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13. ABSTRACT (Maximum 200 words) Research objectives are to (a) examine the health of military women in terms of health status, health practices, and health care utilization; (b) assess work-related performance of military women; and (c) examine relationships between health and performance of military women. Data are drawn from the six Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel. Year 2 analyses examined interrelationships among stress, substance use, and coping and compared military women and men and subgroups of military women. Analyses resulted in three papers and three presentations at a professional meeting. Each addressed an aspect of the health and performance of military women consistent with the grant's objectives. Specifically, among military women and men, papers examined the relationships between stress and substance abuse; the effects of stress, symptoms of depression, and coping style on occupational impairment; and relationships between deployment and substance use. Presentations examined substance use among military women and men as it relates to changes in demographics; sources of stress for military women and men and coping behaviors; and progress toward the <u>Healthy People 2000</u> objectives. Copies of each are included in the appendices to the report.				
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FOREWORD

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Robert M. Day 10/30/97
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HEALTH BEHAVIORS AND PERFORMANCE OF MILITARY WOMEN

YEAR 2 ANNUAL REPORT

INTRODUCTION

The shift in the U.S. Military from a conscription-based to an all-volunteer force in 1973, along with increased acceptance of women's involvement in traditionally male-dominated occupations, has created new opportunities for an increasing number of women in the Military. In the early 1980s, fewer than 10% of the armed forces were women, but by 1995, the percentage had increased to about 14%.¹ The increasing involvement of women in the Military and changes in the nature of that involvement have raised questions about military women's health, safety, and well-being, as well as the implications of these issues for overall military readiness.

Although the percentage of women in the Military has increased, relatively little is known about their health, performance, and special needs. Prior research on military personnel has largely involved male-only samples, and analyses of studies of the total military population have generally concentrated on military men or the overall military population.

The major objectives of the research being examined as part of this grant are to:

- examine the health of military women in terms of health status, health practices, and health care utilization;
- assess work-related performance of military women; and
- examine relationships between health and performance of military women.

This research draws on data for military women and men from the series of Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel sponsored by the Department of Defense. The series includes six surveys conducted in 1980, 1982, 1985, 1988, 1992, and 1995;²⁻⁷ a seventh survey is being planned for 1998. All of these surveys used statistical probability designs that yielded large sample sizes (from 15,000 to 22,000 respondents) and reasonably high response rates (from 70% to 84%). Consequently, their data provide unbiased estimates of population parameters and permit inferences about the characteristics and behaviors of active-duty military personnel. For Year 2 of the grant, most analyses were based on data from the 1995 Worldwide Survey, although data also were analyzed from the earlier surveys to examine trends in health and performance. Comparisons were made between military women and men and among subgroups of military women.

BODY

During Year 2 of the grant, analyses were conducted that supported the preparation of three papers. Three presentations given at the 1996 American Public Health Association Annual Meeting also were supported by this grant. Each of the papers and presentations addresses an aspect of the health and performance of military women consistent with the objectives of the grant. Both descriptive cross-tabulations and multivariate logistic regression analyses were conducted. Copies of each of the papers and slides from the conference presentations are appended to this report. Key findings from the papers and presentations are noted below. Additional papers and conference presentations are in progress and will be completed during the coming year.

Completed Papers

1. "Stress and Substance Use Among Military Women and Men." Robert M. Bray, John A. Fairbank, and Mary Ellen Marsden. Submitted to the American Journal of Drug and Alcohol Abuse.

Portions of this paper appeared in an earlier form in F.H. Gabbay, R.J. Ursano, A.E. Norwood, C.S. Fullerton, and C.C. Duncan (Eds.), Sex Differences, Stress, and Military Readiness (Vol. II), published by the Uniformed Services University of the Health Sciences, Department of Psychiatry, Bethesda, Maryland. This paper examines levels of stress, sources of stress, behaviors for coping with stress, and the relationship between stress and substance use for military women and men. Several findings were considered to be important:

- There was substantial alcohol and cigarette use, but less illicit drug use, among military women and men. Military men (19%) were over three times more likely than military women (5%) to drink heavily. About 1 in 5 men but only 1 in 20 women was likely to be a heavy drinker. The rate of cigarette smoking was 26% among military women and 33% among men. Roughly 1 out of 4 women and 1 out of 3 men were current smokers. The prevalence of illicit drug use showed similar rates among military women (5%) and men (7%), about 1 in 20 for both.
- About 40% of military women and men reported stress at work, more than in the family or personal relationships. About one-third of military women reported that they experienced high levels of stress from being a woman in the Military. The most frequently mentioned source of stress among military women was being away from family. Most military personnel used problem-focused or approach-oriented coping strategies for dealing with stress.

- Stress at work or in the family was an important predictor of substance use among military men but not among military women. Among military women, stress associated with being a woman in the Military was predictive of illicit drug use and cigarette use. Stress reduction and substance abuse prevention programs may need to be targeted differently for military women and men, and the nature of stressors in the military workplace encountered by military women requires additional study.

2. "Does Stress Differentially Affect the Work Performance of Military Women and Men? Findings from a Worldwide Survey of U.S. Military Personnel." Carol S. Camlin, Robert M. Bray, John A. Fairbank, Sara C. Wheelless, and George H. Duntelman. Draft paper to be submitted for publication.

This study compared the effects of stress, symptoms of depression, heavy drinking, and illicit drug use, as well as the mediating effect of coping style, on occupational impairment among military women and men. Multivariate analyses examined data from the 1995 DoD Worldwide Survey of Health Related Behaviors Among Military Personnel. The survey included a representative sample of 16,193 active-duty personnel serving in all branches of the armed forces throughout the world. Key findings from the paper include the following:

- The stressor types predictive of impaired functioning at work were essentially the same for women and men. Women and men who reported high levels of work-related stress, health-related stress, and symptoms of depression were more likely than those who reported lower levels to show evidence of impaired job functioning.
- Both women and men who used illicit drugs in the past year were twice as likely as those who did not to have functional impairment on the job. Women and men were equally likely to experience depression or the effects of depression on work performance.
- Financial stress affected men more than it did women, and Hispanic men were less likely than men of other racial/ethnic origins to report impaired job functioning in analyses that controlled for other demographic and psychosocial factors.
- From the perspective of the current policy debate on the structure of working relations among women and men in the Military, the findings provided no empirical support for a need for differential or segregated training or job placement for women and men in the armed forces. Findings suggest no difference in military women's and men's work performance under stress.

3. "Deployment and Substance Use Among Military Women and Men." E. Belle Federman, Robert M. Bray, and Larry A. Kroutil. Draft paper to be submitted for publication.

Prior research has indicated that rates of substance use by military personnel may increase or decrease during combat situations compared to use prior to deployment. Changes during deployed situations in the access to substances, stress, daily routines, and normative attitudes about substance use have all been implicated in the observed differences in substance use. Despite these advances, little is known about the relative proclivity of individuals to engage in substance use during deployment beyond the specific situation of combat. In addition, even less is known about substance use among deployed military women. This paper examines the relationship between substance use and deployment among military women and men using data from the 1995 DoD Worldwide Survey. Several key findings from the paper are summarized below.

- Past 30-day prevalence rates of cigarette, alcohol, and illicit drug use were higher among both military women and men who were deployed compared to their nondeployed counterparts. Among men, the association between deployment and substance use was statistically significant for all three substances. However, among military women, only the relationship with alcohol use was statistically significant. Rates of heavy alcohol use were almost three times higher among deployed military women compared to those not deployed (12.3% vs. 4.2%). Among men, heavy alcohol use was about half again as high among those deployed relative to those not deployed (24.0% vs. 16.7%).
- Results from regression analyses that controlled for demographic factors were parallel to descriptive analysis findings with one exception: The relationship between illicit drug use and deployment was no longer significant for either military women or men after controlling for demographic factors. However, cigarette use continued to be associated with deployment only among military women and men, and the positive relationship between alcohol use and deployment also remained significant for both women and men. Additional differences between men and women showed that although both heavy and nonheavy use of alcohol were found to be modestly related to deployment among military men, only heavy alcohol use was related to deployment among women. Again, similar to the descriptive analyses, the odds of heavy alcohol use among women were almost three times as great for those deployed compared to those not deployed (O.R.=2.84).
- Additional analyses suggested that the relationship between deployment and substance use was even stronger when stress due to deployment was taken into account. However, for both women and men, deployment even in the absence of stress, remained significantly related to heavy alcohol use.
- Findings from this paper provide evidence that substance use may be higher among those deployed, even when deployment does not involve direct combat. More research is

needed to understand whether increases in substance use subside after personnel return from deployment and also to understand causal factors for increases in use.

Conference Presentations

1. "Substance Use Among Military Women and Men." Mary Ellen Marsden, Robert M. Bray, and Larry A. Kroutil. Paper presented at the 124th Annual Meeting of the American Public Health Association, New York City, New York, November 1996.

Several significant findings were presented:

- Illicit drug use has decreased dramatically from 1980 to 1995 for both military women and men; rates of use were highly similar for women and men. Heavy alcohol use showed a moderate decline between 1980 and 1995 for both military women and men; rates of use among men were double those of women. Cigarette smoking decreased substantially from 1980 to 1995 among military women and men; rates of use were similar for women and men.
- The demographic composition of the Military changed notably from 1980 to 1995. In 1995, military personnel were more likely to be older, to be married, and to have more education than in 1980. Changes observed in demographic composition were not a major factor explaining declines in drug use and smoking rates. Changes in demographic composition among military women and men were related to declines in rates of heavy drinking.

2. "Stress and Substance Use Among Military Women and Men." Robert M. Bray and Mary Ellen Marsden. Paper presented at the 124th Annual Meeting of the American Public Health Association, New York City, New York, November 1996.

Several significant findings were presented:

- Military women and men experienced high levels of stress associated with work and with family life, but consistently higher levels from work. There were no gender differences in rates of stress at work, but women were more likely than men to experience stress in family life.
- Military women also reported high levels of stress associated with being a woman in the Military.
- Men and women were similar regarding most circumstances they found to be stressful, with separation from family mentioned most frequently. Thinking of a plan to solve problems, talking to family members, and exercising were the most commonly reported strategies for coping with stress.

- Men who perceived high stress at work compared to those with low stress were more likely to drink heavily, to use illicit drugs, or to smoke cigarettes. Those who perceived high stress in their family life were more likely than those with low stress to use illicit drugs or to smoke.
- Women who perceived high stress being a woman in the military were more likely than those with low stress to smoke cigarettes or to use illicit drugs.

3. "Progress Toward Healthy People 2000 Objectives Among Military Women and Men."

Larry A. Kroutil, Mary Ellen Marsden, and Robert M. Bray. Paper presented at the 124th Annual Meeting of the American Public Health Association, New York City, New York, November 1996.

Several significant findings were presented:

- In 1995, the Military, overall or among some groups, had met or exceeded Healthy People 2000 objectives for exercise, Pap tests, overweight (among adults aged 20 or older), cholesterol screening (among adults aged 50 or older), and seat belt use (except for young males).
- Some subgroups within the Military in 1995 were close to Healthy People 2000 objectives for blood pressure screening and awareness among some educational groups and cholesterol screening among adults aged 25 to 49.
- In 1995, the Military overall or some subgroups were below the Healthy People 2000 objectives for overweight among younger adults; blood pressure screening and awareness among some demographic groups; seat belt use among young males; condom use among sexually active unmarried personnel; and abstinence from cigarettes during pregnancy (applicable to women only).

Plans for the Coming Year

During Year 3 of this grant, draft papers and the findings reported in the presentations will be completed, and papers will be sent to professional journals for review. Analyses on the following types of issues for military women and men also will be conducted:

- the co-occurrence of substance use and other health risk behaviors;
- variation in health status and health practices among occupational groups and pay grades;
- relationships between substance use and injury;

- predictors of health care utilization, including health status, health practices, and access to health services; and
- comparative rates of substance use among military and civilian women and men.

CONCLUSIONS

Findings from the analyses conducted during Year 2 of this grant show new and important relationships between substance use and stress, between coping style and stress, substance use and deployment, and key differences between women and men in health status. Military women and men have both shown significant reductions in alcohol use, illicit drug use and cigarette use between 1980 and 1995. Illicit drug use has declined to low levels, but rates of heavy alcohol use, particularly for men, and smoking both for women and men are still cause for concern. Many women (and men) report high levels of stress at work and/or associated with being a woman in the Military. Stress at work or in the family is related to substance use for men, but only stress due to being a woman in the Military is associated with substance use for women.

Higher prevalence rates of cigarette, alcohol, and illicit drug use during deployment among both military women and men compared to their nondeployed counterparts have implications for overall readiness during critical times. Attention should be given to promoting healthier coping strategies among personnel facing the unique stressors of deployment.

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APPENDIX A
COMPLETED PAPERS

Running head: Stress and Substance Use in the Military

Stress and Substance Use Among
Military Women and Men

Robert M. Bray

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Research Triangle Institute

and Duke University Medical Center

and

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Abstract

This paper examines the relationship between perceived stress (at work, in family or personal life, and from being a woman in the Military) and substance use (heavy drinking, illicit drug use, cigarette smoking) among active-duty military women and men. Data were drawn from over 16,000 respondents to the 1995 Department of Defense Survey of Health Related Behaviors Among Military Personnel. Findings indicated substantial substance use and perceived high stress in the Armed Forces. Military women reported substantially lower rates of heavy drinking than men, but similar rates of illicit drug use and cigarette smoking. Both military women and men were more likely to describe their military duties as more stressful than their family or personal lives; for women, stress being a woman in the Military was second to stress at work. Stress at work or in the family was an important predictor of substance use among military men, but not among military women. For military women, stress associated with being a woman in the Military was predictive of illicit drug use and cigarette use. These findings suggest that stress reduction and substance abuse prevention programs should be targeted differentially for military women and men.

Military women and men may be subject to a wide range of stressors as part of their military work assignments and duties. Such stressors may be associated with the physical or mental challenges of their jobs, demands placed on them because of a shortage of other personnel, exposure to trauma associated with combat, or conflicts between military and family responsibilities. In addition, military women may experience stress associated with being a woman in a predominantly male environment or because of sexual harassment they may encounter. Military personnel are also likely to experience the same stressors as other people outside the Military, including the press of family and work responsibilities and uncertainties introduced by changing economic conditions.

Psychosocial theories of stress generally recognize the importance of cognitive factors in the development and maintenance of stress-related symptoms and problems in life functioning. Folkman and Lazarus (1, 2), for example, proposed a psychosocial model that emphasizes the important role that cognitive appraisal plays in the development and maintenance of stress-related adjustment problems. Indeed, a number of experimental and applied studies have shown robust relationships between individuals' appraisal of the level of stress associated with specific life events, chronic stressors, and their capacity to function effectively (cf., 3).

Several decades of research also point to the multidimensional nature of reactions to stress, and that such reactions may vary by gender (e.g., 4). Numerous studies have reported strong relationships between stress, alcohol consumption, and emotional problems, with particularly robust connections between stressful life events and depression for women (5) and stress and alcohol abuse for men (4, 6, 7).

Another characteristic of research to date is that findings on the relationship of stress to substance use and emotional problems vary from study to study. Gorman (7) noted that certain features of occupational environments serve as stressors that increase risk for alcohol abuse among both men and women. Indeed, a number of studies have found elevated rates of alcohol consumption among those with elevated levels of occupational stress, particularly among men (4). Other studies have found increased rates of cigarette smoking and coffee drinking as a response to high stress, but no relationship between

high stress and alcohol consumption (8). Similarly, in some studies of women, alcohol use has not been elevated, but psychotropic medication (e.g., tranquilizers) has been (9, 10). Further, some studies have found that respondents actually reduced their alcohol use during stressful periods (11).

Discrepancies between study findings may reflect meaningful differences in research methods, predisposing characteristics of study populations, and the type and severity of the stressor under study. In addition, other factors may influence the relationship between stress and substance abuse, such as respondents' sociodemographic characteristics and coping styles. For example, research has shown that stressors are highly predictive of drinking problems among men who rely on avoidance coping strategies (12). Women who rely on problem-focused strategies drink less during high-stress weeks than women low on problem-focused coping (11).

Exposure to traumatic stressors has been strongly implicated in the elevated rates of substance abuse and dependence among veterans (13) and substance abuse has been found to be highly comorbid with post-traumatic stress disorder (14). Women who served in Vietnam and experienced high levels of war zone stress were found to have significantly higher rates of alcohol abuse and dependence than other women veterans of the Vietnam era, while women theater veterans who were exposed to lower levels of such stress did not have significantly more alcohol disorders than other women veterans of the Vietnam era (14).

Although these studies indicate a relationship between stress and substance use, the extent of the generalizability of their findings to today's active-duty Military is unknown. This paper builds on these prior studies and extends them by examining the relationship between stress and substance use among military personnel under noncombat, peacetime conditions among the current active force. Whereas most prior studies have focused on alcohol, the present study examines the relationship of stress and heavy drinking, any illicit drug use, and cigarette smoking. Data were drawn from the 1995 Department of Defense (DoD) Survey of Health Related Behaviors Among Military Personnel worldwide (15), the

most recent in a series of surveys conducted since 1980 to examine substance use and health behaviors among military personnel worldwide (16 - 23).

Methods

Sampling Design and Data Collection

The sample was selected using a deeply stratified, two-stage, two-phase probability design. The eligible survey population consisted of all active-duty military personnel except recruits, Service academy students, persons absent without official leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. The first stage of sampling involved selection of major military installations stratified by Service (Army, Navy, Marine Corps, Air Force) and world region (within the continental United States [CONUS], and outside CONUS [OCONUS]). Within the selected installations, the second stage of sampling involved selection of military personnel stratified by military pay grade, including three enlisted pay grade strata (E1-E3, E4-E6, E7-E9) and three officer pay grade strata (warrant officers in grades W1-W5 and commissioned officers in grades O1-O3 and O4-O10). The sample was selected to be representative of the active-duty force worldwide. Officers and women were oversampled because of their smaller numbers.

During data collection, respondents anonymously completed self-administered questionnaires that took about 55 minutes on average to answer and included a broad range of questions dealing with health-related behaviors, including items on substance use and stress. Most respondents (88%) attended group sessions at 59 installations where questionnaires were administered by two-person civilian data collection teams. Eligible personnel who did not attend group sessions were mailed a questionnaire along with an explanation of the purpose and anonymity of the survey and instructions for completing and returning it.

These procedures resulted in a sample size of 16,193 respondents and a response rate of 79%. The survey data were weighted and poststratified to reflect the representation of respondents in the population, and adjustments were made for the potential effects of nonresponse.

Measures and Analysis Procedures

Three substance use measures were examined in this paper: heavy drinking, use of any illicit drug, and any cigarette smoking. Heavy drinking refers to consuming five or more drinks per typical drinking occasion at least once a week during the past 30 days and is based on a drinking-level classification scheme adapted from Mulford and Miller (24). Any illicit drug use refers to any use during the past 12 months of marijuana or hashish, phencyclidine (PCP), lysergic acid diethylamide (LSD) or other hallucinogens, cocaine, amphetamines or other stimulants, tranquilizers or other depressants, barbiturates or other sedatives, heroin or other opiates, analgesics or other narcotics, inhalants, or "designer drugs." Because of the relatively low prevalence of any illicit drug use during the past 30 days, results are presented for the past 12 months.

Cigarette use was measured in terms of lifetime numbers of cigarettes smoked and the average daily number of cigarettes smoked in the past 30 days. Current smokers were defined as military personnel who reported that they smoked at least 100 cigarettes in their lifetime and who smoked at least once in the 30 days prior to the survey.

Military women and men were asked to appraise the perceived levels of stress that they experienced at work and in their personal relationships and family life. Both military women and men were asked the following two items, and military women were additionally asked the third item:

- During the past 12 months, how much stress did you experience at work or while carrying out your military duties?
- During the past 12 months, how much stress did you experience in your family life or in a relationship with a person you live with or date seriously?
- In the past 12 months, how much stress did you experience as a woman in the Military?

These items on perceived stress were complemented with items about sources of stress and behaviors used to cope with stress.

We assessed potential sources of stress in the domains of work and family life with the following question: During the past 12 months, how much stress did you experience from each of the following?

- being deployed at sea or in the field;
- having a PCS;
- problems in your relationships with the people you work with;
- problems in your relationship with your immediate supervisor(s);
- concern about being separated from the Military;
- increases in your workload;
- being away from your family;
- changes in your family, such as the birth of a baby, a divorce, or a death in the family;
- conflicts between your military and family responsibilities;
- problems with money;
- problems with housing;
- health problems that you had;
- and health problems in your family.

We also asked respondents to identify the types of strategies that they use to cope when they "feel pressured, stressed, depressed, or anxious." The list of response categories included items that tap approach and problem-oriented strategies ("think of plan to solve the problem"); emotion-focused strategies, such as seeking social support ("talk to friend or family member"); and avoidance coping ("have a drink," "smoke marijuana or use other illegal drugs," "think about hurting yourself or killing yourself").

Population prevalence estimates and associated standard errors were computed from weighted survey data using the SURvey DATA ANalysis (SUDAAN) software package (25). Logistic regressions were also computed using SUDAAN to model outcome measures of heavy drinking, illicit drug use, and

cigarette smoking. For alcohol, the probability of being a heavy drinker in the past month was used as the dependent measure. The dichotomous outcome measure was heavy drinking versus other drinking levels (excluding abstainers). For illicit drug use, the probability of using any illicit drugs during the past 12 months was used as the dependent measure. For cigarette use, the probability of smoking cigarettes in the past month was the dependent measure. Both of the latter two measures were also dichotomous variables.

Findings

Substance Use Among Military Women and Men

Table 1 shows the prevalence of active-duty women and men who engaged in heavy alcohol use, any illicit drug use, and any cigarette use in 1995. As shown, military men (18.8%) were over three times more likely than military women (5.3%) to drink heavily. About 1 in 5 men, but only 1 in 20 women, was likely to be a heavy drinker. These gender differences in heavy drinking are consistent with patterns of heavy drinking in the civilian sector, with men more likely to drink heavily than women (26). The prevalence of any illicit drug use showed similar rates among military women (5.3%) and men (6.7%); about 1 in 20 was likely to use illicit drugs in the past year among both men and women. These data differ from those in surveys of civilians, which show higher rates of use by men (26). The rate of cigarette smoking was 26.3% among military women and 32.7% among military men. Roughly 1 out of 4 military women and 1 out of 3 military men were current smokers. The 1995 smoking rate was considerably higher than the Healthy People 2000 objective of 20% adopted for the Military (27).

 Insert Table 1 about here

Although it is clear that substantial substance use was reported among military personnel, our primary interest here is to examine whether it was related to stress experienced by military women and

men. To do that, we examine the types and levels of stress perceived by military personnel, consider the basic methods used to cope with stress, then assess the association between substance use and stress.

Appraisal of Stress

Table 2 shows the levels of perceived stress at work, in the family (or personal relationships), and associated with being a woman in the Military. The distributions across response categories indicate two key findings. The first finding is that both military women and men were more likely to describe their military duties as stressful than their family or personal lives. Among women, nearly 4 out of 10 (40.1%) perceived high levels of stress at work (i.e., a "great deal" or a "fairly large amount") compared to about 3 out of 10 (29.3%) who experienced high levels of stress in their families or personal relationships. Among men, a comparable 4 out of 10 (39.1%) perceived high stress at work compared to slightly more than 2 out of 10 (21.5%) in their families. Military women were somewhat more likely to feel high levels of stress in their family or personal relationships (29.3%) than were men (21.5%).

Insert Table 2 about here

The second finding, which applies to women only, is that a third (33.0%) experienced high stress associated with being a woman in the Military. This percentage is slightly higher than the percentage experiencing stress in their family life (29.3%), but smaller than the percentage reporting stress at work (40.1%).

Specific Sources of Stress

Table 3 presents data on sources of stress for military women and men. It shows that, for women, the most frequently mentioned sources of stress were being away from family (21.1%); major changes in family, such as birth or death of a loved one (17.0%); increases in workload (15.9%); problems in work relationships (15.7%); and problems with supervisors (13.1%). For men, the most frequently mentioned sources of stress were being away from family (23.7%), deployment (17.1%),

increases in workload (16.6%), financial problems (15.0%), and conflicts between military and family responsibilities (13.0%).

Insert Table 3 about here

Overall, the percentages of men and women who identified different specific problems as significant sources of stress were quite comparable. For example, Table 3 shows that increases in workload were highly stressful for 16.6% of men and for 15.9% of women, and 15.0% of men and 12.2% of women experienced considerable stress due to financial problems. Some 13.0% of men and 12.8% of women found conflicts between military and family responsibilities to be a significant source of stress, and 10.0% of men and 12.2% of women indicated a PCS as a significant stressor. About 1 in 8 men (12.4%) and women (13.1%) found their relationships with their immediate supervisors to be highly stressful, and problems in relationships with co-workers were highly stressful for 12.4% of men and 15.7% of women. Additionally, 8.7% of men and 7.1% of women reported concerns about separation from the Military, and housing problems were a major stressor for 7.6% of men and 7.5% of women.

In spite of an overall pattern for similar proportions of men and women to appraise specific circumstances at work and in their personal lives as highly stressful, there was substantial variability by gender for several types of circumstances. Related to their military functioning, more men than women (17.1% vs. 6.9%) perceived deployment at sea or in the field to be a significant stressor. Women were more likely to indicate that major changes in family structure and functioning, such as the birth of a baby, a divorce, or a death in the family (17.0% for women vs. 12.3% for men), were significant stressors. In addition, women were twice as likely as men to indicate that personal health problems (8.6% for women vs. 4.0% for men) were a significant source of stress.

Approaches for Coping with Stress

Coping has been defined in terms of the strategies and processes that individuals use to modify adverse aspects of their environment, as well as to minimize internal distress induced by environmental demands (28, 29). An important dimension of coping is the distinction between problem-focused coping strategies, defined as efforts to recognize, modify, or eliminate the impact of a stressor, and emotion-focused coping strategies, defined as efforts to regulate negative emotions that occur in reaction to a stressor event (30, 31). There is some empirical evidence that problem-focused or approach-oriented coping strategies that attempt to manage the problem are among the more effective ways to deal with stress, although the utility of any approach depends on the demands of the situation and the skill and flexibility of individuals in using various coping strategies.

Table 4 shows the percentage of personnel who commonly used specific coping strategies under conditions of stress, by gender for the total DoD. As shown, "think of plan to solve problems" was overwhelmingly indicated by military personnel as a "frequently" or "sometimes" implemented coping strategy (87.3%), followed by "talk to friends/family member" (71.9%) and "exercise or play sports" (63.0%). Across all Services, a solid majority of personnel often used these potentially effective problem-focused and approach-oriented coping strategies to deal with stress, daily pressures, and feelings of depression. With respect to generally less effective avoidant coping strategies, 47.0% indicated that they "get something to eat" when confronted with stress, 23.5% "have a drink," and less than 1% used illegal substances. Just over 4% of military personnel considered hurting themselves or committing suicide as a coping option for stress and/or depressive symptoms.

 Insert Table 4 about here

Table 4 also shows some potentially significant gender differences. Women were more likely to use social support as a coping strategy than were men (87.6% vs. 69.7%, respectively), but were less

likely to turn to alcohol as a method of coping (16.8% for women vs. 24.4% for men). Women also reported a greater tendency than men toward using food substances as a method of coping with stress, anxiety, and depression (57.2% vs. 45.5%, respectively).

Substance Use and Stress

There are many strategies for coping with stress, a number of which were examined and discussed above. Data presented in Table 4 suggest that some military personnel use alcohol, illicit drugs, and cigarettes as a coping mechanism for stress. To examine the relationship between substance use and stress in more detail, we conducted a series of logistic regression analyses predicting heavy alcohol use, illicit drug use, and cigarette smoking. Separate analyses were conducted for military women and men for each substance, and results were expressed as odds ratios.

The measure of interest for these analyses was the relationship of perceived stress to substance use (i.e., heavy alcohol use, any illicit drug use, cigarette use) after controlling for effects of other sociodemographic factors. Contrasts examined high versus low stress and moderate versus low stress. "High" stress was defined as persons who answered that they had experienced a great deal or fairly large amount of stress in the past 12 months; "moderate" stress was defined as persons who answered that they had experienced some or a little stress in the past 12 months; and "low" stress was defined as those who stated they experienced no stress in the past 12 months. Separate analyses were conducted for measures of stress at work, stress in the family, and stress associated with being a woman in the Military.

Sociodemographic factors included in the models were Service (Army, Navy, Marine Corps, Air Force), race/ethnicity (white, black, Hispanic, other), education (high school or less, some college, college graduate or higher), age (20 or younger, 21 to 25, 26 to 34, 35 or older), family status (not married, married with spouse not present, married with spouse present), pay grade (E1-E3, E4-E6, E7-E9, W1-W5, O1-O3, O4-O10), and duty location (stationed within CONUS or stationed OCONUS).

Table 5 shows the odds ratios for the types of stress (at work, in the family, being a woman in the Military), and levels of stress (high vs. low, moderate vs. low) from the logistic regression analyses for

heavy alcohol use, illicit drug use, and cigarette smoking. For military women, results indicate a significant relationship between illicit drug use and cigarette use and stress associated with being a woman in the Military. Those who perceived high stress being a woman in the Military were over 1.5 times more likely than those with low stress to smoke cigarettes in the past month and over 2.5 times more likely to use illicit drugs during the past 12 months. In contrast, military women showed no significant association between levels of stress at work or in the family and substance use.

 Insert Table 5 about here

For military men, results showed significant relationships between levels of stress at work and all three substances and between levels of stress in the family and illicit drug use and cigarette use. More specifically, military men who experienced high stress at work were nearly 1.4 times more likely to drink heavily, over 2.3 times more likely to use illicit drugs and 1.7 times more likely to smoke cigarettes than men with low stress at work. In addition, men who experienced high stress in their families or personal relationships were 1.8 times more likely to use illicit drugs and over 1.5 times more likely to smoke cigarettes than those with low stress.

Discussion and Recommendations

Key Findings

Substance use is often considered to be a means of coping with and reducing stress (13), although research shows that the nature of this relationship is more complex than once thought (32, 33). Clearly, as shown here, many military personnel experience high levels of stress associated with military work or family life. Military personnel may be in endangered situations or far away from home and family. They may also experience the same types of stressors in their work and family lives as do nonmilitary personnel. Problems with finances may also contribute to stress. Military personnel reported higher levels of stress associated with their work than with their family life overall. However,

separation from family was mentioned most frequently by both women and men as the leading source of high stress. This finding is consistent with the fact that work and family are closely intertwined in the Military. Many military women also reported high levels of stress simply because of their status as women in a predominantly male workforce.

In our logistic regression analyses, the strongest associations between stress and substance use were found for military men. Military men who experienced high levels of stress at work were more likely than those reporting low stress to be heavy alcohol users, illicit drug users, or smokers. Those experiencing high levels of stress in family life were more likely than those reporting low stress to use illicit drugs or to smoke. In contrast, among military women, levels of stress at work or in the family were not related to use of alcohol, illicit drugs, or cigarettes. That is, military women did not turn to substance use to cope with high or moderate levels of stress in their military work or in their family and personal relationships. However, military women experiencing high levels of stress associated with being a woman in the Military were significantly more likely than those under low levels of stress to report illicit drug use or cigarette use. Notably, heavy alcohol use among women was unrelated to any type of stress. This latter finding for military women is consistent with research in general population studies of women that have found little evidence for an association between life events and alcohol consumption (34).

Results from the logistic regression analyses are consistent with observations of coping strategies reported by military women and men. Military women were less likely than military men to smoke cigarettes or take a drink when they felt stressed but more likely to talk with friends or family members or to report "getting something to eat" as a coping strategy. Very few military women or men reported using illicit drugs to cope with stress. Almost 90% of military women and men tried to think of a plan to cope with stress. This is an encouraging finding in that the extant research literature suggests that coping styles aimed at managing problems through direct action of seeking social support are generally more effective than coping strategies that attempt to ignore or avoid the problem (35).

Overall, findings reported here suggest that stress is an important predictor of substance use among military men, but less so among military women. For military women, substance use is primarily associated with stress experienced as a woman in the Military. Such stress may be a result of particular features of military life, being in a predominantly male organization, poor coping skills, or some combination of these or other factors. These data also suggest the need to target stress reduction and substance use prevention programs differentially for military women and men. Not only do stressors and coping mechanisms differ for women and men, but factors related to substance use may also differ.

Because substantial percentages of military women and men reported experiencing work-related stress, examining the nature of the work situation for particular occupations may help inform the gender-based differences in substance use. For example, in analyses of the Epidemiologic Catchment Area (ECA) data, the risk of developing drug abuse or dependence showed the strongest associations with the combination of jobs with high physical demands and either low skill discretion or high decision authority (36). Examination of military jobs with these characteristics in mind may help untangle some of the gender differences in substance use.

Study findings also suggest that substance use among military women is associated with factors other than stress, a finding that should guide the development of substance use prevention and education efforts for women. The similarity of rates of illicit drug use and cigarette smoking among military women and men contrasts with the typically higher rates of use among men found in many civilian studies (26). The substantially higher rates of heavy drinking among military men compared with military women, however, mirrors gender differences found in other studies (21, 23, 26, 37). Additional analyses should consider the factors related to substance use among military women and the distinctiveness of patterns of substance use among military women relative to military men and civilian women. Prior analyses have suggested that the substance use patterns of military women more closely approximate the substance use patterns of military men than of civilian women (23). The determinants of substance use among military women may differ from those found in civilian studies.

All of these findings must be understood within the context of the survey methodology that was used and its corresponding strengths and limitations. The strengths of these data are that they come from a large-scale survey that used probability sampling methods and rigorous field procedures that (a) resulted in a highly respectable response rate and used weighting adjustments to address issues of nonresponse bias, (b) provided anonymity of respondent's answers to enhance candor and truthfulness, and (c) offered maximum generality of findings by ensuring that sample members represented all active-duty military personnel.

Despite these strengths, the study is also subject to limitations associated with self-report data and practical constraints on the number and type of questions that can be included in broad-based questionnaires. Self-report data on sensitive topics such as substance use are often subject to underreporting and hence are likely to yield conservative estimates of use. Further, considerations of respondent burden and the total array of issues to be addressed placed limits on the number and complexity of the measures of stress and coping that could be included. Indices assessing these constructs were based on fewer items than those typically used in smaller clinical studies. Similarly, it was not possible to include multiple measures of constructs to assess convergent validity of responses. Nonetheless, the findings reported here have important implications for military personnel and provide useful insights into the stressors they experience at work and in their personal lives and the coping mechanisms they use to deal with these stressors.

Recommendations for Further Research

The current study identifies a number of issues and questions in need of further study to more fully understand the relationship of stress and substance use. More research is needed to understand the nature of stressors military women and men face, the level of those stressors, when and how they relate to substance use, and how they affect work performance. Stress appears to be more strongly related to substance use among military men than military women, although under some conditions stress among military women may also result in substance use. These findings also suggest the need for additional

research on the determinants of substance use among military women, their distinctiveness from military men and civilian women, and the nature of stressors in the workplace encountered by military women. Detailed studies of the nature of work groups and occupations engaged in by military women and men, the nature of male and female interactions in the workplace, and specific stressors will inform these questions.

In addition, research should examine the nature of family-related stressors experienced by military personnel and more effective means of addressing these stressors. Research could also examine the relationship between stress and types of illicit drug use among military women. Although no specific relationship between stress and illicit drug use more generally was found for military women, stress may be related to psychotherapeutic or other types of drug use specifically.

This research could be used to inform the design of more effective stress management and substance abuse prevention programs that take into account the specific needs of military women and men. Findings reported here suggest the need to develop different programs for military women and men.

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Table 1. Substance Use Among Military Women and Men

Substance	Women	Men	Total
			DoD
Illicit drug use, past year	5.3	6.7	6.5
Heavy alcohol use, past month	5.3	18.8	17.1
Cigarette use, past month	26.3	32.7	31.9

Note: Table entries are percentages of personnel who reported substance use.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 2. Levels of Perceived Stress Among Military Women and Men

Type of stress/ level of stress	Women	Men	Total DoD
Stress at work			
Great deal	17.6	15.7	16.0
Fairly large amount	22.5	23.4	23.3
Some	30.7	29.7	29.8
A little	22.7	20.6	20.9
None	6.5	10.5	10.0
Stress in family			
Great deal	13.4	8.8	9.3
Fairly large amount	15.9	12.7	13.1
Some	27.3	27.1	27.2
A little	26.9	30.6	30.1
None	16.6	20.8	20.3
Stress being a woman in Military			
Great deal	16.2	NA	16.2
Fairly large amount	16.8	NA	16.8
Some	35.4	NA	35.4
A little	18.4	NA	18.4
None	13.2	NA	13.2

Note: Table entries are column percentages of personnel who reported the indicated levels of stress in the past 12 months (i.e., in the year before the survey period).

NA = Not applicable.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 3. Specific Sources of Stress, Past 12 Months, by Gender, Total DoD

Stressor	Women	Men	Total DoD
Deployment	6.9	17.1	15.9
Having a PCS ^a	12.2	10.0	10.3
Work relationships	15.7	12.4	12.8
Problems with supervisor	13.1	12.4	12.5
Concern about separation from the Military	7.1	8.7	8.5
Increases in workload	15.9	16.6	16.5
Being away from family	21.1	23.7	23.4
Changes in family	17.0	12.3	12.8
Conflicts between military and family responsibilities	12.8	13.0	13.0
Financial problems	12.2	15.0	14.6
Housing problems	7.5	7.6	7.6
Personal health problems	8.6	4.0	4.6
Family health problems	9.1	7.4	7.6

Note: Table entries are percentages of personnel who reported "a great deal" or a "fairly large amount" of stress in the past 12 months (i.e., in the year before the survey period).

^aPCS = Permanent change of station.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 4. Behaviors for Coping with Stress, by Gender, Total DoD

Coping behavior	Women	Men	Total
			DoD
Talk to friend/family member	87.6	69.7	71.9
Light up a cigarette	24.0	26.7	26.4
Have a drink	16.8	24.4	23.5
Exercise or play sports	60.1	63.4	63.0
Get something to eat	57.2	45.5	47.0
Smoke marijuana/use illegal drugs	0.8	0.8	0.8
Think of plan to solve problem	89.3	87.1	87.3
Consider hurting or killing yourself	3.8	4.2	4.2

Note: Table entries are percentages of personnel who "frequently" or "sometimes" engage in a behavior when they feel pressured, stressed, depressed, or anxious.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 5. Perceived Stress and the Odds of Substance Use

		Illicit	
	Heavy	drug use,	
	alcohol use,	past 12	Cigarette use,
Gender/stress	past month	months	past month
Women			
Stress at work			
High vs. low	1.60	1.47	1.20
Moderate vs. low	1.74	.92	.99
Stress in family			
High vs. low	1.28	1.10	.86
Moderate vs. low	1.20	1.44	.86
Stress being a woman in Military			
High vs. low	.97	2.54*	1.52**
Moderate vs. low	.70	1.99	1.29

See notes at end of table.

(continued)

Table 5. Continued

Gender/stress	Illicit		
	Heavy alcohol use, past month	drug use, past 12 months	Cigarette use, past month
Men			
Stress at work			
High vs. low	1.37**	2.32***	1.70***
Moderate vs. low	1.01	1.54	1.21*
Stress in family			
High vs. low	1.26	1.81***	1.53***
Moderate vs. low	1.02	1.31*	1.13

Note: Data are odds ratios of substance use adjusted for effects of military service, race/ethnicity, education, age, family status, pay grade, and duty location. Sample sizes for women ranged from 2,031 to 2,966; for men, sample sizes ranged from 10,403 to 13,171.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Running head: GENDER AND STRESS IN THE MILITARY

DRAFT

Does Stress Differentially Affect the Work Performance of Military Women and Men?

Findings from a Worldwide Survey of U.S. Military Personnel

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ABSTRACT

This study compared the effects of stress, symptoms of depression, heavy drinking and illicit drug use, and the mediating effect of coping style, on occupational impairment among military women and men. Multivariate analyses examined data from the 1995 DoD Survey of Health Related Behaviors Among Military Personnel. The survey included a representative sample of 16,193 active-duty personnel serving in all branches of the armed forces throughout the world. Data were collected in group sessions using a self-administered questionnaire completed anonymously by respondents. Analyses showed that the stressor types predictive of impaired functioning at work were essentially the same for women and men. Women and men who reported high levels of work-related stress, health-related stress, and symptoms of depression were more likely than those who reported lower levels to show evidence of impaired job functioning. Both women and men who used illicit drugs in the past year were twice as likely as those who did not to have functional impairment on the job. Women and men were equally likely to experience depression or the effects of depression on work performance. However, financial stress affected men more than it did women. From the perspective of the current policy debate on the structure of working relations among men and women in the military, our findings provide no empirical support for a need for differential or segregated training or job placement for women and men in the armed forces.

Does Stress Differentially Affect the Work Performance of Military Women and Men?

Findings from a Worldwide Survey of U.S. Military Personnel

Military women are exposed to a wide range of stressors as a part of military work assignments, and they may also experience stressors unique to being a woman in a predominantly male work environment. Research in the past two decades (e.g., Aldwin, 1993; Hobfall, 1989; Folkman & Lazarus, 1984, 1985; Marmot et al., 1994; Mattlin, Wethington, & Kessler, 1990) has pointed to at least three distinct elements of the stress and coping process: (a) the type of stressor or environmental demand; (b) psychosocial mediators, such as an individual's appraisal of the stressor (i.e., the meanings people attach to life events and chronic stressors) and coping style (e.g., avoidant or problem focused); and (c) the resulting psychosocial, physiological, and behavioral outcomes. Little is known, however, about whether the relationship of stress and coping styles to functioning on the job is any different for women than it is for men in the military, or whether there is variation between women and men in the types of stress most highly associated with their functional impairment on the job.

Recent reports of sexual misconduct and gender discrimination in the armed forces and military colleges point to the kind of stressors military women may experience. Not surprisingly, these reports have spawned considerable debate about the effects of sex discrimination and sexual harassment on the functioning and "military readiness" of military personnel. The controversies surrounding relations between men and women in the military has engendered concern among military leaders about the damage that sexual harassment is causing in the military, not only in terms of personal troubles and low

morale, but in high financial costs. It has been estimated, for example, that sexual harassment in the U.S. Army alone costs about \$250 million a year in lost productivity, personnel replacement costs, transfers and absenteeism (Seppa, 1997).

The “bad press” also is of concern to military recruiters, who are working to meet rising demands for new recruits even as they face some of the most challenging missions in the history of the all-volunteer force (Willis, 1997). These controversies have led to Pentagon and Congressional inquiry into solutions to the problems of gender relations and have resulted in a wide range of considerations from a return to segregation of military corps to a return to unit-level punishment for individual misconduct (Willis, 1997).

These reports also have spawned research on questions regarding the prevalence of sexual harassment and gender discrimination and factors that might be fostering them in the armed forces. Despite the attention being given to these issues, relatively little attention has been paid to the effects of a wide range of other stressor types on the working lives of military men and women, nor to any gender differences in the prevalence of exposure to stress and its functional sequelae.

As issues of gender and equity in the military are hotly debated in the media, and policymakers at the Pentagon and in Congress rethink gender integration, information is needed to provide an empirical basis for informing critical military and public policy decisions on how to structure the working relationships of men and women in the armed forces.

This study provides important data bearing on one aspect of this important issue: the effect of stress on impaired work functioning for military women and men. Analyses

draw on data from the 1995 DoD Survey of Health Related Behaviors Among Military Personnel (Bray et al., 1995) and examine work-related stress, family-related stress, financial stress, health-related stress, and coping style.

Methods

Sampling Design and Data Collection

The sample for the 1995 DoD survey was selected using a stratified, two-stage probability sample. The eligible survey population consisted of all active-duty personnel, excluding recruits, service academy students, persons absent without official leave (AWOL), and persons who had a permanent change of station (PCS) at the time of data collection. The first stage of sampling involved selection of military installations stratified by branch of service (Army, Navy, Marine Corps, and Air Force) and world region (within the continental United States [CONUS], and outside CONUS [OCONUS]). Within the selected installations, the second stage of sampling involved selection of military personnel stratified by gender and pay grade (E1-E3, E4-E6, E7-E9, W1-W5, O1-O3, O4-O10) and gender (male, female). The sample was selected to be representative of the active-duty force worldwide. Women and officers were oversampled because of their smaller numbers.

Data were collected between April and August 1995 using self-administered questionnaires completed anonymously by respondents. The questionnaire averaged about 55 minutes to complete. Most respondents (88%) attended group sessions at 59 installations, where questionnaires were administered by civilian data collection teams. Eligible personnel who were not able to attend group sessions were mailed a questionnaire along with an explanation of the purpose and anonymity of the survey, as

well as instructions for completing and returning it. The overall response rate among eligible survey participants was 70%. The data were weighted and post-stratified to reflect the representation of the population, and adjustments were made to offset the potential effects of nonresponse. The final sample consisted of 16,193 respondents, including 13,219 men and 2,974 women; of these, 12,531 were enlisted personnel and 3,662 were officers.

To assess perceived stress, we asked all respondents to answer the following questions:

- During the past 12 months, how much stress did you experience at work or while carrying out your military duties?
- During the past 12 months, how much stress did you experience in your family life or in a relationship with a person you live with or date seriously?

For multivariate logistic regression analyses, a dichotomous dependent measure was constructed to assess impaired job functioning. Scores for the dichotomous measure were based on respondents' answers to five items:

- was late for work by 30 minutes or more,
- left work early for a reason other than an errand or early holiday leave,
- was hurt in an on-the-job accident,
- worked below normal level or performance, and
- did not come to work at all because of an illness or a personal accident.

Response categories for each of the above items measured the number of workdays in the past 12 months these events had happened to the respondent. First, we constructed a

single continuous variable using the five categorical variables. We assigned a score to each of the response categories, from 0 indicating that the event had never happened, to 8 indicating the event had happened on 40 or more days in the past year. The maximum possible score was 40 if the respondent scored an 8 on each of the five items. Next, we examined the distribution of scores for the variable, which ranged from 0 to 32, and based on the distribution chose a cutoff point of 13 for construction of a dichotomous variable. Those who scored 13 or higher, comprising approximately 5% of the respondents (566 men and 175 women), were assigned a score of 1, which represented functional impairment; others received a score of 0. Those receiving a score of 1 had experienced each of the five events at least once in the past year and also experienced at least one of the events on 6 or more days. Typically, they reported each of the events on multiple days. The highest individual-item scores were fairly evenly distributed among the five events.

The key predictors in the logistic regression were four types of stressors: work-related stress, family-related stress, financial stress, and health-related stress. In addition, coping style was examined as an interaction term and independent predictor. Measures of substance use problems, depression, and sociodemographic characteristics also were included as independent variables in the models.

We operationalized stressor types by examining the correlation of responses to a question on the potential sources of stress for military personnel in the domains of their work and family life. The correlation matrix yielded findings consistent with domains of stressors identified in prior studies. Respondents who indicated that they had experienced "a fairly large amount" or "a great deal" of stress at least once in the past 12 months in

each of the four domains of work, family, financial, and health-related stress noted below were scored as a 1, and others as a 0. Items used to define work-related stress were being deployed at sea or in the field; having a permanent change of station; having problems in relationships with co-workers; having problems in relationship with immediate supervisor; experiencing concern about being separated from the military; or experiencing stress from increases in workload. Items used to define family-related stress were being away from family and experiencing changes in the family, such as the birth of a baby, a divorce, or a death in family, or conflicts between military and family responsibilities. Items used to define financial stress were experiencing problems with money or problems with housing. Items used to define health-related stress were health problems experienced or health problems experienced in one's family.

To assess symptoms of depression, we asked respondents whether, in the past 12 months, (a) they had 2 weeks or more in which they "felt sad, blue, or depressed," or (b) they felt sad or depressed much of the time. Those indicating positive responses were scored as a 1; others were scored as a 0. To assess illicit drug use, we asked respondents whether in the past 12 months they used marijuana, phencyclidine (PCP), LSD, cocaine, amphetamines, tranquilizers, barbiturates, heroin, analgesics, inhalants, or "designer drugs" at least once. Those indicating "yes" to one or more items were scored as a 1; others were scored as a 0.

We classified the report of past 12-month alcohol consumption as "heavy drinking" if the respondent (a) drank five or more drinks per typical drinking occasion at least once a week (for men), or (b) drank four or more drinks per typical drinking occasion two to three times per month (for women). Different consumption levels for

defining heavy drinking were employed for men and women to account not only for potential differences in body mass, but also to account for women's higher susceptibility to the physiological consequences of alcohol (Deal & Gavalier, 1994; Dawson & Archer, 1992; Wilsnack, Wilsnack, & Hiller-Sturmhofel, 1994) and their greater likelihood to underestimate the quantity of alcohol they consume (Lemmens, 1994; Marmot et al., 1994; Sobel, Cunningham, & Sobel, 1996; WHO Brief Intervention Study Group, 1996).

We also developed a measure of coping, which is thought to be an important mediator of the relationship between stress and adverse health outcomes. We developed a variable representing two coping styles: a positive, action-oriented coping style or a negative coping style. Coping styles are thought to be relatively stable characteristics and are divided into two basic types: avoidance (i.e., ignores the problem but takes steps to reduce negative affect), and problem focused (i.e., does something to remove the source of stress (Roth & Cohen, 1986). In general, problem-focused coping is associated with better health outcomes.

We conducted a principal components analysis with varimax rotation on eight variables drawn from several coping indexes (Keppel & Zedeck, 1989) to identify underlying factors related to coping styles. The eight variables loaded heavily (factor loadings ranged from .45 to .68) on two factors consistent with an "avoidant" coping style or a "problem-focused" style. The finding matched the theoretical groundwork characterizing the two general coping styles. Items then were operationalized into one dichotomous variable. Persons were scored as a 1 who reported frequently taking the following actions when feeling "pressured, stressed, depressed, or anxious": (a) talking to a friend or family member, (b) exercising or playing sports, or (c) thinking of a plan to

solve the problem. Respondents were scored 0 otherwise, which corresponded to engaging in such nonpositive behaviors as cigarette, alcohol or marijuana use; getting something to eat; or thinking about hurting or killing one's self when feeling pressured, stressed, depressed or anxious.

Analysis Procedures

Population prevalence estimates and associated standard errors were computed from weighted survey data using the SURvey DATA ANalysis (SUDAAN) software package (Shah, Barnwell, & Bieler, 1995). Logistic regression analyses also were computed using SUDAAN to model the outcome-impaired work performance for both women and men.

Results

Demographic Characteristics

Table 1 displays a summary of the counts of the respondents and the demographic characteristics of the eligible respondent population. Overall, for both women and men, the majority were relatively young (80% women, 77% men under age 35), white (60% women, 69% men), enlisted rather than officer (about 84% for both women and men), and moderately well-educated (72% women, 62% men had some college or a college degree). By virtue of these demographic characteristics, the military represents a cross-section of men and women who would be expected to report better health than the general population.

There are several notable demographic differences between men and women in the active-duty military. A lower proportion of men (16%) than women (26%) were African American, men (38%) were more likely than women (28%) to have a high school

education or less, and men were more likely to be married (62%) than women (51%).

Women were more likely to serve in the Air Force and Army than in other branches of service, whereas men were about equally likely to serve in the Army, Navy, or Air Force.

Appraisal of Perceived Stress Among Military Personnel

We conducted analyses of the levels of perceived stress that military personnel indicated in their experience at work and in their personal relationships and family life. The findings in Table 2 show distributions across response categories and mean scores for each type of stress by gender, indicating that both women and men were more likely to perceive some stress at work and in their family lives, rather than a fairly large amount or a great deal of stress. Military personnel overall were more likely to report a great deal of stress in their military work (16%) than in their personal lives (9%). In a *t*-test comparing mean scores, military women (3.23) were significantly more likely than men (3.09) to describe their work as stressful. Women (2.81) also were significantly more likely than men (2.56) to describe their personal lives as stressful.

The findings of greater stress for military women may simply reflect gender differences in the appraisal of stress or gender norms related to the report of mental health problems. They also may relate to genuine differences between men and women in their level of responsibility for childcare or household duties, perhaps leading to role overload or role conflict for women balancing a career in the military with lives at home. In addition, there may be gender role-related differences in the level of stress men and women experience as a result of being away from family members due to deployment or duty assignments, or family problems such as separation or divorce.

Stress-Related Factors Associated with Impaired Job Functioning

To better understand these gender differences, we conducted multivariate analyses to examine the associations between sources of stress and the level of functional impairment men and women experience on the job. The goal was to determine whether there are stress-related differences between women and men in their capacity to function in their military work. Table 3 displays the findings from multivariate logistic regression models testing the associations of stressor types, depression, and illicit drug use with impaired job functioning for military women and men.

The models were identical except for the construction of the heavy drinking measure described above, which accounted for gender-appropriate consumption levels. The dependent variable of impairment job functioning was dichotomous. Independent measures included the four dichotomous stressor types: work-related stress, financial stress, family-related stress, health-related stress, coping style, symptoms of depression, heavy drinking, illicit drug use, and demographic characteristics. Initially, each model tested the independent effect of coping style on the outcome, as well as the interaction of coping style with each of the four stress types on the outcome. Because the interaction term was not significant, it was not included in the final model.

Multiple logistic regression analysis showed that the stressor types were related to impaired functioning at work and that the pattern was essentially the same for men and women. Both women and men who reported high levels of work-related stress (OR 1.9 for women; OR 1.8 for men), health-related stress (OR 2.2 for women; OR 1.9 for men), and symptoms of depression (OR 1.9 for women; OR 2.2 for men) had odds of impaired job functioning that were about twice as high as women and men who reported lower

levels of exposure to these stressors. In addition, the odds of experiencing functional impairment on the job were twice as high for those who used illicit drugs in the past year than for those who did not (OR 2.0 for women; OR 2.1 for men).

Further, financial stress exerted an impact on functional impairment for military men but not for military women. For men, the odds of experiencing job impairment were 40% higher among those who experienced high levels of financial stress than among those who did not (OR 1.4). For Hispanic men, the odds of impaired job functioning were 40% lower than those for white men (OR 0.6). No other demographic characteristics were significantly associated with impaired functioning on the job for either women or men.

Discussion

The findings presented here indicate that a subset of military women and men experienced impaired job functioning due to stress and other factors. The specific factors associated with impaired functioning at work for women and men were work-related stress, health-related stress, symptoms of depression, and past year illicit drug use. High stress related to military work, such as being deployed, undergoing a permanent change of station, having problems with co-workers or immediate supervisors, feeling concern about being discharged from the military, or experiencing increases in workload, were associated with functional impairment on the job. A key finding is that work-related stress affected women no differently than men, indicating that the work performance of women is no more likely than that of men to suffer under the strain of work stressors.

Although the work-related stress items did not directly address sexual harassment, the question regarding problems with an immediate supervisor or co-worker could

include a subsample of respondents who experience problems of harassment. Although a more sensitive measure of sexual harassment may have yielded a different finding (in a different model), we felt that this measure was broad enough to capture the self-report of interpersonal problems at work that encompass not only harassment but other issues related to gender inequity for women. The measure also provides a basis for cross-gender comparison of the effects of work stress on functional impairment.

That high levels of health-related stress would be highly associated with functional impairment is not surprising, and this factor also was significant for both military women and men. Women were neither more likely than men to experience depression, nor was the effect of depression on their work performance different from that effect for men. Interestingly, family-related stress associated with such events as being away from one's family, conflicts between military and family responsibilities, or significant changes, such as the birth, divorce, or death, did not significantly affect the capacity to function at work for either men or women. Apparently, military personnel are able to manage family-related stressors so they do not negatively affect work.

Illicit drug use also was a significant predictor of functional impairment for both men and women although heavy drinking was not. The underlying reason for this difference may be rooted in social acceptability of alcohol relative to illicit drugs. Bray et al. (1995) and Bray, Marsden, and Peterson (1991), in standardized comparisons adjusted to reflect sociodemographic differences between military and civilian populations, reported that heavy drinking is more prevalent in military than civilian populations (17% vs. 12%) while illicit drug use is more rare (3% vs. 10%). This suggests that drinking may be a normative activity in the military, whereas illicit drug use

may be a more marginalized behavior. Not surprisingly, we found that military personnel who use illicit drugs represent a population at disproportionate risk of occupational impairment, whether due to their drug use or to other underlying factors.

For men, a high level of stress from problems with money or problems with housing was significantly associated with functional impairment on the job. The finding should not be construed to mean that women are not affected by financial stress, but rather that financial stress has a more direct negative impact on men's job functioning. The finding suggests that if men, more than women, internalize social role expectations related to the display of financial success, then perhaps problems related to money may cause their disproportionate distress (see Eagley & Wood, 1991, regarding the impact of gender role expectations). Meta-analytic reviews of sex-difference research (e.g., Eagley & Wood, 1991) indicate that gender role expectations arise from the distribution of women and men into different specific social roles, especially family and occupational roles. It has been posited that the gender division of labor (in which women are chiefly responsible for child rearing, familial, and domestic tasks, regardless of their other work, while men focus on the more powerful arenas of the economy) produces gender norms, gender socialization patterns, and gender stereotypes—all of which further reinforce the gender division of labor (Chafetz, 1991). If men are expected to possess "agentic" attributes, including being independent, masterful, assertive, and instrumentally competent (Eagley & Wood, 1991), they also may hold gender-specific role expectations related to income and the status it confers. Social role theories should be employed in further studies to examine this difference and to test theory-based hypotheses that can explain differences in the effects of stress in men and women.

Finally, Hispanic ethnicity appeared to exert a protective effect on the level of functional impairment for men but not women. That is, Hispanic ethnicity predicted less functional impairment for military men. No explanation for this finding was apparent. Additional analyses are needed to identify the determinants accounting for racial/ethnic differences in the effects of stress on functional impairment.

This study did not include an in-depth analysis of coping strategies or processes, but items from several different indexes of coping responses were used to construct a general indicator of coping style. Coping style as defined by our measures did not appear to mediate the relationship between stressor types and **impaired** job functioning nor to be directly associated with job impairment. Our measure of coping as a style, rather than as a process over time or a response to a specific event, could have accounted for this null finding. These findings suggest that events related to work and health status appraised as stressful, symptoms of depression, and illicit drug use may exert an influence on the capacity to function at work, whether or not one has a propensity toward an “approach” or “avoidant” style of coping.

A limitation of large-scale survey research studies such as this one, wherein a wide range of topics is covered and respondent burden is heavy, is a limited opportunity to use multidimensional measures of given constructs, such as those used in structured clinical interviews for depression or coping. It would be important to confirm these findings in smaller studies with a more limited number of in-depth measures of interest.

In summary, although military women reported experiencing more stress than military men, this did not manifest itself in greater functional impairment on the job. Our findings suggest that women are more likely than men to recognize or report the stressors

they experience, or are more able to garner resources, such as social support, to assist in dealing with stress. Indeed, it is not gender differences, but rather military men's and women's similar patterns that these findings highlight. Military men and women are subject to functional impairment on the job under the strain of virtually the same sources of stress. This suggests that there is no need to protect military women, as a class, from exposure to stressors relative to those experienced by men.

The policy implications of these findings are apparent. The current empirical evidence regarding perceived stress from military work does not support the need for differential or segregated training or job placement for women and men in the armed forces. If this holds true for all aspects of work, calls for a return to segregation of men and women in the military may be premature if not misguided. The implications of such policy decisions for gender equity and equal opportunity in the military should be carefully reviewed, and the criteria for such decisions should be subjected to analytic inquiry, before such policy actions are taken.

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Table 1.

Sociodemographic Characteristics of U.S. Military Women and Men

Characteristic	Women		Men	
	Unweighted <u>N</u>	Percent	Unweighted <u>N</u>	Percent
Age (years)				
20 or younger	393	15.2	1,212	11.3
21-25	860	32.5	2,843	31.9
26-34	910	32.5	3,497	33.3
35 or older	811	19.9	5,667	23.5
Race/Ethnicity				
White	1,813	59.8	9,308	68.8
African American	704	25.6	1,967	16.0
Hispanic	258	7.9	1,078	8.6
Other	199	6.7	866	6.6
Education				
High school or less	796	27.6	4,308	38.1
Trade/technical				
graduate or some				
college	1,424	50.7	5,611	42.9
College graduate				
or beyond	754	21.6	3,300	19.0

(continued)

Table 1 (continued)

Characteristic	Women		Men	
	Unweighted <u>N</u>	Percent	Unweighted <u>N</u>	Percent
Service				
Army	686	33.7	2,952	31.6
Navy	864	26.1	3,401	29.2
Marine Corps	576	4.1	3,384	11.9
Air Force	848	36.2	3,482	27.2
Job Status				
Enlisted	2,355	83.6	10,176	84.5
Officer	619	16.4	3,035	15.5
Marital Status				
Married	1,581	51.0	9,099	61.6
Unmarried	1,393	49.0	4,120	38.4
Total	2,974	100	13,219	100

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 2.

Levels of Perceived Stress Among U.S. Military Personnel (%)

Type of Stress/Level of Stress	Women	Men	Total DoD
Stress at Work			
Great deal	17.6	15.7	16.0
Fairly large amount	22.5	23.4	23.3
Some	30.7	29.7	29.8
A little	22.7	20.6	20.9
None	6.5	10.5	10.0
Mean score ^a	3.23	3.09	--
Stress in Family			
Great deal	13.4	8.8	9.3
Fairly large amount	15.9	12.7	13.1
Some	27.3	27.1	27.2
A little	26.9	30.6	30.1
None	16.6	20.8	20.3
Mean score ^a	2.81	2.56	--

Note: Table entries are column percentages of personnel who reported the indicated levels of stress in the past 12 months, except for mean scores.

^a $p < .0001$ for comparisons of mean scores by gender.

NA = Not applicable.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Table 3.

Factors Associated with Impaired Functioning at Work: U.S. Military Personnel, 1995

Independent Variables	Women			Men		
	Adjusted	Adjusted	p	Adjusted	Adjusted	p
	OR	95% CI		OR	95% CI	
Work-related stress						
High vs. low	1.9	1.2, 3.0	<.01	1.8	1.3, 2.4	<.001
Financial stress						
High vs. low	1.0	0.6, 1.6	ns	1.4	1.1, 1.9	<.01
Family-related stress						
High vs. low	0.9	0.6, 1.4	ns	1.1	0.9, 1.3	ns
Health-related stress						
High vs. low	2.2	1.3, 3.6	<.01	1.9	1.4, 2.5	<.0001
Negative coping style vs. other						
style	0.8	0.5, 1.3	ns	1.1	0.9, 1.3	ns
Depression symptoms vs. no						
symptoms	1.9	1.2, 3.1	<.01	2.2	1.7, 2.8	<.0001
Heavy drinking vs. moderate,						
light, or no drinking	1.0	0.4, 2.8	ns	1.1	0.8, 1.6	ns
Illicit drug use in past year vs. no						
use in past year	2.0	1.0, 4.2	<.05	2.1	1.5, 2.9	<.0001

(continued)

Table 3 (continued)

Independent Variables	Women			Men		
	Adjusted	Adjusted		Adjusted	Adjusted	
	OR	95% CI	p	OR	95% CI	p
Enlisted vs. officer status	1.1	0.5, 2.6	ns	0.8	0.5, 1.2	ns
Education						
≤ H.S. vs. college grad.	0.8	0.4, 2.0	ns	0.9	0.6, 1.4	ns
> H.S. vs. college grad.	0.8	0.4, 1.8	ns	0.9	0.7, 1.4	ns
Unmarried vs. married	0.9	0.6, 1.2	ns	1.0	0.8, 1.3	ns
Race/ethnicity						
African American vs. white	0.8	0.6, 1.2	ns	1.3	0.9, 1.8	ns
Hispanic vs. white	1.3	0.7, 2.6	ns	0.6	0.4, 0.9	<.05
Other vs. white	1.0	0.5, 1.9	ns	0.8	0.5, 1.2	ns
Age						
≤ 20 vs. ≥ 35	0.8	0.5, 1.4	ns	1.4	0.9, 2.1	ns
21-25 vs. ≥ 35	1.2	0.7, 2.0	ns	1.2	0.9, 1.6	ns
26-34 vs. ≥ 35	0.7	0.4, 1.3	ns	1.2	0.9, 1.7	ns

ns = Not statistically significant at $p \leq .05$

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 1995.

Running head: DEPLOYMENT AND SUBSTANCE USE

Deployment and Substance Use Among Military Women and Men

DRAFT

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Military life requires personnel to function in a wide variety of environments that range from performing routine job assignments at large or small military installations to working in field conditions to being deployed to unfamiliar surroundings and perhaps stressful battle settings. Although deployments are a regular part of military life, they can vary greatly in terms of the experience they present for personnel. For example, they vary in duration, location, military support, living accommodations and comforts, and stress of the situation.

Many aspects of the deployment experience have not been well studied, including its effects on substance use. Substance use is of concern in both deployed and nondeployed settings because it can have negative effects on health, social life, family relationships, and work performance for military personnel. However, substance use during deployment poses a number of important implications beyond these more global concerns. First, substance use can potentially affect both military readiness and the safety of personnel during deployment. Second, if increases in substance use are associated with deployment, this relationship could have long-term implications for substance use among military personnel. A number of factors related to deployment may influence patterns of substance use, including changes in social support, perceptions and experiences of stress, access to substances, normative attitudes regarding substance use, and supervision. For example, increases in stress may result in greater substance use, or changes in access to substances (either an increase or decrease) could result in corresponding changes in use.

Prior research on the relationship between deployed situations and substance use has focused almost exclusively on specific combat situations, namely, the Vietnam War and the Persian Gulf War, and on men in the military. In a hallmark study, Robins, Helzer, and Davis (1975) examined rates of substance use before, during, and after service in Vietnam among a random sample of 470 Vietnam Army veterans (including both enlistees and draftees) 8 to 12 months after their return to the United States in September 1971. Preservice rates were found to be low and similar to national rates (e.g., 11% had tried a narcotic at least once but fewer

than 1% reported using a narcotic more than 25 times). However, approximately 20% of the sample reported having used narcotics on a weekly basis for 6 months or more during their service in Vietnam, and 20% also were considered to be addicted based on reported symptoms of dependence. Rates of substance use after returning to the United States showed a decrease to preservice levels for overall use but slight elevations, compared to baseline rates, for heavy use.

More recent studies have been based on experiences during the Persian Gulf War. Rothberg, Koshes, Shanahan, and Christman (1994) compared the mental health and drug and alcohol service utilization rates among six U.S. Army units deployed to Southwest Asia during Desert Storm to 11 units not deployed. Their findings showed higher rates of service use both before and after (not significant) deployment for 150 soldiers in deployed units compared to the 150 in nondeployed units. However, the units also differed in demographic characteristics such that deployed personnel were less likely to be white, were younger, and were more likely to be in the enlisted ranks. The small sample size precluded analyses to control for these demographic differences. A second study by Labbate and Snow (1992), although also limited by the small sample size of 53 soldiers, found that deployed members of an Army unit reported using alcohol to alleviate nightmares or to aid sleep.

Three larger studies of substance use during Operation Desert Storm include the 1992 Department of Defense (DoD) Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel (Bray et al., 1992), a study by the Iowa Persian Gulf Study Group (1997), and a study of tobacco use among Naval personnel (Forgas, Meyer, & Cohen, 1996). The 1992 DoD Worldwide Survey retrospectively assessed substance use during Desert Storm relative to use prior to deployment among 3,438 military personnel enrolled as part of a larger study based on a probability sample of all active-duty military personnel in 1992 (Bray et al., 1992). In terms of alcohol use, 45.2% of deployed military personnel reported that their use decreased during Desert Storm, a finding that was consistent with the cultural prohibitions in the region against alcohol. However, approximately 12% reported that their drinking stayed the

same, and almost 8% reported that their drinking increased. Interestingly, the higher rates of increase in drinking were found among the Navy and Air Force personnel (11.7% and 12.0%, respectively, vs. 4.1% for Army and 7.9% Marine Corps); the Navy and Air Force personnel also were more likely to be stationed away from the front lines and perhaps able to obtain access to alcohol more readily. Smoking behavior showed a different pattern, however. Only slightly more than 4% reported a decrease in smoking while almost 15% reported smoking about the same amount, 15% reported smoking more during deployment, and almost 8% either started smoking or resumed smoking. Rates of illicit drug use were much lower than rates for either alcohol or cigarette use; only about 5% had used either before or during Desert Storm. Approximately 1% reported that their drug use increased, almost 1% said their use remained the same, and 2.5% reported a decrease in use.

The Iowa Persian Gulf Study Group (1997) examined rates of illness and health status in a stratified random sample of 3,695 military personnel on active duty (regular or National Guard/Reserve) at some time between August 1990 and July 1991. In analyses that controlled for the stratification variables of age, sex, race, rank, and service branch, Gulf War Veterans who served in the Persian Gulf theater (regular military personnel and National Guard/Reserve) were found to have significantly higher rates of alcohol abuse compared to those who were on active duty (and may have been deployed) but did not serve in the Persian Gulf theater.

Finally, Forgas et al. (1996) examined tobacco use among 1,915 Naval personnel deployed to Desert Storm. They found both increased use of smokeless tobacco and cigarettes among users and initiation of use among nonusers. For instance, 7% reported starting to smoke and 29% reported smoking more while in the Persian Gulf. Two other interesting findings from this study are that boredom and stress were the most frequently reported reasons for smoking and that the ship store was the place most frequently reported for obtaining cigarettes.

These findings reported in the literature suggest that rates and patterns of substance use among military personnel change during combat and that stress, access, and cultural

norms regarding substance use are all potential factors for influencing use during deployed situations. However, despite the important advances afforded by the current literature, several gaps remain to be addressed. First, little is known about the relative proclivity of individuals to engage in substance use during deployed situations that do not include direct combat experience (e.g., peacekeeping missions). Second, relatively even less is known about the effects of deployment on substance use specifically among women despite the fact that, as of 1995, the number of military women is increasing (currently they comprise about 14% of the armed forces) and women are playing increasingly important roles in the military and in deployments. Most of the research to date has concentrated either only on male military personnel, or on the military as a whole, ignoring any potential difference between males and females in the effects they were examining.

To address these gaps, the current study examines whether recently deployed military personnel are more likely to use substances than those not recently deployed. This study also has the added value of examining these relationships separately among women and men in an attempt to understand whether the effects of deployment on substance use differ between the two sexes.

Methods

Study Sample

Data for this study are drawn from the 1995 DoD Survey of Health Related Behaviors among Military Personnel (the 1995 DoD Survey). Details of the 1995 DoD Survey are described by Bray et al. (1995b). Given here is a synopsis of the methods relevant for the current study.

All active-duty military personnel, except recruits, service academy students, persons absent without official leave (AWOL), and persons who had a permanent change of station (PCS), at the time of data collection, were eligible to be included in the study. Sampling was based on a two-staged design. The first stage was comprised of military installations stratified by military service (Army, Navy, Air Force, Marines) and geographic region (within the 48

contiguous or continental United States [CONUS] and outside the continental United States [OCONUS]). The second-stage sampling involved sampling of personnel from the 59 military installations selected during the first stage. For this second stage, personnel were stratified based on sex (male, female) and military pay grade, with three levels among enlisted personnel (E1-E3, E4-E6, E7-E9) and three among officers, including warrant officers (W1-W3, O1-O3, O4-O10). Both women and officers were oversampled due to their smaller relative numbers. The 1995 DoD Survey's study sample was designed to be representative of all active-duty personnel in the military, and data were weighted to reflect the population proportions, taking into account the sampling design.

Data were collected via anonymous questionnaires that were self-administered during group sessions, run by civilian field staff from Research Triangle Institute (RTI). These group sessions were given at each of the 59 selected military installations between April and August 1995. Selected personnel who did not participate in a group session (e.g., were on official leave, sick) were mailed questionnaires to complete and return by mail to RTI. The study had a response rate of 70.0% for a total sample of 16,193. Analyses reported here are based on the 12,978 men and 2,948 women who had valid information about whether they had been deployed in the 30 days prior to the survey (98.3% of total sample).

Measures

The 1995 DoD Survey's questionnaire covered a range of topics relevant to health behaviors, including substance use, stress, exercise, high blood pressure, sexual behavior, and health attitudes. All domains for this study are measured via respondents' answers to items in the self-administered questionnaire.

Demographic Characteristics

A number of demographic factors were considered as potential control variables based on prior research that had shown these characteristics to be related to substance use among military personnel (Bray, Kroutil, & Marsden, 1995a; Bray et al., 1995b) and a hypothesized relationship that these same characteristics might also be related to having recently been

deployed (e.g., age, pay grade). These characteristics included age grouped into the four categories (≤ 20 , 21-25, 26-34, ≥ 35 years); race (white, black, Hispanic, other); marital status coded as a two-level variable for married or not married; education coded as a three-level variable for high school or less, some college, or college graduate and higher; branch of military service; and pay group divided as officers versus enlisted personnel.

Deployment

Deployment status in the past 30 days was assessed via the following question: "During the past 30 days, how many full 24-hour days were you deployed at sea or in the field?" The primary measure of deployment used in this study is a dichotomous variable that indicates any days versus no days deployed in the past 30 days.

Three further measures of deployment were created for additional analyses in which an attempt was made to understand potential causal mechanisms for the relationships identified in the main analyses. First is a three-level variable that accounts for amount of time deployed in past 30 days: not deployed, deployed 2 or fewer weeks, and deployed for 2 or more weeks. Second is a three-level variable designed to take into account the stress experienced during the past 12 months from being deployed at sea or in the field: not deployed, deployed but no stress or only some stress reported, and deployed with either "a fairly large amount" or "a great deal" of stress reported. The third variable, also a three-level type, combines recency of deployment with deployed status: not deployed, deployed 2 or more weeks ago, and deployed fewer than 2 weeks ago.

Substance Use

Substance use was assessed for cigarette smoking, alcohol use, and illicit drug use. The time reference period for all three substances was the past 30 days to coincide with the time frame of the deployment question. Cigarette smoking during the past 30 days was defined as smoking at least 100 cigarettes during one's lifetime and having smoked in the past 30 days. Illicit drug use was based on reported use of any of the following drugs during the past 30 days: marijuana, phencyclidine (PCP), lysergic diethylamide (LSD), cocaine, amphetamines,

tranquilizers, barbiturates, heroin, analgesics, inhalants, and "designer" drugs. Both cigarette smoking and illicit drug use were operationalized as dichotomous variables for any use versus no use during the past 30 days. Alcohol use, however, was conceived as a three-level variable for use in the past 30 days: no use (abstinent), nonheavy use, and heavy use, with heavy use defined to be consumption of five or more drinks per typical drinking occasion at least once a week for both women and men.

For alcohol, a measure of dependence was used in addition to the use measure described above. This dependence measure was based on the sum of reported occurrences during the past 12 months across the following four symptoms: withdrawal symptoms, blackouts, inability to stop drinking before becoming drunk, and morning drinking. Respondents who reported 48 or more occurrences were considered to be dependent. This measure does not directly coincide with the definition of dependence in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association [APA], 1994); however, it is based on the Rand Air Force study definition (Polich & Orvis, 1979).

Statistical Methods

All analyses were performed using RTI's SURvey DATA ANalysis (SUDAAN) software for the statistical analysis of correlated data to take into account the complex survey design (Shah, Barnwell, & Bieler, 1996). In addition, analysis weights that take into account the sampling scheme were used. In presentation of the results, sample sizes are reported as unweighted counts, but statistics (including percentages) are based on weighted data.

Initial descriptive analyses were employed to examine the prevalence of substance use among deployed women and men compared to their nondeployed counterparts. In addition, the relationship of deployment to demographic control characteristics was assessed. Statistical significance of relationships was assessed via chi-squared tests for association (analogous to Pearson chi-squared tests).

To examine the relationship between deployment and substance use, while holding constant the effects of demographic characteristics, logistic and multinomial logit regression

models were employed. Unconditional logistic regression models were used for the two dichotomous outcomes, namely, cigarette use and illicit drug use. Multinomial logit models were used for alcohol use. The multinomial model is based on a generalization of the logistic regression model that allows for categorical outcomes that have more than two response categories. In the multinomial model, a separate intercept and set of slope parameters are calculated for each of the $J-1$ nonredundant categories, where J is the number of categories for the response variable (Agresti, 1990). Specifically for alcohol use, both levels of drinking (i.e., nonheavy use and heavy use) were considered cases compared to the noncase category of abstainers. This model was employed rather than the proportional odds model because it was anticipated that the relationship of deployment to substance use would not be the same for comparisons between no use versus any use and nonheavy use versus heavy use, therefore violating the proportional odds assumption of a uniform slope.

Given the interest in identifying potential differences in relationships for women and men, all regression analyses were conducted separately for each sex. In the final step, additional regression models were run to examine the effects of stress plus deployment, length of time deployed, and recency of deployment. These analyses served as an initial attempt to understand factors related to deployment that might affect the observed relationships and to try to sort out whether the observed relationships are due to changes in use during deployment, after deployment, or both within a cross-sectional framework.

Results

Sociodemographic and service-related characteristics of the study sample are presented for women and men by deployment status in Table 1. The majority of respondents, both women and men, were between the ages of 21 and 34, white, married, with at least some college education, and enlisted personnel. Significant differences between deployed personnel and nondeployed personnel were found for both women and men for all demographic characteristics with two exceptions. First, the relative percentages of enlisted and officer personnel were not significantly different for those deployed compared to those not deployed

among either women or men. In addition, the distribution of race/ethnicity categories was not significantly different for men, but was significantly different for women. Among women, a smaller percentage of deployed personnel were white (53.6% vs. 60.8%) and a greater proportion were Hispanic (13.3% vs. 7.2%) compared to nondeployed women.

In general, however, the trends were similar for both women and men. Those deployed tended to be younger (especially age 35 or younger), less educated (i.e., have a high school education or less), and to be unmarried relative to their nondeployed counterparts. For example, slightly less than half (47.2%) of the nondeployed women were unmarried, compared to more than 60% (61.8%) of the deployed women. The trend for men was the same and was also statistically significant, although not as dramatic: 36.1% nondeployed men were unmarried compared to 43.7% of deployed men. Finally, deployed personnel were more likely to be in the Army and, among men, the Navy.

INSERT TABLE 1 HERE

Table 2 presents substance use rates in the past 30 days for women and men by deployment status. For both sexes, rates of smoking, heavy alcohol use, alcohol dependence, and illicit drug use were higher among deployed personnel compared to those not deployed. Rates of nonheavy alcohol use were between 61.7% and 63.6% across women and men in both the deployed and nondeployed groups. However, for both women and men, a smaller percentage of deployed personnel reported abstaining from alcohol (25.8% vs. 32.2% for women and 14.6% vs. 21.6% for men). The consistency of rates of nonheavy alcohol use suggests changes are likely to be the result of some abstainers initiating use of alcohol at moderate levels and a proportion of moderate drinkers starting to drink heavily. The differences in rates between deployed and nondeployed personnel were significant for all three substances and the alcohol dependence measure among men, but only the alcohol measures were significantly different for women.

INSERT TABLE 2 HERE

Descriptive analyses were followed by logistic and multinomial logit regression analyses. Results of the regression models containing main effects are presented in Table 3. In general, regression analysis results paralleled the bivariate findings presented in Table 2. Alcohol was the only substance significantly related to deployment status among women. However, after controlling for demographic factors, deployment was no longer significantly related to alcohol dependence or to nonheavy use of alcohol. A strong relationship between deployment and heavy alcohol use was found: The odds of heavy alcohol use was 2.84 times higher among deployed women compared to those not deployed. Among men, deployment remained significantly associated with cigarette use, alcohol use, and alcohol dependence, but not with illicit drug use once demographic factors were controlled for.

INSERT TABLE 3 HERE

To shed light on underlying mechanisms, additional analyses examined the relationship between deployment and substance use, taking into account reported stress related to deployment, recency of deployment, and amount of time deployed in the past 30 days. Overall, 24.9% of deployed women and 30.7% of deployed men reported experiencing stress related to deployment; 29.7% of deployed women and 43.4% of deployed men had been deployed for more than 2 weeks in the past 30 days; and 34.2% of deployed women and 41.6% of deployed men had been deployed in the past week. Results from regression models that included recency of deployment in addition to deployment status (i.e., deployed within past 7 days and deployed more than 7 days ago vs. not deployed) showed similar findings to those presented above when only deployment status was considered. However, there was one exception to this—heavy alcohol use among women. Compared to not being deployed, deployment more than 7 days ago was significantly related to heavy alcohol use ($OR=3.30$, 95% C.I.=[1.73, 6.30]) but deployment within the past 7 days was not ($OR=2.2$, 95% C.I.=[0.81, 5.79]).

Additional analyses that considered the amount of time deployed during the past 30 days did not result in any substantive changes from the main findings in Table 3. However, a number of trends should be noted. For alcohol use, there was a trend for the association to be

stronger with increasing amounts of time deployed. Among men, the odds of heavy alcohol use were 1.64 (95% C.I.=[1.29, 2.08]) for those deployed more than 2 weeks and 1.45 (95% C.I.=[1.10, 1.90]) for those deployed 2 weeks or less, both compared to military personnel not deployed. Results for nonheavy use were extremely similar. Odds for nonheavy alcohol use were 1.52 (95% C.I.=[1.27, 1.82]) for those deployed more than 2 weeks and 1.30 [95% C.I.=1.04, 1.64]) compared to those deployed. The results were even stronger for heavy drinking among women. Compared to women not deployed, those deployed for more than 2 weeks had 4.59 times the odds of heavy drinking (95% C.I.=[1.64, 12.85]) and those deployed 2 weeks or less had 2.14 times the odds (95% C.I.=[1.21, 3.80]). The association between nonheavy drinking and deployment remained not significant for women.

Results from analyses that examined stress related to deployment also did not result in substantive differences from results based only on deployment status, but there were several notable trends. First, among men, the relationship between deployment and smoking was stronger among those who reported stress (O.R.=1.42, 95% C.I.=[1.20, 1.70]) than for those who were deployed but did not report high levels of stress due to deployment (O.R.=1.24, 95% C.I.=[1.07, 1.43]). Also, among males the relationship between deployment and illicit drug use approached significance for those who were deployed and reported stress compared to those not deployed (O.R.=1.60, 95% C.I.=[0.98, 2.57]).

For alcohol use, the odds of heavy drinking among those who were deployed and stressed relative to those not deployed were 3.56 for women and 1.73 for men. These point estimates are slightly higher than for heavy drinking among those deployed but not stressed relative to those not deployed: OR=2.64 for women and OR=1.41 for men. It should be noted, however, that even though the point estimates were higher for those stressed than for those not stressed, the relationship between deployment and substance use was significant even among the not stressed group, indicating that deployment, even in the absence of reported stress related to deployment, was positively associated with heavy use of alcohol.

Discussion

This study found deployment to be related to cigarette use and alcohol use, but not to illicit drug use among military personnel. In addition to this overall finding, one of the primary goals of this study was to examine differences in the relationship between substance use and deployment for women and men. Several differences between the sexes were found. First, deployment was found to be positively associated with cigarette smoking among military men but not among military women. Second, deployment was found to be related to all three measures of alcohol use (i.e., alcohol dependence, nonheavy alcohol use, heavy alcohol use) among the military men, but only with heavy alcohol use for military women. On the other hand, the relationship between deployment and heavy alcohol use, as measured by the odds ratio, was stronger for women than for men. Additional analyses indicated that the relationship between deployment and substance use may be exacerbated, or be stronger, among those who experience stress due to deployment but does not account entirely for the observed relationships between deployment and cigarette or alcohol use.

Results from this study, which examined substance use in more general deployed situations, are consistent with findings in the literature that pertain specifically to combat. Rates of use of cigarettes, alcohol, and illicit drugs have all been shown to be higher among those in combat compared to those not in combat or to be elevated during time of combat (Iowa Persian Gulf Study Group, 1997; Robins et al., 1975). This study similarly found rates to be higher among those deployed than not deployed for both women and men, even after controlling for demographic differences. These data for alcohol use were somewhat surprising for military women. Even though only a small percentage of women drink heavily, women who are deployed are more likely to engage in this behavior. This finding of increased substance use during deployment raises questions about the potential readiness of the force to carry out its mission.

The findings from this study must be considered in light of several limitations. First, this study relied on the use of cross-sectional data and did not directly assess changes in substance

use during and after deployment relative to a respondent's baseline levels (i.e., pre-deployment) of substance use. Therefore, it is not possible to determine whether the observed relationships are in fact changes in substance use or are instead a spurious finding related to some other causal factor. It also is not possible to assess whether the relationships, if they are in fact changes, are due to consumption differences during deployment or after deployment, or perhaps both.

An attempt to address this issue was made by looking at the amount of time deployed and recency of deployment. Findings for those deployed for more days during the past 30 and more recently were hypothesized as likely to be reports of substance use during the time they were deployed. In contrast, findings among those deployed for fewer days and less recently were hypothesized as likely to be reports of use after returning from deployment.

A second limitation of the current study is that a global measure of deployment was used. Therefore, it possibly includes peacekeeping missions in addition to training exercises. And, finally, issues related to the use of self-reported data about substance use should be acknowledged. However, questionnaires in the current study were anonymous in an attempt to encourage accurate reporting. In addition, several reports support the use of self-report data of substance use as truthful (e.g., Harrison, 1995; Johnston & O'Malley, 1985).

Despite these limitations, the current study is one of the first to examine substance use during peacetime deployments and suggests that use, especially of alcohol, may increase during deployment situations that are not specifically combat related. This finding has a number of important implications for military readiness and the potential for work-related injuries. Alcohol use, and especially heavy alcohol use, can negatively influence capabilities of decisionmaking, equipment handling, and response time.

These findings suggest that substance use prevention and early intervention programs run by the military as it aims to achieve Healthy People 2000 objectives (Office of the Assistant Secretary of Defense [Health Affairs], 1992; Public Health Service, 1991) would benefit from including program components that deal specifically with substance use during deployed

situations. For instance, if the results of Forgas et al. (1996) are correct in that relief of stress and boredom are two common reasons for smoking, then there needs to be concern about what will replace cigarettes as smoking is banned on more ships and submarines. Finally, the differences between women and men found in this study suggest that more concern should be given to alcohol use for military women but that both cigarette and alcohol use are of concern among men.

These implications argue that more research is needed to better understand the patterns of substance use during deployment and of the causal mechanisms for those changes. Prior studies indicate that access and stress may both be implicated in increased use. In addition, it is important to examine more directly substance use, especially of alcohol, before, during, and after deployment. More qualitative research is needed to understand changes in normative attitudes toward use. And, finally, although it is important to understand changes during deployment, it is equally critical to understand what happens to substance use rates once military personnel return from being deployed. Namely, do rates of substance use return to baseline levels, as found by Robins et al. (1975), or do they remain elevated?

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Table 1

Sociodemographic and Military Service Characteristics of Military Women and Men, by
Deployment Status: 1995 DoD Worldwide Survey

Demographic characteristics		Women		Men	
		% of not deployed (<u>n</u> =2,665)	% of deployed (<u>n</u> =283)	% of not deployed (<u>n</u> =9,709)	% of deployed (<u>n</u> =3,269)
Age(years)	≤20	14.3	20.6	9.8	14.6
	21-25	31.7	37.7	29.2	37.7
	26-34	32.8	29.7	34.4	31.1
	≥35	21.1	12.0	26.6	16.6
Race	White	60.8	53.6	68.4	71.2
	Black	25.5	25.6	16.3	14.2
	Hispanic	7.2	13.3	8.8	8.0
	Other	6.6	7.4	6.5	6.6
Marital status	Not married	47.2	61.8	36.1	43.7
	Married	52.8	38.2	63.9	56.3
Education	≤ High school	26.4	35.4	34.2	45.9
	Some college	51.1	47.3	45.6	37.0
	≥ College	22.5	17.3	20.2	17.1
Service	Army	30.1	58.6	27.7	41.3
	Navy	26.0	26.2	26.3	35.0
	Marine Corps	4.2	3.3	11.6	12.9
	Air Force	39.7	11.9	34.4	10.8
Pay group	Enlisted	82.8	87.3	83.7	85.6
	Officer	17.2	12.7	16.3	14.4

Table 2

Rates of Substance Use for Women and Men, by Deployment Status: 1995 DoD Worldwide Survey

Substance		Women			Men		
		% of not deployed	% of deployed	p-value	% of not deployed	% of deployed	p-value
Cigarette smoking	No use	74.4	70.4	n.s.	70.0	61.3	≤.001
	Any use	25.6	29.6		30.0	38.7	
Alcohol	Abstinent	32.2	25.8	≤.05	21.6	14.6	≤.001
	Nonheavy use	63.6	61.9		61.7	61.4	
	Heavy use	4.2	12.3		16.7	24.0	
Alcohol dependence	No dependence	98.1	95.3	≤.05	95.1	90.7	≤.001
	Yes dependence	1.9	4.7		4.9	9.3	
Illicit drug	No use	97.6	96.5	n.s.	97.5	95.6	≤.05
	Any use	1.4	3.4		2.5	4.4	

Table 3

Association of Deployment with Substance Use: Results of Logistic and Multinomial Logit Regression Models for Women and Men: 1995 DoD Worldwide Survey

Substance Use	Women		Men	
	O.R.	(95% C.I.)	O.R.	(95% C.I.)
Cigarette smoking				
Not deployed	1.00		1.00	
Deployed	1.12	(0.86, 1.45)	1.30	(1.14, 1.48)
Nonheavy alcohol use ¹				
Not deployed	1.00		1.00	
Deployed	1.22	(0.88, 1.69)	1.38	(1.18, 1.61)
Heavy alcohol use ¹				
Not deployed	1.00		1.00	
Deployed	2.84	(1.53, 5.28)	1.51	(1.23, 1.86)
Alcohol dependence				
Not deployed	1.00		1.00	
Deployed	1.87	(0.88, 3.96)	1.50	(1.19, 1.90)
Illicit drug use				
Not deployed	1.00		1.00	
Deployed	1.18	(0.38, 3.67)	1.24	(0.77, 2.01)

Note: Models controlled for age, race/ethnicity, education, marital status, branch of service, and pay grade.

¹Noncase status is abstinence.

APPENDIX B
CONFERENCE PRESENTATIONS

Substance Use Among Military Women and Men

Mary Ellen Marsden, Ph.D.
Brandeis University

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Larry A. Kroutil, M.P.H.

Research Triangle Institute
Research Triangle Park, North Carolina

Paper presented at the 124th Annual Meeting of the American
Public Health Association at New York City, NY, November 20, 1996

Background

- Increasing proportion of women in military
 - Less than 10% women in early 1980s
 - Approximately 14% women in 1995
 - Women still comprise a substantial minority
- Expanded roles for women in military
 - Broader range of occupational specialties open to women
 - Approximately 33,000 women in combat-support roles in Persian Gulf War

Civilian Research Findings

- Men are more likely than women to be illicit drug users.
- Men are more likely than women to be heavy alcohol users.
- Gap in cigarette smoking is narrowing between men and women.
- Illicit drug use and smoking are decreasing, but heavy alcohol use is more stable.

Worldwide Survey Series

Year	Research Organization	Sample Size	Response Rate
1980	Burt Associates	15,268	—
1982	Research Triangle Institute	21,936	84.3%
1985	Research Triangle Institute	17,328	80.4%
1988	Research Triangle Institute	18,673	81.4%
1992	Research Triangle Institute	16,395	77.3%
1995	Research Triangle Institute	16,193	69.6%

Sociodemographic Characteristics of Military Women and Men, 1995

Age	Women	Men
20 and younger	15.2	11.3
21 - 25	32.5	31.9
26 - 34	32.5	33.3
35 and older	19.9	23.5
Race/Ethnicity		
White	59.8	68.8
Black	25.6	16.0
Hispanic	7.9	8.6
Other	6.7	6.6

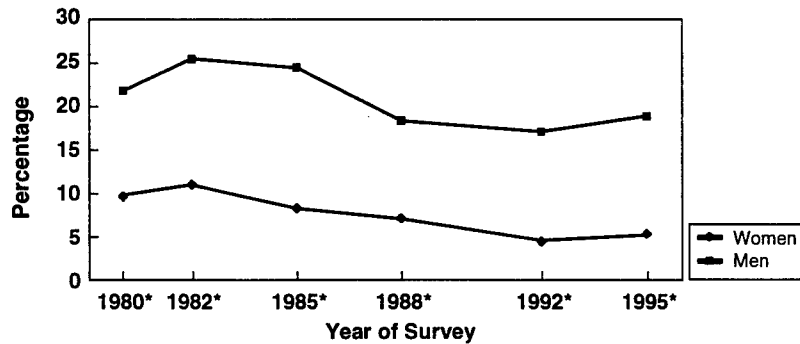
Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

Sociodemographic Characteristics of Military Women and Men, 1995 (continued)...

Education	Women	Men
High school or less	27.6	38.1
Some college	50.7	42.9
College graduate	21.6	19.0
Family Status		
Not Married	49.0	38.4
Married, spouse not present	6.5	5.2
Married, spouse present	44.5	56.4
Pay Grade		
Officer	16.4	15.5
Enlisted	83.6	84.5

Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1995.

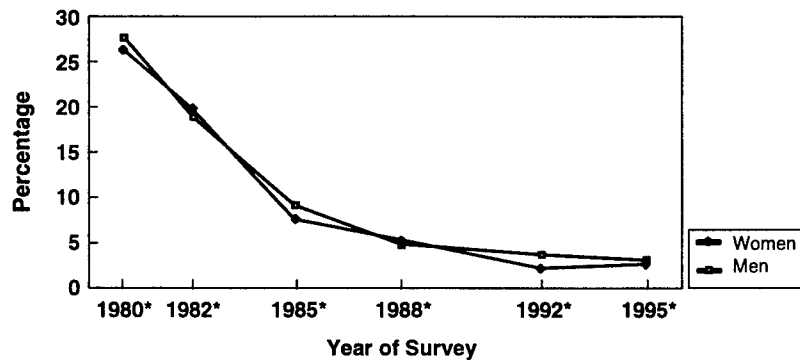
Trends in Heavy Alcohol Use Among Military Women and Men, 1980 - 1995



* Significant .05 level

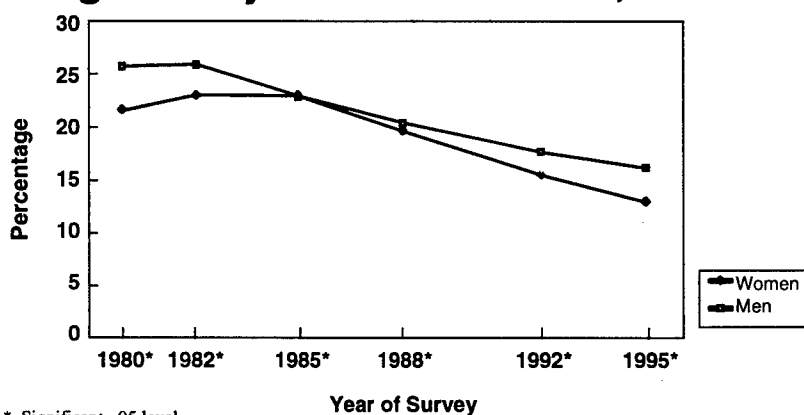
Source: Worldwide Surveys of Substance Abuse and Health Behaviors Among Military Personnel, 1980-1995.

Trends in Any Illicit Drug Use, Past 30 Days, Among Military Women and Men, 1980 - 1995



Source: DOD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995.

Trends in Cigarette Smoking, Past 30 Days, Among Military Women and Men, 1980 - 1995



* Significant .05 level

Source: DOD Surveys of Health Related Behaviors Among Military Personnel, 1980 to 1995

Changes in Sociodemographics

	<u>1980</u>		<u>1995</u>	
	<u>Women</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>
Age				
20 and younger	29.4	20.6	15.2	11.3
21-25	44.3	34.3	32.5	31.9
26-34	23.1	28.3	32.5	33.3
35+	3.2	16.8	19.9	23.5
Race/Ethnicity				
White	72.0	70.8	59.8	68.8
Black	19.5	18.6	25.6	16.0
Hispanic	3.6	4.7	7.9	8.6
Education				
HS or less	48.9	54.4	27.6	38.1
Some college	35.3	29.9	50.7	42.9
College degree	15.7	15.7	21.6	19.0
Marital Status				
Married	35.4	54.4	51.0	61.6

Changes in Substance Use, Past 30 Days, Unadjusted and Adjusted

	<u>1980</u>		<u>1995</u>	
	<u>Women</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>
Any illicit drug use				
Unadjusted	26.4	27.7	2.6*	3.1*
Adjusted	26.4	27.7	3.6*	3.7*
Heavy Alcohol Use				
Unadjusted	9.6	21.8	5.3*	18.8*
Adjusted	9.6	21.8	7.3	22.2
Any cigarette smoking				
Unadjusted	43.6	51.7	26.3*	32.7*
Adjusted	43.6	51.7	30.7*	35.5*

* $p < .05$ between this estimate and estimate for 1980; comparisons are within gender
Adjusted estimates were standardized to the 1980 distribution by age, education, race/ethnicity, and marital status.

Conclusions

- Illicit drug use has decreased dramatically from 1980 to 1995 for both military women and men; rates of use were highly similar for women and men.
- Heavy alcohol use showed a moderate decline between 1980 and 1995 for both military women and men; rates of use among men were double those of women.
- Cigarette smoking has decreased substantially from 1980 to 1995 among military women and men; rates of use were similar for women and men.

Conclusions (Con't)

- The demographic composition of the military has changed notably from 1980 to 1995. In 1995, military personnel were more likely to be older, to be married, and to have more education than in 1980.
- Changes in demographic composition were not a major factor explaining declines in drug use and smoking rates,
- Changes in demographic composition among military women and men were related to declines in rates of heavy drinking. Adjusted rates suggested that military programs and policies have had little effect on heavy drinking.

Stress and Substance Use Among Military Women and Men

**Robert M. Bray, Ph.D.
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**Mary Ellen Marsden, Ph.D.
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Paper presented at 124th Annual Meeting of the American Public Health Association, at New York City, NY, November 20, 1996

Background

- Military women and men are subject to a wide range of stressors as part of military work assignments and duties
- Numerous studies among civilians have reported strong relationships between stress, emotional problems, and alcohol consumption with robust connections between
 - stressful life events and depression for women and
 - stress and alcohol abuse for men
- However, the nature and extent of these relationships varies from study to study.
- Extent of generalizability of findings to active-duty military is unknown, particularly under noncombat peacetime settings

Objectives of Presentation

- Examine levels of perceived stress among military women and men
- Examine sources of perceived stress among military women and men
- Examine behaviors for coping with stress among military women and men
- Examine relationship between perceived stress and substance use for
 - Alcohol
 - Illicit drugs
 - Cigarette smoking

Data Source and Sample Sizes

- 1995 DoD Worldwide Survey of Health Related Behaviors Among Military Personnel

Women	N	=	2,974
Men	N	=	13,219

Definitions of Substance Use

Heavy Drinking:

- Consumption of 5 or more drinks per typical drinking occasion at least once a week during the past 30 days

Illicit Drug Use:

- Any use in the past 12 months of marijuana, PCP, LSD or other hallucinogens, cocaine, amphetamines or other stimulants, tranquilizers or other depressants, barbiturates or other sedatives, heroin or other opiates, analgesics or other narcotics, inhalants, or "designer drugs"

Cigarette Use:

- Smoked 100 cigarettes during lifetime and smoked at least once during past 30 days

Definitions of Stress

Stress at Work

- During the past 12 months, how much stress did you experience at work or while carrying out your military duties?

Stress in Family

- During the past 12 months, how much stress did you experience in your family life or in a relationship with a person you live with or date seriously?

Stress being a Woman in the Military

- In the past 12 months, how much stress did you experience as a woman in the Military?

Levels of Perceived Stress

	<u>At Work</u>		<u>In Family</u>		<u>Woman in Military</u>
	<u>Women</u>	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
Great Deal	17.6	15.7	13.4	8.8	16.2
Fairly Large Amount	22.5	23.4	15.9	12.7	16.8
Some	30.7	29.7	27.3	27.1	35.4
A Little	22.7	20.6	26.9	30.6	18.4
None	6.5	10.5	16.6	20.8	13.2

Specific Sources of Stress, Past Year

<u>Stressor</u>	<u>Women</u>	<u>Men</u>	<u>Total DoD</u>
Deployment	6.9	17.1	15.9
Having a PCS	12.2	10.0	10.3
Work relationships	15.7	12.4	12.5
Problems with supervisor	13.1	12.4	12.5
Concern about being discharged	7.1	8.7	8.5
Increases in workload	15.9	16.6	16.5
Being away from family	21.1	23.7	23.4
Changes in family	17.0	12.3	12.8
Conflicts between military and family responsibilities	12.8	13.0	13.0
Financial problems	12.2	15.0	14.6
Housing problems	7.5	7.6	7.6
Personal health problems	8.6	4.0	4.6
Family health problems	9.1	7.4	7.6

Behaviors for Coping with Stress

<u>Coping Behavior</u>	<u>Women</u>	<u>Men</u>	<u>Total DoD</u>
Talk to friend/family member	87.6	69.7	71.9
Light up a cigarette	24.0	26.7	26.4
Have a drink	16.8	24.4	23.5
Exercise or play sports	60.1	63.4	63.0
Get something to eat	57.2	45.5	47.0
Use illegal drugs	0.8	0.8	0.8
Think of plan to solve problem	89.3	87.1	87.3
Consider hurting or killing yourself	3.8	4.2	4.2

Perceived Stress and Odds of Substance Use for Women

	<u>Heavy</u> <u>Alcohol Use</u>	<u>Illicit Drug</u> <u>Use, Past Year</u>	<u>Cigarette Use</u> <u>Past Month</u>
Stress at work			
High vs. low	1.60	1.47	1.20
Moderate vs. low	1.74	.92	.99
Stress in family			
High vs. low	1.28	1.10	.86
Moderate vs. low	1.20	1.44	.86
Stress being a woman in military			
High vs. low	.97	2.54*	1.52**
Moderate vs. low	.70	1.99	1.29

*P<.05

**p<.01

Note: Data are odds ratios of substance use adjusted for effects of military Service, race/ethnicity, education, age, family status, pay grade, and duty location.

Perceived Stress and Odds of Substance Use for Men

	<u>Heavy</u> <u>Alcohol Use</u>	<u>Illicit Drug</u> <u>Use, Past Year</u>	<u>Cigarette Use</u> <u>Past Month</u>
Stress at work			
High vs. low	1.37**	2.32***	1.70***
Moderate vs. low	1.01	1.54	1.21*
Stress in family			
High vs. low	1.26	1.81***	1.53***
Moderate vs. low	1.02	1.31*	1.13

*P<.05

**p<.01

***p<.001

Note: Data are odds ratios of substance use adjusted for effects of military Service, race/ethnicity, education, age, family status, pay grade, and duty location.

Conclusions

- Military women and men experienced high levels of stress associated with work and with family life, but consistently higher levels from work. There were no gender differences in rates of stress at work, but women were more likely than men to experience stress in family life.
- Military women also reported high levels of stress associated with being a woman in the military
- Men and women were similar regarding most circumstances they found to be stressful with separation from family mentioned most frequently. However, men were more likely than women to perceive deployment as stressful, and women were more likely than men to find major changes in family structure and functioning more stressful.

Conclusions (con't)

- Thinking of a plan to solve problems, talking to family members and exercising were the most commonly reported strategies for coping with stress. Women were more likely to use social support or get something to eat as coping strategies, whereas men were more likely to drink alcohol as a strategy.
- Men who perceived high stress at work compared to those with low stress were more likely to drink heavily, to use illicit drugs, or to smoke cigarettes. Those who perceived high stress in their family life were more likely to use illicit drugs or to smoke than those with low stress.
- Women who perceived high stress being a woman in the military were more likely than those with low stress to smoke cigarettes or to use illicit drugs.

Implications and Research Recommendations

- Findings suggest that
 - stress is an important predictor of substance use among military men, but less so among military women.
 - stress reduction and substance use prevention programs made need to be targeted differentially for military women and men
- More research is needed to understand the nature of stressors faced by military men and women, the level of those stressors, when and how they relate to substance use, and how they affect work performance.

Progress Toward *Healthy People 2000* Objectives Among Military Women and Men

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Paper presented at the 124th Annual Meeting of the
American Public Health Association, New York City, November 1996

Background

- *Healthy People 2000* sets out health objectives to be achieved by the Year 2000 for the Nation.
- DoD identified health objectives most relevant to the military.
- Subset of objectives identified that could be measurable through surveys.

Findings to be Presented

- Physical activity and fitness
 - Overweight
 - Exercise
- Cardiovascular disease risk reduction
 - Blood pressure screening
 - Cholesterol screening
- Injury prevention
 - Seat belt use
- Sexually transmitted disease risk reduction
 - Condom use by sexually active unmarried personnel
- Women's health issues
 - Pap smears
 - Alcohol and cigarette use during pregnancy

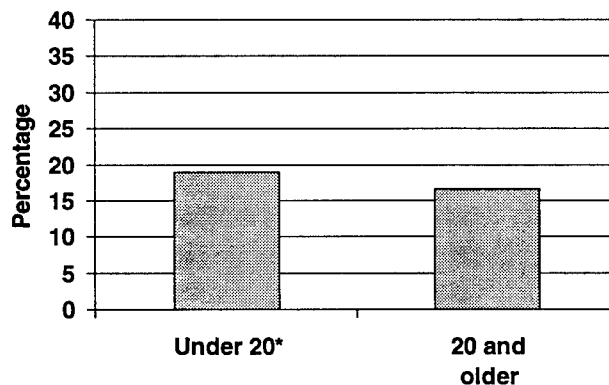
Purpose

- Collect baseline data pertaining to objectives in the areas of:
 - Physical activity and fitness
 - Cardiovascular disease risk reduction
 - Injuries and injury prevention
 - Sexually transmitted disease risk reduction
 - Women's health issues
- Compare rates with targets for the Year 2000

Physical Activity and Fitness: Overweight

- Objective: Reduce the prevalence to no more than 20% among people aged 20 and older, and no more than 15% among people under age 20.
- Measured by the Body Mass Index (BMI)
 - Respondents asked for their weight and height in pounds and inches; values converted to metric equivalents
 - $BMI = (\text{Weight in kilograms}) / (\text{Height in meters})^2$
 - Overweight if:
 - $BMI \geq 25.8$ for men under 20
 - $BMI \geq 25.7$ for women under 20
 - $BMI \geq 27.8$ for men aged 20 or older
 - $BMI \geq 27.3$ for women aged 20 or older

Prevalence of Overweight, by Age and Gender

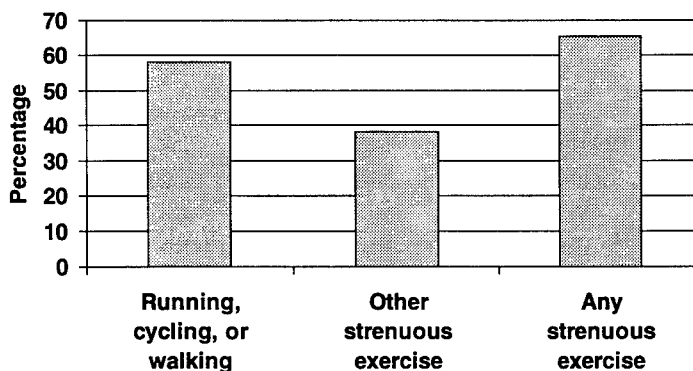


*Above the *Healthy People 2000* objective.

Physical Activity and Fitness: Strenuous Physical Exercise

- Objective: Increase to 20% the proportion of adults engaging in regular, vigorous physical activity.
- Vigorous exercise defined as 20 minutes per occasion, 3 or more days per week.
- Respondents were asked how often they engaged in the following in the past 30 days:
 - Running, jogging, bicycling, or briskly walking for 20 minutes or more
 - Other strenuous physical activity for 20 minutes or more (e.g., swimming)

Involvement in Strenuous Exercise, Past 30 Days



Cardiovascular Disease Risk Reduction: Blood Pressure and Cholesterol Screening

- Objective 1: Increase to at least 90% the proportion of adults who:
 - had their blood pressure measured in the past 2 years; and
 - can state the result.
- Objective 2: Increase to at least 75% the proportion of adults who have had their cholesterol checked in the past 5 years.
- Respondents were asked to report
 - when they last had their blood pressure checked;
 - the result of the last blood pressure check; and
 - when they last had their cholesterol checked

Blood Pressure and Cholesterol Screening, by Selected Demographic Characteristics

Objective/Characteristic	%
Blood Pressure Screening in the Past 2 Years, and Awareness of the Result, by Education	
High school or less	68.5*
Some college	77.7*
College graduate or higher	87.9*
Total DoD	76.3*
Cholesterol Screening in the Past 5 Years, by Age Group	
Under 25	39.1*
25 to 49	73.2**
50 or older	95.2
Total DoD	60.1*

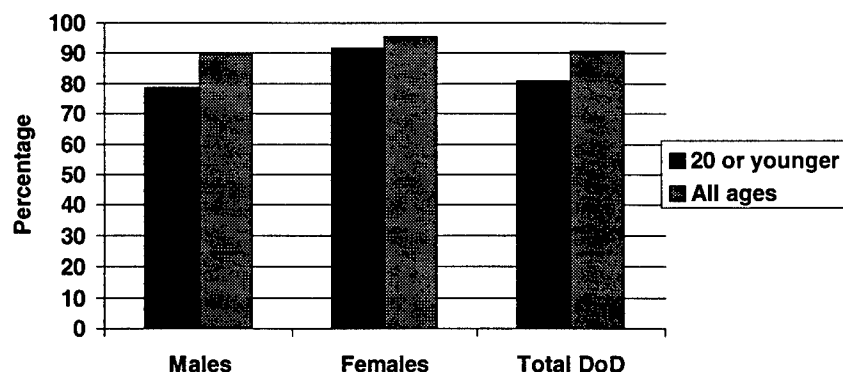
* Below the *Healthy People 2000* objective.

***Healthy People 2000* objective falls within the 95% confidence interval for this estimate.

Injury Prevention: Seat Belt Use

- Objective: Increase use of occupant protection systems, such as seat belts, to at least 85% of motor vehicle occupants.
- Respondents were asked how often they wore seat belts when they drove or rode in a car.
- Seat belt use was defined as use “always” or “nearly always.”

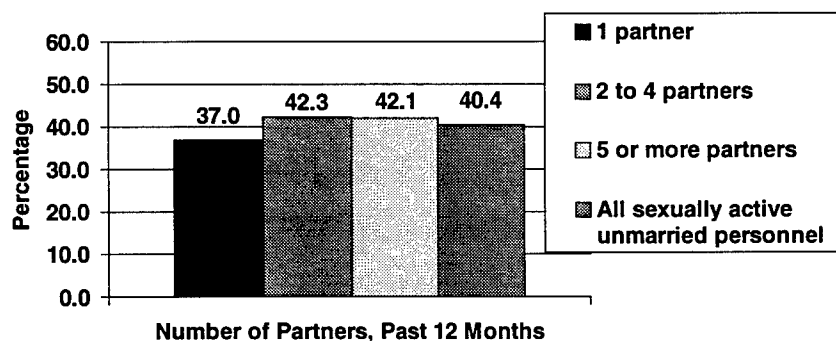
Seat Belt Use, by Gender and Age



Sexually Transmitted Disease Risk Reduction: Condom Use

- Objective: Increase to more than 50% the percentage of sexually active unmarried people who used a condom at last sexual intercourse.
- Respondents were asked to indicate
 - when they last had sex (defined in terms of vaginal or anal intercourse)
 - whether they used a condom the last time they had sex.
- “Sexually active” unmarried personnel were defined as those who had sex in the past 12 months.

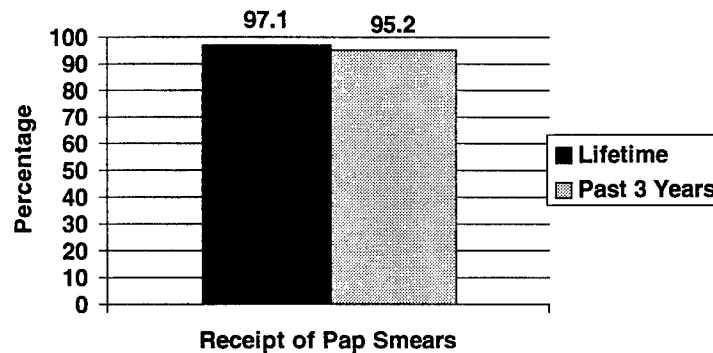
Condom Use at Last Encounter Among Sexually Active Unmarried Personnel, by Number of Sexual Partners in the Past 12 Months



Women's Health Issues: Pap Smears

- Objective 1: Increase to at least 95% the proportion of women aged 18 and older with an intact uterine cervix who have ever had a Pap test.
- Objective 2: Increase to at least 85% those who have received a Pap test within the past 1 to 3 years.
- Female respondents were asked to indicate
 - if they had ever had a hysterectomy; and
 - the last time they had a Pap test.
- Women who had a hysterectomy were excluded from the analyses.

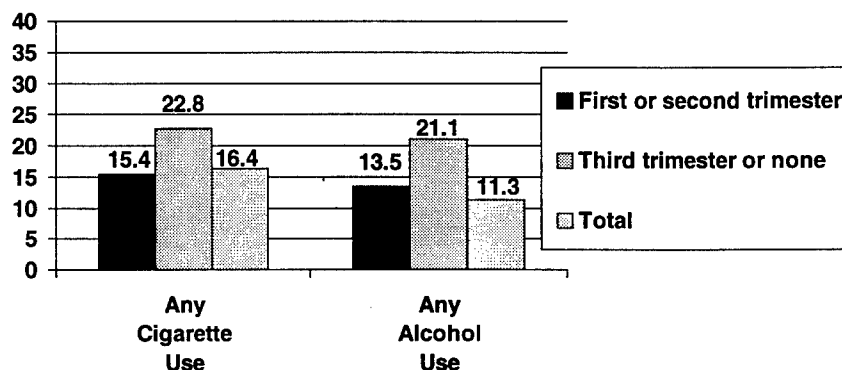
Receipt of Pap Smears by Military Women in the Lifetime and Past 3 Years



Women's Health Issues: Substance Use During Pregnancy

- Objectives: Increase abstinence from tobacco during pregnancy to at least 90% and increase abstinence from alcohol by at least 20%.
- DoD Survey data provides a baseline for measuring changes in abstinence from alcohol during pregnancy.
- Female respondents were asked to indicate
 - the last time they were pregnant; and
 - their quantity and frequency of cigarette and alcohol use during their most recent pregnancies.
- Women who were not pregnant in the past 5 years (or who had never been pregnant) were excluded from the analyses.

Cigarette and Alcohol Use During Pregnancy Among Military Women, by First Prenatal Care Visit



Summary of Findings

- Military (overall or among some groups) in 1995 had met or exceeded *Healthy People 2000* objectives for
 - Exercise
 - Pap tests
 - Overweight (among adults aged 20 and older)
 - Cholesterol screening (among adults aged 50 and older)
 - Seat belt use (except for young males)
- Some subgroups within the military in 1995 were close to *Healthy People 2000* objectives for
 - Blood pressure screening and awareness among some educational groups
 - Cholesterol screening (among adults aged 25 to 49)

Summary of Findings (Continued)

- Military or some subgroups in 1995 were below the *Healthy People 2000* objectives for
 - Overweight among younger adults
 - Blood pressure screening and awareness among some demographic groups
 - Seat belt use among young males
 - Condom use among sexually active unmarried personnel
 - Abstinence from cigarettes during pregnancy (applicable to women only)

Conclusions

- Attainment of *Healthy People 2000* objectives tends to be in those areas where military regulations can mandate and enforce behaviors.
 - Exercise and weight requirements
 - General or age-specific requirements for preventive medical care
 - Seat belt use when on-base
- Greatest challenges may lie in behaviors/objectives that are difficult to mandate, monitor, or enforce.
 - Awareness of blood pressure results
 - Condom use
 - Alcohol and cigarette use during pregnancy



DEPARTMENT OF THE ARMY
US ARMY MEDICAL RESEARCH AND MATERIEL COMMAND
504 SCOTT STREET
FORT DETRICK, MARYLAND 21702-5012

REPLY TO
ATTENTION OF:

MCMR-RMI-S (70-1y)

28 Aug 02

MEMORANDUM FOR Administrator, Defense Technical Information
Center (DTIC-OCA), 8725 John J. Kingman Road, Fort Belvoir,
VA 22060-6218

SUBJECT: Request Change in Distribution Statement

1. The U.S. Army Medical Research and Materiel Command has reexamined the need for the limitation assigned to technical reports written for this Command. Request the limited distribution statement for the enclosed accession numbers be changed to "Approved for public release; distribution unlimited." These reports should be released to the National Technical Information Service.

2. Point of contact for this request is Ms. Kristin Morrow at DSN 343-7327 or by e-mail at Kristin.Morrow@det.amedd.army.mil.

FOR THE COMMANDER:

Encl


PHYLIS M. RINEHART
Deputy Chief of Staff for
Information Management

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