AD_____

MIPR NUMBER 95MM5516

TITLE: Stress and Women's Health: Combat, Deployment, Contingency Operations and Trauma

PRINCIPAL INVESTIGATOR: Robert J. Ursano, M.D.

CONTRACTING ORGANIZATION: Uniformed Services University
Health Sciences
Bethesda, Maryland 20814-4799

REPORT DATE: July 1996

TYPE OF REPORT: Final

PREPARED FOR: Commander
U.S. Army Medical Research and Materiel Command
Fort Detrick, Frederick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for public release;
distribution unlimited

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 1996	Final (1 Dec 94 - 30 Jun 96)

4. TITLE AND SUBTITLE
Stress and Women's Health: Combat, Deployment, Contingency Operations and Trauma

5. FUNDING NUMBERS
95MM5516

6. AUTHOR(S)
Robert J. Ursano, M.D.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Uniformed Services University Health Sciences
Bethesda, Maryland 20814-4799

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Commander
U.S. Army Medical Research and Materiel Command
Fort Detrick, Frederick, Maryland 21702-5012

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200*

This multi-study, programmatic project was directed to understanding the effects of the stress of combat, trauma, and extreme environments on women's health and performance. The following deliverables resulted from the study and are attached as appendices:

1-4. Gender Stress and Coping in the U.S. Military
Vol I: Trauma, Stress, and Health: Military Women in Combat, Deployment, & Contingency Operations
Vol II: Historical Perspectives on Acculturation, Deployment & Contingency Stresses
Vol III: Performance
Vol IV: Training, Deployment, and Contingency Stressors
5. Sex Differences, Stress, and Military Readiness
6. Stress and Women's Health Computerized Database User's Manual & CD-ROM
7. Stress, Health & Performance in Military Women 8. Recommendations

14. SUBJECT TERMS
Defense Women's Health Research Program
stress, military, health, performance, sex, trauma, combat

15. NUMBER OF PAGES
1760

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

FOREWORD

Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the US Army.

____ Where copyrighted material is quoted, permission has been obtained to use such material.

____ Where material from documents designated for limited distribution is quoted, permission has been obtained to use the material.

____ Citations of commercial organizations and trade names in this report do not constitute an official Department of Army endorsement or approval of the products or services of these organizations.

____ In conducting research using animals, the investigator(s) adhered to the "Guide for the Care and Use of Laboratory Animals," prepared by the Committee on Care and Use of Laboratory Animals of the Institute of Laboratory Resources, National Research Council (NIH Publication No. 86-23, Revised 1985).

__X__ For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

____ In conducting research utilizing recombinant DNA technology, the investigator(s) adhered to current guidelines promulgated by the National Institutes of Health.

____ In the conduct of research utilizing recombinant DNA, the investigator(s) adhered to the NIH Guidelines for Research Involving Recombinant DNA Molecules.

____ In the conduct of research involving hazardous organisms, the investigator(s) adhered to the CDC-NIH Guide for Biosafety in Microbiological and Biomedical Laboratories.

Robert A Vaughn

PI - Signature Date

TABLE OF CONTENTS

DEFENSE WOMEN'S HEALTH RESEARCH PROGRAM

03 June 1996 Final Report

Title: **Stress and Women's Health: Combat, Deployment, Contingency Operations and Trauma**

Principal Investigator:

Robert J. Ursano, M.D.
Col, USAF, MC, FS (Ret)
Professor and Chairman
Department of Psychiatry
Uniformed Services University
of the Health Sciences
4301 Jones Bridge Road
Bethesda, Maryland 20814-4799

Phone: (301) 295-2470
Fax: (301) 295-6308
DSN: 295-2470

Co-Principal Investigators:

Loree Sutton, M.D.
MAJ, MC, USA
Assistant Professor
Dept. of Psychiatry, USUHS

Carol S. Fullerton, Ph.D.
Research Associate Professor
Dept. of Psychiatry, USUHS

Ann E. Norwood, M.D.
LTC, MC, USA
Assistant Professor
Dept. of Psychiatry, USUHS

Co-Investigators:

Sidney M. Blair, M.D.
CAPT, MC, USN
Head, Dept. of Psychiatry
NNMC
Bethesda, Maryland 20889-5000

Michael P. Dinneen, M.D.
CDR, MC, USN
Director, Residency Training
NNMC
Bethesda, Maryland 20889-5000

M. Richard Fragala, M.D.
Col, USAF, MC
Consultant to USAF SG
Chief, Division of Mental Health
MGUSADMC/SGHA
Andrews AFB, MD 20331-6600

Harry C. Holloway, M.D.
Associate Director for Life Sciences
and Microgravity, NASA
Professor
Dept. of Psychiatry, USUHS

James R. Rundell, M.D.
Lt Col, USAF, MC
Chief, Consultation/Liaison, Dept. of Psychiatry
MGUSAFMC/SGHA
Andrews AFB, Maryland 20331-6600

Normund Wong, M.D.
COL, MC, USA
Chairman, Dept. of Psychiatry, WRAMC
Washington, D.C. 20307-5001

James E. McCarroll, Ph.D
COL, USA, MS

INTRODUCTION

RELEVANCE TO SERVICEWOMEN / MILITARY

The systematic study of women's health issues in the military is timely for women in all branches of service. Numbering approximately 10% of active duty service members, women are increasingly assuming critical positions of responsibility which fully expose them to the hazards of combat. Following the collapse of the Berlin Wall, the resulting global instability has required the military to prepare its forces, including women, to engage in planning for a number of mission contingencies. These missions include peacekeeping (e.g., Sinai MFO treaty; Bosnia), peacemaking (e.g. Haiti), humanitarian aid (e.g., post-ODS civilian refugee care; Somalia), disaster response to natural and manmade disasters (e.g., Hurricane Andrew & Los Angeles riots), and, of course, combat, in the air, on land and at sea.

At present, military women are confronted by both direct and indirect (secondary to support roles) combat exposure. Military leaders have long recognized that mission readiness requires both the absence of disease and the presence of mental, physical, and spiritual health. However, little is currently known about how the health of military women may be uniquely affected by extreme environments. Such knowledge is essential to meet the health needs of military women and to sustain fitness for all mission contingencies.

Servicepeople are naturally concerned with maintaining their health as an integral part of their readiness to assume any mission they are trained to perform. Research aimed at identifying and understanding overall and gender-specific stressors involved with combat stress, trauma, and extreme environments will enhance the ability of individual servicewomen to care for themselves within an institution that is informed of and concerned with their needs. Educational and preventive measures resulting in servicewomen assuming informed responsibility for their health needs within the context of a supportive group system parallels the process of fostering individual initiative and group cohesion that is essential to mission performance on aircraft, ships, and battlefields.

Gender differences can at times be real, but also of no practical use or importance. Gender differences in health and stress response may confer advantages or disadvantages depending on the context. Present research on stress and gender indicate that women are more likely than men to be depressed and describe phobias and panic attacks (Baum & Grunberg, 1991). It has often been assumed that women experience less stress at work than men, although data are scant on this issue. Women are more likely to visit physicians and seek health care; many of the reported differences in rates of illness may result from this factor.

Gender may mediate the effects of stress on health in several ways. Firstly, directly through biological differences. Secondly, by affecting perception, interpretation and attribution of the external event. Some data indicate that women are more willing to report distress than men, although illness and physiologic responses may not differ from males. Thirdly, women generally report greater social supports than men. Social supports (e.g. unit cohesion) are well known to affect health, either directly or by improving coping. Fourthly, women may use different coping behaviors or use the same coping behaviors at different rates. Smoking and alcohol use are examples of coping strategies that have traditionally been used more frequently by men. As increasing numbers of women adopt similar coping strategies, the effects of stress on health may also change in women.

Studies on the effects of exposure to a number of traumatic events illustrate the complexity of understanding the potential effects of combat stress on women. Data indicate greater risk for posttraumatic stress disorder in single parents with children than in married parents with children, and higher rates of somatization among women in general. Higher rates of substance abuse and violence in men and the higher base rates of depression, greater social supports and higher reported distress after exposure to death and the grotesque in women, may lead to different responses to trauma across genders. In addition, differences across the menstrual cycle in fatigue, chronic stress tolerance, and effects of sleep deprivation may increase or decrease stress tolerance and health effects.

This multi-study programmatic project was focused on understanding the effects of the stress of combat, trauma and extreme environments on women's health and performance. Through this project we have identified critical health and performance issues related to women in the extreme environments of combat, peace-keeping, peace-making, humanitarian operations, and deployment. The project consisted of four parts which addressed the effects of these stressors in operational environments.

BODY

Part I: *Computerized Database on Women's Health and the Stress of Combat, Trauma and Extreme Environments*: A computerized literature database on the effects of extreme environments, combat, stress and trauma on women's psychological health and performance was developed. It broadly examined the biopsychosocial stressors and responses in women by collecting English language non-classified epidemiological and stress research in these areas and by examining analogous areas in which relevant conclusions can be drawn (studies of disaster events, confined environments, Antarctica, space, etc.) The database also includes references and abstracts of articles on stress and women's health, traumatic stress, occupational risk factors, deployment, disaster medicine, humanitarian aid, ethical considerations, and sexual harassment. All articles were screened for relevance and scientific quality. The database is on CD-ROM and is accessible by personal computer using software that is readily available (PROCITE) and the standard of the field. A *User's Guide* as well as PROCITE software are included in the deliverables.

Part II: *Empirical Studies*: The results of the empirical studies are enclosed in the volume, *Stress, Health & Performance in Military Women: Prospects, Pitfalls & Protean Patterns from Current Research.* This part of the project empirically examines trauma and women's health in existing datasets collected by our research group. We analyzed several of our existing datasets of military women exposed to traumatic events, e.g., Operation Desert Storm, Hurricane Andrew, three airplane disasters, and epidemiologic data of women in the military. We also examined our existing data on the spouses of active duty men involved in these traumas. Our data sets include extensive assessments of physical and mental health, posttraumatic distress and psychosocial functioning. Analyses describe each group of women and in several of the studies compare them with a matched group of men and, in some studies, women with similar exposure or with no exposure. Particular attention is given to rates of possible PTSD symptoms, levels of somatization, depression, hostility, fatigue and health care utilization. These studies include:

1. Women deployed on the USS Comfort during Operation Desert Storm (N = 200, 35% women). Data during deployment and follow-up data were examined.

2. Homestead Air Force Base personnel after Hurricane Andrew (N = 243, 10% active duty women; spouses of active duty men, N=145) and matched control groups from MacDill and Shaw AFB (N=150, 10% active duty women; and spouses of active duty men, N = 90).

3. Sioux City, Iowa, United Airlines plane crash. We examined our data on the disaster workers (185th Air National Guard Fighter Group) and their spouses. We have data from a matched control group at the Air National Guard Unit in Sioux Falls, South Dakota. The groups were matched by mission and sociodemographics of the communities. The total sample size was : N = 308 (Sioux City) and 421 (Sioux Falls). Approximately 10-15% of each of these groups are women. In addition, a sample of women indirectly exposed to the trauma of the crash (spouses of the ANG groups) was available (N= 196 for Sioux City; N= 255 for Sioux Falls). Thus we examined both high direct exposure to the air crash and indirect trauma exposure in the spouses using matched control groups.

4. The 1988 Italian Air Show crash at Ramstein AFB. We have data from people involved at the Ramstein Medical Clinic (N = 126). We also have data from personnel at nearby Landstuhl Medical Center who treated victims of the disaster (N = 234). Approximately 35% of each of these groups are active duty service women.

5. Active duty enlisted army troops from Fort Ord and Fort Carson (N = 2223 with 403 women) addressing garrison stressors and mental and physical health. We focused our analysis on two epidemiologic studies, e.g., the General Health Questionnaire (GHQ), and the General Well-Being measure as well as measures of unit and personal morale.

Part III. *Expert Panel*: Distinguished military, academic, and civilian experts were convened to review identified areas of stress effects on women's health from the database and empirical data analyses. Military experts from the United States Armed Forces as well as from overseas were invited. The extensive range of professional expertise and relevant scientific data provided the basis for developing mission-specific recommendations for tri-service distribution. The edited transcripts of this conference appears in the volume, *Gender, Stress, & Coping in the U.S. Military, Volume I, Trauma, Stress & Health: Military Women in Combat, Deployment & Contingency Operations.*

Seminar Series: A series of seminars were held to collect more information on stress and women's health. Transcriptions of these seminars were edited into a series of volumes which are enclosed (*Gender Stress, and Coping in the U.S. Military - Volume II: Historical Perspective on Acculturation, Deployment, and Contingency Stresses; Volume III: Performance; Volume IV: Training, Deployment and Contingency Stressors.*)

Part IV: *Summary of Critical Areas by Area Experts*: A volume containing solicited contributions by experts in the field was compiled entitled, *Sex Differences, Stress, and Military Readiness*. This volume expands upon issues which are especially important to understanding the health effects of extreme environments on women.

CONCLUSIONS

The consensus among scientists involved in the project is that there remains a good deal to be learned about the health effects of the stressors of military service on men and women. As we enter the Twenty-First Century, the changing nature of military missions and shifts in the demographics of military members suggest the importance of maximizing the benefits offered by increased diversity in the Armed Forces. Different missions such as peacekeeping with its ambiguous environments provide arenas where skills and temperaments, perhaps different than those for war-fighting, are adaptive. Training must focus on maximizing individual and unit performance across a wide variety of scenarios and should be informed by research. Future research strategies should focus on sex as one variable affecting health and performance, rather than focusing studies on "women" which serve to reinforce a minority status.

The vast scope of the project makes it impossible to adequately summarize conclusions in a condensed form. The following deliverables (attached as appendices) represent a compendium of information and conclusions:

1. *Gender, Stress & Coping in the U.S. Military*
   Volume I: Trauma, Stress, and Health: Military Women in Combat, Deployment, & Contingency Operations

2. *Gender, Stress & Coping in the U.S. Military*
   Volume II: Historical Perspectives on Acculturation, Deployment & Contingency Stresses

3. *Gender, Stress & Coping in the U.S. Military*
   Volume III: Performance

4. *Gender, Stress & Coping in the U.S. Military*
   Volume IV: Training, Deployment, and Contingency Stressors

5. *Sex Differences, Stress, and Military Readiness*

6. *Stress and Women's Health Computerized Database User's Manual*
   (with CD-ROM containing the database and PROCITE® software)

7. *Stress, Health & Performance in Military Women: Prospects, Pitfalls & Protean Patterns from Current Research*

8. *Recommendations*

Finally, we have distilled findings from all facets of the project into a volume entitled, *Recommendations.* These recommendations address the accumulated knowledge of extreme stress on women's health and performance and resulting operational needs of command; training; medical care; and research. We reprise the priority conclusions and associated recommendations here:

1. Studies on the stress of homecoming following war trauma are greatly needed. Homecoming stress may differ by gender and requires further study to identify gender related stress responses and coping strategies since they are related to health care utilization as well as morbidity and mortality. Examining recovery from PTSD in several available civilian models (motor vehicle accidents, traumatic injury and in family violence) will provide information relevant to homecoming and recovery from war trauma.

2. Studies seeking to explore gender effects should not be conceived of or labeled as "women's studies" in the military. Rather, research should focus on military units which include men and women. Gender should be considered as one variable and studies of performance and health should be encouraged to address this variable in their design.

3. Although women report greater stress in response to many events, it is unclear how this reporting relates to long-term outcomes relative to performance, morbidity and disability. Specific measures of performance, morbidity, and disability should be included in such studies. Research should study end points which are militarily relevant; e.g., research regarding days lost as well as medical symptoms reported.

4. It is important to study attribution processes (e.g., how "cause" is assigned). Attribution processes have become highly important to understanding "ODS Syndrome" where medical problems are attributed to ODS service although no data support this belief. In addition, attribution can result in stigmatizing certain populations such as higher ranks or ethnic groups or genders. Gender differences in attribution may well be present. Medical care and planning after homecoming will benefit greatly from better understanding in this area.

5. Studies examining gender and traumatic/combat stress should pay particular attention to self-selection, individual past history, training experiences, and past exposures to traumatic events as potential confounds of any findings attributed to gender.

6. A Joint Military Medical Readiness Center with fellowship opportunities should be established in which medical personnel (male and female) can meet across services and across disciplines to receive readiness training and professional military education periodically during a career. (Similar to Command & General Staff/War College but with shorter course periods, e.g., 1-6 months.) This will increase knowledge of cross service gender differences and decrease gender-related combat differences which may appear in joint operations. An institution such as the Uniformed Services University can well serve this purpose and both maintain lessons learned and incorporate new changes rapidly for the education and training of future medical leaders.

7. Joint conferences/seminars of scientists and commanders and the development of a Clinical Scientist Training Program which include operational and scientific experience are needed. Military scientists must be able to understand and respond to the needs of the line consumers of research. It is also important to assist people in policy and administrative positions to apply the available data; to understand the research methods used; to know what works and what does not; and to identify the relative strengths and weaknesses of various studies.

8. The Department of Defense should develop a twin registry of female twins serving in the US military. This would be similar to the twin registry of male Viet Nam era twins. In 1995, there were 194,000 women serving in the Armed Forces. In the United States, 1 in 83 deliveries is a twin birth. One might, therefore, expect over 2,000 women in the Armed Forces are members of a twin pair. Such a registry would significantly enhance research on women and stress.

9. The impact of new missions on deployable units should be studied. Past research performed on units which have deployed en bloc may not generalize to current deployments in which parts of a unit or 1-2 individuals from a unit deploy. Examinations of the issues associated with the particular stressors involved in deploying ones and twos are needed. Gender integrated units may experience deployment stressors differently when deployment of parts of a unit cause different work distribution on remaining members. This research should also examine the role of leadership which becomes the only common denominator in deploying in ones and twos.

10. Mixed gender crew studies should be carried out for both short and long-term missions. Study of cognitive function, in particular, has rarely been examined in mixed gender crews. Such studies will aid in understanding multi-person crew function and may be much more relevant than other biological variables to actual crew performance.

11. Studies of single parents should be initiated. Single soldiers with children (the larger number of whom are male, but a higher percentage of whom are female) are an understudied group which may be more vulnerable to combat stressors due to less adequate social supports and instrumental assistance.

12. Studies of the effects of mother absence (in single parent and dual parent families) on children are greatly needed. The effects of father absence on children has been studied. However, comparable research studying the effects of mother absence is lacking. Studies in civilian populations are unlikely to be comparable because the demographics of military women (highly educated, employed) are very different from civilian counterparts. This gap in our knowledge base must be remedied.

13. Study of physical health problems reported following traumatic exposure is needed. Increased physical health problems are associated with the diagnosis of PTSD in women and men. Little is known about these physical health problems e.g., to what extent they are related to injury vs. somatization.

14. The relationship of substance abuse and deployment to family violence in the military requires examination in order to better understand episodes of family violence in the military community. The study of spousal violence in dual active duty and female on active duty families is needed to clarify the higher rates seen in these groups.

15. Studies of substance abuse in active duty men and women indicate that substance use among military women is associated with factors other than stress while substance abuse among military men is highly associated with stress. Identification of the different mechanisms fostering substance abuse in active duty men and women can aid in the development of prevention programs and education efforts targeted by gender.

16. Because of high rates of deployment and joint international operations, medical care providers must be taught the various ways in which stress symptoms manifest themselves in different cultures, genders and organizational contexts. Additionally, health care providers need education on the recovery from stress symptoms over time (e.g., differences in intrusion and arousal symptoms), how one might recover from some symptoms and not the others, and how these symptoms might be reflected differently in various sub-populations, including genders.

17. It is important to examine the relationship of past experience and training, previous traumatic event exposure and exposure to combat on post-combat PTSD, combat stress reaction, depression and substance abuse. There are data that experience (e.g. past combat) can both inoculate individuals and sensitize them. At present, the data support both views: that past experience helps prevent breakdown and that it potentially increases breakdown. In view of the military's missions, it is imperative that the different impacts of exposure be clarified and any gender effects identified.

18. The changed nature of the "front line" in battle has serious ramifications for medical readiness planning. As the tempo of operations has increased throughout the various echelons of care, readiness training includes what goes on at the homefront. ODS showed that when the tempo of operations has increased to a high pace, stress casualties can occur at medical centers in the rear as well as the front. Research designed to identify and monitor care providers' stress at the various echelons is needed. Such research should guide readiness training in the broad view of the combat field that now extends from frontline to home bases/posts in this era of expanded missions.

19. A new generation of military medical consultants, scientists, and researchers must be developed. This education and training should be accomplished across health care specialties. The Fellowship in Military Psychiatry at the Uniformed Services University of the Health Sciences should serve as a model for training military specialists to serve in research, education and as consultants to the Surgeons General.

20. Studies of gender examine what works, e.g., what are the factors that predict women's successful integration into a unit in which their introduction enhances the performance of the unit, or what is it about the command climate in which sexual harassment is not found versus those in which it is. Research must examine factors which promote resiliency as well as those which induce vulnerability.

Comprehensive Reference List

See *Stress and Women's Health Computerized Database User's Manual* (with CD-ROM containing the database and PROCITE® software)

Abbreviated Reference List

Adams RR, Jones DR. Healthy motivation to fly: No psychiatric diagnosis. Aviation, Space, and Environmental Medicine 1987; 58:350-354.

Ashman A, Telfer R. Personality profiles of pilots. Aviation, Space, and Environmental Medicine 1983; 54:940-943.

Baker RR, Menard SW, Johns LA: The military nurse experience in Vietnam: stress and impact. Journal of Clinical Psychology 1989; 45:736-744.

Barkalow C: In the Men's House. Berkeley edition, New York: Berkeley Books, 1992.

Baum A, Fleming I: Implications of psychological research on stress and technological accidents. American Psychologist 1993; 48(6):665-672.

Baum A, Grunberg NE: Gender, stress, and health. Health Psychology 1991; 10(2):80-85.

Baum A, Rikli PA: Psychosocial determinants of chronic stress in nursing. Doctoral dissertation in USUHS library; 1987.

Binkin B: Who Will Fight the Next War? Washington, D.C.: The Brookings Institution, 1993.

Brende JO, Parson ER: Special veteran groups: women and the ethnic minorities. In Brende JO, Parson ER (eds): Vietnam Veterans: The Road to Recovery, NewYork:Plenum Press, 1985.

Carretta TR. USAF pilot selection and classification systems. Aviation, Space, and Environment Medicine 1989; 60:46-49.

Chidester TR, Helmreich RL, Gregorich SE, Feis CE. Pilot personality and crew coordination: Implications for training and selection. International Journal of Aviation Psychology 1991; 1:25-44.

Coie JD, Watt NF, West SG, Hawkins JD, Asarnow JR, Markman Hj, Ramey SL, Shure MB, Long B: The science of prevention. American Psychologist 1993; 48(10):1013-1022.

Cornum R, Copeland P: She Went To War. Novato, California: Presidio Press, 1992.

Coughlan K, Parkin C: Women partners of Vietnam vets. Journal of Psychosocial Nursing 1987; 25(10):25-27.

Dienstfrey SJ: Women veterans' exposure to combat. Armed Forces and Society 1988; 14:549-558.

Feinstein A, Dolan R: Predictors of post-traumatic stress disorder following physical trauma: an examination of the stressor criterion. Psychological Medicine 1991; 21:85-91.

Fine M, Hartman Bo. Psychiatric strengths and weaknesses of typical Air Force pilots. Brooks AFB, TX: USAF School of Aerospace Medicine 1968; Technical Report 68-121.

Flynn CF, Sipes WE, Grosenbach MJ, Ellsworth J: Top performer survey: Computerized psychological assessment in aircrew. Aviation, Space, and Environmental Medicine 1994; 65(5, Suppl.):A39-44.

Fulkerson S, Freud S, Raynor G. The use of the MMPI in the psychological evaluation of pilots. Journal of Aviation Medicine 1958; 29:122-129.

Furey JA: Women Vietnam veterans: A comparison of studies. Journal of Psycho-social Nursing and Mental Health Services 1991; 29:11-13.

Halpern DF. Sex differences in cognitive abilities. Hilsdale, NJ:Lawrence Erlbaum, 1986.

Hanna JH: An analysis of gynecological problems presenting to an evacuation hospital during Operation Desert Storm. Military Medicine 1992; 157(5):222-224.

Hines JF: Ambulatory health care needs of women deployed with a heavy armor division during the Persian Gulf war. Military Medicine 1992; 157(5):219-221.

Hines JF: A comparison of clinical diagnoses among male and female soldiers deployed during the Persian Gulf war. Military Medicine 1993; 158(2):99-101.

Hobfoll SE: Traumatic stress: A theory based on rapid loss of resources. Anxiety Research 1991; 4:187-197.

Hobfoll SE: War-related stress. American Psychologist 1991; 46(8):848-855.

Hoibert A, McCaughey BG: The traumatic aftereffects of collision at sea. American Journal of Psychiatry 1984; 141(1):70-73.

Holm, J: Women in the Military. Revised edition, Novato, California: Presidio Press, 1992.

Hyde JS. How large are cognitive gender differences? American Psychologist 1981; 36:892-901.

Jones DR. Flying and danger, joy and fear. Aviation, Space, and Environmental Medicine 1986; 57:131-136.

Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Wittchen HU, Kendler KS: Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Archives of General Psychiatry 1994; 51:8-19.

Kleiger JH, Kennedy D, Becker DJ, Smith S: "Children, don't forget me": A resource and support group for deployed parents during operations desert shield and desert storm. Practice Forum 1993;18(3):237-240.

Knapp TS, Newman SJ: Variables related to the psychological well being of army wives during the stress of an extended military separation. Military Medicine 1993; 158(2):77-80.

Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS: Trauma and the Vietnam War Generation: Report of findings from the National Vietnam Veterans Readjustment Study. New York: Brunner/Mazel, 1990.

Lavee Y, Ben-David A: Families under war: Stresses and strains of Israeli families during the gulf war. Journal of Traumatic Stress 1993; 6(2):239-254.

Law DL, Pellegrino JW, Hunt EB. Comparing the tortoise and the hare: Gender differences and experience in dynamic spatial reasoning tasks. Psychological Science 1993; 4:35-40.

Leda C, Rosenheck R, Gallup P: Mental illness among homeless female veterans. Hospital and Community Psychiatry 1992; 43:1026-1028.

Leetz KL, Martino-Saltzman D, Dean RC: Effects of the Persian Gulf war on veterans with combat-related post-traumatic stress disorder. Military Medicine 1993; 158(1):19-22.

Leon GR, Ben-Porath YS, Hjemboe S: Coping patterns and current functioning in a group of Vietnam and Vietnam-era nurses. Journal of Social and Clinical Psychology 1990; 9:334-353.

Matthews KA, Davis MC, Stoney CM, Owens JF, Caggiula AR: Does the gender relevance of the stressor influence sex differences in psychophysiological responses? Health Psychology 1991; 10(2):112-120.

McCarroll JE, Ursano RJ, Ventis WL, Fullerton CS, Oates GL, Friedman H, Shean GD, Wright KM: Anticipation of handling the dead: Effects of gender and experience. British Journal of Clinical Psychology 1993; 32:466-468.

McCaughey BG: U.S. Naval special psychiatric rapid intervention team. Military Medicine 1987; 152(3):133-135.

McCaughey BG: The psychological symptomatology of a U.S. Naval disaster. Military Medicine 1986; 151(3):162-165.

McDonnell Douglas Astronautics Company. Feasibility study to predict combat effectiveness for selected military roles: Fighter pilot effectiveness. St. Louis: McDonnell Douglas Astronautics Company, 1977.

Milgram NA, Bar K: Stress on wives due to husbands' hazardous duty or absence. Military Psychology 1993; 5(1):21-39.

Nathanson CA: Illness and the feminine role: a theoretical review. Social Science and Medicine 1975; 9:57-62.

Nelson SS: Women still waiting for better health care. Married to the Military; 16 June 1994:74.

Norman EM: Post-traumatic stress disorder in military nurses who served in Vietnam during the war years 1965-1973. Military Medicine 1988; 153:238-242.

Norris FH: Epidemiology of trauma: frequency and impact of different potentially traumatic events on different demographic groups. Journal of Consulting and Clinical Psychology 1992; 60(3):409-418.

Notman MT, Klein R, Jordan JV, Zilbach JJ: Women's unique developmental issues across the life cycle. In Tasman A, Goldfinger SM (eds): Review of Psychiatry (Vol 10). Washington DC:American Psychiatric Press, 1991.

Paul EA: Wounded healers: A summary of the Vietnam Nurse Veteran Project. Military Medicine 1985; 150:571-576.

Pehrson KL, Thornley N: Helping the helpers: Family support for social workers mobilized during desert storm/shield. Military Medicine 1993; 158(7):441-445.

Perconte ST, Wilson AT, Pontius EB, Dietrick AL, Spiro KJ: Psychological and war stress symptoms among deployed and non-deployed reservists following the Persian Gulf war. Military Medicine 1993; 158(8):516-521.

Picano JJ. Personality types among experienced military pilots. Aviation, Space, and Environmental Medicine 1991; 62:517-520.

Rahe RH, Gunderson EKE, Pugh WM, Rubin RT, Arthur RJ: Illness prediction studies. Archives of Environmental Health 1972; 25:192-197.

Rahe RH, Floistad I, Bergan T, Ringdal R, Gerhardt R, Gunderson EKE, Arthur RJ: A model for life changes and illness research: Cross-cultural data from the Norwegian Navy. Archives of General Psychiatry 1974; 31:172-177.

Rahe RH, Biersner RJ, Ryman DH, Arthur RJ: Psychosocial predictors of illness behavior and failure in stressful training. Journal of Health & Social Behavior 1972; 13:393-397.

Resick PA: Post-traumatic stress disorder in a Vietnam nurse: Behavioral analysis of a case study. In Rothblum ED, Cole E (eds): A woman's recovery from the trauma of war: Twelve responses from feminist therapists and activists, New York: Haworth Press, 1986:55-65.

Retzlaf PD, Bigertini M. Objective psychological testing of U.S. Air Force officers in pilot training. Aviation, Space, and Environmental Medicine 1988; 59:661-663.

Robins LN: Vietnam veterans' rapid recovery from heroin addiction: a fluke or normal expectation? Addiction 1993; 88:1041-1054.

Schnaier JA: A study on women Vietnam veterans and their mental health adjustment. In Figley CR (ed): Trauma and its wake. Vol.II: Traumatic stress theory, research, and intervention, New York:Brunner/Mazel, 1986:97-132.

Schneider, D, Schneider, CJ: Sound Off!. Paperback edition, New York: Paragon House, 1992.

Scurfield RM, Tice SN: Interventions with Medical and Psychiatric Evacuees and their families: From Vietnam through the gulf war. Military Medicine 1992; 157(2):88-97.

Serxner JL: An experience in submarine psychiatry. American Journal of Psychiatry 1968; 125(1):25-30.

Sipes W, Moore J, Caldwell L. The MMPI: A look for Military pilot norms. Proceedings of the Military Testing Association Conference 1991; Oct:429-433.

Smith EM, North CS, Spitznagel EL: Post-traumatic stress in survivors of three disasters. Journal of Social Behavior and Personality 1993; 8(5):353-368.

Sokol RJ: Early mental health intervention in combat situations: The USS Stark. Military Medicine 1989; 154(8):407-409.

Solomon SD, Smith EM, Robins LN, Fischbach RL: Social involvement as a mediator of disaster-induced stress. Journal of Applied Social Psychology 1987; 17(12):1092-1112.

Stiehm, JH: Arms and the Enlisted Woman. Philadelphia, Pennsylvania: Temple University Press, 1989.

Stretch RH, Vail JD, Maloney JP: Post-traumatic stress disorder among Army Nurse Corps Vietnam veterans. Journal of Consulting and Clinical Psychology 1985; 53:704-708.

Synder AI: The impact of Navy deployments: Devising effective interventions. Navy Family Service Center 1986; Norfolk VA:1-9.

Tirre WC, Raouf KK: Gender differences in perceptual-motor performance. Aviation, Space, and Environmental Medicine 1994; 65(5, Suppl.):A49-53.

Turnbull GJ. A review of military pilot selection. Aviation, Space, and Environmental Medicine1992; 63:825-830.

Ursano RJ, Holloway HC: Military psychiatry. In Kaplan H, Sadock B (eds): Comprehensive Textbook of Psychiatry, 2nd ed, Baltimore/London: Williams & Wilkins, 1985:1900-1909.

Wolfe J: Female military veterans and traumatic stress. PTSD Research Quarterly 1993; 4(1):1-8.

Wolfe J, Brown PJ, Bucsela ML: Symptom responses of female Vietnam veterans to Operation Desert Storm. American Journal of Psychiatry 1992; 149:676-679.

Wolfe J, Brown PJ, Furey J, Levin KB: Development of a wartime stressor scale for women. Psychological Assessment 1993; 5(3):330-335.

Wolfe J, Brown PJ, Furey J, Levin KB: Development of a War-Time stressor scale for women. Psychological Assessment: A Journal of Consulting and Clinical Psychology (in press).

APPENDICES