smoking, obesity, high blood pressure or hypertension, high total cholesterol from dried blood spots, and presence of either a diagnosis of diabetes or high HbA1c. We excluded subjects with missing data on more than one of these risk factors. Through employee interviews, we collected self-reports of current smoking and height and weight to calculate obesity (body-mass index > 30). We assessed high blood pressure with self-reports of current medication for hypertension and measured blood pressure during the survey. We collected three blood pressure measurements at selected intervals during the survey with a wrist blood pressure monitor (Omron HEM-637); we used the mean of these values as measured blood pressure. We considered systolic blood pressure greater than or equal to 140 mmHg and diastolic blood pressure greater than or equal to 90 mmHg as high. If a subject reported taking medication for hypertension or had systolic or diastolic levels above these thresholds, we considered that person as having high blood pressure. We collected cholesterol and HbA1c information from blood samples. Using a disposable microlancet, trained research staff pricked the subject's middle or ring finger. We collected up to five blood spots on special filter paper, which were placed in an airtight container with desiccant pouch, stored frozen at -80 °C, and shipped frozen for assay of cholesterol levels (Bui et al., 2002) by a Clinical Laboratory Improvement Amendments-certified commercial laboratory (Biosafe Laboratories, Lake Forest, IL). We considered total cholesterol above 200 as high cholesterol. We assessed presence of diabetes through self-reports of physician diagnosis and immediate determination by trained staff of HbA1c levels using a commercially available point-of-care device (DCA 2000+, Bayer Corporation, Diagnostics Division, Tarrytown, NY). If a subject had diagnosed diabetes or HbA1c greater than or equal to 6.0%, we considered that person as having this risk factor.

The second outcome was mean minutes of sleep per day. We measured sleep with wrist actigraphy (Minimitter, Bend, OR). An actigraphy recorder is a small wrist-worn device that measures activity over extended periods in a noninvasive and discreet manner. The consensus of the sleep community, including the American Academy of Sleep Medicine (Littner et al., 2003), is that actigraphy represents a reliable, valid measure of sleep not used for the diagnosis of sleep disorders (Ancoli-Israel et al., 2003) but is useful in large-scale studies (Knutson, Rathouz, Yan, Liu, & Lauderdale, 2007; Lauderdale et al., 2006). We instructed participants to wear the wrist actigraphy monitor continuously for 7 days, with instructions for this period to include at least 2 work days in a row and 1 nonwork day. Subjects wore the actigraphy monitor for an average of 6.2 valid days ($Mdn = 7$, range: 1–10). Valid data were defined as complete, 24-hr recordings with less than 20 min of missing data because of the watch being off the wrist inferred by the visible absence of activity counts. Average total sleep time per day in minutes was estimated in 30-s epochs using the standard medium sensitivity threshold for visually defined sleep periods using the Actiware Sleep software provided by the manufacturer.

Other measures and covariates—We selected covariates that have been associated with work characteristics as well as cardiovascular health or sleep duration: age, gender, education, race/ethnicity, hours worked per week, hourly wage, regular night work, and work site (Brunner et al., 2004; Hemmingsson & Lundberg, 2006; Marmot et al., 1997). All of these were self-reported during the interview. We included age as a continuous variable. We categorized education into four groups: less than high school, high school diploma or GED, some college, or college degree. We categorized race/ethnicity as non-Hispanic White, non-Hispanic Black, Hispanic, and other. Hours worked per week were the average number of hours each respondent worked per week at the extended care facility. We assessed job demands, control and social support at work by a modified version of the

Karasek Job Content Questionnaire (Johnson & Hall, 1988; Karasek et al., 1998a, 1998b). We assessed flexibility by asking whether individuals could make or take calls at work, and whether they could choose their start and quit times. We assessed work–family spillover by asking whether, in the past month, employees had felt preoccupied with work while at home, and whether they had felt preoccupied with their personal life while at work. In addition, we included work site as a potential confounder because the four work sites varied in size, location, and policies.

Statistical Analysis

We first examined the bivariate relation between manager score and employee characteristics and outcomes. We also examined the correlation between manager score and employee-reported assessments of their jobs and workplace policies related to work–family concerns. Using multilevel regression models, we examined the relation between exposure to a manager with a low or middle work–family balance score (compared with exposure to a manager with a high work–family balance score) and our outcomes, controlling for covariates and potential confounders. Our choice of multilevel models was based on two reasons: These models account for the clustering in our data where employees at Level 1 are nested within managers at Level 2, and they are highly suitable for quantifying the association between a higher level exposure (such as a manager's score) and lower level outcomes (such as CVD risk factors among employees; Bryk & Raudenbush, 1992). In addition to our main models, we restricted analysis to health care workers to assess whether risks were particularly strong for those workers in direct care positions with very limited flexibility. MLwiN 2.10 was used to fit all multilevel models (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). Iterative generalized least squares was used to obtain estimates of the coefficients for the linear models, whereas penalized quasi-likelihood with second-order Taylor linearization was used to obtain estimates of the logit coefficients (Goldstein & Rasbash, 1996).

Results

Sample Characteristics

The cohort used in this analysis comprised 393 men and women who completed the surveys and clinical assessments in the four extended care facilities. They had a mean age of 41 years, and 84.5% were women. They were predominantly low-wage employees, with a mean hourly wage of \$15.73. The employees were from diverse racial and ethnic backgrounds, with about 60% from Black, Hispanic, or another minority groups. In Boston, many recent immigrants working in nursing care are from Haiti, Brazil, and the Dominican Republic. About 8% of the interviews were conducted in Haitian Creole. Just over half of employees had a child under 18 in the household. Over a quarter had two or more CVD risk factors.

Association Between Manager Score and Employee Characteristics

Manager score was associated with several socio-demographic and occupational characteristics in bivariate analyses (see Table 1). It is of particular concern that employees in health care occupations who were largely direct patient care workers, such as certified nursing assistants and licensed practical nurses, tended to have managers with the lowest scores on openness and creativity with regard to work–family issues. Manager score was also significantly associated with CVD risk. Among employees with managers who scored low on the scale, 28.57% had two or more risk factors, whereas only 18.49% of employees whose managers scored high had two or more risk factors ($p = .02$).

We also examined correlations between the manager score and employee reports of job demands, job control, social support at work, work–family spill-over, and workplace flexibility. The manager score was not significantly correlated with any of these measures (data available on request), nor were other dimensions of the job, including demands, control, support, or flexibility, strongly related to manager scores. Thus, the manager score developed from semistructured interviews with managers adds a unique dimension of job exposure to the domains of the occupational health literature.

Association Between Manager Score and Employee CVD Risk and Sleep Duration

In the next set of analyses, we used multilevel models to assess the association between manager score and employee CVD risk and sleep outcomes while controlling for potentially confounding factors. It is important to recall in these analyses that the manager score was derived from information from interviews with the managers, whereas employee data were from interviews and physical examinations of employees. For this reason, it is unlikely that employee characteristics bias the association between manager score and employee health outcomes. Table 2 displays odds ratios for two or more CVD risk factors associated with low and middle, compared with high, manager scores, controlling for age, gender, hourly wage, educational level, race/ethnicity, work site, hours worked per week, and night work. Overall, employees with managers who had low or middle scores had odds ratios of 2.11 (95% CI [0.90, 4.90]) and 2.03 (95% CI [1.02, 4.02]), respectively, of having two or more CVD risk factors compared with employees whose managers had high scores on work–family balance.

In our next set of analyses, we fit the same multilevel models for each of the five risk factors we included in the modified Framingham risk factor score. Figure 1 summarizes these odds ratios in a bar graph. In these analyses, we controlled for the same set of factors that we controlled for in the first analysis (age, gender, hourly wage, educational attainment, race/ethnicity, work site, hours worked per week, and night work). Although these differences were not statistically significant, the trend was for employees of managers with low scores to have higher risks. This was especially apparent for employees with diabetes (OR for low manager score = 1.64; 95% CI [0.49, 5.47]), high blood pressure (OR for low manager score = 1.89; 95% CI [0.73, 4.89]), and obesity (OR for low manager score = 1.44; 95% CI [0.67, 3.05]).

Turning our attention to our second outcome of interest, sleep duration as assessed by the actigraphy monitor, we found a very strong association between sleep duration and manager score. In fully adjusted multilevel models, employees whose managers scored low slept almost 29 min less per day than employees whose managers scored high ($p = .03$; see Table 3). In these analyses, we controlled for all the same confounders we included in the earlier models. In these analyses, our sample size dropped to 320 because not all respondents provided actigraphy data. Subjects with actigraphy data ($n = 320$), compared with those without actigraphy data ($n = 73$), had a slightly lower mean hourly wage (\$15.40 compared with \$17.17, $p = .06$), worked, on average, more hours per week (34.9 compared with 32.8, $p = .11$), had slightly lower mean household income adjusted for household size (\$27,883 compared with \$31,663, $p = .04$), were less likely to have a college degree or more (13.8% compared with 30.1%, $p = .01$), and were more likely to work full time at the extended care facility (76.3% compared with 63.0%, $p = .02$).

Employees in Direct Patient Care Occupations Had Higher CVD Risk in Relation to Manager Score

We were particularly concerned that employees in direct patient care occupations might be at elevated risk because of low levels of job flexibility, whether due to job characteristics

themselves or to managers' practices. In our bivariate data shown in Table 1, it is evident that health care workers generally have managers who score lower on the work–family scale of openness and creativity than employees working in other occupations within long-term care settings. This association may be the result of the job classifications themselves given that nursing care is traditionally a job that has limited flexibility (Kleinman, 2004; McGilton, Hall, Wodchis, & Petroz, 2007). On the other hand, managers of direct patient care occupations tend to be nurses who are selected into management positions on the basis of their excellent clinical skills (Care & Udod, 2003; Kleinman, 2003; Morrison, Jones, & Fuller, 1997); it may be that they have limited management training, resulting in fewer resources or knowledge about how to consider work–family balance in employees. Although we cannot evaluate that issue, we tested whether the risks associated with having managers with low levels of openness and creativity vis-à-vis work–family demands were elevated among health care workers in direct patient care.

Figures 2a and 2b show the odds ratios for health care workers in direct care positions (mostly certified nursing assistants and licensed practical nurses) compared with employees in other occupations for cardiovascular risks (see Figure 2a) and sleep duration (see Figure 2b). Figure 2a shows that the odds ratio for two or more CVD risk factors associated with low manager score is greatly increased (OR = 6.33; 95% CI [1.39, 28.83]) compared with non–health care workers. For sleep duration, the patterns of sleep duration did not differ for health care and non–health care workers although both occupational groups show clearly elevated risks for employees working with managers who score low.

We found no increased risks among employees who had children under the age of 18 living at home (data not shown). Unfortunately, we lacked finer grained data to test hypotheses related to the effects among those who had very young children in the household or for those who had children who did not reside in their household (these children may reside in other countries for some immigrants or in other households for those who are divorced or separated). It may also be that virtually all employees in this sample had caregiving responsibilities related to care of parents or other family members, including partners, siblings, and other close friends, so that our question about children in the household did not capture the myriad family care responsibilities experienced by this cohort. Finally, our hypothesis that supervisor support for work–family balance and CVD risk is mediated by employees' perceptions of work–family spillover was not supported with these data.

In summary, manager attitudes and practices that reflect openness and creativity to work–family balance were an important resource for low-wage workers in long-term care settings. Employees who worked for managers with low work–family openness and creativity were more likely to have elevated CVD risks based on both biomarker assessments and reports of doctor diagnoses. They also sleep almost half an hour less per night than employees with managers with high levels of openness and creativity in relation to work–family issues. The CVD risks for health care workers involved in direct patient care, including nursing assistants and nurses, are particularly elevated.

Discussion

In conclusion, on the basis of interviews with managers and employees working in long-term care, we found that managers' attitudes and practices were related to employees' CVD risk. Employees with managers who scored low or in the middle had odds ratios of 2.11 (95% CI [0.90, 4.90]) and 2.03 (95% CI [1.02, 4.02]), respectively, of having two or more CVD risk factors compared with employees whose managers had high scores on work–family balance. The risk associated with a low manager score was particularly elevated in employees providing direct patient care (OR = 6.33; 95% CI [1.39, 28.83]). In addition,

employees whose managers were open and creative in dealing with work–family issues slept significantly longer, almost 30 min on average, than those whose managers were less open and creative. These results were independent of employee and job characteristics, including hourly wage, age, race/ethnicity, work site, hours worked per week, and night work. Furthermore, our multilevel analysis had the strength of dealing with the clustered data found in work groups and the genuine multilevel nature of the data with employees clustered with specific managers. We found no support for the hypothesis that these risks were elevated among employees who had children under 18 living in the household, nor, interestingly, were they mediated by employee perceptions of work–family spillover or job strain. This work, however, suggests that there may be important crossover effects for families if the health and sleep patterns of employees are compromised. It suggests that, like the work–family research by Frone, Russell, and Cooper (1997) and more recently by Lapierre and Allen (2006), supervisor practices and behaviors have important implications for employees and potentially for their families.

What Is the Manager Score Measuring?

In our semistructured interviews, we coded responses that indicated that the manager listened to concerns of employees regarding work–family issues, allowed extra flexibility for employees who needed it to care for family members, and applied company policies in a creative way to situations in which employees found themselves constrained by both work and family situations. Because we did not ask managers about openness and creativity with regard to how they applied other work policies (career advancement, etc.), we cannot say that this attribute is specific to work–family issues. It may be that such managers are open and creative in many situations, and that we have identified a more general attribute of managers. Other investigators have pointed out the importance of leader behaviors, especially for staff nurse behavior and retention (Laschinger, Wong, McMahon, & Kaufmann, 1999) and nurse manager support (Kramer et al., 2007). In future studies, we will include a wider array of topics to be discussed in manager interviews so that we can identify whether this is a specific attribute or a more general management style. It is interesting that the work–family balance score was not related to any of the subjective employee assessments of job demands, job control, or work–family spillover. This suggests that we have identified a new domain of supervisory behavior that affects CVD risk and sleep duration beyond those identified in the classical models of job strain (Hall, 1992; Karasek, 1979; Sargent & Terry, 2000; Siegrist, 1996; Theorell et al., 1998).

Reverse Causation and Selection

Although cross-sectional in design, a strength of our study is that we relied on reports from managers about their practices to predict health outcomes in employees. This circumvents a common problem in self-report studies in which it is difficult to assess whether the presence of the poor health outcome leads to reports of more negative work conditions. Sick employees may be more inclined to view their supervisors as inflexible or closed to issues related to flexibility. Many of the initial studies of job strain relied on such self-reports, leaving open the potential for bias to affect the associations. Second, for many of the outcomes, we relied on biomarkers rather than on self-report. For instance, we obtained blood samples to assay HbA1c and cholesterol. We assessed blood pressure directly and assessed sleep duration from data collected through actigraphy. Furthermore, although we did still use some information collected through self-reports (doctor's diagnoses, weight and height, smoking behavior), the instruments we used have been found to be valid and compare well with clinical assessments.

Although reporting issues are unlikely to have influenced our results, it is possible that employees with better health and more resources might have changed jobs to work with

more skilled managers. It is certainly conceivable that within the long-term care settings we studied, employees learned of attitudes and practices of specific managers and relocated to work in these improved settings. Because this was a cross-sectional, observational study, all we can do is acknowledge this possibility. However, we are part of a research network funded by the National Institutes of Health and the National Institute of Occupational Safety and Health, and in the next phase of our research, we plan to conduct a randomized control trial to test the effect of work redesign and supervisor support in relation to work–family issues. We can then test the effects of a work–family intervention on cardiovascular and sleep outcomes in a larger, experimental setting.

In this study, we identified four extended care facilities after speaking with the Massachusetts long-term care federation and asking for volunteer companies to participate in this phase of the research. We did not conduct a systematic selection of facilities. Once we identified a nursing home, we obtained complete lists of employees and approached all full-time employees working during the day and evening shifts. In some nursing homes, we surveyed night shift employees. Our response rate of 76.6% reflects the number of people who participated in our survey of the number we invited to participate. Again, it is possible that nonrespondents were very different from our study participants in ways that might have caused bias in our results, but we have very limited information on them. Overall, we believe our solid response rates diminish the potential for a great deal of selection to have occurred at that stage and to have biased our results.

Policy Implications and Extensions to Other Occupations and Industries

Our findings suggest that managers' attitudes and practices may have an important effect on the health of employees. If this is borne out in other studies, the impact of managers' practices may well extend not only to the health of employees, but be reflected in related outcomes such as absence due to and to business outcomes related to productivity and turnover. It is also possible that the impact of such practices could have spillover effects on families, with implications for both young children and elder adults. Furthermore, many of the administrators in the long-term settings in which we conducted our studies suspected that such conditions affect patient outcomes as well as employee outcomes. There are now many models for incorporating flexible scheduling for nurses (Bailyn, Collins, & Song, 2007; Kramer et al., 2007; Kruger & Hickey, 2003; Teahan, 1998). Many of these models discuss costs, benefits, issues related to mandatory overtime participation, training supervisors to be more supportive, and so forth. To date, interventions in this area have shown mixed results with regard to work and satisfaction outcomes, but no study has examined the health impact of such work redesign policies. Over the next decade, there will be an increasing need for a skilled and increasing large workforce in health care. This workforce is likely to comprise women, many of whom will be recent immigrants. In addition, with the demographic transition and the aging of our society, there will be both more employees who are likely to be older and in need of job flexibility as well as more older people in long-term care. Flexibility on the job may well translate into increases in health and well-being for employees and their families as well as for patients in long-term care. Although we did not study other industries here, we suspect that job flexibility, especially for low-wage workers, may have health impacts across multiple industries.

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Figure 1.

Odds ratio for each cardiovascular risk factor for employees with managers with low, middle, or high work–family balance scores. Because of missing data, the number of subjects available for each outcome differs: $n = 393$ for diabetes, high blood pressure, and smoking; $n = 347$ for cholesterol; $n = 375$ for obesity; $n = 393$ for smoking.

Figure 2.

(a) Odds ratios of having two or more cardiovascular risk factors among employees whose managers have low, middle, or high work–family scores stratified by occupation. (b) Mean hours of sleep per day among employees whose managers have low or middle work–family scores compared with those who have high work–family scores stratified by job in health care or not. Models adjusted for age, gender, hourly wage, educational level, race/ethnicity, work site, and hours worked per week. Models among health care workers additionally adjusted for regular night work. ** $p < .05$.

Table 1
Employee Sociodemographic, Work, and Health Characteristics According to Manager Work–Family Balance Score

Variable	Manager work–family balance score						<i>p</i> ^a
	Low (<i>n</i> = 147)		Middle (<i>n</i> = 127)		High (<i>n</i> = 119)		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Age (years)	40.65	13.32	42.95	12.48	39.26	13.76	.09
Hourly wage	15.39	6.88	16.69	7.69	15.14	7.37	.19
Hours per week worked	34.66	10.23	34.48	7.73	34.44	10.09	.98
Months at this work site	51.42	49.35	56.44	47.58	57.70	52.69	.55
Hours/week worked at other jobs	5.99	11.84	5.60	10.38	4.84	10.73	.70
Mean minutes of sleep per day	413.77	77.16	424.05	90.93	422.12	78.00	.61
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Gender							.07
Male	20	13.61	15	11.81	26	21.85	
Female	127	86.39	112	88.19	93	78.15	
Married							.71
No	62	42.18	58	45.67	56	47.06	
Yes	85	57.82	69	54.33	63	52.94	
Education							.45
Less than high school	21	14.29	21	16.54	20	16.81	
High school or GED	46	31.29	37	29.13	34	28.57	
Some college	62	42.18	47	37.01	39	32.77	
College degree or more	18	12.24	22	17.32	26	21.85	
Work site							<.01
1	0	0.00	31	24.41	29	24.37	
2	6	4.08	65	51.18	49	41.18	
3	53	36.05	31	24.41	20	16.81	
4	88	59.85	0	0.00	21	17.65	
Race/ethnicity							.03
Non-Hispanic White	60	40.82	56	44.09	49	41.18	
Non-Hispanic Black	52	35.37	54	42.52	34	28.57	

Variable	Manager work-family balance score						<i>p</i> ^a
	Low (<i>n</i> = 147)		Middle (<i>n</i> = 127)		High (<i>n</i> = 119)		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Non-Hispanic other	23	15.65	14	11.02	21	17.65	
Hispanic	12	8.16	3	2.36	15	12.61	
Language of survey							<.01
English	136	92.52	108	85.04	108	90.76	
Spanish	1	0.68	1	0.79	8	6.72	
Haitian Creole	10	6.80	18	14.17	3	2.52	
Work full time at work site							.56
No	40	27.21	29	22.83	34	28.57	
Yes	107	72.79	98	77.17	85	71.43	
Usually work the night shift							<.01
No	131	89.12	102	80.31	119	100.00	
Yes	16	10.88	25	19.69	0	0.00	
Occupation							<.01
Health care	116	78.91	105	82.68	54	45.38	
Food and maintenance	17	11.56	12	9.45	46	38.66	
Office	12	8.16	8	6.30	11	9.24	
Other	2	1.36	2	1.57	8	6.72	
Have another paid job							.32
Yes	37	25.17	40	31.50	28	23.53	
No	110	74.83	87	68.50	91	76.47	
Child under age 18 in household							.59
No	66	44.90	61	48.03	61	51.26	
Yes	81	55.10	66	51.97	58	48.74	
Current money situation in household							.90
Comfortable	47	32.19	40	31.50	43	36.13	
Enough	53	36.30	45	35.43	37	31.09	
Need to cut back	31	21.23	26	20.47	22	18.49	
Cannot manage	15	10.27	16	12.60	17	14.29	
Two or more cardiovascular risk factors							.02

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Variable	Manager work-family balance score					
	Low (<i>n</i> = 147)		Middle (<i>n</i> = 127)		High (<i>n</i> = 119)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
No	105	71.43	83	65.35	97	81.51
Yes	42	28.57	44	34.65	22	18.49

Note. Because of missing data, some variables have a different sample size. Hours worked per week at other jobs, *n* = 389; mean minutes of sleep per day, *n* = 320; current money situation in household, *n* = 392; household income, *n* = 351; primary wage earner for family, *n* = 387.

^a *p* values for continuous variables are from proc glm; for categorical, chi-square test.

Table 2

Results of Multilevel Model Predicting Two or More Cardiovascular Risk Factors (n = 393)

Variable	OR	95% CI	p
Manager creativity and openness			
Low	2.11	[0.90, 4.90]	.08
Middle	2.03	[1.02, 4.02]	.04
High ^a	1		
Age	1.06	[1.04, 1.09]	<.01
Gender			
Male	1.02	[0.49, 2.13]	.96
Female ^a	1		
Education			
Less than high school	1.92	[0.72, 5.15]	.19
High school or GED	1.92	[0.80, 4.59]	.14
Some college	1.34	[0.62, 2.87]	.45
College degree or more ^a	1		
Race/ethnicity			
Non-Hispanic Black	0.91	[0.47, 1.79]	.79
Non-Hispanic other	1.13	[0.52, 2.44]	.75
Hispanic	1.56	[0.54, 4.50]	.42
Non-Hispanic White ^a	1		
Hourly wage	1.02	[0.97, 1.06]	.42
Hours worked per week	1.01	[0.98, 1.04]	.44
Regular night work			
Yes	1.38	[0.63, 3.01]	.42
No ^a	1		

Note. Model additionally adjusted for work site. All results conditional on random effects at the level of managers.

^aReference category.

Table 3

Results of Multilevel Model Predicting Mean Minutes of Sleep Per Day (n = 320)

	Estimate	95% CI	p
Intercept	462.43	[411.07, 513.73]	<.01
Manager creativity and openness			
Low	-28.96	[-55.05, -2.87]	.03
Middle	1.40	[-20.38, 23.17]	.90
High ^a	0		
Age	-0.44	[-1.09, 0.22]	.19
Gender			
Male	-17.96	[-40.64, 4.72]	.12
Female ^a	0		
Education			
Less than high school	-6.96	[-39.67, 25.75]	.68
High school or GED	-1.02	[-29.79, 27.75]	.94
Some college	1.55	[-24.38, 27.48]	.91
College degree or more ^a	0		
Race/ethnicity			
Non-Hispanic Black	-66.23	[-87.38, -45.08]	<.01
Non-Hispanic other	-40.12	[-65.19, -15.05]	.00
Hispanic	-42.90	[-76.75, -9.05]	.01
Non-Hispanic White ^a	0 (ref)		
Hourly wage	0.80	[-0.61, 2.20]	.27
Hours worked per week	-0.63	[-1.53, 0.27]	.17
Regular night work			
Yes	-2.24	[-28.84, 24.36]	.87
No ^a	0		

Note. Model additionally adjusted for work site. All results conditional on random effects at the level of managers.

^aReference category.