Total Worker Health and Work–Life Stress

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Objective: Review relationships between work–life stress and health behaviors to advance understanding of pathways between occupational and individual risk factors and health and safety outcomes. **Methods:** A background on the Total Worker Health concept is provided, and a review of research on the relationship between work–life stress and health behaviors is presented. **Results:** Research evidence indicates that work–life stress serves as a negative occupational exposure relating to poor health behaviors, including smoking, poor food choices, low levels of exercise, and even decreased sleep time. **Conclusion:** The association between work–life stress and adverse health behaviors suggests that interventions at both the occupational (health protection) and individual (health promotion) level may be helpful in mitigating effects of work–life stress, consistent with the Total Worker Health approach. Further study is needed to investigate gains from an integrated prevention strategy.

Workplace integration of health protection and health promotion activities is becoming a new standard for safeguarding the health and safety of the workforce. Recent guidance statements by the Institute of Medicine[1] and the American College of Occupational and Environmental Medicine[2] advocate strongly for the integration of prevention activities addressing the health and safety of workers. In addition, in 2011, the National Institute for Occupational Safety and Health (NIOSH) intensified its commitment to the integration of workplace health protection and health promotion by expanding its portfolio of research on this topic under the auspices of the NIOSH Total Worker Health™ (TWH) program. Examples of these expanded programmatic efforts include deeper support for intramural research on integration of prevention practices and funding of a fourth extramural Center of Excellence to Promote a Healthier Workforce.[3]

Integration of workplace health promotion and health protection activities is not a new concept. The theoretical and practical justification for this approach was laid down two decades ago in several seminal reports.[4–6] Nevertheless, enthusiasm over this approach has heightened in recent years. Driving forces include (1) growth of preventable chronic health conditions in the workforce, (2) deeper understanding of risks posed by these conditions to the health, safety, and performance of workers and, in turn, to the health of the organization and the economy, (3) a growing body of research linking many of these conditions to workplace exposures as well as lifestyle factors, and (4) accumulating evidence of the superiority of integrated prevention strategies in mitigating these risks.[7–10]

Numerous arguments have been advanced in support of prevention strategies that combine health protection with health promotion. Integrated programs have operational advantages—enabling comprehensive targeting of risk factors and more efficient use of resources by elimination of redundancies across fragmented programs.[4,11–13] Furthermore, risky health behaviors and exposure to hazardous work environments cluster in the workforce, arguing for joint attention to both sets of risk factors.[13] Finally, as detailed by Schulte et al[14] and acknowledged in virtually all reports advocating for systems approaches to prevention, individual and occupational risk factors may act in concert to influence the health and safety of workers.

Within the Schulte et al[14] framework, several pathways between individual and occupational risk factors and illness and injury outcomes can be discerned. Individual risk factors and occupational exposures may each contribute directly and independently to the same health or safety outcomes (additive model). Interactions of individual and occupational risk factors are also depicted in this framework and are representative of the TWH approach. A relevant example cited by Schulte et al[14] is the increased risk of osteoarthritis with prolonged kneeling among obese workers.

Interactions between individual factors and occupational exposures are of special significance in the argument for integration of prevention activities because they suggest that integrated interventions would yield multiplicative or exponential effects. In other words, these interactions support the prevention "synergy" hypothesis that originated with NIOSH (1984) and recurs throughout the literature that advocates for integrated prevention strategies,[2,4,13,15,16] although synergistic effects of integration have not been systematically examined in intervention research to date.

Not mentioned in the Schulte et al[14] framework is an indirect pathway between occupational exposures and safety and health outcomes via influence of occupational exposures on health behaviors. Effects of occupational exposures on health behaviors, especially tobacco and alcohol use, is well-established in the job stress and coping literature.[17] Most recently, a European consortium of investigators reported significant associations between unfavorable workplace psychosocial conditions and physical inactivity, increased smoking intensity, the extremes of body mass index, and the incidence of both weight gain and loss.[18–20] Findings were based on both cross-sectional and prospective analyses of cohort studies inclusive of more than 160,000 workers. Similarly, a 1999 review by Frone[21] found support for a relationship between work-related stressors and elevated alcohol consumption and problem drinking.

Along this line, NIOSH analysis of data from the National Organizations Survey III suggests a pathway between the workplace psychosocial environment and participation in workplace health promotion programs.[22] Quality of work life (eg, autonomy, flexibility, and skill development) in organizations was positively associated with availability of worksite health promotion (stress management) programs, suggesting greater opportunity for participation in health promotion activities in positive work environments. Similarly, Sorensen and Barbeau[13] and Punnett et al[12] suggest that worker receptivity to health messages and motivation to participate in health promotion programs can be enhanced in the presence of workplace environmental interventions to reduce safety and health risks. *In this article, we expand on the role of health behaviors in explaining the effects of occupational psychosocial exposures on health outcomes*.

WORK–LIFE CONFLICT AND NEGATIVE HEALTH BEHAVIORS

Allen and Armstrong[23] suggested that stressful working conditions due to work–family conflict (WFC) lead to negative health

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This study was funded in part by the National Institute for Occupational Safety and Health (grant # U19 OH010154) on which Leslie Hammer is a grantee.
The authors declare no conflicts of interest.

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DOI: 10.1097/JOM.0000000000000043

behaviors, which ultimately result in poor health outcomes. They further argued that these negative health behaviors may represent coping responses to stressful working conditions or are a response to a loss of resources such as time, which occurs with increased work–life stress, making it more difficult to find time to exercise or prepare healthy meals. Although their findings[23] revealed significant relationships between work–life stress, negative health behaviors, and ultimately negative health outcomes, we note that a systematic review of the literature in this area is lacking.

Table 1 identifies 27 studies representing the results of our review of the broader literature on work–life conflict and health behaviors. Notably, we find that work–life conflict is generally examined as an occupational exposure in correlational studies, which are much more prevalent than work–life conflict studies of actual programs or interventions.

To be included in our review, the study must have examined some form of work–life conflict as an antecedent and some type of health behavior outcome. *Work–life conflict* in the literature is most often defined as WFC or negative spillover and frequently consists of two dimensions (ie, work-to-family or family-to-work). Health behavior outcomes typically found were modifiable behaviors, such as food consumption/choices, smoking, alcohol use/abuse, and sleep duration. This last behavior was difficult to define because we wanted to stay focused on modifiable health behaviors and many studies of sleep examined quality, which is not a modifiable behavior per se. This points to the need for future work on sleep hygiene factors as a way to define modifiable sleep behaviors from a health promotion perspective, and we argue that this is important for future research, given the strong relationship between sleep and many long-term health outcomes.

An electronic search using the databases EBSCOhost, psycInfo, JSTOR, ProQuest, PubMed, and Google Scholar was conducted using combinations of the key words and phrases, both dimensions of WFC, work–family spillover, alcohol, problem drinking, diet, exercise, physical activity, drug abuse, sleep, smoking, tobacco, including several synonymous iterations of these constructs. Furthermore, the references of earlier work–family article reviews were scanned for articles missed by the electronic search.[24,25] After articles were collected, a systematic review was completed to determine the level at which each article empirically assessed the target relationship between WFC/spillover and health behaviors.

The most convincing pathway through which WFC impacts negative health behaviors is through the draining of psychological and physical resources.[26,27] Stress and strain deplete available emotional and behavioral resources that could be devoted to improving health and well-being. As such, WFC has been identified as a reason for decreased physical exercise and poor choices or lack of time to prepare healthy foods.[23,28,29] In the case of poor food choices, negative spillover between work and family was related to negative food choice strategies in a qualitative study of low-income workers.[29] Study participants described characteristics of their jobs, such as long hours and inflexible schedules, as depleting their nonwork and family time and energy resources to make healthy food choices and prepare healthy foods. These findings are consistent with those of Allen and colleagues on WFC and family dinner behaviors, including frequency.[30,31] Allen and Armstrong[23] found that WFC was related to less physical activity, eating more high-fat foods, and eating fewer healthy foods.

A second pathway is coping, and the relationship between job stress and negative coping behaviors such as alcohol and tobacco use and abuse has been established.[17] Therefore, it may very well be the case that different theoretical mechanisms explain the WFC–negative health behavior relationship depending on the health behavior examined.

Of special interest, Van Steenbergen and Ellemers[32] suggested that positive spillover can lead to increased emotional resources and energy that, in turn, lead to increased physical exercise and healthy food choices. Van Steenbergen and Ellemers[32] extended the research on WFC and health behaviors to include the study of work–family facilitation (beneficial effects of combining work and family). Theoretically, it is argued that while the stress and strain that result from WFC can tax a system and wear down physiological systems leading to decreased health, positive emotions and positive relationships between work and family can actually replenish such systems and lead to improved physiological health and well-being. Although this study did not specifically examine health behaviors, it does suggest the possibility that similar mechanisms may hold for the beneficial effects of combining work and life such that improved health behaviors may be seen when WFC and stress are reduced and the benefits of combining work and nonwork are enhanced.

WFC INTERVENTIONS AND HEALTH BEHAVIORS

Work–family conflict intervention studies are still extremely rare[33,34] and, as indicated in Table 1, most studies still give far more attention to describing WFC as an exposure in relation to health behaviors as opposed to examination of interventions to prevent WFC and associated negative health behaviors in work organizations.[35]

The Work, Family, and Health Network has been the largest national effort to date to support organization-level work–life intervention studies aimed at health protection through work–life stress reduction. Specifically, the intervention focuses on increasing supervisor support for family and increasing employee control over work time, and outcomes include health behaviors, and numerous health outcomes for workers. Although results of the larger randomized field experiment evaluating the health benefits of a workplace intervention aimed at reducing WFC and stress are not yet published, the initial pilot studies are the first to provide evidence of work–life intervention effects on health[36] and health behaviors.[37,38]

One of these pilot studies by Hammer and colleagues[36] developed, implemented, and evaluated a work–life intervention using a randomized design and was based on family supportive supervisory training and behavioral self-monitoring. The findings of this study demonstrated improved supervisor support for work and family and beneficial effects on worker job satisfaction, turnover intentions, and self-reported physical health symptoms. Although this intervention did not evaluate the effects on health behaviors specifically, findings are promising and suggestive of potential mediating mechanisms leading to decreased stress and improved health behaviors, ultimately impacting longer-term health outcomes.

A second pilot study associated with the Work, Family, and Health Network used a quasi-experimental nonequivalent control group design with a time lag of 6 months to evaluate the effects of an intervention aimed at increased control over work time and work place.[37,38] This intervention was aimed at decreasing WFC through increased schedule control on the basis of face-to-face participatory training sessions with groups of employees in a corporate headquarters work environment where workers were already afforded a fair amount of flexibility and control over work. Employees reported improved health behaviors (ie, reduced smoking and alcohol consumption, increased physical activity, more time for sleep, and improved diet) after the intervention that increased positive work–life spillover and decreased negative WFC compared with control groups.[37]

In sum, we suggest that further research is needed to examine WFC reduction interventions and programs that (1) target changes to the work environment to reduce the workplace hazard of WFC and improve workplace social support for family and personal life, control over work time, and formal policies and programs designed to support workers' work and nonwork lives with respect to their effects on worker health behaviors; and (2) are implemented in conjunction with health promotion interventions to assess the interactive and synergistic effects on health behaviors and long-term health outcomes above and beyond the effects of either program

TABLE 1. Work–Life Stress and Health Behaviors

Citation	Exposure Versus Intervention	Work–Family Stress Variables	Health Behavior Outcome Variables
Allen and Armstrong[23]	Exposure	WFC	Healthy and unhealthy food consumption/choices
Allen et al[30]	Exposure	WFC	Family dinner frequency
Barnes et al[41]	Exposure	Time spent on work and family	Sleep duration
Berkman et al[42]	Exposure	Manager work–family balance score	Cardiovascular risk score that included smoking behaviors
			Sleep duration
Cho and Allen[31]	Exposure	WFC	Family dinner frequency
Crain et al[43]	Exposure	WFC	Sleep duration
Devine et al[29]	Exposure; qualitative	Negative work–family spillover	Healthy and unhealthy food consumption/choices
Devine et al[44]	Exposure; qualitative	Negative work–family spillover	Healthy and unhealthy food consumption/choices
Devine et al[45]	Exposure	Negative work–family spillover	Healthy and unhealthy food consumption/choices
Frone[46]	Exposure	WFC	Substance dependence
			Substance abuse
Frone et al[47]	Exposure	WFC	Cigarette use
			Frequency of heavy drinking
Frone et al[48]	Exposure	WFC	Alcohol abuse/use
Frone et al[49]	Exposure	WFC	Alcohol abuse/use
Frone et al[50]	Exposure	WFC	Alcohol abuse/use
Grzywacz and Marks[51]	Exposure	Positive and negative work–family spillover	Alcohol abuse/use
Grzywacz and Marks[52]	Exposure	Positive and negative work–family spillover	Exercise habits
Lallukka et al[53]	Exposure	WFC	Health behaviors
			Tobacco use
			Alcohol consumption
			Physical inactivity
			Diet
Lallukka et al[54]	Exposure	WFC	Tobacco use
			Alcohol consumption
			Physical activity
			Healthy and unhealthy food consumption/choices
Moen et al[37]	Intervention; quasi-experimental intervention with nonrandom assignment	Positive and negative work–family spillover	Smoking Alcohol consumption Physical activity Time for sleep Healthy and unhealthy food consumption/choices
Moen et al[38]	Intervention; quasi-experimental intervention with nonrandom assignment	Positive and negative work–family spillover	Sleep duration Exercise Health care management
Roos et al[55]	Exposure	WFC	Alcohol abuse/use
Roos et al[56]	Exposure	WFC	Healthy and unhealthy food consumption/choices
			Physical activity
Sekine et al[57]	Exposure	WFC	Sleep quality/duration
Van Hooff et al[58]	Exposure; daily diary	Work–home interference	Sleep quality
Wang et al[59]	Exposure	WFC	Daily alcohol consumption
Williams et al[60]	Exposure	Positive work–family spillover	Sleep quality/duration
Wolff et al[61]	Exposure	WFC	Alcohol abuse/use

WFC, work–family conflict.

alone. Such WFC reduction interventions and programs should be designed to support healthy psychosocial work environments by preventing stressors in the organization of work that can lead to WFC. These interventions should aim to facilitate emotional and behavioral resources leading to a reduction in negative health behaviors, and ultimately chronic disease. Examples include giving employees control over work schedules; training managers, supervisors, and coworkers to provide support for family and personal life to employees; or planned redesign of the work organization to improve work processes so that employees feel that they have role clarity to focus on tasks that are most critical for performance. Although increasing control over work may be particularly challenging in certain highly structured work environments, practices such as increasing control through implementation of self-scheduling practices and increasing control over work processes are strategies that can prove effective in reducing WFC.

CONCLUSIONS AND FUTURE RESEARCH NEEDS

Research evidence, as shown in Table 1, indicates that the psychosocial stressor of WFC serves as a negative occupational exposure relating to poor health behaviors, including smoking, heavy drinking, poor food choices, low levels of exercise, and even decreased sleep time. We argue that the mechanisms that tie WFC to negative health behaviors include resource depletion and resource allocation, as well as coping mechanisms. We expect to see the most pronounced effects on improvements in health outcomes and disease that are the result of occupational exposures through the combination of WFC reduction programs and interventions in combination with health promotion interventions that target individual behavior change, rather than either type of program or intervention alone. This would result in a two-pronged approach to behavior change that is characteristic of TWH programs and interventions. The demonstrated associations between WFC and health behaviors not only add to our understanding of the influence of WFC on health, but also greatly expand the evidence base that health behavior comprises a major pathway by which workplace psychosocial stressors influence the health and well-being of workers and their families. This leads, in turn, to the implication that workplace programs to control health behaviors through health promotion interventions alone are likely to not be as effective as those that use a comprehensive prevention strategy that is also aimed at health protection at the organizational level, such as those that reduce work-related psychosocial stressors.

Although we would expect that health protection interventions focused on decreasing unsafe working environments would have the strongest effect on safety outcomes, we find it surprising that given the volume of research on WFC and health behaviors, almost no attention has been given to a possible link between WFC and safety behaviors. Although two studies have shown correlational evidence of the relationship between WFC and safety outcomes,[39,40] little is known about the associated mechanisms that may be operating in the relationship between WFC and safety behaviors. There is a suggestion that work–life interventions that target work–life stress reduction can lead to increased resources, similar to the mechanisms described with health behaviors, and thus, improved safety behaviors. We, therefore, reason that interventions designed to reduce WFC could have a corresponding positive effect on safety behaviors and, likewise, could have enhancing effects when combined with interventions that promote health behaviors. The integration of health protection interventions aimed at WFC hazard reduction and health promotion may result in greater levels of safety and health than either one type of intervention by itself.

Health, safety, and work are intimately related, and it is time that scholars and practitioners alike go beyond the focus of either health protection or health promotion and move toward what scholars have been advocating for over two decades[4–6]—specifically, that scholars and practitioners take a broader systems view of the organization of work and its clear impact on workers' abilities to engage in healthy behaviors. This TWH approach to WFC that integrates individual health promotion interventions and organizational health protection interventions is expected to lead to reduced negative health and safety behaviors and improved health and safety outcomes for workers, and families alike.

ACKNOWLEDGMENT

The authors thank Joseph Sherwood for comments on an earlier version of this article and for providing editorial assistance with the manuscript.

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