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Lifestyle Practices and Occupational Stressors as Predictors of Health Outcomes in Urban Firefighters

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This study developed lifestyle risk factor profiles for firefighters and tested the influence of lifestyle along with other individual and organizational risk and protective factors on emotional and physical health outcomes. A sample of 441 male firefighters was recruited from 2 urban fire departments in a Pacific Northwest state. Self-reported questionnaire data were collected and analyzed by descriptive and multivariate statistics. In this sample of firefighters, 13% met criteria for lifestyle strengths, 53% met criteria for lifestyle concerns, and 33% met criteria for lifestyle risks. After controlling for the influence of demographic factors, job stressors, and job satisfaction, the lifestyle risk composite variable (based on exercise, alcohol consumption, and smoking), accounted for a significant increase in the variance predicting health outcomes. It was concluded that lifestyle behaviors deserve increased attention from occupational health researchers.

KEY WORDS: firefighter; lifestyle; occupational stressors; job satisfaction; health outcomes.

INTRODUCTION

The burden of illness in North America is strongly influenced by individual lifestyle behaviors. Studies of community samples in both the United States and Canada have found that not smoking, moderate use of alcohol, regular physical

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exercise, maintaining desirable weight in relation to height, and sleeping 7 to 8 hours each night are positively and strongly associated with good health and lower risks of various diseases and mortality (Berkman & Breslow, 1983; Lalonde, 1974). In recognition of these important lifestyle data, in 1991 the U.S. Surgeon General recommended a 36% increase in moderate, daily, physical activity, a 17% decrease in dietary fat intake, and a 48% decrease in smoking for Americans by the year 2000 (U.S. Department of Health and Human Services [USDHHS], 1991). However, none of these goals were met, suggesting that lifestyle practices are difficult to change.

The workplace is an important social environment that influences health behavior by its norms, policies, and job characteristics (Wilson, Holman, & Hammock, 1996). One occupational group with a relatively unique work and social environment is that of professional firefighters (Corneil, 1995). In most U.S. cities, firefighters have become the first responders to medical emergencies and rely on teamwork in both fire suppression and medical emergencies. Employees who engage in teamwork are more likely to spend off-duty time together than those whose jobs require more independence (Fillmore, 1992). These factors raise questions regarding the roles of both individual firefighters and the fire service in maintaining levels of physical and emotional resilience that fire service personnel need to mitigate risks of on-the-job injuries and stress-related illnesses. An assessment of both individual and social environment factors could facilitate health promotion and stress management preventive interventions.

This study developed lifestyle risk factor profiles in a sample of professional firefighters and tested the influence of both individual and occupational risk and protective factors on health outcomes based on these profiles. Although firefighters provided data for this study, the authors believe the findings are applicable to other occupations that require teamwork, close employee contact over extended periods, and unpredictable job tasks with little employee control and are yet coupled with a significant amount of "down time," employ a relatively young work force, and maintain a hierarchical organizational structure, such as the U.S. Armed Forces.

An ecological model guided the current exploratory investigation. Ecological models consider both personal and environment factors, including the individual's knowledge and beliefs about health as well as and the influence of systems in the identification of health risk and protective factors, such as the work environment (Breslow, 1996; Bronfenbrenner, 1977; Jaffe, 1995; Salazar & Beaton, 2000). There is empirical evidence for linkages between individual and organizational behavior. Jaffe noted that stress research defines the core factors that individuals need for health and well-being and called for a convergence of paradigms of work stress, work redesign, human resouree policies, and the study of manager behavior. Breslow noted that lifestyle practices are situational as well as volitional. Bennett and Lehman (1998) and Fillmore (1992) reported that in occupations requiring high levels of teamwork, off-the-job socializing, and drinking were more common than in occupations less dependent on high levels of teamwork. We conceptualized the individual component of the ecological model as lifestyle behaviors including exercise, alcohol consumption, and smoking and demographic factors. We conceptualized the organizational component of the ecological model to include both work stressors and job satisfaction.

Individual Lifestyle Practices

Lifestyle Practices

Cigarette smoking, excessive alcohol consumption, and diet and exercise to control obesity have had the most profound influences on health (Wigle, Semenciw, McCann, & Davies, 1990). These four lifestyle factors contributed to over 50% of premature death before age 75 in Canada (Wigle et al., 1990). In a U.S. study, Berkman and Breslow (1983) found that the effects of engaging in positive health behaviors were additive and cumulative, that is, the greater the number of personal health habits practiced, the greater the probability of one living a longer, healthier life. These data provide strong evidence for the importance of assessing lifestyle behaviors and classifying these behaviors in some meaningful way.

Exercise

Exercise during leisure (as opposed to physical and aerobic fitness) has been shown to moderate the relationship between stress and illness (Brown, 1991; Carmack, Amaral-Boudreaux, Melendez, Brantley, & de Moor, 1999). To maintain physical stamina and "stay in shape," some fire departments have exercise equipment available for firefighter use, leading to the presumption that health-protective practices such as exercise are widespread among firefighters. However, a search of the published literature did not reveal *any* prior studies that have examined exercise practices among firefighters. In a study of police in New South Wales, 21% of male police officers reported they did not exercise at all (Richmond, Wodak, Kehoe, & Heather, 1998). Similarly, a study of Australian police reported almost identical findings (McNeill & Wilson, 1993).

Alcohol Consumption

Recent recommendations for alcohol use state that men should limit consumption to no more than two standard drinks per day (Archer, Grant, & Dawson, 1995). Boxer and Wild (1993) reported prevalence rates of 29% for alcohol

abuse among a sample of 149 U.S. urban firefighters. Data collected previously by our research team showed that 18% of an initial baseline sample of 179 met alcohol-problem diagnostic criteria and reached 30% in the same sample when a history of alcohol problems was included in the "problem drinking" criteria (Murphy, Beaton, Pike, & Johnson, 1999). McFarlane (1998) and Richmond et al. (1998) reported similar results in emergency and law enforcement personnel.

Smoking

In 1987, 32% of all U.S. male adults smoked. This information prompted the U.S. Surgeon General's recommendation calling for a 48% reduction of cigarette smoking by the year 2000 (USDHHS, 1991). By 1998, the percent of male smokers had dropped to 24% (Centers for Disease Control and Prevention, [CDC], 2000). In the Richmond et al. study (1998) of police officers cited previously, 27% of the male officers smoked cigarettes.

Social and Work Environment

Job Stressors

Time pressure, accurate decision making, potential for injury and/or death of self and others, witnessing frequent deaths and injuries, and conveying news of tragedy to others—including kin and friends, are examples of these factors. Several investigators have shown that job stressors affect both physical and mental health (Beaton, Murphy, Pike, & Jarrett, 1995; Jaffe, 1995; Mitchell & Bray, 1990).

Both disrupted sleep and the lack of sleep have been reported previously to be major sources of occupational stress in fire service personnel (Beaton & Murphy, 1993). A major factor accounting for sleep problems is the 24-hour work shift, which is common in the fire service (Monk, 1990). Long work shifts may also contribute to the boredom and tedium secondary to various routine fire station housekeeping tasks undertaken by firefighters, who are highly trained personnel.

Reliance on coworkers is an inherent part of work in the fire service. Firefighters have identified aspects of teamwork as contributing to both job strain and job satisfaction (Beaton & Murphy, 1993; Corneil, 1995). Spending off-duty time together is common and is said to contribute to the camaraderie noted in the fire service. "De-briefing" is frequently accompanied by alcohol use.

Years of Service

Prior research with fire service personnel has documented a significant relationship between years of service and measures of psychological distress. Murphy, Beaton, Pike and Cain (1994) reported years of service and scores on a Burnout Scale in a sample of firefighters ($n = 1{,}728$) were statistically significant and in the predicted direction consistent with negative outcomes, even after controlling for age. Corneil, Beaton, Murphy, Johnson, and Pike (1999) reported that years of service in a sample of urban Canadian, but not in urban U.S., firefighters was associated with an increased risk of posttraumatic stress disorder. Taken together, these studies suggest that the cumulative wear and tear of years of service in the fire service increases the likelihood of psychological strain and distress.

Job Satisfaction

Job satisfaction, or the lack thereof, is potentially related to all the organizational factors reviewed above. For example, in a previous study conducted by the investigators, job satisfaction was significantly and negatively correlated with years of service while controlling for age (Murphy et al., 1994). Beaton, Murphy, Pike, and Corneil (1997) also reported that job satisfaction and social support at work were significantly correlated and that this same job satisfaction index was associated with stress symptoms in fire service personnel.

Health Outcomes

Stress-related disorders are the physiological, cognitive, psychological, and behavioral manifestations of an acute or chronic nature, some of which have been previously documented to occur at elevated prevalence rates in emergency service workers (Mitchell & Corneil, 1995; Bray, 1990). Stress-related signs and symptoms are outcomes of considerable concern because they may interfere with job performance, impact the length of employment, impair health status following retirement, and also because they may impose high economic costs on employers and employees alike. Data show that approximately 8% of firefighter job disabilities reported in the United States in 1996 were due to mental distress (International Associatino of Firefighters [IAFF], 1997a).

In summary, little is known about lifestyle behaviors among fire service personnel or whether their health behaviors are related to their perceptions of occupational stressors, job satisfaction, and/or to health-related outcomes. The relatively unique work environments of firefighters, including 24-hour work

shifts and the stressful nature of the job, would appear to present difficult challenges to fire service personnel to develop and/or maintain good health practices. Therefore the aims of this investigation were to (a) classify urban firefighters using three levels of lifestyle behavior protection or risk, that is, strengths, concerns, or risks, based on the extent of exercise, alcohol consumption, and smoking reported, and to (b) assess the influence of the lifestyle behavior variable composite on health outcomes in a sample of urban firefighters while controlling for the influence of demographic characteristics, job stressors, and job satisfaction.

METHOD

Sample

Participants were recruited for a longitudinal, prospective study whose purpose was to identify sources of occupational stress and health outcomes (Beaton, Murphy, Johnson, Pike, & Corneil, 1999). A letter describing the study was sent to potential participants and was cosigned by the Principal Investigator and a local union official. Recruitment and investigational procedures assured confidentiality and were in accordance with university and APA human subjects guidelines.

A sample of 441 male firefighters was obtained. There were 281 participants in Department #1 (80% of the firefighters assigned to the department), and 160 participants in Department #2 (95% of those assigned to the department) for an overall participation rate of about 89%. The sample was 90% Caucasian, with mean age of 38 years ($SD = 8.1$) with an age range of 21 to 59 years. The majority of the participants were married (70%) and well educated, with a mean of 14.1 years ($SD = 1.69$) of formal schooling. At the time of the initial data collection, the study participants had been firefighters for an average of 10.6 years ($SD = 9.1$) and of these, 72% were considered "line" firefighters and paramedics (as opposed to supervisors or officers).

Measures

Health Screening Survey (HSS)

The 10-item HSS (Fleming & Barry, 1991) was used to measure diet, exercise, smoking, and alcohol consumption. The first four items start with a common stem: *In the last 3 months . . .* have you dieted to lose weight, exercised during leisure, smoked cigarettes, and/or consumed alcohol? Following a yes/no response, subitems query respondents in more detail, that is, about the number of pounds lost, average days per week exercised, number of cigarettes smoked, and the quantity and frequency of various types of alcoholic beverages consumed. Embedded in the HSS are the four CAGE alcohol screening items (Mayfield, McLeod, & Hall, 1974). The acronym, CAGE, is interpreted as follows: *C*—Have you wanted to *cut down* on alcohol use? *A*—Have others been *annoyed* at the amount of your alcohol use? *G*—Have you felt *guilty* over your use? *E*—Do you ever need a morning *eye-opener*? Cronbach's α for the CAGE items included in the HSS for the current sample was .76.

Sources of Occupational Stress (SOOS)

This instrument measured occupational stressors (Beaton & Murphy, 1993). The SOOS is a 57-item questionnaire developed to assess the types and intensity of job-related stressors to which firefighters are commonly exposed. Three lifestyle items—lack of exercise, poor diet, and carryover stress from family problems—were removed from the SOOS for the current analyses. On the SOOS, respondents identify job stressors such as management/labor conflict, personal safety concerns, conflict with coworkers, substandard equipment, concerns regarding reduction in force and benefits, conveying tragedy, job tedium, discrimination, financial concerns, and poor health habits experienced during their past 10 shifts worked and then indicate how "bothered" they are by each job-related stressor experienced. Respondents are asked to make a slash on a 0–100 visual analog scale (VAS) line that provides three anchors: 0 = not at all bothered, 50 = somewhat bothered, and 100 = extremely bothered. "Bothered" is defined in the instructions as "frustrated, annoyed, or irritated." If a particular SOOS item had not occurred within the past 10 shifts, participants are asked to check the "Not Applicable" column. A total SOOS score can be obtained by summing the scores from the revised SOOS measure, 54 items. SOOS items marked nonapplicable were assigned a zero value in subsequent analyses. Internal consistency reliability of the revised SOOS for the current sample was .96.

Job Satisfaction

Job Satisfaction was measured by asking respondents to rate overall job satisfaction by making a slash on a 0–100 VAS line that provided three anchors: 0 = not at all satisfied, 50 = somewhat satisfied, and 100 = extremely satisfied. Test-retest reliability was calculated using a convenience sample of firefighters who provided data 6 months apart ($r = .63$, $n = 177$). This finding and prior investigations suggest this index is a valid and reliable indicator of perceived job

satisfaction in fire service personnel (Beaton & Murphy, 1993; Beaton, Murphy, Pike, & Corneil, 1997).

Symptoms of Stress Inventory (SOS)

This instrument measured emotional and physical health outcomes (Beaton, Egan, Kogan, & Morrison, 1991). The 95-item SOS is a self-report inventory with 10 content-derived subscales: peripheral/cutaneous, cardiovascular, muscle tension, neurologic, depression, anxiety, anger, nervous habit patterns, gastrointestinal distress, and cognitive disorganization. Respondents are asked which stress-related symptoms they have experienced in the past week and, if experienced, how frequently (0 = never to 4 = very frequently). The potential range of scores is 0–4. The total possible number of points a respondent could obtain is 380. Examples of SOS items are "feeling unhappy or depressed," "difficulty concentrating," "migraine headaches," and several items regarding anger. The instrument has both adequate interitem and test-retest reliability, and concurrent validity (Beaton et al., 1991; Beaton et al., 1995). Only total SOS scores were calculated for the analyses in the present study and were used as the emotional and physical health outcome variable. The total SOS Cronbach's α calculated for the current study sample was .97.

Demographic Data

Individual and occupational data were obtained via a background form that consisted of items asking for: age, gender, marital status, ethnicity, current job title, years of education, number of years as a fire fighter, length of time assigned to one's current department, number of hours per month employed at a second job, and self-reported estimations of the proportions of their medical emergencies and fire suppression activities within the prior month on duty.

RESULTS

Data Analysis

Several preliminary analyses were undertaken. (a) *T* tests were used to compare mean scores on the study variables obtained from study participants representing the two fire departments. There were no significant differences between the two departmental samples on the measured variables; therefore, in subsequent analyses, data from the two departments were combined. (b) Because age and the number of years as a firefighter were highly correlated (r = .82), the decision to use "years of service" instead of age was based on the conceptualization of lifestyle as situational as well as volitional, which is consistent with an ecological model of occupational stress selected for our analyses. Moreover, the literature suggested that years of service might influence lifestyle behaviors because of the unique fire service environment and work culture. (c) Skinner, Allen, McIntosh, and Palmer (1985) identified a list of lifestyle behaviors that included exercise, diet, alcohol consumption, smoking, safety behaviors, and regular health checkups and classified the behaviors by relative protection or risk, that is, "lifestyle strengths," "lifestyle concerns," or "lifestyle risks" as determined by previous research. Based on study data collected, lifestyle strengths were operationally defined as not smoking, drinking 14 or fewer drinks per week, and exercising 5 to 6 times per week for at least 20 minutes; lifestyle risks were defined as smoking 10 or more cigarettes per day, meeting CAGE screen criteria for alcohol abuse or dependence, and not exercising vigorously at all during leisure time in the past 3 months, and lifestyle concerns were defined as not meeting the criteria for either the "risks" or "strengths" categories. A composite socre for the three lifestyle practices was computed consistent with the Skinner et al. scheme. (d) Hierarchical (step-wise) regression analysis was used to test the relative influence of demographic variables, job stressors, job satisfaction, and the lifestyle composite variable on the emotional and physical health symptom outcome variables. The order for entering the variables into the hierarchical regression analyses was as follows: Step 1: demographic (martial status, education, rank, and years of fire service). Step 2: Sources of job stressors. Step 3: Job satisfaction. Step 4: The lifestyle behavior composite. The ordering of the main effects selected was based on factors one has the least (or no control) over, to those variables that could be altered.

Aims

Aim 1: Descriptions of Lifestyle Behaviors and Classification According to Risk

The first study aim was to classify urban firefighters using three levels of lifestyle protection or risk, that is, strengths, concerns, or risks, based on the extent of exercise, alcohol consumption, and smoking reported. The data showed that for the prior 3-month period, 13% of firefighters smoked, 90% exercised during leisure time, and 78% consumed alcohol. For smokers in the sample, about a third reported smoking 1 to 9 cigarettes per day, whereas smaller percentages reportedly smoked more than 10 cigarettes a day. Among those who exercised regularly, 41% reportedly exercised in their leisure time 3

to 4 days per week. Finally, among those who consumed alcoholic beverages in the past 3 months, 47% reportedly drank 1 to 2 days per week and, on those drinking days, consumed 1 to 2 drinks.

The sample was classified by three mutually exclusive levels of lifestyle behavior protection or risk, according to the criteria operationalized above. The data show that 14% of the male firefighter sample met criteria for lifestyle strengths, 53% met criteria for lifestyle concerns, and 33% met criteria for lifestyle risks. Table 1 shows the means and standard deviations attributed to the three levels of lifestyle risk for the occupational predictors and health outcome variable.

Aim 2: The Influence of Lifestyle Behaviors on Health Outcomes While Controlling for Demographic Factors, Job Stressors, and Job Satisfaction

Table 2 shows the means, standard deviations, and correlations for all variables used in the regression analysis. The most robust and statistically significant relationships were among the health symptom outcome variable and job stressors, job satisfaction, and lifestyle composite factors. All of these associations were in the expected directions.

The results of the regression analyses are shown on Table 3. The predictor variables were entered in four separate blocks. This step-wise approach measured the relative influence of each set of variables entered by controlling for variables entered at the previous step. As the data show, the greatest amount of R^2 change was attributed to job stressors when this variable was entered at Step 2 after controlling for the demographic variables. The entry of job satisfaction at Step 3 did not produce a statistically significant change. Finally, lifestyle practices entered at the final step produced a significant change in R^2. Overall, the ecological model variables employed in this study accounted for 46% of the

Table 1. Means and Standard Deviations for Selected Variables by Extent of Risk on Three Categories of Lifestyle Behaviors

	Extent of lifestyle behavior risk					
	Risk ($n = 160$)		Concern ($n = 257$)		Strength ($n = 61$)	
Measures	*M*	*SD*	*M*	*SD*	*M*	*SD*
Occupational Stressors (SOOS)	19.0	13.2	15.3	12.3	18.1	14.6
Job Satisfaction	74.0	17.8	79.6	13.8	77.5	18.1
Mental/Physical Health (SOS-Total Score)	.87	.51	.56	.42	.54	.36

Table 2. Means, Standard Deviations, and Correlations for Variables in the Lifestyle Model[a]

Variable	1	2	3	4	5	6	7	8
1. Symptoms of stress[b]	—	−.06	.09*	.002	.15*	.67*	−.27*	−.27*
2. Years of education			−.01	−.07	−.26*	.11*	−.02	.14*
3. Rank				.06	.49*	.13*	−.19	−.14*
4. Marital status					.11*	.01	.07	−.04
5. Years as firefighter						.11*	−.24*	−.28*
6. Job stressors						–	−.30*	−.16*
7. Job satisfaction								.12*
8. Lifestyle factors[c]								
M	.67	14.14	.33	2.35	11.50	17.04	78.12	−.21
SD	.47	1.7	.47	1.18	8.76	12.96	14.81	.65

[a] $N = 441$.
[b] Measure of mental and physical health.
[c] Measure of exercise, alcohol consumption, and smoking.
* $p \leq .05$.

Table 3. Summary of Hierarchical Regression Analysis for Variables Predicting Mental and Physical Health Outcomes ($N = 441$)

	Step 1. Adj. $R^2 = .015$			Step 2. Adj. $R^2 = .43$			Step 3. Adj. $R^2 = .44$			Step 4. Adj. $R^2 = .46$		
Variable	B	SEB	β	B	SEB	β	B	SEB	β	B	SEB	β
Years as firefighter	.007	.003	.14*	.004	.002	.07	.003	.002	.06	.001	.002	.02
Rank	.02	.06	.03	−.003	.04	.03	−.003	.04	−.009	−.04	.04	−.04
Marital status	−.006	.01	−.017	−.006	.02	−.015	−.004	.02	.04	−.004	.01	−.01
Years of education	−.007	.01	−.03	−.003	.01	−.19*	−.003	.01	−.12*	−.002	.01	−.10*
Job stressors				.002	.001	.66*	.002	.001	.64*	.002	.002	.62*
Job satisfaction							−.002	.001	−.07	−.002	.001	.07
Lifestyle										−.11	.03	−.15*

*$p = \leq .05$.

variance of firefighters' scores on the emotional and physical symptom (SOS) outcome variable.

DISCUSSION

This study classified firefighter lifestyle behaviors using a schema developed by Skinner et al. (1985) and tested the influence of lifestyle behaviors on health outcomes while controlling for demographic, job stressors, and job satisfaction variables. The data show that 53% of the sample meet the criteria for lifestyle "concerns." A surprising finding was that those participants meeting the criteria for lifestyle "risks" was the second largest lifestyle category in this sample of urban firefighters (33%).

The data on smoking suggest that fewer male firefighters smoke compared with a U.S. sample of adults of similar age, 13% vs 24%. The present male firefighter sample also report lower rates of smoking than police officers. Nonetheless, the fire service has recently adopted even more stringent policies regarding smoking. The IAFF (1997b) Wellness-Fitness initiative recommends smoking cessation programs be made available to firefighters who smoke and further recommends the hiring of only nonsmokers as a matter of policy.

Although nearly 80% of firefighters in the sample reported that they were presently drinkers, the majority stated that alcohol consumption was limited to 1 to 2 drinking days per week and that only 1 to 2 drinks were consumed per drinking day. Alcohol consumption reported by our sample may represent an underreporting of their actual consumption. Other studies that have reported alcohol use among firefighters suggest somewhat higher rates of drinking, and some alcohol abuse and dependence, for example, 29% of a sample of firefighters studied by Boxer and Wild (1993) met abuse criteria and 42% met abuse criteria following emergency duties in Australia (McFarlane, 1998). According to Grant et al. (1994), 7.4% of Americans meet criteria for alcohol dependence. Compared with samples in other occupational groups, the rates of drinking reported by the current sample are much lower than that reported for a sample of police officers and even less than those reported for General Mills sales associates (Richmond et al., 1998; Wood, Olmstead, & Craig, 1989). The police study offered anonymity, and the sales sample was offered a worksite health promotion program, which may account for some differences between samples in self-reports of such sensitive information between different occupations.

Alcohol abuse and/or dependence may be a serious personal and organizational problem in the fire service (Boxer & Wild, 1993; Murphy et al., 1999). Previous research has shown that even low to moderate levels of off-duty drinking are related to many aspects of work performance, including absenteeism, interpersonal conflict, and both the quality and quantity of work performed (Blum,

Roman, & Martin, 1993; Earleywine, 1993; Mangione et al., 1999). Wellness-Fitness Guidelines (IAFF, 1997b) recommend early intervention for firefighters who abuse alcohol. However, given the closeness of fire fighter networks, firefighters may be less likely than those in other occupational groups to recommend that a colleague seek help for alcohol abuse or dependence.

The self-reported exercise patterns during personal leisure time in our firefighter sample are encouraging. The data show that the majority of firefighters in this investigation exercised according to current recommended guidelines (USDHHS, 1996). This finding is especially important in the context of recent research. A study by Carmack et al. (1999) showed that participation in leisure physical activity as opposed to the level of aerobic fitness is an important buffering mechanism between stress and illness.

Taken in combination, the three lifestyle behaviors assessed in the current study warrant our attention. The adjusted R^2 of 46% for the ecological model as a whole suggests a sizeable influence of the model variables on symptom outcomes.

Not to be overlooked, however, is the impact of job stressors. When the job stressor variable was entered on Step 2, the adjusted R^2 increased from .02 to .42. Sources of job stress, such as personal safety and maintaining needed skills, are central to firefighters. These concerns need to continue to be addressed by management through more training, stress management, and perhaps scheduling. Lifestyle practices are known to reduce stress and promote health. Thus, both individual firefighters and fire service leaders need to work together to reduce job stress and to increase employee awareness of the importance of exercise, not smoking, moderate alcohol consumption, and other lifestyle factors not measured in this investigation, such as diet, weight control, and assessment of stress-related health conditions.

These findings have implications for both health promotion and stress management preventive interventions. These programs are recommended by both labor and management in the fire service (IAFF, 1997b) and support recommendations of previous worksite health promotion studies with other worker groups (Conrad, Campbell, Edington, Faust, & Vilnius, 1996; Marcus, Simkin, Rossi, & Pinto, 1996.

Several limitations of the study warrant caution in the interpretation of the findings. First, the data come from a single data collection point, which poses threats to internal validity. A second limitation pertains to measurement. The Health Screening Survey (Fleming & Barry, 1991), yields only nominal and categorical data and does not have items pertaining to diet (except whether dieting), quality of sleep, caffeine consumption, drugs other than alcohol, or other commonly measured health promotion variables, such as regular medical and dental check-ups and use of motor vehicle safety restraints (Skinner et al., 1985). Finally, data for this report came from only one source, questionnaires completed by the respondents, which limits the generalizability of the results.

Even though firefighters were the "exemplar group" studied here, we believe our findings may be generalized to other occupational groups that require teamwork, extended close employee contact, and unpredictable job tasks with little employee control and are yet coupled with a significant amount of down time, employ a relatively young work force, and maintain a hierarchical organizational structure.

CONCLUSION

This study demonstrates that firefighters engage in both health risk and health protective behaviors. The lifestyle composite variable, exercise, alcohol consumption, and smoking, along with demographic and organizational variables, accounted for 26% of the variance attributed to health symptom outcomes. The findings suggest that identification of high-risk groups, based on lifestyle practices, within the fire service is an important next step. The social significance of the findings is that continued investigations of individual and organizational behaviors are warranted involving firefighters and similar workers who are at risk for higher levels of occupational mortality and morbidity than those in the general population or other worker groups.

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