FRONT COVER

CONTRACT NO.: 96MM6654

TITLE: Women Aboard Navy Ships: A Comprehensive Health and Readiness Research Project

PRINCIPAL INVESTIGATOR: Frank C. Garland, Ph.D.

PI ADDRESS: Naval Health Research Center
P. O. Box 85122
San Diego, CA 92186-5122

REPORT DATE: December 31, 1996

TYPE OF REPORT: Final Report

PREPARED FOR: U. S. ARMY MEDICAL RESEARCH AND MATERIEL COMMAND
FORT DETRICK
FREDERICK, MARYLAND 21702-5012

DISTRIBUTION STATEMENT: Distribution Limited

VOLUME 2 OF 2

TABLE OF CONTENTS

VOLUME 1

APPENDICES

APPENDIX D

RESULTS

REPORT TOPIC AREA: **Contraceptive Use and Attitudes Toward Family Planning in Navy Enlisted Women and Men**

LEAD AUTHORS: Marie D. Thomas, Ph.D., Patricia J. Thomas, M. S., and Frank C. Garland, Ph.D.

ABSTRACT

In addition to the Women Aboard Navy Ships survey package completed by over 5,700 personnel assigned aboard U.S. Navy ships, 714 enlisted women and 665 enlisted men on 15 ships completed a Family Planning Supplement, which assessed use of contraception and attitudes toward family planning. For this sample, contraceptive use was related to age and marital status, with young unmarried personnel more likely to take measures to prevent pregnancy than their older married shipmates. More favorable family planning attitudes were related to contraceptive use. Depression, shipboard stress, or job quality of life were not related to use of birth control. Women and men differed in their attitudes toward family planning, with women's responses more positive than men's.

INTRODUCTION

Literature Review

Since the early 1980s, the Navy has sponsored research on pregnancy and its organizational impact [1]. Problems associated with the management of pregnant personnel were the impetus for much of the research and studies that were conducted [2-6]. Because these problems are not unique, efforts by other military services and civilian agencies to reduce the number of unplanned pregnancies were reviewed for applicability to the Navy [7]. Although these studies had a personnel management emphasis, concern over the reproductive health of women was, and continues to be, an underlying force behind Navy pregnancy research.

During Year 1 of the Women Aboard Navy Ships research project, Thomas and Thomas [8] reported that the point-in-time pregnancy rate of the women in the sample was 5.5%. This figure is lower than the 7.5% pregnancy-in-ship rate found with a 1992 sample using the same methodology [9]. The authors noted that whereas women were restricted to support ships in 1992, many of the ships in the Year 1 sample were combatants. The combatants have a high operational tempo that keeps them at sea for longer periods than support ships. Thus, absences from home were believed to be responsible for the reduced pregnancy rate. This hypothesis could not be explored, however, because of the small number of pregnant women ($N = 73$) in the Year 1 sample.

Garcia, Gasch and Quester [10] investigated the effect of assignment to a deployable unit on pregnancy rates. They analyzed the assignment codes of the Navy women 9 months prior to

their hospitalization for childbirth in 1992/1993. A somewhat higher pregnancy rate was found for women serving ashore than those in ships and squadrons. All of the afloat women were assigned to non-combatant ships.

Pregnancy, of course, is related to attitudes and practices regarding contraception. Research on the contraceptive behavior and beliefs of Navy personnel is difficult to perform because of religious, moral, and privacy considerations. Nevertheless, the Navy in its role as primary medical provider for its personnel, has a compelling need to know whether women have access to effective birth control and are sufficiently informed about contraception to make wise choices. While Navy policy [11] states that pregnancy is compatible with a naval career, an unstated desire is that pregnancies be planned to coincide with non-operational tours.

Research conducted with enlisted Marines in 1986 [12] found generally positive attitudes toward contraception but not necessarily sufficient knowledge to be effective contraceptors. These young Marines believed, for example, that the birth control pill presented significant health risks, which may explain why 29% of them either used no contraceptive or relied on withdrawal or the rhythm method to avoid pregnancy.

Surveys of Navy women in 1988, 1990, and 1992 [1,9] indicated that only about 40% of their pregnancies were planned, with the youngest women having the highest rate of unintentional pregnancy. Over half of the women who experienced an unplanned pregnancy were using a seemingly reliable form of birth control. Analysis of Year 1 data from the Women Aboard Navy Ships research project yielded very similar results [8]. That is, 61% of the women in the sample stated that their most recent pregnancy had been unplanned; 43% of these pregnancies represented contraceptive failures (i.e., the women were using birth control).

The outcome of the pregnancies of Navy women has been investigated through analysis of survey and hospitalization data. Based on self-reports, Navy women obtain fewer elective abortions but experience more miscarriages than their civilian counterparts [9]. Moreover, women who become pregnant while assigned to a ship are more likely to obtain an abortion than women on shore duty [8]. Nice, Calderon and Hilton [13], in their analysis of 11-years of hospitalization data, found no increased risk of ectopic pregnancy, spontaneous abortion, or early fetal death associated with shipboard duty.

Hypotheses

Several hypotheses were tested in this report:

1) Contraceptive use will be related to age, education, and marital status.

2) Contraceptive use will be related to family planning attitudes.

3) Contraceptive use will be related to psychosocial variables such as mood and self-reports of stress.

4) Women and men will differ in their attitudes toward family planning.

METHODS

This study is part of the Women Aboard Navy Ships Comprehensive Health and Readiness Project conducted at the Naval Health Research Center in San Diego, California as part of the Defense Women's Health Research Program administered by the Naval Medical Research Development Command and the U.S. Army Medical Research and Materiel Command, Ft. Detrick, Maryland. This epidemiologic research project utilizes several data collection methods including surveys administered aboard ship. The study is a multi-year effort with all women serving aboard ship eligible for inclusion, along with an equal number of men matched on important characteristics. The study has a longitudinal design with women and men enrolled in Year 1 of the study being contacted again and re-surveyed on a 12-month cycle. This is a report of Year 2 survey results, based on 11 months of data collection.

Sample

Although this report is part of the Year 2 cycle of the project, it uses a different data set than was analyzed by the other authors in this volume. This report describes results from the Family Planning Supplement (FPS), a series of items that assessed use of contraception and measured attitudes towards family planning. Beginning in November 1995, personnel on 15 ships received survey packets that included the FPS. A subset of the ships that are described in other chapters is included in the FPS, but additional ships surveyed after the 11-month cutoff were added to increase the sample size. Table 1 lists the number of surveys completed in each of the 15 ships by enlisted women and men and the percentage of the population they represent. It also shows, by ship, the number of Supplements completed (2 men and 1 woman could not be classified by ship). The FPS sample consisted of 714 enlisted women and 665 enlisted men.

Women and men in the sample were matched on the following characteristics: ship, work division, department, race (white, black, Hispanic, other), paygrade group (E1-E3, E4-E6, E7-E9), rating (if no individual was available in the same rating, an individual with a closely related rating was selected), and date of birth (nearest date of birth, not to exceed plus or minus two years). In the infrequent instances where these criteria could not be met, men that matched women as closely as possible were selected.

Table 1. Participating Ships, Enlisted Personnel, Family Planning Supplement Respondents, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

	SURVEYS COMPLETED				FAMILY PLANNING SUPPLEMENT	
	WOMEN (N = 822)		MEN (N = 803)		WOMEN (N = 713)*	MEN (N = 663)*
SHIP (HULL #)	N	% OF TARGET	N	% OF TARGET	N	N
USS ABRAHAM LINCOLN (CVN 72)	235	76%	238	77%	216	212
USS ARCTIC (AOE 8)	35	34%	31	30%	29	25
USS ASHLAND (LSD 48)	31	84%	34	92%	24	27
USS BRISCOE (DD 977)	30	75%	30	75%	18	16
USS BUTTE (AE 27)	24	62%	23	59%	17	21
USS DAVID R. RAY (DD 971)	4	100%	4	100%	1	1
USS HAYLER (DD 997)	22	61%	26	72%	18	24
USS KINKAID (DD 965)	27	77%	24	69%	24	15
USS LABOON (DDG 58)	10	59%	8	47%	10	7
USS MOOSBRUGGER (DD 980)	8	38%	14	67%	4	8
USS MOUNT WHITNEY (LCC 20)	63	68%	59	63%	54	48
USS NIMITZ (CVN 68)	196	82%	196	82%	184	169
USS SACRAMENTO (AOE 1)	56	81%	47	68%	45	35
USS SEATTLE (AOE 3)	61	80%	53	70%	54	44
USS TORTUGA (LSD 46)	20	71%	16	57%	15	11

* 2 men and 1 woman could not be classified by ship.

The procedure for selection of the matched men in the study was accomplished as follows: (1) the eligible population was determined using NHRC files, and an electronic roster was developed which included all data elements needed for matching; (2) the personnel department of each ship provided an electronic roster with limited information which was compared to the NHRC roster, and a final roster was determined; (3) a matching program was run to select the men to be included in the survey; and (4) individual identification labels were created and affixed to survey packets.

Survey Instrument

The FPS items analyzed in this report fell into three sections. The first series of six items are presented as statements about various aspects of family planning; respondents agree or disagree with each item using a five-point Likert scale [14]. These statements were extracted from a survey given to women in the Marine Corps [12]. The second series of items assesses form(s) of birth control used by the respondent and/or her or his partner. Three Ships: the USS NIMITZ, USS MOUNT WHITNEY, and USS TORTUGA received a version of the FPS without the item assessing forms of birth control. Finally, three items are directed to women only. These items assess the woman's desire to become pregnant during the next 12 months, her partner's objection to birth control use, and the perceived inconvenience of birth control.

Several items from the larger survey were also considered in conjunction with the FPS, including basic demographic characteristics (gender, age, race, education and paygrade) and several psychosocial variables. The psychosocial items measured:

Depression. The short form of the Center for Epidemiological Studies' Depression Scale (CES-D) [15, 16] which is included in two forms of the U. S. Navy Shipboard Health Survey, has a correlation of $r = .92$ with the full CES-D. Respondents are asked on how many of the past 7 days each of seven feelings occurred. The feelings that are measured are sadness, loneliness, inability to shake the blues, difficulty attending to the task at hand, feeling that everything was an effort, difficulty in getting going, and problems with sleep. The responses are averaged, providing an index of depression. In the Women Aboard Navy Ships sample, the index had a reliability (Chronbach's coefficient alpha) of .86.

Shipboard Stress. A series of 10 items addressing current level of stress due to living and working aboard ship appear in two of the four forms of the larger survey. These items were constructed specifically for the U.S. Navy Shipboard Health Survey [17]. Participants were asked: "Of the stress you experience, how much comes from problems or concerns with..." They then rated the following aspects of stress on a five-point scale ranging from (1) not at all to (5) extreme amount: crowded conditions, personal safety, maintaining personal hygiene, lack of privacy, inability to get enough exercise, lack of recreational activities, the people with whom living space is shared, nutrition or the unavailability of desired foods, the way things are typically done in ships, and just being aboard ship. Ratings for these items were averaged into an overall measure

of shipboard stress, which had a reliability (Chronbach's coefficient alpha) of .87 in the Women Aboard Navy Ships sample.

Quality of Job Life. A single item measured participants' perceived quality of job life using a seven-point Likert [14] scale with response categories ranging from (1) "terrible" to (7) "delighted."

The psychosocial items appeared on approximately half of the forms of the larger survey.

Survey Administration

The overall administration plan included the distribution of individually identified packets with all necessary materials to each study subject. Whenever possible, study subjects were brought together to a common location aboard ship, briefed on the study, invited to volunteer and sign an informed consent form and to complete the survey while study coordinators were present. When, due to shipboard activity, it was not practical for all study subjects to remain in one area, surveys were distributed, and the participants were allowed to fill them out in work spaces. The completed surveys were collected by study staff in sealed envelopes.

Statistical Analyses

Mean differences were examined using Student's t tests and analyses of variance. Differences in proportions were analyzed by chi-square tests. Pearson product-moment correlations were also computed. Because of the large number of statistical comparisons made, a $p \leq .01$ level of significance, two-tailed test, was adopted for all analyses.

RESULTS AND DISCUSSION

Description of Study Participants

Table 2 presents demographic information about the women and men who completed the FPS. Women and men were closely matched by age, paygrade, and race. They differed in marital status, with more men currently married and more women either never married or formerly married. In addition, women and men differed in level of education; women were more likely than men to have attended college. These two findings are consistent with the demographic analysis of a recent large sample of enlisted personnel (Kantor J. Personal communication, 1995).

Table 2. Gender Comparisons of Demographic Characteristics, Family Planning Supplement Respondents, Enlisted Personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

DEMOGRAPHIC VARIABLE	WOMEN (N = 714)	MEN (N = 665)
AGE		
Mean	26.5	26.4
Standard deviation	6.9	6.7
PAYGRADE		
E-1 to E-3	35.4%	33.1%
E-4 to E-6	42.7%	43.5%
E-7 to E-9	21.9%	23.4%
RACE		
White	62.3%	63.3%
African-American	29.1%	29.0%
Other	8.6%	7.7%
MARITAL STATUS*		
Never married	56.2%	43.7%
Currently married	28.5%	48.6%
Separated, divorced, widowed	15.3%	7.7%
EDUCATION**		
Less than high school	2.4%	5.1%
High school diploma	51.1%	63.2%
Some college	42.3%	29.7%
College degree	4.2%	2.0%

* χ^2 (2, N = 1,379) = 64.15, $p < .001$

** χ^2 (3, N = 1,379) = 36.57, $p < .001$

Contraceptive Use

An item on the FPS asked, "Do you or your partner use any form of birth control to prevent pregnancy? (*Please check all that apply).*" Table 3 lists the response options, and the percentage of women and men who checked each option. There was a write-in option that is not listed in the table: "Yes, other (please specify)." Fifteen participants chose this option and, as requested, specified the method they were using. Each of these answers could be classified into another category except for one: "I am currently pregnant." This respondent was not included in the analysis of contraceptive use. Respondents who gave answers such as "Withdrawal" (four men and one woman), "Rhythm" (one man and one woman), "I am married" (one man), and "No we are trying to have a child" (one man) were categorized as not using a method of birth control unless they also had specified another type of contraception. In addition, 169 respondents reported utilizing more than one method of contraception; 75% of those using multiple methods checked birth control pills and condoms.

Table 3. Gender Comparisons of Use of Contraception, Family Planning Supplement Respondents, Enlisted Personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

Do you or your partner use any form of birth control to prevent pregnancy?	**WOMEN (N = 415)**	**MEN (N = 391)**
YES		
Birth control pills	27.0%	32.7%
Condoms or rubbers	36.9%	46.8%
Spermicidal foam or jelly	3.6%	6.6%
Depo Provera	11.6%	4.3%
Norplant	2.2%	2.8%
Intrauterine device (IUD)	.2%	.8%
Diaphragm	.7%	2.8%
NO		
Vasectomy or tubal ligation (tubes tied)	11.1%	10.7%
I am (or my partner is) sterile	1.8%	1.3%
I am not sexually active	14.5%	6.1%
I (we) use no method of birth control	14.0%	15.6%

Note: More than one method could be chosen so percentages add to more than 100%.

A substantial portion of the sample, 34% of men and 35% of women, did not receive the question about their use of birth control. Of the participants who did receive the question, 7% of men and 7% of women did not answer it. Versions of the questionnaire that did not contain this item were administered aboard three ships: USS NIMITZ, USS TORTUGA, and USS MOUNT WHITNEY. Therefore, the percentages in Table 3 may not be representative of all ships listed in Table 1.

The most commonly used methods of birth control for both women and men (or their partners) were condoms and birth control pills (Table 1). Almost 12% of the women were using Depo Provera. Few mentioned using Norplant. Among American women of childbearing age, sterilization (female or male) is the most common method of contraception (42%) followed by the pill (29%) and condoms (18%) [18]. Unfortunately, these percentages are based on 1990 data, which are the most recent available for a national sample on this topic, when both Depo Provera and Norplant were newly introduced methods of birth control.

Forty-one percent of the women and thirty-four percent of the men were not using birth control, but most of the personnel in this group were either medically or surgically sterile, or not sexually active. Women were more likely to report that they were not sexually active than were men (χ^2 (N = 805) = 15.02, $p < .001$). In addition, never married (15.8%) and divorced, separated, or widowed (14.1%) personnel were more likely than married personnel (2%) to indicate that they were not sexually active (χ^2 (N = 804) = 35.90, $p < .001$).

Service members who had opted for surgical sterilization (vasectomy or tubal ligation) were older (mean = 34.7 years old) than other participants, who averaged 25 years of age (t (801) = 14.25, $p < .001$). E6 and above personnel were more likely than those in the lower paygrades to be sterilized (χ^2 (N = 806) = 153.16, $p < .001$), with 41.3% of chiefs (E7-E9) reporting that they or their partner had had a vasectomy or tubal ligation. White personnel (14.0%) were more likely to be sterilized than black (6.8%) or respondents from other racial groups (5.7%) (χ^2 (N = 806) = 10.92, $p < .005$). In addition, currently married personnel (23.1%) and separated, divorced, or widowed personnel (15.2%) were more likely than never married participants (1.2%) to be sterilized (χ^2 (N = 804) = 88.12, $p < .001$).

A series of analyses were conducted on contraceptive use of sexually active personnel who were not surgically or medically sterile. Table 4 presents comparisons of demographic characteristics of contraceptors and non-contraceptors.

Table 4. Comparison of Demographic Characteristics, Contraceptive Users and Non-Users, Family Planning Supplement Respondents, Enlisted Personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

DEMOGRAPHIC VARIABLE	BIRTH CONTROL USE	
	NO (N = 119)	YES (N = 502)
AGE IN YEARS*		
Mean	25.9	24.2
Standard deviation	6.5	5.4
GENDER		
Women	19.3%	80.7%
Men	19.1%	80.9%
PAYGRADE		
E-1 to E-3	17.4	82.6
E-4 to E-6	19.5	80.5
E-7 to E-9	29.4	70.6
RACE		
White	17.4	82.6
African-American	20.4	79.6
Other	25.5	74.5
MARITAL STATUS**		
Never married	13.0	87.0
Currently married	27.1	72.9
Separated, divorced, widowed	26.2	73.8
EDUCATION		
Less than high school	20.0%	80.0%
High school diploma	17.9%	82.1%
Some college	22.1%	77.9%
College degree	10.5%	89.5%

* $t\,(617) = 2.66, p < .01$

** $\chi^2\,(N = 620) = 18.99, p < .001$

Gender, paygrade, race, and education were not related to use of contraception, while age and marital status showed statistically significant relationships with birth control use. Personnel who used contraception tended, as a group, to be younger than those who did not use contraception. Among participants under 25 years of age, 82.8% reported using a form of birth control, while only 65.4% of those over 35 years old reported regular contraceptive use. The effect was due primarily to age differences in birth control use among men, with 83.8% of those under 25 compared to only 57.1% of men 35 and older using birth control.

Marital status was also significantly related to use of birth control. Currently and formerly married personnel were less likely to use contraception than were never married participants. When controlled for age, marital status was significant only for personnel between the ages of 20 and 24 years (χ^2 (2, N = 363) = 11.64, $p < .01$). In this age category, never married personnel were most likely to use birth control, and currently married personnel were least likely.

It can be assumed that some portion of those who were not using birth control were trying to have a child. For women, a measure of intent to become pregnant was available in an item that stated, "I hope to become pregnant during the next 12 months." The decision not to use contraception was clearly related to the desire to have a child (χ^2 (2, N = 269) = 34.53, $p <$ .001); 48.1% of the non-contraceptors (N =52) agreed that they hoped to become pregnant in the next 12 months while only 13.4% of the women who used birth control (N = 217) agreed with this statement. The mean scores for this item were 2.82 for non-contraceptors and 4.01 for those who used contraception (t (198) = -3.98, $p < .001$) on a scale that ranged from 1 (strongly agree) to 5 (strongly disagree).

Navy pregnancy policy states that pregnant women must be transferred off ships by the 20th week of pregnancy, or sooner under a variety of circumstances [19]. Due to this policy, women's motivation for pregnancy has often been questioned; that is, do they use pregnancy as a means for obtaining a transfer off sea duty? While a direct measure of pregnancy motivation was not available, it might be hypothesized that women who are unhappy with their Navy assignment aboard ship might be motivated to become pregnant, leading to a transfer to shore duty. The CES-D and shipboard stress scales, and a job quality of life item were used to investigate the women's job satisfaction and psychological state. No significant differences were found between women who used contraception and those who did not in t-tests comparing their levels of depression, levels of environmental stress, and job quality of life.

Finally, an analysis was conducted on women who did <u>not</u> express a hope to become pregnant (i.e., they disagreed with or were neutral about the idea). The demographic characteristics of non-contracepting women were compared to contraceptors. No significant differences were found. In addition, no demographic differences were found between non-contraceptors who hoped or did not hope to become pregnant.

Gender Differences in Family Planning Attitudes

Female and male participants were presented with six statements that assessed their attitudes towards various aspects of family planning. Women responded to two additional questions. These items were scaled from 1 (strongly agree) to 5 (strongly disagree). Table 5 lists the items and means for women and men, and the results of *t*-test comparisons. All gender differences were statistically significant with women showing a more positive attitude toward family planning than men.

Table 5. Mean Responses, Attitudes Toward Family Planning Items by Gender, Family Planning Supplement Respondents, Enlisted Personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

ITEM	WOMEN (N = 714)	MEN (N = 665)	t	p
The whole idea of birth control is embarrassing to me.	4.47	4.28	3.92	<.001
If I needed to go to a doctor or clinic for birth-control information, I would feel comfortable about it.	1.82	2.28	-7.47	<.001
I think it is very important to use birth control after marriage until you have decided to start a family.	2.04	2.23	-2.92	<.004
I would not have sexual intercourse without using birth control.	2.41	2.88	-6.87	<.001
I would have sexual intercourse without birth control if my partner wanted me to.	3.83	3.03	12.14	<.001
Sometimes when a birth control method is not available, I believe you just have to take a chance and hope for good luck to avoid causing a pregnancy.	4.25	3.82	7.31	<.001
Family Planning Scale (mean)	4.05	3.63	11.97	<.001

Item Scales: 1 = Strongly agree, 2 = Agree, 3 = Neither agree nor disagree, 4 = Disagree, 5 = Strongly disagree

Neither women nor men found birth control to be embarrassing and both agreed that they would feel comfortable asking for birth-control information. There was somewhat less agreement with the statement, "I would not have sexual intercourse without using birth control.". The greatest ambivalence was demonstrated in the item, "I would have sexual intercourse without using birth control if my partner wanted me to." Over one-third of the men (36%) and 13% of the women agreed with this statement. For women, there was a statistically significant, moderate correlation ($r = .26$, $p < .001$) between this item and the item assessing their partner's objection to contraceptive use.

A family planning attitude scale was constructed by calculating the mean of the six family planning items. Three of the items were reversed-scored so that higher values represented a more positive attitude towards family planning. The scale's reliability (Chronbach's coefficient alpha) was .62. Not surprisingly, this scale showed a large gender difference, with women endorsing use of contraception more than men.

Other Demographic Variables and Family Planning Attitudes

Although only a gender difference in family planning attitudes had been hypothesized, the relationships between other demographic variables and the Family Planning Scale were investigated. Table 6 shows scale means and statistical comparisons for several of these variables.

Table 6. Demographic Variables and Mean Family Planning Scale, Family Planning Supplement Respondents, Enlisted Personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

DEMOGRAPHIC VARIABLE	MEAN	STANDARD DEVIATION	*F*-RATIO	*p*
Paygrade			10.72	<.001
E-1 to E-3	3.74	.64		
E-4 to E-6	3.88	.69		
E-7 to E-9	4.01	.67		
RACE			.90	n.s.
White	3.86	.67		
African-American	3.81	.70		
Other	3.81	.70		
MARITAL STATUS			5.03	<.01
Never married	3.81	.68		
Currently married	3.85	.67		
Separated, divorced, widowed	4.00	.67		
EDUCATION			11.94	<.001
Less than high school	3.80	.61		
High school diploma	3.75	.67		
Some college	3.98	.68		
College degree	4.00	.56		

The means of white, black and Hispanic personnel on the Family Planning Scale did not differ significantly; however, there were mean differences based on paygrade, marital status, and education. E1s to E3s had the least favorable family planning attitudes ($p < .01$). With marital status, formerly married personnel (separated, divorced, or widowed) expressed the most favorable attitudes towards family planning. This group's mean was significantly different only from the never married group, however. For education, the least favorable attitudes were found among high school graduates, who differed from participants with some college. There were no significant gender interactions with any of these demographic variables.

Contraceptive Use and Family Planning Attitudes

Table 7 lists family planning item means and statistical comparisons for personnel (women and men combined) who either used a reliable method of birth control (contraceptive pill, condom, diaphragm, spermicide, IUD, Norplant, Depo Provera) or did not use a reliable method (withdrawal, rhythm, or no birth control). These groups did not differ in their degree of embarrassment over birth control or their comfort level in seeking information about contraception. The other four items did show statistically significant differences, however. Non-contraceptors were less likely than contraceptors to believe that it is important to use birth control after marriage and that they would not have intercourse without using birth control. In addition, personnel who did not use birth control were more likely to take a chance on pregnancy if birth control were not available, and to have sexual intercourse without contraception if their partner desired it. Women who did not use birth control were more likely than their contraceptive-using counterparts to have partners who objected to its use, and to agree that birth control is inconvenient. Perhaps not surprisingly, a significant correlation was found between a partner's objection to birth control and belief in the inconvenience of birth control ($r = .46$, $p < .001$). Overall, personnel who used birth control had higher means on the Family Panning Scale than those who did not practice contraception.

Table 7. Mean Responses, Attitudes Toward Family Planning Items by Contraceptive Use, Family Planning Supplement Respondents, Enlisted Personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

ITEM	BIRTH CONTROL USE		t	p
	NO ($N = 61$)	YES ($N = 342$)		
The whole idea of birth control is embarrassing to me.	4.36	4.42	-.53	n.s.
If I needed to go to a doctor or clinic for birth-control information, I would feel comfortable about it.	1.95	2.00	-.31	n.s.
I think it is very important to use birth control after marriage until you have decided to start a family.	2.66	2.23	2.44	<.05

Table 7. -- *Continued*-- Mean Responses, Attitudes Toward Family Planning Items by Contraceptive Use, Family Planning Supplement Respondents, Enlisted Personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1995 - 31 DEC 1996.

ITEM	USE BIRTH CONTROL?		*t*	*p*
	NO (*N* = 61)	YES (*N* = 342)		
I would not have sexual intercourse without using birth control.	3.57	2.56	6.31	<.001
Family Planning Scale	3.45	3.88	-6.50	<.001
(Women only) My partner objects to use of birth control measures.*	3.58	4.34	-3.26	<.01
(Women only) Using birth control is inconvenient.*	3.76	4.31	-3.02	<.01

Item scales: 1 = Strongly agree, 2 = Agree, 3 = Neither agree nor disagree, 4 = Disagree, 5 = Strongly disagree

* *N* =33 for women who did not use contraception; *N* = 165 for women who used contraception.

CONCLUSIONS

Analysis of the Women Aboard Navy Ships Family Planning Supplement demonstrated that enlisted women and men had attitudes toward birth control favoring contraception. The following conclusions were drawn regarding the four hypotheses that were tested:

1. Contraceptive use was related to age and marital status: Young unmarried personnel were more likely to take measures to prevent pregnancy than their older married shipmates. Education was not related to use of birth control.

2. Contraceptive use was related to family planning attitudes: Women and men who used birth control held attitudes more favorable to the prevention of unplanned pregnancies than personnel who did not.

3. Contraceptive use was not related to psychosocial variables, such as mood and self-reported stress.

4. Women and men differed in their attitudes toward family planning: Women's responses to all six statements in the family planning scale were significantly more positive than men's.

FUTURE DIRECTIONS

The results of the survey suggest a need for additional research to identify strategies to increase use of effective birth control methods by women who do not want to become pregnant. Further research also is needed concerning the influence of men's attitudes about pregnancy prevention on their partners' decisions about use of effective birth control methods.

These issues highlight the need for additional research focusing on the effect of attitudes on contraceptive behavior.

REFERENCES

1. Thomas PJ, Edwards JE. Incidence of pregnancy and single parenthood among enlisted personnel in the Navy. San Diego: Navy Personnel Research and Development Center, 1989.

2. Thomas MD, Thomas PJ, McClintock V. Pregnant enlisted women in Navy work centers. San Diego: Navy Personnel Research and Development Center, 1991.

3. Thomas PJ, Thomas MD. Impact of pregnant women and single parents upon Navy personnel systems. San Diego: Navy Personnel Research and Development Center, 1992.

4. Thomas PJ, Thomas MD, Robertson P. Absences of Navy enlisted personnel: A search for gender differences. San Diego: Navy Personnel Research and Development Center, 1993.

5. Newell CE, Thomas, PJ. Comparison of permanent change of station costs for women and men transferred prematurely from ships. San Diego: Navy Personnel Research and Development Center, 1993.

6. Thomas MD. Utilization of pregnant enlisted women transferred off ships. San Diego: Navy Personnel Research and Development Center, 1994.

7. Royle MH, Thomas PJ. Reducing unplanned pregnancies in the Navy. San Diego: Navy Personnel Research and Development Center, 1996.

8. Thomas PJ, Thomas MD. Pregnancy among enlisted women aboard ships. San Diego: Naval Health Research Center, 1996.

9. Thomas MD. Survey of pregnancy and parenthood. Briefing for Chief of Naval Personnel. Washington DC, 1993.

10. Garcia FE, Gasch JL, Quester AO. Nondeployable and assignment-restricted Navy personnel. Alexandria, VA: Center for Naval Analyses, 1996.

11. Secretary of the Navy, SECNAV Instruction 1000.10, "Department of the Navy (DoN) Policy on Pregnancy," 5 February 1995.

12. Royle MH, Molof MJ, Winchell JD, Gerrard M. Development of a pilot sex education program for enlisted Marines (NPRDC-TR-86-9). San Diego: Navy Personnel Research and Development Center, 1986.

13. Nice DS, Calderon RL, Hilton SM. Reproductive outcome in Navy enlisted women: 1982-92. San Diego: Naval Health Research Center. Manuscript in review.

14. Babbie ER, Survey Research Methods. Belmont, CA: Wadsworth, 1973.

15. Mirowsky J, Ross, CE. Age and depression. Journal of Health and Social Behavior 1992; 33:187-205.

16. Kohout J, Berkman LF, Evans DA, Cornoni-Huntley J. Two shorter forms of the CES-D depression symptoms index. Journal of Aging and Health 1993; 5: 179-193.

17. Martin JA. Comparisons of men and women aboard Navy ships: Life stress conditions, psychosocial stress, distress, coping and quality of life issues. San Diego: Naval Health Research Center, 1996.

18. Cohen P. The IUD: Birth control device that the U.S. market won't bear. The Washington Post 1996, August 6: A1, A10.

19. Chief of Naval Operations, OPNAV Instruction 6000.1A, "Management of Pregnant Service Women," 21 February 1989.

REPORT TOPIC AREA: **Stress and Well-being of Women Serving Aboard Navy Ships**

LEAD AUTHORS: James A. Martin, Ph.D., BCD, Gregory A. Acevedo, M.S., and Frank C. Garland, Ph.D.

ABSTRACT

This report presents descriptive psychosocial information from an important longitudinal study of the health and well-being of women assigned aboard Navy ships. Womens' increasing presence and evolving roles in the Navy make this research important for Navy women and for overall military readiness. The experiences of these women were compared to the experiences of a matched sample of Navy men across enlisted and officer ranks. Over 40% of the men and women in this sample reported "quite a bit" or "an extreme amount" of stress in their current life with enlisted women reporting slightly more stress than enlisted men. However, the percentage of women officers reporting stress specifically associated with being aboard ship was less than the percentage of male officers. Additionally, men and women report that they were coping well with the stress, and that stress did not diminish their duty performance or personal life.

INTRODUCTION

The health and general well-being of Navy men and women are important components of building and sustaining a capable Navy. Knowledge of military life and duty stress, stress response, and stress consequences are critically important for Navy leaders. Navy women now serve on all types of surface ships in a wide variety of military occupational roles. In addition to the stress associated with integration into a male dominated industrial environment, Navy women share the demands of military deployments, long-term separation from home, and possible exposure to naval combat operations. This report describes a broad range of personal views and perceptions of men and women assigned aboard a sample of Navy ships. A variety of duty and military life stress issues are considered, along with some of the perceived consequences and moderators of these stressors. Gender comparisons, within separate rank groups, are used to highlight a variety of shipboard and military service stress and well-being variables. These rank and gender comparisons help to enhance the understanding of the relationships among these variables. The most impressive finding is the general absence of a substantial difference between men and women within the various rank groups.

This study is part of the U.S. Navy Women Aboard Ship Comprehensive Health and Readiness Research Project conducted at the Naval Health Research Center in San Diego, California. The research is funded by the Defense Women's Health Research Program (DWHRP), a Congressionally mandated research program administered by the Naval Medical Research and Development Command and the U.S. Army Medical Research and Material Command, Ft. Detrick, Maryland. The DWHRP was established to fund broadly defined health

research related to women's service in the Armed Forces. The Navy's Woman Aboard Ship Study focuses on a wide range of health and mental health issues associated with women's assignment to shipboard duty within the context of their overall service and personal life experiences in the Navy. The first phase of this study provides extensive baseline descriptive information and uses a matched sample of Navy men for selected comparisons. This report provides data on a variety of personal background factors, and psychosocial stress and well-being issues associated with shipboard duty and Navy service life. A complete description of the study methods and initial overall study findings has previously been reported [1].

BACKGROUND

The Department of Defense is America's largest employer of women [2]. The 200,000 women on active military duty in 1995 represented 14% of all active duty military personnel [3]. While many women in the armed forces serve in military occupations that represent traditional jobs for women (health care, and various types of administrative, service, and supply functions), increasing numbers of military women are occupying nontraditional duty roles [3]. Women are now integrated into combat service and service support units in all branches of the military and they are being deployed throughout the world in a full range of combat and peacekeeping operations.

In 1995, women represented approximately 12% of Navy enlisted personnel [3]. The Navy has assigned women to non-combatant ships since 1978. At the time these data were collected, almost 9,000 women were serving aboard Navy ships. These women were assigned on almost all types of ships in a wide array of duty positions. Like their male counterparts, women sailors are exposed to the biopsychosocial stress associated with military deployments, long duty hours, separations from family and friends, and the possible exposure to combat and other stressful military operations. These women also face the challenge of social integration into an historically all-male environment. The combination of these factors have potential implications for health and psychological well-being [4].

METHODS

There were four alternate forms of the survey questionnaire administered in the Women Aboard Ships Study. Each had an identical core of questions, followed by questions that varied according to the form. Psychosocial questions examined in this report were on two of the four forms and were administered to a 50% probability sample.

This report is based on surveys from the first 36 ships enrolled in the Women Aboard Navy Ships study (5,510 women and 18,443 men assigned aboard these ships). Ships were surveyed based on availability as determined by the Commanding Officer of each ship. The full range of Navy ships from guided missile destroyers and fast combat support ships to salvage ships and oilers were represented in this sample. The men included in this study were matched to the

women based on a variety of demographic characteristics, and relevant duty and military service criteria.

Participation in the Women Aboard Navy Ships study was voluntary. The overall median ship response rate for the 36 ships was 63.1%, and the overall mean response rate was 52.2%. Participation rates varied by the size of the ship and the number of women serving aboard ship. Ships with less than 100 women aboard had an overall median response rate for women of 69.5% compared to ships with more than 100 women assigned, which had an overall median response rate for women of 49.9%.

RESULTS AND DISCUSSION

This report summarizes information on psychosocial issues, including the relationship between shipboard stress variables and the psychological well-being of men and women aboard ship. Emphasis is on practical rather than merely statistically significant differences. Because of sample size, slight differences can achieve statistical significance. For this reason, significance levels were not reported in these tables. The differences that are highlighted (shaded cells in these tables) are percentages where the difference is greater than 10%. All are highly significant (typically $p < 0.001$) statistical differences. This report uses a traditional stress-distress model [5]. Separate rank-group comparisons are used to further clarify similarities and differences between men and women aboard ship.

Despite the matching procedure used, some relevant demographic and background differences existed between the men and women in this sample (Table 1). Enlisted women had more formal education and were less likely to be married. Senior enlisted women were more likely than senior men to be separated or divorced. Women, especially more senior women, had substantially less deployment experience than their male counterparts (Table 2). All of these factors were conceptually related to psychosocial stress, subsequent distress, and life dissatisfaction.

Table 1. Demographic information for officers and enlisted personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	OFFICERS		ENLISTED	
	Men (N = 53)	Women (N =70)	Men (N=1,323)	Women (N = 1,375)
AGE IN YEARS				
Mean	30.4	28.1	26.3	26.0
Standard deviation	5.9	5.0	6.3	6.2
RACE - ETHNIC STATUS				
White, non-Hispanic	86.8 %	80.0 %	52.7 %	50.6 %

Table 1. --*Continued*-- Demographic information for officers and enlisted personnel, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	OFFICERS		ENLISTED	
	Men (N = 53)	**Women (N =70)**	**Men (N=1,323)**	**Women (N=1,375)**
White, Hispanic	3.8 %	5.7 %	5.1 %	5.4 %
Black/ African-American, non-Hispanic	7.5 %	4.3 %	29.9 %	31.5 %
Black/ African-American, Hispanic	0 %	0 %	1.7 %	2.5 %
Asian/ Pacific Islander	1.9 %	4.3 %	3.6 %	3.4 %
Native American	0 %	0 %	1.2 %	1.3 %
Other Race/ Ethnicity	0 %	5.7 %	5.7 %	5.2 %
RANK				
O1-O3	81.2 %	88.7 %		
O4-O6	15.1 %	8.6 %		
All Warrant Officers	3.8 %	2.9 %		
E1-E2			13.1 %	15.6 %
E3-E4			44.7 %	48.1 %
E5-E6			36.1 %	31.4 %
E7-E9			6.1 %	4.8 %
EDUCATION				
Some high school	0 %	0 %	2.1 %	0.4 %
High school graduate or GED	3.8 %	5.7 %	64.1 %	52.0 %
Trade or technical school graduate	0 %	0 %	4.1 %	3.5 %
Some college or AA degree	15.1 %	4.3 %	27.4 %	39.4 %
College degree and above	81.1 %	89.9 %	2.3 %	4.6 %
MARITAL STATUS				
Never married	28.3 %	44.9 %	42.0 %	51.7 %
Married	64.2 %	43.5 %	49.6 %	32.4 %
Separated	1.9 %	5.8 %	3.9 %	6.1 %
Divorced	5.7 %	5.8 %	4.3 %	9.3 %
Widowed	0 %	0 %	0.1 %	0.5 %
SHIP STATUS				
In home port	81.1 %	79.7 %	83.5 %	81.4 %
At sea	7.5 %	13.0 %	11.6 %	11.8 %
In port other than home port	3.8 %	0 %	1.3 %	1.9 %
In shipyard	5.7 %	5.8%	2.1 %	3.1 %
Other	1.9 %	1.4 %		

Table 2. Percentages currently deployed and with previous deployments, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percent deployed											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
	M= 1,350	W= 1,412	M= 156	W= 195	M= 555	W= 662	M= 451	W= 432	M= 78	W= 63	M= 52	W= 65
Currently deployed	2.9	3.2	1.8	2.9	3.8	3.4	2.6	3.3	1.3	1.5	1.9	2.9
No previous deployments	19.3	36.6	43.6	59.5	25.0	36.0	7.1	27.1	3.8	27.0	15.4	41.5
Three or more previous deployments	66.0	43.0	27.3	29.5	52.8	38.9	81.4	51.0	97.3	54.3	68.2	35.9
Five or more previous deployments	43.3	22.0	10.2	12.8	27.7	18.7	58.6	26.7	87.7	30.6	36.4	17.9
Ten or more previous deployments	20.3	8.0	DNA	DNA	13.6	8.3	25.1	8.3	47.9	13.0	20.5	2.6

DNA: Does not (typically) apply to this category because of the short time they have been in the Navy

Note: Percentages reflect individuals in these discrete categories and do not, therefore, add up to 100%.

Across gender and all rank groups, more than 40% of this sample reported that they were experiencing either "quite a bit" or an "extreme amount" of stress in their current life (Table 3). Overall, the differences between men and women were slight. A surprising finding was the high percentage of senior men and women who report substantial amounts of stress in their current life. Across all rank groups, a large proportion of these men and women reported a high level of stress associated with being aboard ship (Table 4). The highest level of stress associated with being aboard ship was reported by the E3-E4 men and women. For men and women, across all rank groups, there was a moderate correlation between overall life stress scores and the perceived stress associated with being aboard ship (Table 5).

Table 3. Overall current life stress, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

"Think about your whole life over the past 2 weeks. On the whole, how much stress do you think is in your life right now?"					
	(0) "None At All"	(1) "A Little Bit"	(2) "Moderate Amount"	(3) "Quite A Bit"	(4) "Extreme Amount"
Men (N = 1,340)	6.0 %	20.7 %	29.1 %	31.3 %	12.8 %
Women (N = 1,416)	3.1 %	19.8 %	29.3 %	34.4 %	13.4 %
E1-E2 Rank Group					
Men (n = 173)	8.2 %	21.8 %	22.9 %	31.2 %	15.9 %
Women (n = 202)	4.7 %	20.4 %	27.6 %	36.0 %	14.2 %
E3-E4 Rank Group					
Men (n = 559)	6.3 %	22.1 %	29.2 %	28.9 %	13.6 %
Women (n = 647)	2.6 %	19.5 %	30.9 %	32.5 %	14.5 %
E5-E6 Rank Group					
Men (n = 463)	5.6 %	19.0 %	32.0 %	32.8 %	10.6 %
Women (n = 424)	3.8 %	20.0 %	29.7 %	33.3 %	13.2 %
E7-E9 Rank Group					
Men (n = 81)	2.5 %	21.3 %	26.3 %	38.8 %	11.3 %
Women (n = 62)	1.6 %	28.1 %	20.3 %	43.8 %	6.3 %
All Officers/Warrant Officers					
Men (n = 52)	5.8 %	17.3 %	26.9 %	34.6 %	15.4 %
Women (n = 70)	0.0 %	11.4 %	34.3 %	45.7 %	8.6 %

Level of stress expressed on a 5 point Likert Scale ranging from a score of (0) "none at all" to (4) "extreme amount".

Table 4. Stress associated with being aboard ship for men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996

	Percent expressing high levels of perceived stress											
			E1-E2		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
Stress	M = 1,376	W = 1,446	M = 173	W = 215	M = 592	W = 662	M = 477	W = 432	M = 81	W = 66	M = 53	W = 70
Being aboard ship	42.6	46.2	41.0	45.2	46.8	49.5	40.3	46.8	30.8	32.9	38.5	30.0

Level of stress expressed on a 5 point Likert Scale ranging from a score of (0) "none at all" to (4) "extreme amount". Percent expressing high stress represents scores of either (3) "quite a bit" or (4) "an extreme amount."

Table 5. Relationship between overall life stress and stress aboard ship, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Correlation coefficient											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
Overall life stress and shipboard stress	M = 1,340	W = 1,416	M = 170	W = 211	M = 565	W = 642	M = 457	W = 419	M = 78	W = 64	M = 52	W = 70
Correlation	.42	.36	.41	.41	.45	.35	.37	.37	.41	.38	.71	.18

Specific aspects of shipboard life are perceived as quite stressful for some men and women (Table 6). Among the most stressful issues were "lack of privacy" and the related experience of "crowded conditions" aboard ship. Junior personnel, especially women, were the most likely to report these as sources of stress. Crowding and privacy concerns had the highest overall correlation with perceived stress related to being aboard ship (Table 7). Except for the most junior enlisted group and the officers, the correlations among these variables for men and women were similar. While the number of men and women who were at sea when they responded to this survey was very small, both men and women "at sea" reported higher levels of stress across most shipboard life conditions (Table 8) Typically, more women than men reported high levels of stress while at sea. More junior enlisted men than women in the "at sea" group (both the E1-E2 and E3-E4 rank groups) reported higher levels of stress associated with being aboard ship. The opposite was true for the E5-E6 group. The number of senior enlisted members and officers at sea was too small to report rank group comparisons.

Table 6. Sources of shipboard life stress rank-ordered for men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percent expressing high levels of perceived stress											
Stress	**All**		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
Shipboard living conditions	M = 1,376	W = 1,446	M = 173	W = 215	M = 592	W = 662	M = 477	W = 432	M = 81	W = 66	M = 53	W = 70
My nutrition, the unavailability of desired foods aboard ship	29.8	35.8	22.8	32.8	34.2	37.7	30.5	37.6	15.3	23.4	19.2	27.1
My lack of privacy aboard ship	27.4	35.8	28.6	44.2	32.0	38.9	25.7	33.2	14.1	9.6	5.7	1.4
Crowded conditions aboard ship	29.3	33.7	26.2	38.0	34.2	37.4	29.4	34.9	12.9	11.1	11.5	0.0

Table 6. --*Continued*-- Sources of shipboard life stress rank-ordered for men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percent expressing high levels of perceived stress											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
The people with whom I share living space aboard ship	13.7	20.7	14.0	25.9	15.8	24.2	13.8	17.7	5.1	9.4	3.8	1.4
The lack of recreational activities aboard ship	16.0	18.0	17.5	16.7	19.6	20.3	12.6	18.4	11.6	11.0	7.6	5.7
My inability to get enough exercise aboard ship	13.3	17.2	14.0	11.0	13.2	17.0	11.8	18.9	19.2	15.7	15.4	30.0
Maintaining personal hygiene aboard ship	13.0	14.6	5.3	13.9	14.6	15.2	16.1	17.3	7.7	6.3	0.0	1.4
My personal safety aboard ship	10.0	11.6	8.1	13.5	12.4	12.8	9.8	11.7	2.6	10.9	0.0	1.4

Level of stress expressed on a 5 point Likert Scale ranging from a score of (0) "none at all" to (4) "extreme amount". Percent expressing high stress represents scores of either (3) "quite a bit" or (4) "an extreme amount."

Table 7. Relationship between stress being aboard ship and shipboard living conditions, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Correlation coefficients											
Correlation	**All**		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
between stress being aboard ship and:	M = 1,345	W = 1411	M= 173	W= 210	M= 579	W= 646	M= 463	W= 421	M= 78	W= 64	M= 52	W= 70
Food	.42	.35	.52	.39	.44	.37	.36	.32	.28	.23	.37	.22
Privacy	.51	.53	.52	.53	.55	.53	.49	.55	.44	.47	.34	.31
Crowding	.65	.63	.66	.69	.68	.64	.64	.63	.50	.59	.44	.28
Living space	.41	.42	.46	.35	.41	.43	.41	.46	.26	.30	.28	.14
Recreation	.40	.35	.44	.37	.41	.34	.36	.35	.42	.33	.46	.24
Exercise	.35	.28	.40	.26	.36	.27	.29	.34	.39	.42	.51	.23
Hygiene issues	.31	.32	.28	.27	.31	.32	.33	.33	.35	.47	.34	.04
Safety	.41	.43	.35	.43	.44	.42	.42	.43	.35	.41	.19	.35

Table 8. Percentage of men and women in home port and those at sea reporting high levels of perceived stress associated with sources of shipboard life stress, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	E3-E4				E5-E6			
Shipboard living conditions	In home port		At sea		In home port		At sea	
	M= 461	W= 523	M= 82	W= 67	M= 400	W=3 340	M= 39	W= 46
Being aboard ship	44.3	48.7	54.9	44.1	38.7	43.6	47.6	63.9
My nutrition, the unavailability of desired foods aboard ship	33.0	37.1	39.8	35.3	29.7	37.0	33.3	40.5
My lack of privacy aboard ship	30.5	37.1	36.1	48.5	24.0	32.7	35.7	40.4
Crowded conditions aboard ship	31.9	36.4	41.0	36.8	27.3	32.4	41.0	51.1
The people with whom I share living space aboard ship	14.0	23.7	19.3	27.9	13.5	16.1	16.6	27.7
The lack of recreational activities aboard ship	18.7	18.1	25.3	28.3	10.9	16.1	23.8	29.7
My inability to get enough exercise aboard ship	13.1	16.3	10.8	20.6	11.0	18.1	21.4	23.4
Maintaining personal hygiene aboard ship	15.7	16.0	8.4	9.0	14.6	16.8	28.6	15.2
My personal safety aboard ship	11.2	12.5	16.8	8.8	8.4	10.8	23.8	19.2

Level of stress expressed on a 5 point Likert Scale ranging from a score of (0) "none at all" to (4) "extreme amount". Percent expressing high stress represented scores of either (3) "quite a bit" or (4) "an extreme amount."

Note: Comparisons in this table are between the in home port and at sea duty stations.

A substantial percentage of men and women (approximately 40% to 50%) reported that "the way things are typically done on board ship" is a source of "quite a bit" or "extreme" stress (Table 9). The percentages were essentially the same for men and women and across all the rank groups and a substantial number of senior enlisted personnel and officers reported high levels of stress on this item. When asked about shipboard duty relationships (Table 10), approximately 20% to 25% of men and women reported high levels of stress associated with "the person I work for - my immediate supervisor." There was less stress associated with peers and supervisee relationships across all rank groups. Generally, more women reported high levels of peer related stress than men. More than 20% of men and women officers reported high levels of stress associated with their relationship with those whom they supervise.

Table 9. Stress associated with the way things are typically done aboard ship, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Percent expressing high levels of perceived stress associated with the way things are typically done aboard ship											
Total		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
M = 1,376	W = 1,446	M= 173	W= 215	M= 592	W= 662	M= 477	W= 432	M= 81	W= 66	M= 53	W= 70
42.6	45.7	36.3	37.9	44.7	48.3	41.3	45.9	47.5	48.5	44.3	41.4

Level of stress expressed on a 5 point Likert Scale ranging from a score of (0) "none at all" to (4) "extreme amount". Percent expressing high stress represented scores of either (3) "quite a bit" or (4) "an extreme amount."

Table 10. Stress associated with duty relationships aboard ship for men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percent expressing high levels of perceived stress											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
Shipboard duty relationships	M= 1,376	W= 1,446	M= 173	W= 215	M= 592	W= 662	M= 477	W= 432	M= 81	W= 66	M= 53	W= 70
The person I work for (my immediate supervisor)	23.6	24.4	25.1	22.8	26.0	25.6	20.4	25.7	21.8	13.0	23.1	20.0
The people I work with (my peers)	15.8	20.2	18.2	21.4	16.6	20.8	15.2	20.1	10.2	20.3	11.5	11.5
The people who work for me (those I supervise)	10.4	10.2	Does not apply		6.1	5.4	14.7	17.2	16.7	17.5	21.2	25.8

Level of stress expressed on a 5 point Likert Scale ranging from a score of (0) "none at all" to (4) "extreme amount". Percent expressing high stress represented scores of either (3) "quite a bit" or (4) "extreme amount."

There was a substantial positive correlation between the perceived stress associated with being aboard ship and stress associated with the way things are typically done aboard ship (Table 11). The gender differences in these relationships were greatest for senior enlisted personnel (higher for women) and officers (higher for men). Other gender differences occurred in the relationship between stress "being aboard ship" and "relationships with supervisors" (typically higher for men, especially the most junior enlisted personnel and the most senior enlisted personnel) and the relationships between stress "being aboard ship" and both the peers and supervise stress items (in both cases the greatest difference related to much stronger associations for the male officers). Those actually at sea, the junior to mid-level enlisted personnel, typically reported more stress associated with all the domains of shipboard duty relationships than those not at sea (Table 12). "The way things are typically done" was a substantial source of stress for all of the at sea groups.

Table 11. Relationship between stress being aboard ship and shipboard relationships, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Correlation coefficients											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
Stress being aboard ship	M = 1,326	W = 1,385	M= 167	W= 199	M= 565	W= 635	M= 461	W= 416	M= 78	W= 62	M= 52	W= 70
The way things are typically done aboard ship	.54	.54	.56	.54	.60	.56	.49	.53	**.33**	**.52**	**.59**	**.37**
Relationships with supervisors	.42	.39	**.53**	**.35**	.42	.41	.39	.37	**.34**	**.17**	.31	.31
Relationship with peers	.35	.40	.45	.44	.35	.42	.34	.38	.28	.28	**.24**	**.12**
Relationship with those I supervise	.22	.18	Does not apply		.18	.19	.31	.30	.27	.32	**.38**	**.15**

Table 12. Percentage of men and women in home port and those at sea reporting high levels of perceived stress associated with shipboard relationships, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	E3-E4				**E5-E6**			
Shipboard duty relationships	In home port		At sea		In home port		At sea	
	M= 456	W= 522	M= 80	W= 68	M= 401	W= 341	M= 42	W= 47/45
The way things are typically done aboard ship	42.7	46.4	48.1	55.9	40.1	45.1	52.3	57.4
The person I work for (my immediate supervisor)	23.8	24.9	31.4	25.0	19.9	23.4	23.8	34.0
The people I work with (my peers)	15.6	19.6	17.5	23.5	13.6	20.1	28.6	20.0
The people who work for me (those I supervise)	5.6	5.6	7.2	4.4	12.7	16.4	28.5	23.4

Level of stress expressed on a 5 point Likert Scale ranging from a score of (0) "none at all" to (4) "extreme amount". Percent expressing high stress represents scores of either (3) "quite a bit" or (4) "an extreme amount."

Note: Comparisons in this table are between the in home port and at sea duty stations.

Based on the number of participants who report substantial current life stress, a surprisingly small percentage (5% to 20%) reported that this stress was impacting their duty performance (Table 13). Senior personnel reported the least effect of stress on duty performance No major differences existed between men and women, although the actual percentages for women

were less than those for men across three of the enlisted rank groups. However, slightly higher percentages of participants reported that current life stress is having a significant effect on their personal life (Table 14).

Table 13. Percentage expressing stress as affecting job (duty) performance during the past two weeks, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Percent expressing stress dimensions as having a significant effect on job performance											
All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
M = 1,332	W = 1,401	M = 167	W = 207	M = 574	W = 641	M = 461	W = 421	M = 78	W = 64	M = 53	W = 68
14.7	14.1	21.6	17.9	16.1	14.1	12.0	13.3	11.5	9.4	5.7	10.3

Table 14. Percentage expressing stress as affecting personal life during the past two weeks, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Percent expressing stress dimensions as having a significant effect on personal life											
All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
M = 1,332	W = 1,401	M = 167	W = 207	M = 574	W = 641	M = 461	W = 421	M = 78	W = 64	M = 53	W = 68
14.7	14.1	21.6	17.9	16.1	14.1	12.0	13.3	11.5	9.4	5.7	10.3

One fourth of the junior enlisted personnel reported that they had serious problems coping with duty and personal life stress (Table 15). Coping improves as rank increases, and except for the officers where women report more coping problems than men, there are no apparent gender differences.

Table 15. Percentage reporting problems coping with duty and personal life stress, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Percent expressing difficulty coping with duty and personal life stress											
All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
M = 1,332	W = 1,403	M = 166	W = 207	M = 575	W = 644	M = 462	W = 419	M = 77	W = 64	M = 52	W = 69
22.9	23.0	27.1	32.3	28.5	25.7	18.6	17.9	13.0	12.5	3.8	13.0

One half to one quarter of the respondents had an overall score in the symptomatic range on a study measure of current depression (Table 16). Junior enlisted personnel had the highest scores. Overall depression scores decrease as rank increased and women had slightly higher scores across all rank groups. In general, these scores were consistent with the percentages reported for high levels of current overall life stress (Table 4). The seven discrete symptoms that make up the overall depression measure provide a detailed indication of those experiencing the greatest degree of distress (Table 17). Overall, distress symptoms decreased as rank increased

and in the more senior rank groups, women typically reported slightly more symptom days than men. Symptom days were highest for the most junior enlisted personnel and the percentages for men and women were quite similar. One-fifth of these junior enlisted men and women felt lonely and sad, felt that everything was an effort, had trouble keeping their mind on that they are doing, and experienced sleeping problems five or more day a week. About 15% of the most junior enlisted personnel had the same experience.

Table 16. Percentage depressed according to a modified version of the CES-D Scale [8], U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Percent distressed											
All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
M = 1,323	W = 1,359	M = 165	W = 203	M = 570	W = 613	M = 459	W = 412	M = 77	W = 63	M = 52	W = 70
32.2	39.1	47.3	52.7	36.8	41.1	24.2	33.5	24.7	28.6	15.4	23.5

Table 17. Depression symptoms, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percent expressing depression symptoms 5 or more days per week											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
Symptom	M= 1,348	W= 1,396	M= 172	W= 209	M= 579	W= 640	M= 466	W= 419	M= 79	W= 63	M= 52	W= 68
Couldn't get going	10.7	13.7	14.0	16.5	13.1	17.0	7.9	9.9	3.8	4.8	7.7	7.1
Felt sad	10.4	15.3	18.0	21.0	12.0	17.7	6.4	11.1	7.7	4.7	7.7	11.4
Trouble getting to sleep or staying asleep	13.9	17.4	19.8	19.4	14.1	18.2	13.0	16.3	11.3	14.1	3.8	12.9
Everything was an effort	12.3	15.7	19.3	22.0	14.2	16.6	8.8	14.0	6.4	4.7	7.7	8.6
Felt lonely	15.8	18.6	25.9	25.9	18.3	20.1	11.6	15.0	7.5	12.5	5.8	10.3
Couldn't shake the blues	10.0	14.2	17.0	21.0	12.2	16.1	6.2	9.7	5.0	7.8	3.8	8.6
Trouble keeping mind on what you are doing	13.1	15.7	21.4	22.7	16.1	17.7	8.1	12.3	6.3	6.3	1.9	4.3

Depression measured by responses to the question "How many days during the past 7 days have you:" Response categories range from (0) "no days" to)7) "seven days." Percentages were those symptomatic (4) four or more days per week.
Note: Comparisons in this table are between ranks.

Less than 10%, of participants reported that they had been unable to perform their military duties in the last 30 days because of an emotional problem, personal problem, or family problem (Table 18). Almost 10% of the mid-level enlisted men and women reported some lost duty time because of family problems. Overall, the percentages were small and there are no dramatic gender differences in any of the rank group comparisons.

Table 18. Percentage who reported being unable to perform their military duties for one or more days during the past 30 days U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percent unable to perform their military duties because of:											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
Problem	M = 1,333	W = 1,391	M= 166	W= 204	M= 574	W= 637	M= 460	W= 416	M= 80	W= 64	M= 52	W= 69
Emotional problems	3.9	4.9	4.6	7.8	4.2	5.3	3.3	3.8	3.8	1.6	3.8	1.4
Personal problems	6.9	7.3	7.5	10.2	6.4	6.9	8.0	8.4	3.8	0.0	3.8	2.9
Family problems	7.6	7.3	3.5	6.4	7.5	7.1	10.1	19.5	5.0	4.7	3.8	1.4

Response categories were "No" and "Yes"

The vast majority of study participants were satisfied with the overall quality of their current life and very few reported that they were severely dissatisfied (Table 19). When asked about specific life domains, many participants report their "job" as a source of dissatisfaction (Table 20). Dissatisfaction with job decreased with increased rank. Junior men were more dissatisfied with their job than junior women, and senior women were more dissatisfied than senior men. Only 6% or less of all rank and gender groups reported dissatisfaction with family life. Among those currently married, a substantial number of junior and mid-level enlisted women reported that they were dissatisfied with their spouse. The percent of women dissatisfied was almost twice as high as of men in the corresponding rank groups.

Table 19. Percentage expressing dissatisfaction with overall quality of life, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

"How do you feel about your life as a whole?"	Percent expressing dissatisfaction in their overall quality of life											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
	M = 1,339	W = 1,401	M= 171	W= 206	M= 576	W= 642	M= 462	W= 422	M= 79	W= 65	M= 51	W= 69
	6.7	5.4	10.5	8.1	8.0	5.7	4.7	4.5	5.0	3.1	0.0	1.4

Level of satisfaction with quality of life was expressed on a 7 point Likert scale ranging from a score of (-3) "terrible" to (3) "delighted" for each quality of life item. Percent expressing high levels of dissatisfaction represented scores of either (-3) "terrible" through (-1) "mostly dissatisfied".

Table 20. Percentage expressing dissatisfaction with quality of life, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

"How do you feel about your:"	Percent expressing dissatisfaction in their quality of life											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
	M= 1,339	W= 1,402	M= 171	W= 206	M= 576	W= 642	M= 462	W= 422	M= 79	W = 65	M= 51	W= 69
Job?	31.8	31.7	44.8	37.3	36.7	33.4	26.0	30.3	16.3	23.1	9.6	15.7
Personal life?	9.4	9.4	14.0	9.4	11.2	9.4	6.4	9.4	5.0	6.2	7.7	12.9
Health and physical condition?	9.2	14.2	13.4	18.4	9.3	14.2	8.5	13.7	8.8	6.2	1.9	11.4
Family?	5.2	3.9	5.3	5.3	5.2	3.7	5.0	4.3	6.3	3.1	5.9	0.0
(If married) Spouse?	9.6 (n=749)	17.8 (n=545)	13.9 (n=36)	24.3 (n=37)	11.1 (n=243)	21.5 (n=195)	7.9 (n=368)	16.8 (n=244)	13.2 (n=68)	10.8 (n=37)	5.9 (n=34)	3.1 (n=32)
(If you have children) Children?	3.9 (n=673)	2.3 (n=518)	6.5 (n=31)	7.1 (n=28)	3.4 (n=205)	2.3 (n=176)	3.2 (n=364)	2.3 (n=262)	4.5 (n=66)	0.0 (n=41)	4.0 (n=25)	0.0 (n=11)

Level of satisfaction with quality of life expressed on a 7 point Likert scale ranging from a score of (-3) "terrible" to (3) "delighted" for each quality of life item. Percent expressing high levels of dissatisfaction represents scores of either (-3) "terrible" through (-1) "mostly dissatisfied". Note: questions about spouse and children only reflected those individuals who responded that the questions applied to them (Men: spouse = 749, children = 673, Women: spouse = 545, children = 518
Note: Comparisons in this table are beetween ranks.

Roughly 5% to 15% of the sample reported that they had no close friends or no close relatives (Table 21). Almost 15% of the senior enlisted personnel reported that they have no close friends. Across all rank groups, men were more likely to report not having a close friend and except for women officers, more men reported that they had no close relatives. Even for those who had at least one close friend and/or relative, many (40% to 60% of men and women across all rank groups) reported that they seldom or almost never saw these close friends or relatives (Table 22).

Table 21. Percentage who reported no perceived close personal or family relationships and no formal ties to religious and social organizations, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percentage expressing no personal relationships or group participation											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
	M= 1,345	W= 1,405	M= 171	W= 209	M= 579	W= 642	M= 464	W= 420	M= 78	W= 62	M= 52	W= 69
No close friends	8.6	5.7	9.9	4.3	6.9	5.1	9.5	7.9	14.1	4.8	7.7	2.9
No close relatives	6.5	5.1	7.0	4.3	4.5	3.1	8.4	7.6	10.3	6.5	5.8	8.6
Not a club or group member	71.9	78.5	84.2	89.0	75.8	82.2	65.3	71.3	64.1	60.9	57.7	71.4
Not a member of a religious organization	69.2	66.5	76.6	66.7	69.2	67.0	67.9	66.9	75.6	65.6	46.2	59.4

Table 22. Percentage who reported that they seldom or almost never see close friends and relatives, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Percent with close friends/relatives, who seldom or almost never see them											
	All		**E1-E2**		**E3-E4**		**E5-E6**		**E7-E9**		**Officers**	
	M= 1,226	W= 1,319	M= 153	W= 200	M= 539	W= 607	M= 419	W= 383	M= 67	W= 60	M= 48	W= 68
Seldom or almost never see them	53.7	53.1	64.1	61.5	55.8	53.9	46.5	49.9	55.2	43.3	56.2	50.0

Study participants typically did not belong to clubs or membership groups (Table 21). They are typically not members of religious organizations. This was true for men and women across all rank groups. In general, these data suggest that many of these study participants had relatively shallow informal social support systems.

When asked about potential sources of help (Table 23), 9% - 16% of men and women in all rank groups said that "family was unhelpful." Except for officers, 15% to 25% of men and women reported that if they experience a personal life problem, "friends aboard ship," "other friends in the Navy," and "other friends not in the Navy" would generally be unhelpful to them. Enlisted men were slightly more negative than women. About 10% of the officers have these same negative views about friends as sources of social support in times of need. Women officers were slightly more negative in their view of available support than the men.

Table 23. Potential sources of help, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

"If you experienced a personal problem, how helpful would the following individuals be?"	Percent expressing sources of help as unhelpful											
			E1-E2		E3-E4		E5-E6		E7-E9		Officers	
	M= 1,335	W= 1,399	M= 173	W= 215	M= 592	W= 662	M= 477	W= 432	M= 81	W= 66	M= 53	W= 70
Your family	14.0	12.3	14.0	12.9	12.3	11.2	16.7	13.1	12.8	9.4	9.6	11.4
Your friends aboard ship	21.0	19.0	21.1	18.6	21.8	19.4	22.0	20.0	16.9	18.8	7.8	11.4
Other friends in the Navy	21.0	18.4	24.6	20.9	23.2	19.9	18.8	16.4	18.2	14.3	7.7	12.9
Other friends not in the Navy	16.2	14.6	20.5	19.7	16.3	15.2	15.2	11.7	18.4	15.6	7.7	10.0
Chaplains, ministers, or other clergy	22.3	21.6	25.4	23.6	22.5	23.7	21.4	19.0	25.6	16.1	13.5	17.1
Other Navy professionals	30.1	29.2	34.9	33.0	33.3	30.7	27.2	26.9	21.8	22.6	19.2	24.3
Your ship's leaders	36.4	36.9	38.8	35.9	38.8	39.8	34.0	35.6	29.5	28.1	32.7	30.0

One–fifth to one–third of all study participants reported potential formal sources of social support as unhelpful in the context of a personal problem. Among this group, ship's leaders are seen as the least helpful, this includes senior enlisted personnel and officers. There are almost no differences among men and women in any of the rank groups in this negative view about ship leaders. Twenty to thirty-five percent of the survey participants have a negative perception of "other Navy professionals" as potential sources of help. Junior personnel are slightly more negative than senior personnel. No differences emerge between men and women across rank groups.

A fifth of the senior enlisted personnel and officers shared these same negative views about Navy professional helpers. Chaplains and other clergy were reported as unhelpful by 20% to 25% of study participants. Except for senior enlisted women who are slightly more positive, men and women across all rank groups have similar views about the clergy.

CONCLUSIONS

These data support earlier findings [6] suggesting that men and women have very similar experiences and views with respect to a variety of psychosocial stress and well-being variables. Current findings, demonstrating substantial perceived stress for both men and women associated with aspects of shipboard living conditions and shipboard duty relationships, reinforce the value

of examining military-related stress conditions, well-being, and other psychosocial variables within the framework of military career stages. While the number of deployed study participants was very small, there was evidence that being deployed was associated with increased stress or distress. These represent potential health and well-being consequences for both men and women.

While there was a general recognition that military duties and a military lifestyle can be stressful, the data suggest that men and women aboard ship perceive their life as very demanding. Understanding the basis of this assessment and the possible consequences for health and well-being will require further analysis. The planned collection of a second set of data from these subjects will provide an opportunity to address the nature of many of these stress-distress relationships, including the temporal ordering and subsequent direction. For now, it is apparent that aspects of duty and duty relationships aboard ship are important factors in the overall stress experienced by these men and women.

Men and women in this sample tended to report that they were coping well with life stress, and that stress did not diminish their duty performance or personal life. At the same time, many of these men and women do report experiencing symptoms that denote a substantial amount of psychological distress. Women in this sample reported more symptoms than men, similar to what has typically been found in civilian studies on symptoms of minor psychological distress [7]. The distress experienced by men and women in this sample, and the potential consequences for subsequent health and well-being, warrants continued exploration.

Subsequent analysis on follow-up data needs to be done to establish baseline measures of psychological distress for Navy men and women. Ideally, these baselines will provide appropriate rank group norms for future studies of Navy men and women.

While it may be common for individuals to complain about their jobs, the level of dissatisfaction reported here requires additional exploration. The fact that so many of these men and women, across all rank groups, report stress associated with the way things are typically done aboard ship reinforces the importance of focusing on interpersonal and leadership aspects of this duty stress factor. This is another area where the differences between deployed and nondeployed personnel need to be considered.

Prior research has established the importance of formal and informal supportive relationships to perceived stress, distress, and various health and well-being outcomes [9]. These data suggest that some shipboard personnel perceive a lack of support from their Navy peers, formal sources of support in the Navy community, and their Navy leaders. Future analyses need to consider how various factors, such as ship type, number of women aboard, and the ratio of men to women aboard ship, impact these variables. In addition, even those who report supportive relationships with friends and family, report that they have very little contact with these people. Barriers to these relationships need to be examined. Information from study participants suggests that men and women aboard ship have few connections to institutional sources of support such as

social and religious organizations. This is true across gender and all rank groups and is another issue warranting continued study. The stressful nature of military duties, and the potential for traumatic stress exposure make formal support systems an invaluable resource for military members.

These findings may not represent the views and perceptions of all military women, all Navy women, or even all Navy women assigned aboard ship. This information is descriptive in nature and caution is therefore needed in interpreting these findings and making a judgment on the nature of relationships among these variables. The current sample over-represents mid-level enlisted personnel and under represents other rank groups. Despite these limitations, these data provide useful information and direction for future analyses.

Shipboard stress and psychosocial well-being need to be examined in relationship to other shipboard and military life stressors, and with other health and mental health outcomes. Structural, operational, and interpersonal moderators of these life stressors and stress outcomes require further study. A planned one year follow-up of these subjects should shed considerable light on all of these issues. These data will allow the examination of many hypotheses related to stress and psychosocial well-being.

REFERENCES

1. Garland F. Women Aboard Navy Ships: A Comprehensive Health and Readiness Project Vol. 2. San Diego, CA: Naval Health Research Center, 1996.

2. Perry W. Forward. Woman in Defense--DoD Leading the Way. Washington, D.C.: Department of Defense Publication, 1996.

3. Institute of Medicine (IOM). Recommendations For Research on the Health of Military Women. Washington, DC: National Academy Press, 1995.

4. Lerner DJ, Levine S, Malspeis S, D'Agostino RB. Job strain and health-related quality of life in a national sample, 1994; American Journal of Public Health, 84: 1580-1585.

5. Cohen SL, Kessler RC, Gordon LU. Measuring Stress: A Guide for Health and Social Scientists. New York: Oxford University Press, 1995.

6. Martin JA, Acevedo G, Vickers RR. Comparison of men and women aboard navy ships: Life stress conditions, psychological stress, distress, coping, and quality of life issues (In Review).

7. Jenkins R. Sex differences in minor psychiatric morbidity. Psychological Medicine. Monograph Supplement 7. Cambridge: Cambridge University Press, 1985.

8. Radloff L. The CES-D Scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1977: 1:385-401.

9. Taylor SE, Aspinwall LG. Mediating and Moderating Processes in Psychosocial Stress: Appraisal, Coping, Resistance, and Vulnerability. In Kaplan HB (Ed), Psychosocial stress: perspectives on structure, theory, life-course, and methods. San Diego, Academic Press, 1996.

REPORT TOPIC AREA: **Gender Differences in The Association of Life Style Factors to the Prevalence and Symptoms of Migraines and Other Headaches Among Navy Personnel**

LEAD AUTHORS: Deborah L. Wingard, Ph.D., Donna Kritz-Silverstein, Ph.D., and Frank C. Garland, Ph.D.

ABSTRACT

Many studies have noted that women report more headaches than men, and that migraines in particular occur most frequently among women between the ages of 25 and 55 years. However, relatively few studies have examined the association between life style characteristics and headaches of any type. Using data from a cross-sectional survey of 2,841 men and 2,914 women in the Navy between 1995 and 1996, the present study confirmed a significant female excess in the prevalence of headaches and migraines, without evidence of a gender difference in the presence or absence of an association between life style variables and headaches. The present study also suggested an increased risk of headaches associated with cigarette smoking and short sleep duration among both men and women, but no association with alcohol consumption, exercise, or obesity.

INTRODUCTION

There are numerous reports indicating that women use medical care and seek help from health care providers more often than men [1-4]. Women have also been found to report more symptomatology and higher morbidity than men [3-8]. However, there are relatively few large, population-based comparisons of the experience of symptoms and health conditions of relatively young men and women. There are also very few studies with sample sizes large enough to describe gender differences within different racial/ethnic groups. Data from the National Health Interview Survey suggests there may be substantial variations [9].

Several studies have noted that women report more migraine headaches than men (15-18% compared to approximately 6%), and that migraines occur most frequently between the ages of 25 and 55 years [10, 11]. One population-based study in Finland reported that among women 54% of all headaches were migraines, compared to 39% among men [12]. In the United States, women from lower-income households were at higher risk of having migraines, and were more likely to use health care services for their headaches even after adjusting for headache severity [4, 13]. Relatively few studies have examined the association of life style characteristics to migraines and other headaches. One cross-sectional survey found no significant association between tension or migraine headaches and smoking, coffee or alcohol consumption, but a significant association between tension headaches and lack of physical exercise [14]. Both tension and migraine headaches were associated with sleeping problems [14].

The present study will examine the association of obesity, cigarette smoking, alcohol consumption, exercise, and hours of sleep to the prevalence of migraines and other headaches among a large population-based sample of men and women in the Navy.

METHODS

This study is part of the Women Aboard Navy Ships Comprehensive Health and Readiness Research Project conducted at the Naval Health Research Center in San Diego, California as part of the Defense Women's Health Research Program administered by the Naval Medical Research and Development Command and the U.S. Army Medical Research and Materiel Command, Ft. Detrick, Maryland. This epidemiologic research project utilizes several data collection methods including surveys administered aboard ship. The study is a multi-year effort with all women serving aboard ship eligible for inclusion, along with an equal number of men matched on important characteristics. The study has a longitudinal design with women and men enrolled in Year 1 of the study being contacted again and re-surveyed on a 12-month cycle. This is a report of Year 2 survey results, based on 11 months of data collection.

Population

All women serving aboard U.S. Navy ships were eligible for inclusion in the survey portion of the study during Year 1. An equal number of men serving aboard ship matched on relevant characteristics were also eligible. The Navy Bureau of Personnel (PERS-OOW) provided a listing of all ships with women assigned aboard; this listing was verified with respective Fleet Surgeons and Force Medical Officers. A total of 74 ships with 7,944 women and 69,012 men assigned were determined to be eligible for inclusion in the study.

This report is based on the first 36 ships surveyed. These ships were surveyed based on availability as determined by the Commanding Officer and Medical Department of each ship. The ships surveyed included USS BARRY, USS CAMDEN, USS CAPE COD, USS CIMARRON, USS COMSTOCK, USS CORONADO, USS CURTIS WILBUR, USS DETROIT, USS DIXON, USS EMORY S. LAND, USS FRANK CABLE, USS GRAPPLE, USS GRASP, USS HOLLAND, USS JOHN YOUNG, USS KISKA, USS LASALLE, USS L.Y. SPEAR, USS MCKEE, USS MONONGAHELA, USS MOUNT BAKER, USS MOUNT HOOD, USS MOUNT WHITNEY, USS PLATTE, USS RAINIER, USS RUSHMORE, USS SACRAMENTO, USS SAFEGUARD, USS SALVOR, USS SANTA BARBARA, USS SHASTA, USS SHENANDOAH, USS SIMON LAKE, USS SUPPLY, USS WILLIAMETTE, and USS YELLOWSTONE (Appendix Table 1). These 36 ships had 5,510 women and 18,443 men assigned aboard.

Matching

The men aboard ship included in this study were matched to women on the following characteristics: ship, work division, department, race (white, black, Hispanic, and other),

paygrade (E1-E3, E4-E6, E7-E9, O1-O3, O4-O6), rating (if no individual was available in the same rating, an individual with a closely related rating was selected), and date of birth (nearest date of birth, not to exceed plus or minus two years). In the infrequent instances where these criteria could not be met, men who matched as closely as possible to women were selected.

The procedure for selection of the matched men in the study was accomplished as follows: (1) the eligible population was determined using NHRC files, and an electronic roster was developed which included all data elements needed for matching; (2) the personnel department of each ship provided an electronic roster with limited information which was compared to the NHRC roster, and a final roster was determined; (3) a matching program was run to select the men to be included in the survey; and (4) individual identification labels were created and affixed to survey packets.

Survey Development

Several methods were used for the development of the U.S. Navy Shipboard Health Survey used in this study, including the following: (1) review of extant questionnaires, literature, and standard scales, (2) convening of a panel of subject matter experts, (3) elicitation of major issues from knowledgeable sources, and (4) review of Navy requirements concerning the reporting of women's health and access to health care.

A series of questionnaires developed by the Centers for Disease Control and Prevention (CDC), Department of Defense, U.S. Navy, U.S. Army, and several universities [15, 16] were reviewed and adopted for use in this study. The questionnaires developed by the CDC included the National Health Interview Survey [17], the Health Interview Survey Form HIS-1(1992) and HIS-2(1992) [18, 19], the National Ambulatory Health Care Survey for 1994, 1995, and 1996 [20], and the Youth Behavior Survey [21]. Previous questionnaires developed by the Naval Health Research Center also were reviewed, and ranged from nutrition surveys to patient care surveys. In addition, a series of scales and inventories were reviewed and selected for use. These standard scales included but were not limited to: Center for Epidemiological Studies Depression Scale (CE S-D) [22], a scale which measures the current frequency of depressive symptoms, and the Quality of Life Scale [23], a four-item scale previously used in research on Navy populations.

Survey Administration

The overall administration plan included the distribution of individually identified packets with all necessary materials to each study subject. Whenever possible, study subjects were brought together in a common location aboard ship, briefed on the study, asked to sign informed consent and to complete the survey while study coordinators were present. When, due to shipboard activity, it was not practical for all study subjects to remain in one area, surveys were distributed, and the participants were allowed to fill them out in work spaces. The completed surveys were collected by study staff in sealed envelopes in all cases.

Response Rates

The overall median ship response rate for the 36 ships was 63.1%, and the overall mean response rate was 52.2%. The overall median response rate for women was 66.2%. Participation rates varied by the number of women serving aboard ship. Ships with fewer than 100 women assigned had an overall median response rate for women of 69.5% compared to ships with more than 100 women assigned, which had an overall median response rate for women of 49.9%.

Variables

The Navy questionnaire included questions on the experience of any headache (migraine or nonmigraine) and headache symptoms during the past 30 days. These symptoms include several major components of the International Headache Society diagnostic criteria for migraines (visual disturbances, sensitivity to noise, sensitivity to light and nausea). Experience of any migraine symptom was calculated by combining responses to each symptom. The questionnaire also included prior physician diagnosis of migraine.

The questionnaire also includes information on many life style characteristics, which were coded in the following ways. Those who had not smoked at least 100 cigarettes in their entire life and reported either not smoking any cigarettes or less than 1 cigarette per day in the past 30 days were considered as nonsmokers. Women who reported smoking 1 or more cigarettes per day were considered as current smokers. Nondrinkers were those who reported not having any alcoholic beverages in the past 7 days, while those who reported drinking on 1 day were considered as light drinkers, on 2-4 days moderate drinkers, and on 5-7 days heavy drinkers. The number of drinks consumed in the past week was calculated by multiplying the frequency of alcohol consumption(days/week) by the average number of drinks per day. Those who reported not engaging in exercise or exercising only once or twice per week were considered as light exercisers, while those who engaged in exercise 3-4 times per week were considered moderate exercisers, and those who engaged in exercise 5 or more times per week were considered heavy exercisers. Body mass index defined as weight (kg)/height(m)^2 was used as an estimate of obesity. Sleeping pattern was categorized as four hours or less, five to six hours, and seven or more hours.

Statistical analyses

Descriptive statistics were calculated for age, race, paygrade, each life style variable, each symptom, any headache and migraine diagnosis. Chi-square analyses were used to calculate the proportion reporting headaches, symptoms or migraine diagnosis by quartile of body mass index, current cigarette smoking (no/yes) alcohol frequency (none/low/moderate/high), and exercise (none or low/moderate/high). Separate logistic regression analyses were used to examine the risk of each symptom by age, race and paygrade, and by each life style factor after adjustment for age, race and paygrade. All statistical tests were two-tailed.

RESULTS

There were 2,841 men and 2,912 women who completed the survey. Age ranged from 18-51 years in men and 18-49 years in women, with a mean age of 26.4 and 26.0 years respectively. Of these personnel, approximately 60% were white, 30% black and 10% were of other racial groups (Table 1). Slightly more women than men were employed at the lower paygrades, 62% versus 56% were at enlisted levels E1-E4. Forty percent of men and 33% of women were at enlisted levels E5-E9. The proportion of officers was roughly similar, with 4.4% of men and 5.0% of women reporting officer status. The distributions of each of the life style variables are also presented in Table 1. Men reported more cigarette smoking, greater alcohol consumption, and more regular exercise than women. Men were also more likely to report getting 7 or more hours of sleep.

Table 1. Distribution of demographics and life style characteristics, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Men			Women		
	N	**Mean**	**SD***	**N**	**Mean**	**SD**
Age in years	2,841	26.4	6.3	2,912	26.0	6.1
Body Mass Index (BMI)	2,691	25.3	3.3	2,740	23.6	3.1
		Percent			Percent	
Race	2,841			2,907		
White		60.4			58.2	
Black		28.8			31.8	
Other		10.8			10.0	
Paygrade	2,840			2,912		
Enlisted E1-E4		56.0			61.7	
Enlisted E5-E9		39.6			33.3	
Officer		4.4			5.0	
Current smoking	2,726	38.2		2,822	34.5	
No		61.8			65.5	
Yes		38.2			34.5	
Alcohol frequency (drinks/weeks)	2,719			2,782		
None		39.2			50.9	
1		16.9			19.1	
2-4		32.4			25.2	
5-7		11.5			4.7	

Table 1. -- *Continued* -- Distribution of demographics and life style characteristics U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Men			Women		
	N	Mean	SD	N	Mean	SD
Exercise	840			846		
≤2x/week		18.8			24.6	
3-4x/week		44.8			44.9	
≥5x/week		36.4			30.5	
Sleep	808			831		
1-4		11.8			13.2	
5-6		58.7			61.5	
≥7		29.6			25.3	

*SD, Standard Deviation

Table 2 presents age-adjusted prevalence of headaches, headaches with migraine symptoms, and diagnosed migraines by gender. Women uniformly reported headaches, migraine symptoms, and doctor-diagnosed migraines more than twice as often as men. Among the possible symptoms of migraine, sensitivity to noise and light reported were most frequently, by 15% of the men and 22-26% of the women. After age-adjustment, nearly twice as many women as men reported headaches with sensitivity to noise and light, and visual disturbances, while three times as many women reported headaches accompanied by nausea.

Table 2. Age-adjusted prevalence of headaches, diagnosed migraines and possible migraine symptoms, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Men Percent	Women Percent	Odds Ratio	95% Confidence interval
Headaches				
Any headaches	50.5	69.6	2.3*	2.01-2.51
Headaches with symptoms	19.1	35.5	2.3*	2.07-2.66
Doctor-diagnosed migraines	6.3	13.3	2.3*	1.89-2.75
Migraine symptoms				
Visual disturbance	7.3	13.0	1.9*	1.55-2.33
Sensitivity to noise	14.9	21.9	1.6*	1.39-1.88
Sensitivity to light	15.0	26.0	2.0*	1.73-2.32
Nausea	8.8	23.8	3.2*	2.74-3.88

*$p < 0.001$ based on chi-square statistic

The association of demographic characteristics and headaches, migraine symptoms, and diagnosed migraines is presented in Table 3. There was no association with age for either sex. Significantly fewer black men and women reported migraine symptoms compared to whites. In addition, significantly fewer black women reported any headaches. Significantly more enlisted men at ranks E5-E9 reported headaches and migraine symptoms, compared to enlisted men at lower ranks (E1-E4), while significantly fewer male officers reported headaches and migraine symptoms. Similarly, significantly fewer female officers reported migraine symptoms, compared to enlisted women at ranks E1-E4. However, significantly more enlisted women at ranks E5-E9 reported diagnosed migraines, compared to enlisted women at lower ranks (E1-E4). In a combined model adjusted for age, race, and paygrade (data not shown), women were over 50% more likely than men to report headaches (OR=1.53, CI=1.44-1.61, $p<0.001$), migraine symptoms (OR=1.54, CI=1.45-1.64, $p<0.001$), and diagnosed migraines (OR=1.57, CI=1.43-1.71, $p<0.001$).

The association of each lifestyle variable with headaches, headaches accompanied by possible migraine symptoms, and diagnosed migraines, is also presented in Table 3, after adjustment for possible differences in age, race and paygrade. Of note, cigarette smoking was significantly associated with the experience of headaches, symptoms, and migraine diagnosis for both men and women, while the report of seven or more hours sleep was significantly associated with fewer reported symptoms of possible migraines for both men and women, and significantly fewer diagnosed migraines among women. No consistent associations were observed between headaches and alcohol consumption, exercise or obesity.

DISCUSSION AND CONCLUSIONS

Consistent with existing reports [4, 10, 11, 13], women were significantly more likely to report headaches, headaches accompanied by migraine symptoms, and diagnosed migraines than men. Among the possible migraine symptoms, sensitivity to noise and light were the most frequently reported by both sexes, however they were reported almost twice as often by women.

Results of the present study indicate that cigarette smoking was significantly associated with higher prevalence of headaches, headaches accompanied by migraine symptoms, and diagnosed migraines among both men and women. In contrast, both men and women reporting seven or more hours sleep were significantly less likely to report migraine symptoms. Of note, there was little if any association between headaches and alcohol consumption, exercise or obesity. While the prevalence of headaches, symptoms and diagnosed migraines were more common among women than men in this study, the presence or absence of an association between lifestyle variables and headaches did not differ substantially between men and women.

Table 3. Multiple-adjusted association of life style characteristics and headaches, possible migraine symptoms, and diagnosed migraines, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Men						Women					
	Headaches		Symptoms		Migraine		Headaches		Symptoms		Migraine	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age (per year)	.99	(.98-1.02)	.98	(.95-1.01)	.99	(.96-1.03)	.99	(.97-1.01)	.99	(.97-1.01)	.99	(.97-1.01)
Race												
White	1.0		1.0		1.0		1.0		1.0		1.0	
Black	.91	(.80-1.03)	.81‡	(.67-.96)	1.41	(.79-1.36)	.87†	(.77-.99)	.82‡	(.71-.94)	1.04	(.84-1.28)
Other	.96	(.81-1.13)	.93	(.75-1.16)	.91	(.63-1.30)	.86	(.72-1.02)	.90	(.74-1.08)	.69‡	(.51-.93)
Paygrade												
Enlisted E1-E4	1.0		1.0		1.0		1.0		1.0		1.0	
Enlisted E5-E9	1.46£	(1.23-1.73)	1.40‡	(1.07-1.82)	1.18	(.85-1.64)	1.08	(.90-1.30)	1.10	(.91-1.33)	1.31†	(1.03-1.66)
Officer	.63£	(.48-.82)	.50‡	(.16-.78)	1.07	(.65-1.30)	.91	(.71-1.17)	.67‡	(.51-.88)	.94	(.67-1.33)
Body Mass Index quartile												
I (lowest)	1.0		1.0		1.0		1.0		1.0		1.0	
II	.94	(.81-1.08)	1.03	(.86-1.22)	.97	(.72-1.32)	.97	(.85-1.13)	.98	(.85-1.10)	.88	(.72-1.08)
III	.98	(.86-1.12)	.94	(.79-1.11)	.94	(.72-1.23)	.99	(.86-1.15)	1.13	(.98-1.30)	.97	(.80-1.17)
IV (highest)	1.06	(.94-1.22)	1.04	(.88-1.23)	1.09	(.84-1.42)	1.05	(.91-1.22)	1.09	(.95-1.26)	1.18	(.97-1.42)
Current Smoking												
No	1.0		1.0		1.0		1.0		1.0		1.0	
Yes	1.09†	(1.01-1.19)	1.11†	(1.01-1.23)	1.20†	(1.03-1.41)	1.08	(.98-1.18)	1.14‡	(1.05-1.23)	1.24£	(1.11-1.38)
Alcohol frequency (drinks/week)												
0	1.0		1.0		1.0		1.0		1.0		1.0	
1	1.11	(.95-1.30)	1.02	(.84-1.25)	1.09	(.80-1.49)	1.28‡	(1.06-1.55)	1.12	(.94-1.32)	.87	(.69-1.09)
2-4	.97	(.85-1.10)	1.00	(.85-1.17)	.87	(.66-1.14)	.83†	(.70-.98)	1.04	(.88-1.22)	.99	(.80-1.22)
5-7	1.04	(.89-1.25)	1.09	(.87-1.37)	1.09	(.75-1.57)	1.12	(.82-1.52)	.89	(.67-1.19)	1.36	(.97-1.91)
Exercise (times/week)												
<2	1.0		1.0		1.0		1.0		1.0		1.0	
3-4	1.15	(.95-1.40)	1.22	(.93-1.60)	1.21	(.80-1.52)	.90	(.73-1.10)	1.01	(.84-1.24)	.75†	(.58-.97)
≥5	.98	(.80-1.19)	.99	(.75-1.32)	1.01	(.65-1.57)	1.18	(.94-1.49)	1.15	(.93-1.42)	1.38‡	(1.06-1.79)
Hours sleep (times/week)												
4	1.0		1.0		1.0		1.0		1.0		1.0	
5-6	.99	(.81-1.22)	1.02	(.78-1.33)	.91	(.60-1.37)	1.03	(.83-1.29)	1.16	(.95-1.42)	.86	(.67-1.12)
≥7	.90	(.72-1.14)	.72†	(.52-.99)	.82	(.52-1.31)	.78	(.60-1.01)	.58£	(.45-.75)	.70†	(.50-.98)

Multiple logistic regression adjusted for age, race, and paygrade.
CI=confidence interval
†p<0.05, ‡p<0.01, £p<0.001

These findings are consistent with a cross-sectional study of headaches from Denmark [14] and other countries [24-27], in that no association was found with alcohol consumption. In contrast to previous studies [14, 24-27], the present study found a strong association between cigarette smoking and headaches, headaches accompanied by migraine symptoms, and diagnosed migraines.

The present study found no association between reported exercise and headaches or symptoms, while the Denmark study found a significant association between reported lack of physical activity and tension headaches [14]. That study [14] also found an association between tension and migraine headaches and sleeping problems, but not length of sleep. Similar to the present study, two other studies found a higher prevalence of reported headaches among those sleeping fewer hours per day [27-28].

The foregoing discrepancies between studies may reflect differences in the measurement of lifestyle factors or headaches, in the length of time since onset of headaches, geographic differences, or differences between a general population-based sample and a military population. The latter tends to be healthier, and has several enforced behavioral factors (such as quantity of exercise and duration of sleep). Length of time since onset of headaches can be important in a cross-sectional study, if the lifestyle variable is a trigger factor for migraines or other headaches. Individuals may change their behavior to avoid a known trigger, thereby masking any causal association between the variable and risk of headaches or migraines.

The present study confirms a female excess in the prevalence of headaches and migraines, without evidence of a gender difference in the presence or absence of an association between lifestyle variables and headaches. The present study also suggests a possible association between cigarette smoking, sleeping patterns, and headaches for both men and women, but not with alcohol consumption, exercise, or obesity.

REFERENCES

1. Corney RH. Sex differences in general practice attendance and help seeking for minor illness. J Psychosomatic Res 1990;34:525-534.

2. Kendrack MA, Grant KR, Segall A. Gender differences in health related behaviour: some unanswered questions. Soc Sci Med 1991;32:579-90.

3. Wingard DL. The sex differential in morbidity, mortality, and life style. Ann Rev Pub Health 1984;5:433-458.

4. Celentano DD, Linet MS, Stewart WF. Gender differences in the experience of headache. Soc Sci Med 1990;30:1289-1295.

5. Gijsbers van Wijk CM, Van Vliet KP, Kolk AM, Everaerd WT. Symptom sensitivity and sex differences in physical morbidity: a review of health surveys in the United States and The Netherlands. Women and Health 1991;17:91-124.

6. Klonoff EA, Landrine H. Sex roles, occupational roles, and symptom reporting: a test of competing hypotheses on sex differences. J Behav Med 1992;15:355-364.

7. Harris RB, Weissfeld LA. Gender differences in the reliability of reporting symptoms of angina pectoris. J Clin Epidemiol 1991;44:1071-1078.

8. Wool CA, Barsky AJ. Do women somatize more than men? Gender differences in somatization. Psychosomatics 1994;35:445-452.

9. Wingard DL. Patterns and Puzzles: The distribution of health and illness among women in the United States. In Rusez S, Olesen V, Clarke A (eds). Women's Health: The Dynamics of Diversity. Ohio State University Press, accepted for publication.

10. Lipton RB, Stewart WF. The epidemiology of migraine. European Neurology 1994;34 suppl. 2:6-11.

11. Stewart WF, Shechter A, Rasmussen, BK. Migraine prevalence. A review of population-based studies. Neurology 1994;44(6 suppl 4):S17-23.

12. Honkasalo ML, Kaprio J, Heikkila K, Sillanpaa M, Koskenvuo M. A population-based survey of headache and migraine in 22,809 adults. Headache 1993;33:403-12.

13. Stewart WF, Lipton RB, Celentano DD, Reed ML. Prevalence of migraine headache in the United States. Relation to age, income, race, and other sociodemographic factors. JAMA 1992;267:64-9.

14. Rasmussen BK. Migraine and tension-type headache in a general population: precipitating factors, female hormones, sleep pattern and relation to life style. Pain 1993;53:65-72.

15. Norris F. Screening for traumatic stress. J Appl Soc Psychol 1990; 20:1704-18.

16. Bernstein E. Development, reliability, and validity of a dissociation scale. J Nerv Ment Dig 1986; 174:285-93.

17. Centers for Disease Control and Prevention. National Health Interview Survey, 1992.

18. Centers for Disease Control and Prevention, Health Interview Survey Form HIS-1, 1992.

19. Centers for Disease Control and Prevention, Health Interview Survey Form HIS-2, 1992.

20. Centers for Disease Control and Prevention, National Ambulatory Health Care Survey, 1994, 1995, 1996.

21. Centers for Disease Control and Prevention, Youth Behavior Survey, 1996.

22. Radloff L. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Measurement 1977; 1:385401.

23. Naval Health Research Center. NHRC Technical Report 88-43, reporting on Andrews-Withey 1976 Quality of Life Scale, 1988.

24. Nikiforow R, Hokkanen E. An epidemiological study of headache in an urban and rural population in Northern Finland. Headache 1978;18:137-45.

25. Abramson JH, Hopp C, Epstein LM. Migraine and non-migrainous headaches: a community survey in Jerusalem. J Epidemiol 1980;34:188-93.

26. Paulin J, Waal-Manning JW, Simpson O, Knight G. The prevalence of headache in a small New Zealand town. Heachache 1985;25:147-51.

27. Hale WE, May FE, Marks RG, Moore MT, Stewart RB. Headache in the elderly: an evaluation of risk factors. Headache 1987;27:272-6.

28. Serratrice G, Serbanesco F, Sambuc R. Epidemiology of headache in the elderly - correlation with life conditions and socio-professional environment. Headache 1985;25:85-9.

REPORT TOPIC AREA: **The Association of Behavior and Life Style Factors with Menstrual Symptoms.**

LEAD AUTHORS: Donna Kritz-Silverstein, Ph.D., Deborah L. Wingard, Ph.D., and Frank C. Garland, Ph.D.

ABSTRACT

It has been estimated that 50-85% of women in the United States currently having menstrual periods experience dysmenorrhea and other menstrual or premenstrual symptoms, and that 3.5-7 million are incapacitated for one to two days each month because of these symptoms. Previous studies examining the association of behavioral and life style factors such as obesity, cigarette smoking, alcohol consumption and exercise with menstrual symptoms have yielded inconsistent results, with some showing a positive association and others showing either no association or a negative association. Because these life style factors are all potentially modifiable, the demonstration and elucidation of their associations with menstrual symptoms represents an important avenue of research. Most previous studies of the association of life style variables with menstrual disorders have relied on small clinic- or physician-based samples of women, or small samples of college students. There have been relatively few large, population-based studies of the association of behavioral and life style variables with dysmenorrhea or other menstrual symptoms. The present study examined the association of obesity, cigarette smoking, alcohol consumption and exercise with the prevalence of menstrual cycle disorders in a large population-based sample of women in the Navy. After adjustment for age and other potentially confounding covariates, current cigarette smoking was associated with increased risk of all menstrual symptoms and cycle disorders. Obesity, exercise and alcohol consumption did not show consistent associations with menstrual symptoms or cycle disorders. Results suggested that interventions targeted at smoking cessation might be useful to reduce the prevalence of menstrual symptoms, cycle disorders and time lost from work.

INTRODUCTION

It has been estimated that 50-85% of the 15 million women in the United States currently having menstrual periods suffer to one degree or another from dysmenorrhea and other menstrual or premenstrual symptoms [1-3]. For some women, the symptoms associated with the menstrual cycle are severe enough to cause disruption to their daily activity [2, 3]. These symptoms are responsible for more lost work and school hours in women than any disease [1-3, 4]. It has been estimated that 3.5-7 million American women are incapacitated for one to two days each month because of their symptoms [1, 5].

Previous studies examining the association between behavioral and life style factors such as obesity, cigarette smoking, alcohol consumption and exercise have yielded inconsistent results. For instance, weight loss has been associated with irregular menstrual periods and amenorrhea

[6, 7]. However, obesity also has been associated with amenorrhea and other alterations in the menstrual cycle such as hypermenorrhea, oligomenorrhea, anovulation, infertility, and premature menopause [8]. Tolino, *et. al.* [8] reported that obese women have reduced serum levels of FSH, increased LH, increased LH/FSH ratios, decreased levels of sex hormone binding globulin with a resultant increase in free testosterone, and hyperestrogenism due to the increased conversion of androstenedione to estrogen in fatty tissues, all of which could affect the menstrual cycle and its characteristics.

Cigarette smoking has been associated with shorter cycle length, increased dysmenorrhea, and menopause that occurs on average one to two years earlier than for nonsmokers [2, 9]. Higher alcohol consumption has been associated with increased premenstrual symptoms [10], however, others have reported no associations between either cigarette smoking or alcohol consumption and dysmenorrhea [9, 11, 12].

Exercise has been recommended for treatment of dysmenorrhea [13] and several studies have reported a beneficial effect for exercise interventions on the premenstrual syndrome and dysmenorrhea [14-16]. For example, Prior, *et. al.* [14] found that the severity of premenstrual symptoms among sedentary women was decreased after they had participated in a 6-month physical training program. Israel, *et. al.* [16] found that 12 weeks of an aerobic exercise program reduced symptoms of dysmenorrhea. Johnson, *et. al.* [17] reported that more frequent exercise was related to lower severity ratings of some menstrual symptom clusters, but the intensity of exercise was unrelated to symptoms. However, Jarrett, *et. al.* [12] reported that there were no significant differences between women with and without dysmenorrhea in exercise behavior, and other studies have associated excessive exercise with delayed menarche, lack of ovulation and the absence of menstrual periods [6, 13, 18, 19].

Because obesity, cigarette smoking, alcohol consumption and exercise are all potentially modifiable characteristics, the demonstration and elucidation of the associations of behavioral and these life style factors with menstrual symptoms represents an important avenue of research. However, most of the previous studies of the association of life style variables with menstrual disorders have relied on small clinic-based or physician-based samples of women, or small samples of college students. There have been relatively few large, population-based studies of the association of behavioral and life style variables with dysmenorrhea or other disturbances of the menstrual cycle.

The present study was designed to overcome the lack of scope in previous studies. It examined the association of obesity, cigarette smoking, alcohol consumption and exercise with the prevalence of menstrual cycle disorders among a large population-based sample of women in the Navy.

METHODS

This study is part of the Women Aboard Navy Ships Comprehensive Health and Readiness Research Project conducted at the Naval Health Research Center in San Diego, California as part of the Defense Women's Health Research Program administered by the Naval Medical Research and Development Command and the U.S. Army Medical Research and Materiel Command, Ft. Detrick, Maryland. This epidemiologic research project utilizes several data collection methods including surveys administered aboard ship. The study is a multi-year effort with all women serving aboard ship eligible for inclusion, along with an equal number of men matched on important characteristics. The study has a longitudinal design with women and men enrolled in Year 1 of the study being contacted again and re-surveyed on a 12-month cycle. This is a report of Year 2 survey results, based on 11 months of data collection.

Population

All women serving aboard U.S. Navy ships were eligible for inclusion in the survey portion of the study during Year 1. An equal number of men serving aboard ship matched on relevant characteristics were also eligible. The Navy Bureau of Personnel (PERS-OOW) provided a listing of all ships with women assigned aboard; this listing was verified with respective Fleet Surgeons and Force Medical Officers. A total of 74 ships with 7,944 women and 69,012 men assigned were determined to be eligible for inclusion in the study.

This report is based on the first 36 ships surveyed. These ships were surveyed based on availability as determined by the Commanding Officer and Medical Department of each ship. The ships surveyed included USS BARRY, USS CAMDEN, USS CAPE COD, USS CIMARRON, USS COMSTOCK, USS CORONADO, USS CURTIS WILBUR, USS DETROIT, USS DIXON, USS EMORY S. LAND, USS FRANK CABLE, USS GRAPPLE, USS GRASP, USS HOLLAND, USS JOHN YOUNG, USS KISKA, USS LASALLE, USS L.Y. SPEAR, USS MCKEE, USS MONONGAHELA, USS MOUNT BAKER, USS MOUNT HOOD, USS MOUNT WHITNEY, USS PLATTE, USS RAINIER, USS RUSHMORE, USS SACRAMENTO, USS SAFEGUARD, USS SALVOR, USS SANTA BARBARA, USS SHASTA, USS SHENANDOAH, USS SIMON LAKE, USS SUPPLY, USS WILLIAMETTE, and USS YELLOWSTONE. These 36 ships had 5,510 women and 18,443 men assigned aboard.

Matching

The men aboard ship included in this study were matched to women on the following characteristics: ship, work division, department, race (white, black, Hispanic, and other), paygrade (E1-E3, E4-E6, E7-E9, O1-O3, O4-O6), rating (if no individual was available in the same rating, an individual with a closely related rating was selected), and date of birth (nearest date of birth, not to exceed plus or minus two years). In the infrequent instances where these criteria could not be met, men that matched as closely as possible to women were selected.

The procedure for selection of the matched men in the study was accomplished as follows: (1) the eligible population was determined using NHRC files, and an electronic roster was developed which included all data elements needed for matching; (2) the personnel department of each ship provided an electronic roster with limited information which was compared to the NHRC roster, and a final roster was determined; (3) a matching program was run to select the men to be included in the survey; and (4) individual identification labels were created and affixed to survey packets.

Survey Development

Several methods were used for the development of the U.S. Navy Shipboard Health Survey used in this study, including the following: (1) review of extant questionnaires, literature, and standard scales, (2) convening of a panel of subject matter experts, (3) elicitation of major issues from knowledgeable sources, and (4) review of Navy requirements concerning the reporting of women's health and access to health care.

A series of questionnaires developed by the Centers for Disease Control and Prevention (CDC), Department of Defense, U.S. Navy, U.S. Army, and several universities [20, 21] were reviewed and adopted for use in this study. The questionnaires developed by the CDC included the National Health Interview Survey [22], the Health Interview Survey Form HIS-1(1992) and HIS-2(1992) [23, 24], the National Ambulatory Health Care Survey for 1994, 1995, and 1996 [25], and the Youth Behavior Survey [26]. Previous questionnaires developed by the Naval Health Research Center also were reviewed, and ranged from nutrition surveys to patient care surveys. In addition, a series of scales and inventories were reviewed and selected for use. These standard scales included but were not limited to: Center for Epidemiological Studies Depression Scale (CES-D) [27], a scale which measures the current frequency of depressive symptoms, and the Quality of Life Scale [28], a four-item scale previously used in research on Navy populations.

Survey Administration

The overall administration plan included the distribution of individually identified packets with all necessary materials to each study subject. Whenever possible, study subjects were brought together in a common location aboard ship, briefed on the study, invited to volunteer and sign informed consent forms and to complete the survey while study coordinators were present. When, due to shipboard activity, it was not practical for all study subjects to remain in one area, surveys were distributed, and the participants were allowed to fill them out in work spaces. The completed surveys were collected by study staff in sealed envelopes.

Response Rates

The overall median ship response rate for the 36 ships was 63.1%, and the overall mean response rate was 52.2%. The overall median response rate for women was 66.2%. Participation rates varied by the number of women serving aboard ship. Ships with fewer than 100 women

assigned had an overall median response rate for women of 69.5% compared to ships with more than 100 women assigned, which had an overall median response rate for women of 49.9%.

Body mass index defined as weight (kg)/height(m)^2 was used as an estimate of obesity. Those who had not smoked at least 100 cigarettes in their entire life and reported either not smoking any cigarettes or less than 1 cigarette per day in the past 30 days were considered as nonsmokers. Women who reported smoking 1 or more cigarettes per day were considered as current smokers. Nondrinkers were defined as those who reported not having any alcoholic beverages in the past 7 days, while those who reported drinking on 1 day were considered as light drinkers, on 2-4 days moderate drinkers, and on 5-7 days heavy drinkers. The number of drinks consumed in the past week was calculated by multiplying the frequency of alcohol consumption (days/week) by the average number of drinks per day. Information on exercise was obtained for a probability sample of women (n=846). Those who reported not engaging in exercise or exercising only once or twice per week were considered as light exercisers, while those who engaged in exercise 3-4 times per week were considered moderate exercisers, and those who engaged in exercise 5 or more times per week were considered heavy exercisers.

As part of the section on women's health conditions, participants were asked to indicate whether they had experienced the following symptoms during the past 90 days: cramps or pain during their period requiring medication or time off work; bleeding between periods, excessive frequency of periods (time between periods too short); heavy periods (excessive menstrual flow); periods lasting for longer than a week; scanty menstrual flow; and irregular periods. For the first six symptoms, participants were asked if they had first noticed the condition or if it got worse since they came aboard ship.

Statistics

Descriptive statistics were calculated for age, race, paygrade, each behavioral and life style variable, and each symptom. Chi-square analyses were used to calculate the proportion reporting each menstrual cycle symptom by quartile of body mass index, current cigarette smoking (no/yes) alcohol frequency (none/low/moderate/high), and exercise (none or low/moderate/high). Separate logistic regression analyses were used to examine the risk of each symptom by age, race and paygrade, and by each life style and behavioral factor after adjustment for age, race and paygrade. All statistical tests were two-tailed.

RESULTS

There were 2,912 women who completed the survey. Age ranged from 18-49 years, with a mean of 26.0 (SD=6.1). Of these women, 58% were white, 32% were black and 10% were of other racial groups (Table 1). A total of 62% of the women could be classified as enlisted in paygrades E1-E4, 33% were enlisted at paygrades E5-E9 and 5% were officers. The distributions of each of the other behavioral and life style variables and the proportion reporting the experience

of each menstrual cycle symptom or disorder also is presented in Table 1. Of note is that 5.4% of the women first noticed bleeding between periods and 4.9% first noticed heavy periods while aboard ship. An additional 3.6% of the women reported that bleeding between periods became worse and 7.2% reported that their condition of having heavy periods became worse since they came aboard ship.

The proportion of women reporting each menstrual symptom or disorder by age, race, and paygrade is shown in Table 2. Younger women were more likely to report menstrual cycle symptom and disorders. A lower proportion of white women reported menstrual cycle symptoms and disturbances and this was significant for bleeding between periods and scanty menstrual flow ($p<0.05$). Significant differences also were observed associated with paygrade for almost all symptoms; a lower proportion of women who were officers or above reported experiencing symptoms and cycle disturbances.

The proportion of women reporting menstrual cycle symptoms or disturbances by each of the behavioral and life style covariates is shown in Table 3. Greater proportions of women who were currently cigarette smokers reported menstrual symptoms and cycle disturbances. Those who consumed alcohol more frequently reported bleeding between periods and were more likely to report scanty menstrual flow. Those in the second quartile (next to lowest) f body mass index were more likely to report having periods lasting greater than one week. Exercise was not associated with menstrual symptoms or cycle disturbances.

Results of separate logistic regression analyses examining the association of each life style and behavioral factor with menstrual symptoms after adjustment for age, race and paygrade are presented in Table 4. As compared to nonsmokers, current smokers were at increased risk of cramps or pain requiring medication or time off work (OR=1.13, CI=1.03, 1.25), bleeding between periods (OR=1.22, CI=1.09, 1.38), excessive frequency of periods (OR=1.33, CI=1.17, 1.51), heavy periods (OR=1.17, CI=1.06, 1.29), periods lasting longer than a week (OR=1.31, CI=1.16, 1.48), scanty flow (OR=1.13, CI=1.01, 1.29) and irregular periods (OR=1.14, CI=1.05, 1.24). As compared to women in the lowest quartile of body mass, women in the second quartile were at increased risk of excessive frequency of periods and of having periods lasting longer than a week, while women in the third quartile had decreased risk of reporting irregular periods. As compared to nondrinkers, women who consumed a high amount of alcohol were at increased risk of having heavy periods. As compared to those who exercised less than twice per week, those with a high frequency of exercise were at an increased risk of having excessive frequency of periods. Otherwise, there were no patterns of associations of exercise or alcohol consumption with menstrual symptoms. Analyses using average number of drinks per week instead of frequency per week, showed similar results (data not shown). Among the covariates, age had a protective effect; older age was associated with a reduced risk of reporting all symptoms, with significance achieved for bleeding between periods, periods lasting longer than a week, and irregular periods. As compared to those in paygrade E1-E4, those in paygrade E5-E9 were generally more likely to report symptoms while officers were significantly

less likely to report menstrual symptoms. With the exception of black women being at a decreased risk of reporting irregular periods as compared to white women, there were no differences in risk due to race.

Table 1. Demographic characteristics and menstrual symptoms for women (N=2,192 Women), U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Characteristics	N	Mean	(SD)
Age in years	2,912	26.0	6.1
Body mass index	2,740	23.6	3.1
		%[b]	
Race	2,907		
White		58.2	
Black		31.8	
Other		10.0	
Paygrade	2,912		
Enlisted E1-E4		61.7	
Enlisted E5-E9		33.3	
Officer		5.0	
Current smoking	2,822		
No		65.5	
Yes		34.5	
Alcohol frequency	2,782		
None		50.9	
1 (light)		19.1	
2-4 (moderate)		25.2	
5-7 (heavy)		4.7	
Exercise	846		
<3x/week (light)		24.4	
3-4x/week (moderate)		44.9	
5-7x/week (heavy)		30.9	

Symptoms	N	%	% First noticed*	% Worse*
Cramps / pain	2,657	26.5	0.9	1.9
Bleeding between periods	2,661	15.5	5.4	3.6
Excessive frequency	2,628	11.2	3.4	3.4
Heavy periods	2,635	24.4	4.9	7.2
Periods > 1 week	2,658	14.3	3.8	3.9
Scanty flow	2,565	11.7	3.3	3.1
Irregular periods	2,762	37.3	---	---

* Symptoms first noticed aboard ship
* Symptoms got worse since aboard ship
SD = Standard Deviation

Table 2. Percentage of women reporting menstrual symptoms by age, race and paygrade, (N=2,912), U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

		Symptom						
		Cramps/pain	Bleeding between periods	Excessive frequency	Heavy periods	Periods > 1 week	Scanty flow	Irregular periods
Age (in years)								
	<20	33.1	14.8	12.3	25.2	18.4	14.6	41.0
	20-22	31.1	18.6	13.9	27.1	18.4	15.1	44.9
	23-24	22.1	18.9	13.5	23.4	15.7	12.4	40.9
	25-29	26.2	17.0	9.1	24.3	12.2	15.0	34.3
	30-34	21.3	10.7	8.0	19.3	8.4	9.7	27.5
	35+	23.4	8.9	9.2	25.9	11.0	10.6	30.7
	c^2	25.1***	27.6***	15.3***	9.5	31.3***	10.7†	48.9***
Race								
	White	25.1	14.1	11.4	23.1	13.8	14.7	38.0
	Black	29.1	17.7	10.3	27.1	15.0	11.4	35.2
	Other	27.1	17.3	13.0	24.3	14.6	10.3	39.8
	c^2	4.6	5.9*	1.5	4.7	0.6	6.9*	2.7
Paygrade								
	Enlisted, E1-E4	29.0	17.1	12.7	26.3	16.5	13.7	42.0
	Enlisted, E5-E9	23.5	13.2	9.5	22.7	11.6	12.0	32.0
	Officer	16.4	12.7	4.5	13.6	5.2	16.4	17.4
	c^2	16.5***	7.5*	12.4**	12.9**	20.7***	2.6	51.5***

* $p<0.05$
** $p<0.01$
*** $p<0.001$
† $p<0.06$

Table 3. Proportion of women reporting each menstrual symptoms by behavioral and life style variables, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	N	Symptom: Cramps/pain	Bleeding between	Excessive frequency	Heavy periods	Periods > 1 week	Scanty flow	Irregular periods
Body mass index quartile	2,740							
I (lowest)		24.5	15.9	10.4	22.0	14.2	15.0	36.4
II		28.1	17.1	14.0	25.4	17.1	13.3	39.5
III		28.1	15.5	10.5	25.4	14.2	11.9	33.7
IV (highest)		23.6	14.5	10.3	24.9	11.6	13.4	38.9
χ^2		5.4	1.7	6.2	2.6	8.1*	2.5	5.9
Smoking	2,822							
No		25.3	14.4	8.9	22.7	12.1	12.5	34.4
Yes		29.2	18.0	14.9	27.9	18.5	15.5	41.9
χ^2		4.6*	5.7**	21.0***	8.3**	19.6**	5.3*	15.0***
Alcohol frequency	2,782							
None		25.5	13.5	10.5	23.8	13.2	11.4	36.8
Low		27.5	16.6	13.9	24.8	13.7	13.6	40.4
Moderate		27.0	19.4	10.3	24.3	15.7	16.5	35.7
High		30.0	19.5	14.4	33.6	19.0	14.8	39.5
χ^2		1.7	12.8**	6.0	5.7	4.7	9.9*	3.2
Exercise	846							
Low		30.3	17.6	11.9	27.2	15.2	16.9	38.2
Moderate		29.7	17.6	11.9	25.9	14.9	12.1	38.0
High		27.3	16.0	18.0	23.5	16.7	18.8	39.3
χ^2		0.6	0.3	4.6	0.7	0.4	4.7	0.1

*p<0.05
**p<0.01
***p<0.001

Table 4. Logistic regression examining association of behavioral and life style covariates with menstrual symptoms adjusted for age, race, and paygrade, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Symptom:	Cramps/pain		Bleeding between periods		Excessive frequency		Heavy periods		Periods ≥ 1 week		Scanty flow		Irregular periods	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Age (in years)	.98	(.96, 1.00)	.95[c]	(.93, .98)	.99	(.96, 1.02)	1.00	(.98, 1.03)	.96[b]	(.93, .99)	.97	(.95, 1.00)	.98[a]	(.96, .99)
Race														
White	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Black	1.05	(.90, 1.21)	1.11	(.94, 1.32)	.88	(.71, 1.08)	1.08	(.93, 1.26)	1.03	(.85, 1.23)	.93	(.76, 1.15)	.87[a]	(.76, .99)
Other	1.01	(.82, 1.23)	1.08	(.86, 1.36)	1.12	(.86, 1.47)	.97	(.80, 1.48)	.98	(.76, 1.26)	.85	(.64, 1.14)	1.05	(.89, 1.25)
Paygrade														
Enlisted, E1-E4	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Enlisted, E5-E9	1.11	(.90, 1.37)	1.11	(.86, 1.42)	1.22	(.86, 1.74)	1.10	(.88, 1.37)	1.39[a]	(1.01, 1.90)	.98	(.76, 1.26)	1.29[b]	(1.06, 1.58)
Officer	.72[a]	(.53, .99)	.96	(.67, 1.36)	.52[a]	(.40, .69)	.65	(.46, .91)	.51[b]	(.30, .86)	1.14	(.82, 1.59)	.50[c]	(.37, .69)
BMI (Kg/m^2)	1.00	(.48, 2.10)	.49	(.96, 1.02)	.99	(.95, 1.03)	1.01	(.98, 1.04)	.96[a]	(.92, .99)	.99	(.95, 1.03)	1.00	(.97, 1.03)
Body mass index quartile														
I (lowest)	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
II	1.11	(.95, 1.29)	1.10	(.83, 1.31)	1.29[b]	(1.05, 1.57)	1.01	(.91, 1.25)	1.25[a]	(1.03, 1.50)	.98	(.80, 1.20)	1.09	(.95, 1.26)
III	1.12	(.96, 1.30)	.99	(.82, 1.20)	.93	(.75, 1.16)	1.05	(.90, 1.23)	1.00	(.83, 1.21)	.88	(.71, 1.08)	.87[a]	(.75, .99)
IV (highest)	.88	(.75, 1.03)	.91	(.75, 1.33)	.92	(.74, 1.14)	1.01	(.86, 1.17)	.80	(.65, .98)	1.03	(.84, 1.26)	1.10	(.96, 1.27)
Smoking														
No	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Yes	1.13[b]	(1.03, 1.25)	1.22[c]	(1.09, 1.38)	1.33[c]	(1.17, 1.51)	1.17[c]	(1.06, 1.29)	1.31[c]	(1.16, 1.48)	1.13[a]	(1.01, 1.29)	1.14[b]	(1.05, 1.24)
Alcohol frequency														
None	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Low	1.01	(.84, 1.22)	.96	(.74, 1.25)	1.14	(.90, 1.46)	.93	(.77, 1.13)	.88	(.70, 1.11)	.96	(.75, 1.22)	1.09	(.92, 1.28)
Moderate	.99	(.83, 1.18)	1.20	(.98, 1.46)	.84	(.66, 1.53)	.91	(.76, 1.07)	1.06	(.86, 1.30)	1.20	(.96, 1.50)	.91	(.78, 1.07)
High	1.14	(.84, 1.54)	1.22	(.85, 1.75)	1.23	(.86, 1.52)	1.40[a]	(1.05, 1.89)	1.32	(.92, 1.88)	1.07	(.71, 1.62)	1.06	(.80, 1.41)
Exercise														
Low	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Moderate	1.05	(.84, 1.31)	1.04	(.80, 1.35)	.85	(.74, 1.15)	1.02	(.81, 1.29)	.96	(.73, 1.27)	.76	(.57, 1.01)	1.01	(.84, 1.23)
High	.91	(.71, 1.15)	.94	(.70, 1.25)	1.39[a]	(1.03, 1.87)	.90	(.70, 1.16)	1.09	(.82, 1.46)	1.22	(.90, 1.65)	1.02	(.83, 1.26)

OR = odds ratio; CI = 95% confidence interval; BMI = body mass index
[a] $p<0.05$
[b] $p<0.01$
[c] $p<0.001$

DISCUSSION AND CONCLUSIONS

Results of the present study support the detrimental effect of cigarette smoking on menstrual symptoms. Current cigarette smoking was associated with the increased risk of every menstrual symptom. This was found even after adjustment for age and paygrade, which were each independently associated with risk of menstrual symptoms. These results are in accord with previous studies showing that cigarette smoking is associated with shorter cycle length and increased dysmenorrhea [2, 9]. In addition, this study showed that smoking is associated with bleeding between periods and having heavy, long and irregular periods.

In the present study, body mass index was not associated with menstrual symptoms or cycle disorders. This is in contrast to Tolino, *et. al.* [8], who found that women who were more obese were at increased risk of alterations in their menstrual cycle. However, the population in the present study of Navy women is relatively lean with a mean body mass index of 23.6 and a modal body mass index of 22.4. There were very few obese women. The relationships observed between risk of menstrual symptoms and cycle disorders may be greater in populations having more obese women.

In accord with other studies [9, 11, 12], the present study generally did not find significant associations between alcohol consumption and menstrual symptoms and cycle disorders. High frequency of alcohol consumption was only associated with increased risk of heavy periods. Furthermore, neither low nor moderate alcohol consumption increased or decreased risk of symptoms, and results were similar when number of drinks per week was examined.

In the present study, the only significant association found with exercise was that women with high frequency of exercise were at increased risk of cycle disorders, which is somewhat in contrast with studies that reported excessive exercise was associated with an absence of menstrual periods [6, 13, 18, 19]. Exercise interventions have been associated with a beneficial effect on dysmenorrhea [13-16], and more frequent exercise has been associated with less severe symptoms [17]. In contrast to the previous studies, this study did not find an association of exercise frequency with risk (either increased or decreased) of menstrual symptoms. Among the relatively physically fit women in the Navy, the lack of observed associations may reflect the fact that three-fourths of these women exercised 3 or more times per week.

Since more than one-third of Navy women reported irregular periods and one-fourth reported heavy periods and having cramps or pain requiring medication or time off work, the experience of menstrual cycle symptoms represents an important problem. Over one-third of Navy women are current cigarette smokers. While symptoms and cycle disorders may abate with aging, results from the present study suggest that interventions targeted at smoking cessation may help reduce the prevalence of menstrual cycle symptoms, disorders, and time lost from work in this population of Navy women.

REFERENCES

1. Budoff PW. No More Menstrual Cramps and Other Good News. New York: Penguin, 1981.

2. Sundell G, Milsom I, Andersch B. Factors influencing the prevalence and severity of dysmenorrhea in young women. British J Obstet Gynecol 1990;97:588-594.

3. Ng TP, Tan NC, Wansaicheong GK. A prevalence study of dysmenorrhea in female residents aged 15-54 years in Clementi Town, Singapore. Annals of the Academy of Medicine, Singapore 1992;21:323-327.

4. Dingfelder JR. Treatment of dysmenorrhea. Hospital Physician 1982;73-78.

5. Norris RV, Sullivan C. PMS/Premenstrual Syndrome. New York: Rowson Associates, 1983.

6. Carpenter SE. Psychosocial menstrual disorders: stress, exercise and diet's effect on the menstrual cycle. Current Opinion Obstet Gynecol 1994;6:536-539.

7. Falsetti L, Pasenetti E, Mazzani MD, Gastaldi A. Weight loss and menstrual cycle: clinic and endocrinological evaluation. Gynecological Endocrinology 1992;6:49-56.

8. Tolino A, Pellicno M, Rosini S, Liguori G, Nappi C. Obesity and reproduction. Acta Europaea Fertilitatis 1994;25:119-121.

9. Parazzini F, Tozzi L, Mezzopane R, *et. al.* Cigarette smoking, alcohol consumption, and risk of primary dysmenorrhea. Epidemiology 1994;5:469-472.

10. Caan B, Duncan D, Hiatt R, *et. al.* Association between alcoholic and caffeinated beverages and premenstrual syndrome. J Repro Med 1993;38:630-636.

11. Tate DL, Charette L. Personality, alcohol consumption, and menstrual distress in young women. Alcoholism Clin Exper Res 1991;15:647-652.

12. Jarrett M, Heitkempner MM, Shaver JF. Symptoms and self-care strategies in women with and without dysmenorrhea. Health Care for Women Int 1995;16:167-178.

13. Greene JW. Exercise-induced menstrual irregularities. Comprehensive Therapy 1993;19:116-120.

14. Prior JC, Vigna Y, Sciarretta D *et. al.* Conditioning exercise decreases premenstrual symptoms: A prospective, controlled 6-month trial. Fertil Steril 1987;47:402-408.

15. Steege JF, Blumenthal JA. The effects of aerobic exercise on premenstrual symptoms in middle-aged women: A preliminary study. J Psychosom Res 1993;37:127-133.

16. Israel SL, Sutton M, O'Brien P. Effects of aerobic training on primary dysmenorrhea symptomatology in college females. J Am Coll Health 1985;33:241.

17. Johnson WG, Carr-Nangle RE, Bergeron KC. Macronutrient intake, eating habits, and exercise as moderators of menstrual distress in healthy women. Psychosomatic Med 1995;57:324-330.

18. Keizer HA, Rogol AD. Physical exercise and menstrual cycle alterations. What are the mechanisms? Sports Medicine 1990;10:218-235.

19. Loucks AB. Effects of exercise training on the menstrual cycle: existence and mechanisms. Med and Science in Sports and Exercise 1990;22:275-280.

20. Norris F. Screening for traumatic stress. J Appl Soc Psychol 1990; 20:1704-18.

21. Bernstein E. Development, reliability, and validity of a dissociation scale. J Nerv Ment Dis 1986; 174:285-93.

22. Centers for Disease Control and Prevention. National Health Interview Survey, 1992.

23. Centers for Disease Control and Prevention, Health Interview Survey Form HIS-1, 1992.

24. Centers for Disease Control and Prevention, Health Interview Survey Form HIS-2, 1992.

25. Centers for Disease Control and Prevention, National Ambulatory Health Care Survey, 1994, 1995, 1996.

26. Centers for Disease Control and Prevention, Youth Behavior Survey, 1996

27. Radloff L. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Measurement 1977; 1:385-401.

28. Conway SW, Conway TL. Perceived Life quality and health-related correlates among men Aboard Navy Ships (NHRC Technical Report 88-93). San Diego, CA: NHRC, 1988.

REPORT TOPIC AREA: **Normative Comparisons of Psychological Symptomatology in Navy and Army Women and Men: Effects of Gender, Demographic Characteristics, and Deployment History**

LEAD AUTHOR: Kathleen Wright, Ph.D., and Frank C. Garland, Ph.D.

ABSTRACT

This report describes the results of administration of the Brief Symptom Inventory (BSI) aboard U.S. Navy ships as a part of the Navy Women Aboard Ships Study. The BSI is a standardized instrument that measures psychological symptoms. It was administered to a 20% probability sample of women aboard 36 US. Navy ships during 1994-1996 and a comparison group of men, matched to the women on ship, work division, department, race (white, black, Hispanic, or other), paygrade, occupational rating, and date of birth. Overall, women scored significantly higher than men on the somatization, depression, interpersonal sensitivity, and psychological trauma subscales, and on an index of general severity of psychological symptoms (GSI). Women who had deployed scored significantly lower than men who had deployed on obsessive-compulsive and hostility symptoms. There were no significant differences, however, between women and men who had deployed to the same location. The demographic comparisons revealed that women scored significantly higher on the GSI than men in the 19 and 24 year old age groups, the E - 2 and E - 4 pay grades, high school graduate and some college educational levels, and Pacific Islander and Native American ethnic groups, although the ethnic group differences should be interpreted with caution given the small sample sizes. Results of a stepwise multiple regression indicated that lower rank and ethnic group remained significant predictors of psychological distress for women. The only significant predictor for men was lower rank. Gender differences on psychological symptoms related to deployment history and demographic characteristics also were compared with several large Army data bases.

INTRODUCTION

The Brief Symptom Inventory (BSI) is a standardized and validated psychological inventory that measures self-reported symptoms such as anxiety, depression, and hostility [1]. The BSI was administered as part of the Women Aboard Navy Ships survey to a 20% probability sample of women aboard 36 U.S. Navy ships and a matched comparison group of men assigned aboard the same ships during 1994-1996.

METHODS

Population

All women serving aboard U.S. Navy ships were eligible for inclusion in the survey portion of the study during Year 1 of a longitudinal, multi-year effort, along with a comparison group of men serving aboard the same ships and matched to the women on important characteristics. The Navy Bureau of Personnel (PERS-00W) provided a listing of all ships with women assigned aboard; this listing was verified with respective Fleet Surgeons and Fleet Medical Officers. A total of 74 Navy ships with women assigned aboard were identified as eligible for the survey based on having women crew members. There were 36 ships available for sampling during the time interval from 15 November 1994 through 31 January 1996. Availability during this interval was based primarily on ship movements. The form that included the data used in this study (Form 78) was assigned to a 20% sample of women aboard the 36 ships and an equal number of men serving aboard the same ships. Women and men enrolled in Year 1 of the study will be contacted again and re-surveyed on a 12-month cycle in Year 2.

Matching

Men were matched to women on ship, work division, department, race (white, black, Hispanic, or other), paygrade, occupational rating, and date of birth. If no individual was available in the same occupational rating, an individual with a closely related rating was selected. Matching was accomplished using the following procedures: (1) the eligible population was determined using Naval Health Research Center (NHRC) current demographic and career history file in San Diego CA, and an electronic roster was developed that included all data elements needed for matching; (2) the personnel department of each ship provided and electronic roster with limited information that was compared to the NHRC roster, and a final roster was determined; (3) a matching program was used to select the men to be included in the survey; and (4) identification labels were created and affixed to the survey packets.

Instruments

The Brief Symptom Inventory (BSI) used in the current Navy study is a 53 item self-report scale of symptoms [1], derived from the 90 item Symptom Check List (SCL-90-R, [2]). Respondents were requested to rate the items on a 5-point scale of distress, ranging from "none" (0) to "extreme" (4), using the past week as a time frame for assessment. The BSI has been used extensively in both research and clinical practice to determine symptom profiles for psychiatric and medical patients, and non-patient populations [3-11]. Derogatis and Melisaratos [12] in their frequently cited introductory report, included an overview of studies using the BSI, analyses demonstrating high reliability with the SCL-90 ranging from 0.92 to 0.99 indicating that both inventories measure the same constructs, and convergent validity between the symptom

dimensions of the BSI and the clinical scales of the MMPI. The report also provided normative data for psychiatric inpatient, out-patient and non-patient populations.

The BSI consists of nine subscales that measure symptoms of somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. It also provides a general index on psychological distress, the Global Severity Index (GSI), and a derived index of psychological trauma. The Trauma Index includes the somatization, depression and anxiety subscales and was designed by the Department of Military Psychiatry of the Walter Reed Army Institute of Research as a shortened version of the BSI for use in soldier surveys during Operation Desert Storm. It is included in these analyses for comparison with the Army data on deployment effects. Those using the BSI as an outcome measure can assess respondents with symptom profiles based on subscale scores, or use the GSI to determine overall distress level. Internal consistency for all nine symptom dimensions is acceptable, with alpha coefficients ranging from a low of 0.71 on the Psychoticism dimension, to a high of 0.85 on Depression. Test-retest reliability over a two week period ranged from a low of 0.68 for Somatization, to a high of 0.91 for Phobic Anxiety. The Global Severity Index (GSI) revealed a stability coefficient of 0.90 providing evidence for the consistency of the BSI across time [1].

There were four alternate forms of the survey questionnaire administered in the Women Aboard Navy Ships Study. Each had an identical core of questions, followed by questions that varied according to form. The Brief Symptom Inventory was part of Form 78, which was administered to the 20% probability sample.

Comparisons With Army Data

Several studies with large samples of soldiers and data collected during or post deployment administered the same symptom inventory as the current Navy study. A brief review of these studies is provided since military deployment history was included on the Navy survey as having potential psychological consequences. The studies highlight the importance of collecting prospective data and establishing risk status for follow up.

Operation Desert Storm - The Department of Military Psychiatry conducted an extensive research program prior to, during, and after Operation Desert Storm. Approximately 13,000 deployed soldiers completed surveys rating stresses during and after Operation Desert Storm, individual morale and competence, unit cohesion, and leader effectiveness, and assessed personal resilience, coping strategies, and stress- related symptoms using the BSI. The surveys were supplemented by interviews conducted in Southwest Asia and one year post return at home stations. Analyses indicated that the stress of the deployment was more significant than that of the ground war, and that fewer than three percent of respondents would meet diagnostic criteria for Post Traumatic Stress Disorder (PTSD). Those who responded to the symptom inventory in a manner consistent with PTSD were more likely to report greater combat exposure, lower personal

resilience, and lower unit cohesion. Comparisons with subjects who had not deployed indicated that despite the difficult deployment and the trauma of combat, the overall population was basically healthy and well-adjusted.

Most soldiers surveyed had adapted well since Operation Desert Storm and the vast majority were not experiencing major psychological distress. However, 10-15% of the sample appeared more stressed than their peers, and attributed more of their stress to the deployment. Some soldiers were reporting psychological distress or persistent unexplained physical symptoms enough to be an issue of concern to them and to care providers. Factors related to successful coping included: fewer reported symptoms before the ground war began; less reported combat exposure; post combat or post deployment debriefing; unit cohesion; and personal hardiness. In general, more current life stresses such as unit issues, leadership, and military downsizing, overshadowed the Desert Storm deployment experiences. [13, 14].

Recent Deployments - Research conducted during more recent deployments is described in a recent report [15]. The study compared the Global Severity Index score on the symptom inventory across several Army deployments finding differences based on the particular deployment experience. In the comparison, soldiers surveyed in the pre-combat phase of Operation Desert Shield showed the highest symptom ratings. When the researchers examined soldier characteristics in relation to a particular deployment, they found the primary symptom rating differences related to rank. Soldiers in the ranks of Private to Specialist/Corporal (paygrades E-1 to E-4), reported significantly higher levels of psychological distress than senior enlisted, company grade, or field grade officers. When rank was controlled, there were no differences based on age, gender, or marital status. In related analyses, the critical differences on global symptom measures were found between those soldiers who had deployed versus those who had not, across gender [16]. Similarly, a study conducted post- Operation Desert Storm comparing active duty and reserve personnel across services, found the critical differences in reported symptoms to be related to the experience of deployment [17].

Army Samples - Two data bases collected by the Department of Military Psychiatry served as the comparison groups for the Navy respondents. One data base was a subset of data collected following Operation Desert Storm that included units with female soldiers and was used in comparison with Navy data assessing deployment effects. The second Army data base was collected in 1993 from soldiers stationed at a large military installation in the Midwest and provided normative data for comparison with Navy respondents.

Statistical Analysis

Demographic characteristics and BSI subscale scores were analyzed according to gender and the individual's personal history of deployment. Differences in BSI subscale scores between women and men were tested for statistical significance using two-sided *t*-tests. Symptom reports for Navy and Army respondents were compared across demographic categories with gender

differences tested using two-sided *t*-tests. A factor analysis was performed to examine the internal structure of the self-reported symptom inventory for Navy respondents.

Response Rates

The questionnaire was administered aboard 36 U.S. Navy ships with 5,510 women and 18,443 men assigned during 15 November 1994 through 31 January 1996. The overall median response rate for all forms of the questionnaire was 63%. The overall median response rate for women was 66%. Participation rates for all forms of the questionnaire varied according to the number of women assigned to the ship. Ships with fewer than 100 women assigned had an overall median response rate for women of 69%, compared to 50% for ships with more than 100 women assigned. The form used for this analysis, Form 78, was administered to a 20% probability sample of the eligible population. The response rate for this form was 59% of eligible women and 55% of eligible men.

RESULTS

Demographic Characteristics

Respondents numbered 1,172, and there were approximately equal numbers of women and men due to the matching procedure (Table 1). Three-quarters of the respondents were less than 31 years old (Table 2), approximately half were non-Hispanic white (Table 3), and 99% had completed high school or had a general equivalency diploma (GED) (Table 4). Most respondents were either never married (48%) or currently married (40%) (Table 5). More than half (59%) of the sample were in pay grades E-4 or lower (Table 6). The age distribution of the men was slightly older than that of the women (Table 7). A slightly greater proportion of women than men were non-Hispanic Black (Table 8). A larger proportion of women than men had attended or completed some college (Table 9). Men tended to be in higher pay grades (Table 11), consistent with their slightly older age distribution (Table 7), and a larger proportion of men than women were married (Table 10).

Table 1. Gender of respondents in U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

GENDER	NUMBER	%
Male	563	48.0%
Women	609	52.0%
Total	**1,172**	**100.0%**

Table 2. Age of respondents, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

AGE	NUMBER	%
18-25	691	59.0%
26-30	201	17.2%
31-35	162	13.8%
36-40	91	7.8%
41+	26	2.2%
Total	**1,171**	**100.0%**

Table 3. Race and ethnicity of respondents, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

RACE/ETHNICITY	NUMBER	%
White, Non-Hispanic	631	53.9%
White, Hispanic	54	4.6%
Black, Non-Hispanic	349	29.8%
Black, Hispanic	25	2.1%
Asian/Pacific Islander	44	3.8%
Native American	17	1.5%
Other Race/Ethnicity	51	4.4%
Total	**1,171**	**100.0%**

Table 4. Educational level of respondents, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

EDUCATION	NUMBER	%
Some high school	13	1.1%
GED	40	3.4%
High school graduate	617	52.8%
Trade/technical school	38	3.3%
Some college/AA	371	31.8%
BA/BS	73	6.3%
Graduate degree	16	1.4%
Total	**1,168**	**100.0%**

Table 5. Marital Status of respondents, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

MARITAL STATUS	Number	%
Never Married	559	47.8%
Married	466	39.9%
Separated	66	5.6%
Divorced	74	6.3%
Widowed	4	0.3%
Total	**1,169**	**100.0%**

Table 6. Paygrade of respondents, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

PAYGRADE/RANK	Number	%
E-1	35	3.0%
E-2	121	10.3%
E-3	197	16.8%
E-4	334	28.5%
E-5	223	19.0%
E-6	165	14.1%
E-7	31	2.6%
E-8	5	0.4%
E-9	3	0.3%
W-2	1	0.1%
O-1	12	1.0%
O-2	18	1.5%
O-3	19	1.6%
O-4	4	0.3%
O-5	3	0.3%
Total	**1,171**	**100.0%**

Table 7. Age by gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

AGE	Men		Women	
	NUMBER	%	NUMBER	%
18-25	322	57.2%	369	60.7%
26-30	95	6.8%	106	17.4%
31-35	82	4.6%	80	13.2%
36-40	51	9.1%	40	6.6%
41+	13	23.0%	13	2.1%
Total	**563**	**100%**	**608**	**100%**

Table 8. Race by gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

RACE/ETHNICITY	Men		Woman	
	NUMBER	%	NUMBER	%
White, Non-Hispanic	314	55.8%	317	52.1%
White, Hispanic	33	5.9%	21	3.4%
Black, Non-Hispanic	160	28.4%	189	31.2%
Black, Hispanic	8	1.4%	17	2.8%
Asian/Pacific Islander	19	3.4%	25	4.1%
Native American	8	1.4%	9	1.5%
Other Race/Ethnicity	21	3.7%	30	4.9%
Total	**563**	**100%**	**608**	**100%**

Table 9. Education by gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

EDUCATION	Men		Women	
	NUMBER	%	NUMBER	%
Some high school	11	2.0%	2	.32%
GED	26	4.6%	14	2.3%
High school graduate	327	58.3%	290	47.8%
Trade/technical school	21	3.7%	17	2.8%
Some college/AA	150	26.7%	221	36.4%
BA/BS	19	3.4%	54	8.9%
Graduate degree	7	1.2%	9	1.5%
Total	**561**	**100%**	**607**	**100%**

Table 10. Marital Status by gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

MARITAL STATUS	Men		Women	
	NUMBER	%	NUMBER	%
Never Married	232	41.3%	327	53.9%
Married	282	50.2%	184	30.3%
Separated	25	4.4%	41	6.8%
Divorced	23	4.1%	51	8.4%
Widowed	0	0.0%	4	.66%
Total	**562**	**100%**	**607**	**100%**

Table 11. Paygrade by gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

PAYGRADE/RANK	Men		Women	
	NUMBER	%	NUMBER	%
E-1	13	2.3%	22	3.6%
E-2	56	9.9%	65	10.7%
E-3	97	17.2%	100	16.4%
E-4	143	25.4%	191	31.4%
E-5	107	19.0%	116	19.1%
E-6	99	17.6%	66	10.9%
E-7	18	3.2%	13	2.1%
E-8	3	.53%	2	.33%
E-9	3	.53%	0	0.0%
W-2	1	.18%	0	0.0%
O-1	4	.71%	8	0.0%
O-2	7	1.2%	11	1.3%
O-3	8	1.4%	11	1.8%
O-4	3	.53%	1	.16%
O-5	1	.18%	2	.33%
Total	**563**	**100%**	**608**	**100%**

Brief Symptom Inventory

Gender Differences - Women scored significantly higher than men on somatization ($p < .001$), interpersonal sensitivity ($p < .001$), and depression ($p < .01$) subscales, and on the trauma scale ($p < .001$) and the Global Severity Index ($p < .05$) (Table 12). Frequency distributions of response according to gender for all items on the BSI are shown in Appendix Table A-1.

Table 12. Comparison of mean scores on Brief Symptom Inventory Subscales by gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	MEANS		
BSI subscale	**Men**	**Women**	**All**
Somatization	0.2253	0.3409***	0.2854
Obsessive compulsive	0.5586	0.5964	0.5783
Interpersonal sensitivity	0.3588	0.597***	0.4824
Depression	0.4644	0.5805**	0.5247
Anxiety	0.3670	0.4216	0.3954
Hostility	0.7519	0.7439	0.7478
Phobic anxiety	0.1847	0.2064	0.1960
Paranoid ideation	0.8041	0.8862	0.8467
Psychoticism	0.4129	0.4633	0.4391
Trauma	0.5119	0.6461***	0.5817
Global severity index	0.3783	0.4439*	0.4124
Total N	563	609	1,171
Mean age in years	26.3	25.8	26.0

* = $p<.05$
** = $p<.01$
*** = $p<.001$

Deployment History - A total of 173/563 (31%) of men and 93/609 (15%) of women respondents had previously deployed to areas such as Operations Desert Shield/Desert Storm in the Persian Gulf, Somalia, Haiti, and Bangladesh. Mean scores according to gender and history of deployment on the nine subscales of the Brief Symptom Inventory are shown in Table 13 for Navy respondents to the Comprehensive Women Aboard Navy Ships questionnaire and U.S. Army respondents to the Army Department of Military Psychiatry survey following Operations Desert Shield/Storm.

Table 13. Comparison of mean scores on Brief Symptom Inventory Subscales by gender and deployment history, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Navy					Army				
	Not deployed		Deployed			Not deployed		Deployed		
BSI subscale	**Men**	**Women**	**Men**	**Women**	**All**	**Men**	**Women**	**Men**	**Women**	**All**
Somatization	0.194	0.3614***	0.293	0.2351	0.2854	0.4077	0.4226	0.321	0.4333	0.3549
Obsessive compulsive	0.526	0.6273*	0.629	0.526	0.5783	0.6237	0.6736	0.5456	0.608	0.5734
Interpersonal sensitivity	0.3446	0.6216***	0.389	0.3446	0.4824	0.393	1.125***	0.411	0.5579	0.4401
Depression	0.4578	0.6025**	0.478	0.4670	0.5247	0.5695	0.8917	0.492	0.6596	0.5369
Anxiety	0.332	0.4402**	0.443	0.3264	0.3954	0.4216	0.5833	0.371	0.5023	0.4008
Hostility	0.7054	0.7690	0.852	0.6146*	0.7478	0.8512	0.8833	0.746	0.6479	0.7671
Phobic anxiety	0.1642	0.2186	0.228	0.1437	0.1960	0.2955	0.5167	0.254	0.3077	0.2762
Paranoid ideation	0.7819	0.8990	0.852	0.8208	0.8467	0.8478	1.1000	0.805	0.9979	0.8406
Psychoticism	0.3853	0.4784*	0.473	0.3854	0.4391	0.4694	0.6938	0.452	0.5831	0.4746
Trauma	0.486	0.6674***	0.568	0.5367	0.5817	0.5687	0.8287	0.51	0.6834*	0.5484
Global severity index	0.3562	0.4604**	0.4262	0.3589	0.4124	0.4551	0.6291	0.406	0.4932	0.4318
Total N	390	513	173	96	1,172	208	24	546	73	851
Mean age in years	25.6	25.4	27.9	27.5	26.0	24.6	24.1	26.7	26.1	26.0

* = $p < .05$
** = $p < .01$
*** = $p < .001$

Navy women with a history of deployment scored significantly lower than Navy men with a history of deployment on the obsessive compulsive ($p < .05$) and hostility ($p < .05$) subscales (Table 13). Women in the previous Army study with a history of deployment scored significantly higher on the Trauma Scale ($p < .05$) than Army men with a history of deployment.

Comparisons of scores on the BSI according to location and phase of deployment (Operation Desert Shield, Operation Desert Storm, Somalia, or Haiti) revealed that Navy women did not differ significantly from Navy men on any BSI subscale (Table 14).

Table 14. Comparison of Brief Symptom Inventory Subscales and Deployment Location, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

BSI subscale	**Desert Shield**		**Desert Storm**		**Somalia**		**Haiti**	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Somatization	0.2691	0.1905	0.2939	0.2508	0.2725	0.2088	0.3136	0.2714
Obsessive compulsive	0.6307	0.3556	0.5593	0.4333	0.5309	0.4615	0.8699	0.4417
Interpersonal sensitivity	0.3859	0.4463	0.3800	0.5167	0.3951	0.5962	0.4634	0.3875
Depression	0.4598	0.4556	0.4526	0.4704	0.4556	0.5171	0.5935	0.5583
Anxiety	0.4660	0.3074	0.4189	0.3296	0.4216	0.3077	0.4309	0.3667
Hostility	0.8520	0.4978	0.7633	0.5689	0.7574	0.6974	1.0902	0.6400
Phobic anxiety	0.2117	0.1511	0.2198	0.1822	0.2333	0.1949	0.3073	0.1400
Paranoid ideation	0.8843	0.7600	0.8600	0.7556	0.7963	0.9436	1.0195	0.9400
Psychoticism	0.4333	0.4089	0.4389	0.3778	0.4824	0.4615	0.6000	0.5200
Trauma	0.5610	0.5193	0.5333	0.5605	0.5207	0.5821	0.6803	0.6111
Global severity index	0.4225	0.3306	0.4010	0.3600	0.3971	0.3972	0.5191	0.4032
Total N	103	45	91	45	54	39	41	20

Demographic Comparisons - Table 15 summarizes demographic comparisons for Navy men and women. Women scored significantly higher than men in the 19 year old ($p < .05$), and the 24 year old ($p < .001$) age categories; in the E - 2 ($p < .05$) and E - 4 ($p < .05$) paygrades; in the Asian/Pacific Islander ($p < .05$) and Native American ($p < .05$) ethnic groups; and in the high school graduate ($p < .05$) and some college ($p < .05$) education level categories. Results

of stepwise multiple regression analyses revealed that rank and ethnic group remained significant predictors for GSI scores for women. While only rank remained a significant predictor for men. Appendix Table A-2 summarizes the results of the stepwise multiple regression for the total sample, and for women and men separately.

Table 15: Comparison of mean Global Severity Index, men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

DEMOGRAPHIC CHARACTERISTIC	WOMEN (N=609)			MEN (N=563)		
	N	Mean GSI	SD	N	Mean GSI	SD
AGE IN YEARS						
18	12	0.440	0.491	7	0.676	0.441
19	45	0.499*	0.477	31	0.381	0.366
20	62	0.601	0.665	41	0.428	0.592
21	63	0.506	0.544	68	0.550	0.512
22	53	0.384	0.449	5	0.418	0.427
23	42	0.525	0.498	33	0.342	0.396
24	42	0.510***	0.570	32	0.222	0.216
25	38	0.409	0.496	31	0.415	0.377
26-30	100	0.365	0.464	92	0.363	0.385
31-35	78	0.385	0.352	81	0.289	0.372
36-40	39	0.322	0.252	50	0.285	0.365
41+	13	0.429	0.759	13	0.376	0.309
PAYGRADE						
E-1	22	0.401	0.512	13	0.391	0.402
E-2	62	0.629*	0.661	54	0.470	0.528
E-3	94	0.456	0.512	93	0.491	0.496
E-4	185	0.508*	0.546	137	0.416	0.413
E-5	113	0.333	0.309	101	0.290	0.366
E-6	63	0.360	0.352	98	0.310	0.374
E-7, E-8, and E-9	15	0.462	0.692	24	0.368	0.280
O-1, O-2, and O-3	30	0.287	0.319	19	0.192	0.211
O-4, and O-5	3	0.164	0.033	4	0.107	0.102

Table 15: --*Continued*-- Comparison of mean Global Severity Index men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

DEMOGRAPHIC CHARACTERISTIC	WOMEN (N=609)			MEN (N=563)		
	N	Mean GSI	SD	N	Mean GSI	SD
RACE						
White	311	0.430	0.466	307	0.383	0.413
White Hispanic	21	0.454	0.423	32	0.352	0.352
Black	180	0.391	0.475	150	0.374	0.418
Black Hispanic	15	0.490	0.463	8	0.274	0.325
Asian/Pacific Islander	25	0.654*	0.785	19	0.270	0.326
Native American	8	0.700*	0.814	8	0.492	0.43
Other	27	0.660	0.558	20	0.479	0.71
MARITAL STATUS						
Never Married	317	0.479	0.516	226	0.433	0.457
Married	179	0.386	0.444	270	0.311	0.352
Separated	37	0.421	0.440	24	0.624	0.617
Divorced	51	0.440	0.595	23	0.390	0.402
EDUCATION						
High school graduate	282	0.501*	0.527	318	0.418	0.452
GED	14	0.519	0.567	24	0.376	0.439
Trade/tech school	17	0.314	0.456	20	0.432	0.35
Some college	212	0.404*	0.467	143	0.316	0.376
College degree	52	0.363	0.465	19	0.278	0.258
Graduate degree	9	0.181	0.120	7	0.091	0.1

SD, Standard deviation
* = $p<.05$
** = $p<.01$
*** = $p<.001$

Table 16 summarizes demographic comparisons from survey data collected in 1993 from 1,156 Army soldiers; 158 women and 998 men. Army women scored significantly higher than Army men in the 31 - 35 year old age group ($p < .05$). Army men scored significantly higher than Army women in E -2 ($p < .05$) and E - 6 ($p < .01$) pay grades, and in the Hispanic ethnic group ($p < .05$).

Table 16. Comparison of mean Global Severity Index for Army men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

DEMOGRAPHIC CHARACTERISTIC	Women (N=158)			Men (N=998)		
	N	Mean GSI	SD	N	Mean GSI	SD
AGE IN YEARS						
19	7	1.010	0.625	58	0.921	0.737
20	11	1.052	0.854	86	0.914	0.761
21	8	0.587	0.841	102	0.945	0.818
22	16	0.983	0.562	102	1.001	0.745
23	10	0.678	0.875	71	0.895	0.778
24	7	0.916	0.612	73	0.918	0.786
25	8	0.485	0.464	42	0.946	0.81
26-30	28	0.954	0.839	193	0.747	0.705
31-35	12	0.596*	1.031	82	0.588	0.564
36-40	3	0.176	0.133	34	0.833	0.835
41+	5	1.709	1.354	10	0.972	0.928
PAYGRADE						
E-1	5	1.166	0.389	15	1.016	1.016
E-2	17	0.523*	0.584	113	0.897	0.824
E-3	23	1.020	0.806	142	0.961	0.777
E-4	52	1.020	0.847	340	0.903	0.743
E-5	26	0.695	0.722	208	0.724	0.699
E-6	11	0.333**	0.377	74	0.726	0.633
RACE						
White	68	0.967	0.843	596	0.846	0.728
African American	37	0.682	0.695	154	0.825	0.728
Hispanic	8	0.3273*	0.345	61	0.7546	0.746
Multi-racial	9	1.300	1.199	26	1.393	0.931
Other	12	0.863	0.851	34	0.717	0.691
MARITAL STATUS						
Single	56	0.983	0.879	381	0.944	0.772
Married	69	0.709	0.737	490	0.758	0.690
Divorced	8	0.908	0.743	48	0.876	0.898
Separated	9	1.349	0.808	38	0.942	0.592
Other	2	0.481	0.680	8	1.627	1.401

Table 16. --*Continued*-- Comparison of mean Global Severity Index for Army men and women, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

DEMOGRAPHIC CHARACTERISTIC	Women (N=158)			Men (N=998)		
	N	Mean GSI	SD	N	Mean GSI	SD
EDUCATION						
Some high school	3	2.396	1.394	5	1.709	0.942
High school graduate	62	1.029	0.885	484	0.925	0.759
GED	4	0.849	0.584	38	0.977	0.785
Some college	62	0.641	0.631	378	0.738	0.654
College graduate	11	.548	0.463	37	0.664	0.879
Graduate degree	5	1.143	0.790	7	1.374	1.506

* = $p<.05$
** = $p<.01$
*** = $p<.001$
SD = Standard Deviation

Factor Analysis - A principal components factor analysis of the BSI with varimax rotation revealed eight factors accounting for 60% of the variance for the total sample of Navy women and men. Separate factor analyses by gender revealed 8 factors accounting for 61% of the variance for women, and 9 factors accounting for 61% of the variance for men. Appendix Table A - 3 lists the BSI items with mean scores for the total Navy sample. Appendix Table A - 4 summarizes the item subscales and factor loadings for the total sample, and for women and men separately.

For Navy women, the first factor accounted for 41% of the variance and included high loadings for all seven items on the somatization dimension. Two items from the anxiety dimension, possibly reflecting somatic equivalents of anxiety [1], also correlated highly with this factor. Interpersonal sensitivity, hostility and obsessive-compulsive symptoms clustered on the hypothesized dimensions. Interpersonal sensitivity items combined with several symptoms of paranoid ideation as the second factor, accounting for 5% of the variance.

The factor structure of the BSI was less well-defined for Navy men. The first factor, accounting for 35% of the variance, included high loadings for all items of the hostility dimension, plus two anxiety items indicating tension and restlessness. The second factor, accounting for 6% of the variance, consisted of six of the seven somatization items and two obsessive-compulsive symptoms relating to concentration problems.

Comparisons of Scores On the BSI With Those in the Civilian Population - Results for Navy respondents were compared to norms for a civilian non-patient population (1), it should be noted, however that the age-distribution of the population used to establish civilian norms was

considerably older than that of Navy personnel in the sample. Navy women scored significantly higher than civilian women on the depression ($p < .001$), interpersonal sensitivity ($p < .001$), hostility ($p < .001$), obsessive-compulsive symptoms ($p < .01$), paranoid ideation ($p < .001$), and psychoticism subscales ($p < .001$), and the GSI ($p < .01$) (data not shown). Navy men scored significantly higher than civilian men on anxiety, depression, hostility, interpersonal sensitivity, obsessive-compulsive symptoms, paranoid ideation, phobic anxiety, psychoticism, and the GSI. These differences possibly reflected the considerable age difference between the Navy sample and the population used to establish the civilian norms (data not shown).

DISCUSSION

Normative Data

Psychological Well Being and Deployment History - The addition of Time 1 respondents increased the normative data base for Navy service members to more than 1,100 respondents on the self-reported symptom inventory. Initial global analyses of gender differences for the Navy sample revealed that women scored significantly higher than men on the somatization, depression, interpersonal sensitivity and trauma subscales, and on the GSI. The second stage of analysis examined symptom scores by gender and deployment history. The first comparison included respondents with without a deployment history. Men with a history of deployment scored significantly higher than women with such a history on obsessive-compulsive and hostility symptoms. However, gender differences disappeared when deployment locations were included in the analyses. There were no significant differences between men and women who had deployed to the same locations. The difference on interpersonal sensitivity symptoms between women and men who had deployed to Somalia noted in the first report, disappeared with the increased sample size.

Psychological Well Being and Demographic Characteristics - The importance of establishing norms for the BSI has been noted in the literature. In prior research different age groups have shown different patterns of distress [18-20] and variability in symptom dimension patterns was found in different age, sex, work status, and culture groups [4]. As discussed above, the comparison of scores on the BSI for military personnel and the civilian sample reported in the BSI Manual [1], revealed significant differences for most of the subscales, with Navy and Army personnel scoring higher than civilians. The considerable age difference between the military and civilian samples was suggested as a factor that may have affected the scores. Correspondingly, the current analyses included a large Army data base of surveys collected in 1993 from 1,650 soldiers, comprised of 158 women and 998 men. The large Navy and Army samples established preliminary gender-based norms for different demographic categories. In addition to providing normative comparison groups for future military research, the gender differences found on some subscales reinforced the need to consider this variable when using the BSI as an outcome measure.

Analyses were conducted for the Navy and Army samples to determine whether mean GSI scores differed significantly by age, paygrade, marital status, ethnic group or educational level, when gender was controlled. Results indicated that Navy women in the 19 and 24 year old age categories, the E-2 and E-4 paygrades, high school graduate and some college educational levels, and Pacific Islander and Native American ethnic groups reported significantly higher levels of psychological distress than did Navy men in the same categories. Results of a stepwise multiple regression indicated that rank and race remained significant predictors of psychological distress for women. The only significant predictor for men was rank. This finding was consistent with results reported for more than 3,000 soldiers deployed to Haiti in 1994 for Operation Uphold Democracy [15]. In this study soldiers in paygrades E-1 to E-4 reported significantly higher levels of psychological distress than did soldiers in other paygrades. After controlling for rank, there were no significant differences in GSI scores for any other demographic characteristic.

Risk Status

Consistent with findings in the first report on Women Aboard Navy Ships, mean symptom ratings and subscale scores for the completed Time 1 sample were relatively low. Generally, women and men had very similar scores across demographic categories. Few categories revealed gender differences, with women typically scoring higher than men in symptom reports. The gender differences require additional analyses relating psychological symptom reports to physical symptoms, sick call visits, current life stress ratings, and performance indicators. The finding of rank as a significant predictor for both men and women, with lower ranks tending to report higher GSI scores, merits further attention to determine other situational variables that might be affecting responses. Work-related stress and job type could be contributing factors. Currently there is no evidence that respondents reporting elevated symptoms were demonstrating problem behaviors or poor adaptation.

Support for the influence of situational variables may be seen in the comparative analyses on deployment history for both the Navy and Army samples. Greater control of demographic variables and sample experiences lessened the effect of gender on symptom ratings. For both Navy and Army data sets, the highest similarities in symptom rating patterns occurred for men and women who deployed to the same location. This is not to say that the ratings were low, only that they were similar. Consideration of symptom profiles may contribute to the determination of risk status across gender.

CONCLUSIONS

The second report on Women Aboard Navy Ships included additional survey respondents to augment the preliminary normative data base established for Navy service members on the self-reported symptom inventory. Additional comparisons were made with the expanded Army data base collected for male and female soldiers in a study conducted by Walter Reed Army Institute of Research in 1993 and with data collected during Operation Desert Storm. Mean psychological

symptom ratings and subscale scores for Navy respondents were relatively low and comparable to findings for Army respondents. The additional Navy respondents expanded the sample of those with a history of military deployment enabling further assessment of this experience as a risk factor with consequences for post-deployment psychological adaptation. Gender differences apparent in the initial comparison of symptom reports for women and men disappeared when the experience and location of the deployment were included. Risk status based on the general index of psychological distress from the symptom inventory was also assessed across demographic variables, revealing lower rank as a significant correlate of psychological distress for both women and men.

Notes:

This work was supported by Department of Defense Funds with the U.S. Army as the Executive Agent. Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the U.S. Navy, the U.S. Army, or the Department of Defense.

REFERENCES

1. Derogatis LR. (1993). The Brief Symptom Inventory: administration, scoring, and procedures manual, third ed. Minneapolis MN: National Computer Systems, Inc.

2. Derogatis, LR. (1977). The SCL Manual I: Scoring, administration and procedures for the SCL-90. Baltimore: Clinical Psychometric Research.

3. Del-Vecchio Good, MG., BJ., & Clearly, PD. (1987). Do patients attitudes influence physician recognition of psychosocial problems in primary care? The Journal of Family Practice, 25(1), 53-59.

4. Francis, VM., Rajan, P., & Tuner, N. (1990). British community norms for the Brief Symptom Inventory. British Journal of Clinical Psychology, 29, 115-116.

5. Marziali, EA. (1984). Prediction of outcome of brief psychotherapy from therapist interpretive interventions. Archives of General Psychiatry, 41, 301-304.

6. Norbeck, JS. (1985). Types of sources of social support and managing job stress in critical care nurses. Nursing Research, 34(4), 225-230.

7. Royse, D., & Drude, K. (1984). Screening drug abuse clients with the Brief Symptom Inventory. The International Journal of the Addictions, 19(8), 849-85.

8. Sable, P. (1989). Attachment, anxiety, and loss of a husband. American Journal of Orthopsychiatry, 59(4), 550-556.

9. Stefanek, ME., Derogatis, LP., & Shaw, A. (1987). Psychological distress among oncology outpatients. Psychosomatics, 28(10), 530-539.

10. Wood, WD. (1982). An attempt to validate the psychoticism scale of the Brief Symptom Inventory. British Journal of Medical Psychology, 55, 367-373.

11. Wood, WD. (1986). Patterns of symptom report on the Brief Symptom Inventory. Psychological Reports, 58, 427-431.

12. Derogatis, LR., & Melisaratos, N. (1983). The brief symptom inventory: an introductory report. Psychological Medicine, 13, 595-605.

13. Gifford, RK., Marlowe, DH., Wright, KM., Bartone, PT., Martin, JA. (1992, December). Unit cohesion in Operations Desert Shield/Desert Storm. Journal of the U.S. Army Medical Department, 11-13.

14. Wright, KM., Marlowe, DH., Martin, JA., Gifford, RK., Beleknky, GL., & Manning, FI. (1995). Operation Desert Shield: A summary report. (TR 95-0019). Walter Reed Army Institute of Research, Division of Neuropsychiatry, Washington, DC, DTIC AD# ADA303327.

15. Halverson, RR., Bliese, PD., Moore, RE., & Castro, CA. (1995, May). Psychological well-being and physical health of soldiers deployed for Operation Uphold Democracy: A summary of human dimensions research in Haiti. Defense Technical Information Center, Document ADA 298125, Alexandria, VA.

16. Stuart, J., & Halverson, R. (In press). Psychological status of deployed and non-deployed U.S. Army Soldiers. Journal of Military Medicine.

17. Marlowe, DH., Knudson, K., Wright, KM., Stretch, RH., Bliese, PD., & Hoover, CH. (1994, May). The General Well-Being of Gulf war Era veterans from the States of Pennsylvania and Hawaii: A Survey. Report prepared for the office of the Assistant Secretary of Defense for Health Affairs, USMRMC, Ft. Detrick, MD.

18. Cochran, CD., & Hale, WD. (1985). College student norms on the Brief Symptom inventory. Journal of Clinical Psychology, (41) 6, 777-779.

19. Hale, WD., & Cochran, CD. (1992). Age differences in self-reported symptoms of psychological distress. Journal of Clinical Psychology. (48), 5, 633-636.

20. Piersma, HL., Boes, JL., & Reaume, WM. (1994). Unidimensionality of the Brief Symptom Inventory on adult and adolescent populations. Journal of Personality Assessment, 63(2), 338-344.

Appendix Table A-1. Brief Symptom Index Response Frequency by Gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	None				A Little Bit				Moderate				Quite A Bit				Extreme			
BSI Item	**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Nervousness or shakiness inside	398	72.8%	429	72.5%	86	15.7%	93	15.7%	41	7.5%	36	6.1%	20	3.7%	23	3.9%	2	0.4%	11	1.9%
Repeated unpleasant thoughts	273	49.8%	311	52.5%	123	22.4%	138	23.3%	82	15.0%	58	9.8%	51	9.3%	60	10.1%	19	3.5%	25	4.2%
Faintness or dizziness	496	90.8%	492	83.4%	29	5.3%	51	8.6%	14	2.6%	25	4.2%	5	0.9%	16	2.7%	2	0.4%	6	1.0%
Loss of sexual interest or pleasure	436	79.6%	431	73.4%	58	10.6%	75	12.8%	34	6.2%	32	5.5%	14	2.6%	29	4.9%	6	1.1%	20	3.4%
Feeling critical of others	300	55.2%	284	48.5%	117	21.5%	141	24.1%	86	15.8%	92	15.7%	26	4.8%	52	8.9%	14	2.6%	17	2.9%
The idea that someone else can control of your thoughts	432	79.0%	463	78.2%	41	7.5%	51	8.6%	32	5.9%	37	6.3%	26	4.8%	29	4.9%	16	2.9%	12	2.0%
Feeling others are to blame for most of your troubles	392	71.5%	449	76.2%	84	15.3%	88	14.9%	35	6.4%	33	5.6%	24	4.4%	13	2.2%	13	2.4%	6	1.0%
Trouble remembering things	335	61.1%	371	62.9%	116	21.2%	120	20.3%	64	11.7%	48	8.1%	24	4.4%	35	5.9%	9	1.6%	16	2.7%
Feeling easily annoyed or irritated	219	40.0%	163	27.6%	129	23.5%	166	28.1%	89	16.2%	99	16.8%	71	13.0%	96	16.2%	40	7.3%	67	11.3%
Pains in heart or chest	470	85.8%	491	83.1%	35	6.4%	52	8.8%	31	5.7%	28	4.7%	6	1.1%	12	2.0%	6	1.1%	8	1.4%
Feeling afraid in open spaces	524	95.6%	561	94.9%	12	2.2%	21	3.6%	10	1.8%	3	0.5%			4	0.7%	2	0.4%	2	0.3%
Feeling low in energy or slowed down	283	51.7%	250	42.2%	148	27.1%	150	25.3%	69	12.6%	85	14.4%	37	6.8%	73	12.3%	10	1.8%	34	5.7%
Thoughts of ending your life	504	92.0%	547	92.7%	24	4.4%	22	3.7%	9	1.6%	6	1.0%	5	0.9%	8	1.4%	6	1.1%	7	1.2%
Feeling that most people cannot be trusted	278	50.7%	254	43.0%	116	21.2%	119	20.1%	69	12.6%	79	13.4%	38	6.9%	76	12.9%	47	8.6%	63	10.7%
Poor appetite	419	76.6%	393	66.4%	74	13.5%	94	15.9%	32	5.9%	49	8.3%	14	2.6%	42	7.1%	8	1.5%	14	2.4%

Appendix Table A-1. *--Continued--* Brief Symptom Index Response Frequency by Gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	None				A Little Bit				Moderate				Quite A Bit				Extreme			
BSI Item	**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Crying easily	504	92.0%	391	66.0%	22	4.0%	98	16.6%	16	2.9%	42	7.1%	2	0.4%	32	5.4%	4	0.7%	29	4.9%
Suddenly scared for no reason	510	93.1%	506	85.5%	18	3.3%	61	10.3%	14	2.6%	13	2.2%	3	0.5%	5	0.8%	3	0.5%	7	1.2%
Temper outbursts that you could not	401	73.2%	417	70.4%	60	10.9%	81	13.7%	40	7.3%	48	8.1%	26	4.7%	31	5.2%	21	3.8%	15	2.5%
Feeling lonely even when you are with	362	66.1%	359	60.6%	95	17.3%	108	18.2%	48	8.8%	53	9.0%	29	5.3%	40	6.8%	14	2.6%	32	5.4%
Feeling blocked in getting things done	338	62.0%	360	61.2%	79	14.5%	117	19.9%	75	13.8%	59	10.0%	35	6.4%	40	6.8%	18	3.3%	12	2.0%
Feeling lonely	347	63.3%	327	55.3%	103	18.8%	135	22.8%	51	9.3%	56	9.5%	29	5.3%	38	6.4%	18	3.3%	35	5.9%
Feeling blue	351	64.1%	320	54.1%	103	18.8%	153	25.9%	59	10.8%	42	7.1%	20	3.6%	44	7.4%	15	2.7%	32	5.4%
Worrying too much about things	192	35.0%	141	23.8%	162	29.5%	190	32.1%	112	20.4%	112	18.9%	58	10.6%	97	16.4%	25	4.6%	52	8.8%
Feeling no interest in things	319	58.2%	337	56.9%	125	22.8%	127	21.5%	76	13.9%	69	11.7%	19	3.5%	41	6.9%	9	1.6%	18	3.0%
Feeling fearful	443	81.9%	474	80.3%	66	12.2%	73	12.4%	21	3.9%	25	4.2%	8	1.5%	6	1.0%	3	0.6%	12	2.0%
Your feelings are easily hurt	421	77.2%	324	55.1%	69	12.7%	132	22.4%	42	7.7%	63	10.7%	7	1.3%	39	6.6%	6	1.1%	30	5.1%
Feeling others do not understand you or are unsympathetic	352	64.2%	338	57.1%	104	19.0%	136	23.0%	54	9.9%	63	10.6%	26	4.7%	34	5.7%	12	2.2%	21	3.5%
Feeling that people are unfriendly or dislike you	410	74.7%	386	65.2%	85	15.5%	112	18.9%	35	6.4%	45	7.6%	12	2.2%	32	5.4%	7	1.3%	17	2.9%
Feeling inferior to others	455	83.0%	466	78.7%	58	10.6%	67	11.3%	24	4.4%	34	5.7%	6	1.1%	18	3.0%	5	0.9%	7	1.2%

Appendix Table A-1. *--Continued--* Brief Symptom Index Response Frequency by Gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	None				A Little Bit				Moderate				Quite A Bit				Extreme			
BSI Item	**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Nausea or upset stomach	465	84.9%	423	71.5%	48	8.8%	91	15.4%	25	4.6%	43	7.3%	4	0.7%	24	4.1%	6	1.1%	11	1.9%
Feeling that you are watched or talked about by others	371	67.7%	337	56.9%	95	17.3%	123	20.8%	48	8.8%	66	11.1%	18	3.3%	35	5.9%	16	2.9%	31	5.2%
Trouble falling asleep	368	67.3%	343	57.9%	93	17.0%	115	19.4%	43	7.9%	56	9.5%	25	4.6%	48	8.1%	18	3.3%	30	5.1%
Having to check and double-check what you do	349	63.6%	379	64.0%	114	20.8%	119	20.1%	60	10.9%	46	7.8%	17	3.1%	31	5.2%	9	1.6%	17	2.9%
Difficulty making decisions	380	69.5%	396	67.0%	105	19.2%	111	18.8%	42	7.7%	49	8.3%	11	2.0%	25	4.2%	9	1.6%	10	1.7%
Feeling afraid to travel	504	92.1%	542	91.7%	26	4.8%	32	5.4%	12	2.2%	9	1.5%	1	0.2%	4	0.7%	4	0.7%	4	0.7%
Trouble getting your breath	497	90.7%	509	86.1%	28	5.1%	51	8.6%	14	2.6%	15	2.5%	7	1.3%	11	1.9%	2	0.4%	5	0.8%
Hot or cold spells	510	93.1%	516	87.2%	23	4.2%	47	7.9%	12	2.2%	15	2.5%	2	0.4%	11	1.9%	1	0.2%	3	0.5%
Having to avoid certain things because they frighten you	508	92.7%	528	89.3%	20	3.6%	35	5.9%	16	2.9%	14	2.4%	2	0.4%	9	1.5%	2	0.4%	5	0.8%
Your mind going blank	425	77.8%	449	76.2%	76	13.9%	89	15.1%	31	5.7%	30	5.1%	12	2.2%	13	2.2%	2	0.4%	8	1.4%
Numbness or tingling in parts of your	464	84.7%	477	80.7%	53	9.7%	72	12.2%	18	3.3%	22	3.7%	6	1.1%	10	1.7%	7	1.3%	10	1.7%
The idea that you should be punished for your sins	464	84.8%	499	84.6%	51	9.3%	52	8.8%	24	4.4%	15	2.5%	3	0.5%	15	2.5%	5	0.9%	9	1.5%
Feeling hopeless about the future	409	74.9%	417	70.6%	83	15.2%	97	16.4%	36	6.6%	44	7.4%	13	2.4%	20	3.4%	5	0.9%	13	2.2%
Trouble concentrating	358	65.2%	358	60.5%	104	18.9%	128	21.6%	57	10.4%	60	10.1%	23	4.2%	31	5.2%	7	1.3%	15	2.5%

Appendix Table A-1. --*Continued*-- Brief Symptom Index Response Frequency by Gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	None				A Little Bit				Moderate				Quite A Bit				Extreme			
BSI Item	**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Feeling weak in parts of your body	386	70.3%	381	64.5%	107	19.5%	135	22.8%	45	8.2%	46	7.8%	6	1.1%	18	3.0%	5	0.9%	11	1.9%
Feeling tense or keyed up	285	52.0%	283	47.8%	128	23.4%	132	22.3%	81	14.8%	98	16.6%	42	7.7%	57	9.6%	12	2.2%	22	3.7%
Thoughts of death or dying	437	79.9%	504	85.3%	60	11.0%	42	7.1%	28	5.1%	21	3.6%	14	2.6%	14	2.4%	8	1.5%	10	1.7%
Having urges to beat, injure or harm someone	336	61.8%	434	73.6%	89	16.4%	71	12.0%	53	9.7%	29	4.9%	35	6.4%	30	5.1%	31	5.7%	26	4.4%
Sleep that is restless or disturbed	341	62.2%	310	52.4%	110	20.1%	130	22.0%	53	9.7%	69	11.7%	26	4.7%	50	8.4%	18	3.3%	33	5.6%
Having urges to break or smash things	365	66.8%	445	75.4%	75	13.7%	72	12.2%	45	8.2%	25	4.2%	38	7.0%	30	5.1%	23	4.2%	18	3.1%
Feeling very self-conscious with others	403	73.8%	394	66.8%	88	16.1%	114	19.3%	36	6.6%	42	7.1%	9	1.6%	28	4.7%	10	1.8%	12	2.0%
Feeling uneasy in crowds	403	73.5%	449	76.0%	75	13.7%	78	13.2%	39	7.1%	30	5.1%	19	3.5%	23	3.9%	12	2.2%	11	1.9%
Never feeling close to another person	399	72.8%	419	70.9%	79	14.4%	89	15.1%	39	7.1%	49	8.3%	21	3.8%	24	4.1%	10	1.8%	10	1.7%
Spells of terror or panic	506	92.3%	544	92.0%	24	4.4%	32	5.4%	11	2.0%	6	1.0%	5	0.9%	4	0.7%	2	0.4%	5	0.8%
Getting into frequent arguments	378	69.0%	403	68.2%	88	16.1%	106	17.9%	55	10.0%	37	6.3%	16	2.9%	25	4.2%	11	2.0%	20	3.4%
Feeling nervous when your are alone	499	91.4%	519	88.1%	29	5.3%	38	6.5%	12	2.2%	18	3.1%	3	0.5%	6	1.0%	3	0.5%	8	1.4%
Others not giving you proper credit for your achievements	288	52.7%	315	53.6%	94	17.2%	113	19.2%	79	14.4%	77	13.1%	48	8.8%	52	8.8%	38	6.9%	31	5.3%
Feeling so restless you couldn't sit still	406	74.2%	453	76.9%	94	17.2%	69	11.7%	20	3.7%	41	7.0%	17	3.1%	17	2.9%	10	1.8%	9	1.5%

Appendix Table A-1. *--Continued--* Brief Symptom Index Response Frequency by Gender, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	None				A Little Bit				Moderate				Quite A Bit				Extreme			
BSI Item	**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**		**Men**		**Women**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Feeling of worthlessness	442	81.0%	472	80.3%	64	11.7%	66	11.2%	29	5.3%	22	3.7%	8	1.5%	13	2.2%	3	0.5%	15	2.6%
Feeling people will take advantage of you if you let them	285	52.0%	286	48.6%	115	21.0%	135	22.9%	73	13.3%	72	12.2%	48	8.8%	50	8.5%	27	4.9%	46	7.8%
Thoughts and images of a frightening nature	476	86.9%	510	86.4%	44	8.0%	43	7.3%	16	2.9%	17	2.9%	9	1.6%	11	1.9%	3	0.5%	9	1.5%
Feelings of guilt	414	75.5%	438	74.4%	90	16.4%	88	14.9%	27	4.9%	32	5.4%	10	1.8%	15	2.5%	7	1.3%	16	2.7%
The idea that something is wrong with your mind	449	82.5%	489	83.4%	53	9.7%	52	8.9%	24	4.4%	17	2.9%	11	2.0%	19	3.2%	7	1.3%	9	1.5%
Spending less time with peers and friends	369	67.8%	391	66.5%	88	16.2%	104	17.7%	54	9.9%	45	7.7%	25	4.6%	31	5.3%	8	1.5%	17	2.9%

Appendix Table A-2. Stepwise Regression Analysis for Demographic Variables.

Results of Stepwise Regression Analysis for Variables Predicting Navy GSI Scores. U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Variable	B	SE B	Beta	t	P
Step 1					
Rank	-0.03252	0.006561	-0.1469	-4.957	<0.0001
Step 2					
Rank	-0.03163	0.006564	-0.14287	-4.819	<0.0001
Race	0.015754	0.007378	0.063313	2.135	0.033

Results of Stepwise Regression Analysis for Variables Predicting GSI Score for Navy Women.

Variable	B	SE B	Beta	t	P
Step 1					
Rank	-0.03044	0.009922	-0.12679	-3.068	0.002
Step 2					
Rank	-0.02971	0.00988	-0.12375	-3.007	0.003
Race	0.027043	0.010697	0.104045	2.528	0.012

Results of Stepwise Regression Analysis for Variables Predicting GSI Score for Navy Men.

Variable	B	SE B	Beta	t	P
Step 1					
Rank	-0.03314	0.00849	-0.16627	-3.904	0.001

Appendix Table A-3. BSI Items and Means, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Item	Mean	N	Question
BSI01	.45	1139	NERVOUSNESS OR SHAKINESS INSIDE
BSI02	.92	1140	REPEATED UNPLEASANT THOUGHTS
BSI03	.22	1136	FAINTNESS OR DIZZINESS
BSI04	.44	1135	LOSS OF SEXUAL INTEREST OR PLEASURE
BSI05	.86	1129	FEELING CRITICAL OF OTHERS
BSI06	.45	1139	THE IDEA THAT SOMEONE ELSE CAN CONTROL Y
BSI07	.44	1137	FEELING OTHERS ARE TO BLAME FOR MOST OF
BSI08	.65	1138	TROUBLE REMEMBERING THINGS
BSI09	1.40	1139	FEELING EASILY ANNOYED OR IRRITATED
BSI10	.28	1139	PAINS IN HEART OR CHEST
BSI11	.08	1139	FEELING AFRAID IN OPEN SPACES
BSI12	.98	1139	FEELING LOW IN ENERGY OR SLOWED DOWN
BSI13	.15	1138	THOUGHTS OF ENDING YOUR LIFE
BSI14	1.15	1139	FEELING THAT MOST PEOPLE CANNOT BE TRUST
BSI15	.51	1139	POOR APPETITE
BSI16	.41	1140	CRYING EASILY
BSI17	.17	1140	SUDDENLY SCARED FOR NO REASON
BSI18	.55	1140	TEMPER OUTBURSTS THAT YOU COULD NOT CONT
BSI19	.70	1140	FEELING LONELY EVEN WHEN YOU ARE WITH PE
BSI20	.71	1133	FEELING BLOCKED IN GETTING THINGS DONE
BSI21	.76	1139	FEELING LONELY
BSI22	.74	1139	FEELING BLUE
BSI23	1.38	1141	WORRYING TOO MUCH ABOUT THINGS
BSI24	.73	1140	FEELING NO INTEREST IN THINGS
BSI25	.29	1131	FEELING FEARFUL
BSI26	.61	1133	YOUR FEELINGS ARE EASILY HURT
BSI27	.69	1140	FEELING OTHERS DO NOT UNDERSTAND YOU OR
BSI28	.51	1141	FEELING THAT PEOPLE ARE UNFRIENDLY OR DI
BSI29	.32	1140	FEELING INFERIOR TO OTHERS
BSI30	.37	1140	NAUSEA OR UPSET STOMACH
BSI31	.70	1140	FEELING THAT YOU ARE WATCHED OR TALKED A
BSI32	.72	1139	TROUBLE FALLING ASLEEP
BSI33	.61	1141	HAVING TO CHECK AND DOUBLE-CHECK WHAT YO
BSI34	.51	1138	DIFFICULTY MAKING DECISIONS
BSI35	.13	1138	FEELING AFRAID TO TRAVEL
BSI36	.19	1139	TROUBLE GETTING YOUR BREATH
BSI37	.16	1140	HOT OR COLD SPELLS
BSI38	.15	1139	HAVING TO AVOID CERTAIN THINGS BECAUSE T

Appendix Table A-3. --*Continued*-- BSI Items and Means, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Item	Mean	N	Question
BSI39	.35	1135	YOUR MIND GOING BLANK
BSI40	.28	1139	NUMBNESS OR TINGLING IN PARTS OF YOUR BO
BSI41	.26	1137	THE IDEA THAT YOU SHOULD BE PUNISHED FOR
BSI42	.45	1137	FEELING HOPELESS ABOUT THE FUTURE
BSI43	.63	1141	TROUBLE CONCENTRATING
BSI44	.49	1140	FEELING WEAK IN PARTS OF YOUR BODY
BSI45	.92	1140	FEELING TENSE OR KEYED UP
BSI46	.31	1138	THOUGHTS OF DEATH OR DYING
BSI47	.66	1134	HAVING URGES TO BEAT, INJURE OR HARM SOM
BSI48	.80	1140	SLEEP THAT IS RESTLESS OR DISTURBED
BSI49	.58	1136	HAVING URGES TO BREAK OR SMASH THINGS
BSI50	.49	1136	FEELING VERY SELF-CONSCIOUS WITH OTHERS
BSI51	.45	1139	FEELING UNEASY IN CROWDS
BSI52	.49	1139	NEVER FEELING CLOSE TO ANOTHER PERSON
BSI53	.13	1139	SPELLS OF TERROR OR PANIC
BSI54	.55	1139	GETTING INTO FREQUENT ARGUMENTS
BSI55	.17	1135	FEELING NERVOUS WHEN YOUR ARE ALONE
BSI56	.96	1135	OTHERS NOT GIVING YOU PROPER CREDIT FOR
BSI57	.41	1136	FEELING SO RESTLESS YOU COULDN T SIT STI
BSI58	.32	1134	FEELING OF WORTHLESSNESS
BSI59	.99	1137	FEELING PEOPLE WILL TAKE ADVANTAGE OF YO
BSI60	.23	1138	THOUGHTS AND IMAGES OF A FRIGHTENING NAT
BSI61	.41	1137	FEELINGS OF GUILT
BSI62	.30	1130	THE IDEA THAT SOMETHING IS WRONG WITH YO
BSI63	.58	1132	SPENDING LESS TIME WITH PEERS AND FRIEND

Appendix Table A-4. BSI FACTORS, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

NAVY WOMEN	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR	FACTOR 7	FACTOR 8
% of Var.	40.6	5.1	3.4	3.2	2.7	2.4	2.2	2.1
BSI44(SOM)	0.69924							
BSI40(SOM)	0.67047							
BSI03(SOM)	0.62355							
BSI37(SOM)	0.61855							
BSI36(SOM)	0.60323							
BSI30(SOM)	0.5574							
BSI01(ANX)	0.54268							
BSI10(SOM)	0.48846						0.47073	
BSI45(ANX)	0.44758							
BSI32(ADD)	0.3788							
BSI28(INS)		0.73964						
BSI31(PAR)		0.65561						
BSI56(PAR)		0.59013						
BSI29(INS)		0.56832						
BSI50(INS)		0.55589						
BSI59(PAR)		0.52382						
BSI58(DEP)		0.5229						
BSI26(INS)		0.4722						
BSI53(ANX)			0.73165					
BSI55(PHO)			0.60591					
BSI61(ADD)			0.60399					
BSI62(PSY)			0.53921					
BSI38(PHO)			0.50561					
BSI51(PHO)			0.46441					
BSI25(ANX)			0.45822					
BSI42(DEP)			0.37808					
BSI41(PSY)			0.36483					
BSI21(DEP)				0.81469				
BSI19(PSY)				0.78531				
BSI22(DEP)				0.74362				
BSI52(PSY)				0.55914				
BSI24(DEP)				0.45479				
BSI15(ADD)				0.45116				
BSI47(HOS)					0.69479			
BSI49(HOS)					0.61799			
BSI09(HOS)					0.58913			
BSI54(HOS)					0.56333			
BSI18(HOS)					0.52663			
BSI14(PAR)					0.4494			
BSI57(ANX)					0.409			
BSI08(OBC)						0.70909		
BSI34(OBC)						0.59631		
BSI43(OBC)						0.59153		
BSI33(OBC)						0.56762		
BSI39(OBC)						0.5429		
BSI20(OBC)						0.41342		
BSI13(DEP)							0.71853	
BSI46(ADD)							0.62983	
BSI35(PHO)							0.48452	
BSI17(ANX)								0.59821
BSI07(PAR)			0.46705					0.57248
BSI11(PHO)								0.54491
BSI06(PSY)								0.46345

Appendix Table A-4. --*Continued*-- BSI FACTOR, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

NAVY MEN	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9
% of Var.	35.3	5.9	3.7	3.4	3.1	3	2.6	2.1	2
BSI49(HOS)	0.76767								
BSI47(HOS)	0.7567								
BSI18(HOS)	0.70318								
BSI54(HOS)	0.67269								
BSI09(HOS)	0.60205								
BSI45(ANX)	0.55053								
BSI56(PAR)	0.51637								
BSI57(ANX)	0.50785								
BSI51(PHO)	0.42023								
BSI32(ADD)	0.38182								
BSI39(OBC)		0.68031							
BSI40(SOM)		0.64837							
BSI36(SOM)		0.59423							
BSI10(SOM)		0.56072							
BSI44(SOM)		0.55581							
BSI37(SOM)		0.54066							
BSI30(SOM)		0.45627							
BSI43(OBC)		0.43383							
BSI26(INS)			0.61768						
BSI29(INS)			0.58833						
BSI42(DEP)			0.57515						
BSI50(INS)			0.54346						
BSI58(DEP)			0.53971						
BSI61(ADD)			0.4745						
BSI46(ADD)			0.43503						
BSI62(PSY)			0.37347						
BSI53(ANX)				0.68451					
BSI38(PHO)				0.66714					
BSI55(PHO)				0.65509					
BSI17(ANX)				0.60838					
BSI35(PHO)		0.46725		0.47793					
BSI41(PSY)				0.3859					
BSI21(DEP)					0.84351				
BSI19(PSY)					0.80192				
BSI22(DEP)					0.64084				
BSI52(PSY)					0.57151				
BSI15(ADD)					0.36645				
BSI34(OBC)						0.56079			
BSI20(OBC)						0.55794			
BSI33(OBC)						0.55675			
BSI25(ANX)						0.5061			
BSI24(DEP)						0.48857			
BSI01(ANX)						0.4799			
BSI28(INS)							0.69055		
BSI31(PAR)							0.64655		
BSI14(PAR)							0.50906		
BSI59(PAR)							0.49393		
BSI06(PSY)								0.58436	
BSI11(PHO)				0.51445				0.54297	
BSI07(PAR)								0.47402	
BSI08(OBC)								0.44996	
BSI03(SOM)									0.77429
BSI13(DEP)									0.42615

Appendix Table A-4. --*Continued*--BSI FACTORS, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

TOTAL NAVY	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8
% of Var.	38.5	5.1	3.4	3	2.8	2.7	2.3	2.1
BSI53(ANX)	0.69673							
BSI55(PHO)	0.64094							
BSI61(ADD)	0.5845							
BSI38(PHO)	0.58118							
BSI25(ANX)	0.52371							
BSI58(DEP)	0.47413							
BSI51(PHO)	0.46525							
BSI62(PSY)	0.44935							
BSI50(INS)	0.43632							
BSI41(PSY)	0.41065							
BSI42(DEP)	0.37636							
BSI47(HOS)		0.74546						
BSI49(HOS)		0.73902						
BSI18(HOS)		0.64282						
BSI54(HOS)		0.63093						
BSI09(HOS)		0.56576						
BSI45(ANX)		0.47996						
BSI57(ANX)		0.46211						
BSI21(DEP)			0.82539					
BSI19(PSY)			0.78513					
BSI22(DEP)			0.7289					
BSI52(PSY)			0.54946					
BSI15(ADD)			0.45485					
BSI44(SOM)				0.6788				
BSI40(SOM)				0.65847				
BSI36(SOM)				0.62923				
BSI37(SOM)				0.62808				
BSI30(SOM)				0.57427				
BSI10(SOM)				0.53536				
BSI03(SOM)				0.52432			0.45496	
BSI32(ADD)				0.41104				
BSI01(ANX)				0.38939				
BSI28(INS)					0.73584			
BSI31(PAR)					0.67686			
BSI59(PAR)					0.52055			
BSI29(INS)					0.51775			
BSI56(PAR)		0.47025			0.49602			
BSI14(PAR)					0.46332			
BSI26(INS)					0.39601			
BSI08(OBC)						0.66862		
BSI43(OBC)						0.63885		
BSI34(OBC)						0.61587		
BSI33(OBC)						0.58146		
BSI39(OBC)						0.56875		
BSI20(OBC)						0.48034		
BSI24(DEP)						0.39601		
BSI11(PHO)							0.60412	
BSI17(ANX)	0.48723						0.55111	
BSI06(PSY)							0.48954	
BSI07(PAR)							0.48793	
BSI13(DEP)								0.67992
BSI46(ADD)								0.55011
BSI35(PHO)								0.41565

REPORT TOPIC AREA: **Availability of Gynecological Supplies and Other Issues Related to the Reporting Requirements of the Department of the Navy's Policy on Pregnancy**

LEAD AUTHORS: Frank C. Garland, Ph.D., David Timberlake, M.P.H., and Diana R. Simmes, M.P.H.

ABSTRACT

This report addressed issues pertinent to the Department of Navy's Policy on Pregnancy. The U.S. Navy Shipboard Health Survey and the Anonymous Supplemental Health and Behavioral Survey were administered as part of the U.S. Navy Women Aboard Ship Study. A total of 2,914 women provided information pertaining to the availability of gynecological supplies, counseling, and gynecological appointments. A majority of the women who needed birth control pills, 82.4%, either agreed or strongly agreed that birth control pills were readily available. In contrast, only 7.8% of the women either disagreed or strongly disagreed that birth control pills were readily available. 63.2 % percent of the women who needed counseling for birth control methods either agreed or strongly agreed that such counseling was readily available. In contrast, 12.2% of the women surveyed either disagreed or strongly disagreed that counseling for birth control methods was readily available. A total of 2,739 women provided information pertaining to pregnancy in the Anonymous Supplemental Health and Behavioral Survey. Of the 391 total women who suspected being pregnant, 274 (70.1%)women had a pregnancy test. Of the 66 total women who suspected being pregnant and had a positive test result, 57 (86.4%) women informed their commanding officer.

INTRODUCTION

The objective of this report is to provide information relevant to the reporting requirements of the Department of Navy's (DoN) Policy on Pregnancy [1] which mandates the collection of data to analyze and evaluate the effectiveness of the current policy.

The policy indicates the Navy's commitment to providing service members with medical and other services to support family planning. This report presents information pertinent to the availability of gynecological supplies, i.e. birth control pills, pregnancy testing kits, and family planning information to women aboard ship. The Navy also provides active duty servicewomen with routine obstetric/gynecological (Ob/Gyn) care, with the stipulation that women preparing for deployment be given priority when scheduling appointments. This report presents the number of women who requested and received a gynecological appointment prior to deployment, and presents information pertinent to the availability of counseling. Women serving aboard ship who suspect that they are pregnant are required to obtain a pregnancy test and to report a confirmed pregnancy to their commanding officer. This report presents the number of women who suspected being pregnant, the subsequent number of women who had a pregnancy test, the subsequent result

of each test, and the subsequent number of women, given a positive result, who informed their commanding officer.

METHODS

This study is part of the Women Aboard Navy Ships Comprehensive Health and Readiness Research Project conducted at the Naval Health Research Center in San Diego, California as part of the Defense Women's Health Research Program administered by the Naval Medical Research and Development Command and the U.S. Army Medical Research and Materiel Command, Ft. Detrick, Maryland. This epidemiologic research project utilizes several data collection methods including surveys administered aboard ship. This is a report of Year 2 survey results, based on 11 months of data collection.

Population

All women serving aboard U.S. Navy ships were eligible for inclusion in the study. The Navy Bureau of Personnel (PERS-OOW) provided a listing of all ships with women assigned aboard; this listing was verified with respective Fleet Surgeons and Force Medical Officers. A total of 74 ships with 7,944 women and 69,012 men assigned were determined to be eligible for inclusion in the study. The results of this study are based on the first 36 ships surveyed with 2,914 women providing information.

These ships were surveyed based on availability as determined by the Commanding Officer and Medical Department of each ship. The ships surveyed included the USS BARRY, USS CAMDEN, USS CAPE COD, USS CIMARRON, USS COMSTOCK, USS CORONADO, USS CURTIS WILBUR, USS DETROIT, USS DIXON, USS EMORY S. LAND, USS FRANK CABLE, USS GRAPPLE, USS GRASP, USS HOLLAND, USS JOHN YOUNG, USS KISKA, USS LA SALLE, USS L.Y. SPEAR, USS MCKEE, USS MONOGAHELA, USS MOUNT BAKER, USS MOUNT HOOD, USS MOUNT WHITNEY, USS PLATTE, USS RAINIER, USS RUSHMORE, USS SACRAMENTO, USS SAFEGUARD, USS SALVOR, USS SANTA BARBARA, USS SHASTA, USS SHENANDOAH, USS SIMON LAKE, USS SUPPLY, USS WILLIAMETTE and USS YELLOWSTONE. These 36 ships had 5,510 women and 18,443 men assigned aboard.

Pregnancy and reporting results were based on the Anonymous Supplemental Health and Behavioral Survey. This survey consists of four sections which include demographic data, birth control, STD prevention, and a section designated for women's issues (birth control, pregnancy testing, and motivation). A total of 2,739 women provided these anonymous surveys.

Survey Development and Administration

Several methods were used for the development of the U.S. Navy Shipboard Health Survey used in this study, including the following: (1) review of extant questionnaires, literature, and standard scales, (2) convening of a panel of subject matter experts, (3) elicitation of major issues from knowledgeable sources, and (4) review of Navy requirements concerning the reporting of women's health and access to health care. The items relevant to this report were included on a questionnaire which covered many other topic areas.

The overall administration plan included the distribution of individually identified packets with all necessary materials to each study subject. Whenever possible, study subjects were brought together in a common location aboard ship, briefed on the study, asked to sign informed consent and to complete the survey while study coordinators were present. When, due to shipboard activity, it was not practical for all study subjects to remain in one area, surveys were distributed, and the participants were allowed to fill them out in work spaces. The completed surveys were collected by study staff in sealed envelopes in all cases.

Response Rates

The overall median response rate for the 36 ships was 63.1%. Participation rates varied by the number of women serving aboard ship. Ships with fewer than 100 women assigned had an overall median response rate for women of 69.5% compared to ships with more than 100 women assigned, which had an overall median response rate for women of 49.9%.

RESULTS

Availability of counseling and gynecological appointments and supplies

Over 80% of women who needed either birth control pills, Norplant, condoms, or kits for pregnancy testing either agreed or strongly agreed that these gynecological supplies were readily available (Table 1). No more than 7.8% of women either disagreed or strongly disagreed that any one gynecological supply was readily available, with the exception of an appropriately staffed and equipped Ob/Gyn medical support (28.2%).

Over 59% of women who needed either counseling for alcohol abuse, birth control methods, drug abuse, or medical concerns either agreed or strongly agreed that these counseling services were readily available (Table 2). Two hundred sixteen women reported requesting a pre-deployment gynecological appointment. Of those, 81.9% received an appointment prior to deployment (Table 3).

Pregnancy Testing

A total of 14.3% of women participating in the Anonymous Supplemental Health and Behavioral Survey suspected being pregnant (Table 4). Of those who suspected being pregnant, 70.1% of the women had a pregnancy test (Table 5). Of the women who suspected being pregnant and had a pregnancy test, a majority of women, 85.4%, did not respond to the question inquiring about the type of pregnancy test that had been administered. Of the women who suspected being pregnant and had a pregnancy test, 24.1% of the women had a positive result to a pregnancy test (Table 6). Of the women who suspected that they were pregnant and had a positive result to a pregnancy test, 86.4% of the women informed their commanding officer of the result, while, only 7.6% of the women did not inform their commanding officer (Table 7). Over 50% of pregnant women reported that they did not plan their pregnancies (Table 8). The other four common reasons for becoming pregnant included the desire for a child (38.2%), the desire of the father for having a child (21.1%), the concern about the biological window (19.7%), and the desire for having a child for an existing sibling (15.8%). Less than 3% of women reported becoming pregnant to either get reassigned to shore, or to avoid a deployment.

CONCLUSIONS

This report has presented information relevant to the medically-related reporting requirements of the Department of the Navy's Policy on Pregnancy. The policy requires that servicewomen who suspect that they are pregnant (1) obtain a pregnancy test and (2) report confirmation of the pregnancy to their commanding officer. Results of this study indicate that the majority of Navy women comply with both components of the policy, 70% and 86% respectively in this sample. The Navy's commitment to providing service members with medical services to support family planning is further evidenced by the outcomes of this research. A second aspect of the DoN's Pregnancy Policy was investigated by determining the accessability of Ob/Gyn supplies, counseling, and appointments. The majority of women who participated in the survey and needed family planning services agreed that they were readily available to them. Specifically, over 80% agreed or strongly agreed that birth control pills, Norplant, condoms or pregnancy testing kits were available while 63% agreed that birth control methods counseling was available. Moreover, gynecological appointments appear to be readily accessible to Navy women, with 82% of those requesting one reporting that they did receive an appointment. Overall, the results of this research indicate that the current objectives of the Department of the Navy's Policy on Pregnancy to provide readily available gynecological supplies, family planning counseling and priority for gynecological appointments before deployment are being met by the Navy. This study also indicates that the majority of women aboard ship are following the instruction and reporting pregnancies to the commanding officer when they become aware that they are pregnant. Women aboard ships report their motivation for pregnancy involves their's and the father's desire for a child, while only an extremely low percent report becoming pregnant to alter their shipboard status.

REFERENCES

1. Secretary of the Navy, SECNAV Instruction 1000.10, "Department of the Navy (DON) Policy on Pregnancy, dated 06 February 1995.

Table 1. Availability of gynecological supplies for women needing supplies, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

	Strongly Agree		Agree		Neither Agree Nor Disagree		Disagree		Strongly Disagree		Total	
Supplies*	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
a. Birth control pills	972	52.8	545	29.6	180	9.8	70	3.8	74	4.0	1,841	100
b. Depo-Provera, Norplant	736	46.9	436	27.8	278	17.7	61	3.9	57	3.6	1,568	100
c. Condoms	964	56.4	524	30.1	164	9.6	25	1.5	31	1.8	1,708	100
d. Diaphragm	406	31.1	322	24.7	476	36.4	62	4.7	40	3.1	1,306	100
e. Pregnancy Testing or test kit	768	49.0	496	31.7	218	13.9	46	2.9	38	2.4	1,566	100
f. Family planning information	521	35.1	433	29.1	412	27.7	77	5.2	43	2.9	1,486	100
g. Appropriately staffed and equipped Ob/Gyn medical support	520	26.1	471	23.6	440	22.1	256	12.8	308	15.4	1,995	100

*This table is based on the question: "During the past 30 days, the following were readily available to me from the ship's medical department"

Note: This table excludes either respondents who did not need the gynecological supplies, or who did not respond to the question.

Table 2. Availability of counseling for women needing services, U.S. Navy Women Aboard Ship Study, 16 NOV 1994 to 31 DEC 1996.

	Strongly Agree		Agree		Neither Agree Nor Disagree		Disagree		Strongly Disagree		Total	
Supplies*	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
a. Alcohol abuse	131	19.4	263	39.0	188	27.9	35	5.2	57	8.5	674	100
b. Birth control methods	160	22.6	290	41.0	171	24.2	34	4.8	52	7.4	707	100
c. Drug abuse	127	19.1	260	39.0	182	27.3	41	6.2	56	8.4	666	100
d. Family planning	103	15.2	248	36.6	208	30.7	56	8.3	63	9.3	678	100
e. Medical concerns	114	15.5	299	40.7	185	25.2	71	9.7	65	8.6	734	100
f. Quitting smoking	102	15.3	224	33.6	225	33.8	54	8.1	61	9.2	666	100
g. Stress management	94	13.1	244	34.0	202	28.2	92	12.8	85	11.9	717	100
h. Weight control	99	41.1	231	33.0	204	29.1	94	13.4	73	10.4	701	100

*This table is based on the following question: "During the past 30 days, I felt counseling was readily available to me on: (type of counseling)"

Table 3. Number and percent of women requesting a gynecological appointment prior to deployment who reported receiving one, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Received requested Appointment*	Women	
	Number	Percent
Yes	177	81.9
No	33	15.3
Not Reported	6	2.8
Total	216	100.0

*This table is based on the following question: "Were you given a gynecological or obstetrical appointment?"

Note: Women who answered this question where not necessarily currently deployed and could have answered the question in reference to a previous deployment.

Table 4. Number and percent of women who suspected being pregnant in the past 90 days, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

Response*	Women	
	Number	Percent
Did not suspect pregnancy	1,815	66.3
Did suspect pregnancy	391	14.3
Did not know	53	1.9
Did not report	480	17.5
Total	2,739	100.0

*This table is based on the following question: "Have you suspected that you may have been pregnant during the past 90 days?"

Table 5. Number and percent of women who had a pregnancy test in the past 90 days given a suspicion of being pregnant, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Women	
Response*	Number	Percent
Had pregnancy test	274	70.1
Did not have pregnancy test	114	29.2
Did not know	3	.8
Total	391	100.0

*This table is based on the following question: "Have you had a pregnancy test during the past 90 days?"

Table 6. Result of pregnancy test for women who suspected being pregnant and had a pregnancy test, U.S. Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1996.

	Women	
Result of Test*	Number	Percent
Negative	205	74.8
Positive	66	24.1
Did not know	2	0.7
Did not report	1	0.4
Total	274	100.0

*This table is based on the following Question: "What was the result of the Pregnancy Test?"

Table 7. Number and percent of women who informed their commanding officer, given a positive result for the pregnancy test, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Women	
Response*	Number	Percent
Did not inform commanding officer	5	7.6
Did inform commanding officer	57	86.4
Did not know	2	3.0
Did not report	2	3.0
Total	66	100

*This table is based on the following question: "Did you inform your Commanding Officer (or an appropriate person in chain of command) of the result of your pregnancy test?"

Table 8. Reasons for becoming pregnant for those reporting currently being pregnant, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Yes		No		Total**	
Reason*	No.	%	No.	%	No.	%
a. Pregnancy was unintentional/unplanned	39	51.3	19	25.0	76	100
b. Wanted a child (or another child)	29	38.2	25	32.9	76	100
c. Wanted a sibling for an existing child	12	15.8	36	47.4	76	100
d. Wanted to strengthen a relationship	2	2.6	46	60.5	76	100
e. Wanted to get reassigned to shore	1	1.3	47	61.8	76	100
f. Wanted to avoid a deployment	2	2.6	46	60.5	76	100
g. Did not want to wait until too old	15	19.7	34	44.7	76	100
h. Child's father wanted a child	16	21.1	32	42.1	76	100

*This table is based on the following question: "The reason(s) I became pregnant were:"
Note: These categories are not mutually exclusive, as evidenced by a total of 76 pregnant servicewomen responding to this question.

**Totals include not reported, which was common for this question (>25% of respondents)

REPORT TOPIC AREA: **Descriptive Tables of Demographic Characteristics, Family Structure, and Women's Health-related Issues, and Occupational Exposures of Personnel Participating in the U.S. Navy Women Aboard Ship Study**

LEAD AUTHORS: Frank C. Garland, Ph. D., David Timberlake, M.P.H., and Diana R. Simmes, M.P.H.

ABSTRACT

This report presents demographic and other characteristics of the population participating in the U.S. Navy Women Aboard Ship Study, a project conducted as part of the Defense Women's Health Research Program. This tabular presentation focuses on 4 topic areas: (1) demographic characteristics, (2) family structure, (3) women's health-related issues, and (4) occupational exposures. The population (n = 5,755) was predominately young (age < 30 years); approximately 50% were white and 30% were black. The population consisted of 95.3% enlisted personnel, 0.1% warrant officers, and 4.6% officers. The majority of the population, 62.9%, had served 3 years or less aboard ship. The number of years served aboard ship varied by gender, as indicated by 73.8% of women and 51.6% of men having served 3 years or less. Marital status varied by gender; 49.1% of men reported not being currently married compared to 66.2% of women reporting not currently being married. Nearly three-fourths (72.1%) of married personnel reported having one or more children in their household. For all respondents, 14.3% of women and 7.0% of men reported being single parents. Women's health issues addressed in this report covered self-reported medical conditions and availability of Ob/Gyn supplies. The majority of women, (83.3%) reported not having been medically screened prior to deployment. The majority of women agreed that counseling for a range of medically-related issues was available. Availability of protective gear (i.e., gloves, respirators, ear plugs) for use in current job, proper fit of protective gear, use of protective gear when needed, and interference from the gear with ability to perform work are also reported.

INTRODUCTION

This study is part of the Women Aboard Navy Ships Comprehensive Health and Readiness Research Project conducted at the Naval Health Research Center in San Diego, California as part of the Defense Women's Health Research Program administered by the Naval Medical Research and Development Command and the U.S. Army Medical Research and Materiel Command, Ft. Detrick, Maryland. This epidemiologic research project utilized several data collection methods including surveys administered aboard ship. This is a report of Year 2 survey results, based on 11 months of data collection.

METHODS

Population

All women serving aboard U.S. Navy ships were eligible for inclusion in the survey portion of the study during Year 1. An equal number of men serving aboard ship matched on relevant characteristics were also eligible. The Navy Bureau of Personnel (PERS-OOW) provided a listing of all ships with women assigned aboard; this listing was verified with respective Fleet Surgeons and Force Medical Officers. A total of 74 ships with 7,944 women and 69,012 men assigned were determined to be eligible for inclusion in the study. The results of this study are based upon the first 36 ships surveyed with 2,914 women providing information.

These ships were surveyed based on availability as determined by the Commanding Officer and Medical Department of each ship. The ships surveyed included the USS BARRY, USS CAMDEN, USS CAPE COD, USS CIMARRON, USS COMSTOCK, USS CORONADO, USS CURTIS WILBUR, USS DETROIT, USS DIXON, USS EMORY S. LAND, USS FRANK CABLE, USS GRAPPLE, USS GRASP, USS HOLLAND, USS JOHN YOUNG, USS KISKA, USS LA SALLE, USS L.Y. SPEAR, USS MCKEE, USS MONONGAHELA, USS MOUNT BAKER, USS MOUNT HOOD, USS MOUNT WHITNEY, USS PLATTE, USS RAINIER, USS RUSHMORE, USS SACRAMENTO, USS SAFEGUARD, USS SALVOR, USS SANTA BARBARA, USS SHASTA, USS SHENANDOAH, USS SIMON LAKE, USS SUPPLY, USS WILLIAMETTE AND USS YELLOWSTONE. These 36 ships had 5,510 women and 18,443 men assigned aboard.

Survey Development and Administration

Several methods were used for the development of the U.S. Navy Shipboard Health Survey used in this study, including the following: (1) review of extant questionnaires, literature, and standard scales, (2) convening of a panel of subject matter experts, (3) elicitation of major issues from knowledgeable sources, and (4) review of Navy requirements concerning the reporting of women's health and access to health care.

A series of questionnaires developed by the Centers for Disease Control and Prevention (CDC), Department of Defense, U.S. Navy, U.S. Army, and several universities [1-2] were reviewed and adopted for use in this study. The questionnaires developed by the CDC included the National Health Interview Survey [3], the Health Interview Survey Form HIS-1(1992) and HIS-2(1992) [4-5], the National Ambulatory Health Care Survey for 1994, 1995, and 1996 [6], and the Youth Behavior Survey [7]. Previous questionnaires developed by the Naval Health Research Center also were reviewed, and ranged from nutrition surveys to patient care surveys. In addition, a series of scales and inventories were reviewed and selected for use. These standard scales included but were not limited to: Center for Epidemiological Studies Depression Scale (CES-D) [8], a scale which measures the current frequency of depressive symptoms, and the Quality of Life Scale [9], a four-item scale previously used in research on Navy populations. as

The overall administration plan included the distribution of individually identified packets with all necessary materials to each study subject. Whenever possible, study subjects were brought together in a common location aboard ship, briefed on the study, asked to sign informed consent and to complete the survey while study coordinators were present. When, due to shipboard activity, it was not practical for all study subjects to remain in one area, surveys were distributed, and the participants were allowed to fill them out in work spaces. The completed surveys were collected by study staff in sealed envelopes in all cases.

Response Rates

The overall median ship response rate for the 36 ships was 63.1%, and the overall mean response rate was 52.2.%. The overall median response rate for women was 66.2%. Participation rates varied by the number of women serving aboard ship. Ships with fewer than 100 women assigned had an overall median response rate for women of 69.5% while ships with more than 100 women assigned had an overall median response rate for women of 49.9%.

RESULTS AND DISCUSSION

1. Demographics

Table 1. Survey respondents by age and gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 2. Survey respondents by race and gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 3. Survey respondents by paygrade and gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 4. Survey respondents by number of years served aboard ship and gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 5. Survey respondents by number of previous deployments (30 days or more) and gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

2. Family Structure

Table 6. Survey respondents by marital status and gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 7. Number of children (natural, adopted, or stepchildren) under the age of 21 living in a household of a survey respondent, by age group of child and respondent gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 8. Number of children (actual, adopted, or step children) under the age of 21 years living in households of naval personnel, by marital status, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

3. Women's Health Related Issues

Table 9. Personnel reporting being medically screened prior to deployment, by gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 10. Self-Reported medical conditions during the past 30 days whether or not they resulted in a sick call visit, by gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 11. Availability of counseling during the past 30 days according to respondent, by gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 12. Availability of Ob/Gyn supplies, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

4. Occupational Exposures

Table 13. Self-Reported occupational exposures, by gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 14. Availability of protective gear for use in current job, by gender, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

5. Additional Women's Health Related Issues

Table 15. Number and percent of women who reported requesting a gynecological appointment prior to deployment, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 16. Number and percent of women requesting a gynecological appointment prior to deployment who reported receiving one, US Navy Women Aboard Ship Study, 15 November 1994 to 31 December 1995

Table 1. Survey respondents by age and gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Age group (years)	Women		Men		Total	
	Number	Percent	Number	Percent	Number	Percent
18 to 19	276	9.5	199	7.0	475	8.3
20 to 24	1,244	42.7	1,257	44.2	2,501	43.5
25 to 29	597	20.5	545	19.2	1,142	19.8
30 to 34	458	15.7	457	16.1	915	15.9
35 to 39	243	8.3	278	9.8	521	9.1
40 to 44	79	2.7	91	3.2	170	3.0
45 +	15	0.5	14	0.5	29	0.5
Not reported	2	0.1	0	0.0	2	0.0
Total	2,914	100.0	2,841	100.0	5,755	100.0

Table 2. Survey respondents by race and gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

	Women		Men		Total	
Race	Number	Percent	Number	Percent	Number	Percent
White, non-Hispanic	1,520	52.2	1,571	55.3	3,091	53.7
White, Hispanic	173	5.9	144	5.1	317	5.5
Black, non-Hispanic	854	29.3	776	27.3	1,630	28.3
Black, Hispanic	69	2.4	42	1.5	111	1.9
Asian/Pacific Islander	104	3.6	121	4.3	225	3.9
Native American	42	1.4	35	1.2	77	1.3
Other race/ethnicity	146	5.0	152	5.4	298	5.2
Not reported	6	0.2	0	0.0	6	0.1
Total	2,914	100.0	2,841	100.0	5,755	100.0

Table 3. Survey respondents by paygrade and gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

	Women		Men		Total	
Paygrade	Number	Percent	Number	Percent	Number	Percent
E-1	101	3.7	79	2.9	180	3.3
E-2	332	12.0	272	10.0	604	11.0
E-3	568	20.5	553	20.4	1,121	20.4
E-4	796	28.8	686	25.3	1,482	27.0
E-5	541	19.6	535	19.7	1,076	19.6
E-6	294	10.6	430	15.8	724	13.2
E-7	107	3.9	120	4.4	227	4.1
E-8	24	0.9	24	0.9	48	0.9
E-9	4	0.1	17	0.6	21	0.4
Enlisted total	2,767	100.0	2,716	100.0	5,483	100.0
O-1	30	21.1	25	20.7	55	20.9
O-2	53	37.3	38	31.4	91	34.6
O-3	46	32.4	43	35.5	89	33.8
O-4	8	5.6	11	9.1	19	7.2
O-5	4	2.8	4	3.3	8	3.0
O-6	1	0.7	0	0.0	1	0.4
Officer total	142	100.0	121	100.0	263	100.0
W-1	0	0.0	0	0.0	0	0.0
W-2	3	75.0	2	66.7	5	71.4
W-3	0	0.0	1	33.3	1	14.3
W-4	1	25.0	0	0.0	1	14.3
Warrant total	4	100.0	3	100.0	7	100.0
Missing	1	0.0	1	0.0	2	0.0
Total	2,914	100.0	2,841	100.0	5,755	100.0

Table 4. Survey respondents by number of years served aboard ship and gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Number of years served aboard ship	Women		Men		Total	
	Number	Percent	Number	Percent	Number	Percent
0 to .99	844	29.0	483	17.0	1,327	23.1
1 to 1.99	772	26.5	591	20.8	1,363	23.7
2 to 2.99	533	18.3	394	13.9	927	16.1
3 to 3.99	321	11.0	235	8.3	556	9.7
4 to 4.99	185	6.3	248	8.7	433	7.5
5 to 5.99	111	3.8	173	6.1	284	4.9
6 to 6.99	62	2.1	151	5.3	213	3.7
7 to 7.99	47	1.6	121	4.3	168	2.9
8 to 8.99	17	0.6	105	3.7	122	2.1
9 to 9.99	8	0.3	90	3.2	98	1.7
10 to 10.99	8	0.3	88	3.1	96	1.7
11 to 11.99	4	0.1	65	2.3	69	1.2
12 +	2	0.1	97	3.4	99	1.7
Total	2,914	100.0	2,841	100.0	5,755	100.0

Table 5. Survey respondents by number of previous deployments (30 days or more) and gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Number of previous deployments	Women		Men		Total	
	Number	Percent	Number	Percent	Number	Percent
None	926	31.8	519	18.3	1,445	25.1
1	601	20.6	395	13.9	996	17.3
2	380	13.0	308	10.8	688	12.0
3	222	7.6	285	10.0	507	8.8
4	162	5.6	200	7.0	362	6.3
5	112	3.8	153	5.4	265	4.6
6	66	2.3	148	5.2	214	3.7
7	36	1.2	91	3.2	127	2.2
8	24	0.8	77	2.7	101	1.8
9	16	0.5	52	1.8	68	1.2
10	43	1.5	118	4.2	161	2.8
11 to 20	104	3.6	212	7.5	316	5.5
More than 20	30	1.0	96	3.4	126	2.2
Not reported	192	6.6	187	6.6	379	6.6
Total	2,914	100.0	2,841	100.0	5,755	100.0

Table 6. Survey respondents by marital status and gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

	Women		Men		Total	
Marital status	Number	Percent	Number	Percent	Number	Percent
Never married	1,482	50.9	1,175	41.4	2,657	46.2
Married	975	33.5	1,441	50.7	2,416	42.0
Separated	189	6.5	99	3.5	288	5.0
Divorced	248	8.5	119	4.2	367	6.4
Widowed	9	0.3	1	0.0	10	0.2
Not reported	11	0.4	6	0.2	17	0.3
Total	2,914	100.0	2,841	100.0	5,755	100.0

Table 7. Number of children (natural, adopted, or stepchildren) under the age of 21 living in a household of a survey respondent, by age group of child and respondent gender, US Navy Women Aboard Ship Study 15 NOV 1994 to 31 DEC 1996.

Age group	Women (N = 1,446)*		Men (N = 1,376)*		Total (N = 2,822)*	
No. of children	Number	Percent	Number	Percent	Number	Percent
Under 6 Weeks						
0	783	99.1	848	95.4	1,631	97.1
1	5	0.6	37	4.2	42	2.5
2	2	0.3	3	0.3	5	0.3
3 or more	0	0.0	1	0.1	1	0.1
Total	790	0.9	889	4.6	1,679	2.9
6 Weeks to 1 Year						
0	760	96.2	797	89.7	1,557	92.7
1	30	3.8	88	9.9	118	7.0
2	0	0.0	3	0.3	3	0.2
3 or more	0	0.0	1	0.1	1	0.1
Total	790	3.8	889	10.3	1,679	7.3
12 to 23 Months						
0	708	89.6	796	89.5	1,504	89.6
1	80	10.1	86	9.7	166	9.9
2	2	0.3	6	0.7	8	0.5
3 or more	0	0.0	1	0.1	1	0.1
Total	790	10.4	889	10.5	1,679	10.4
24 to 35 Months						
0	712	90.1	795	89.4	1,507	89.8
1	77	9.7	90	10.1	167	9.9
2	1	0.1	4	0.4	5	0.3
3 or more	0	0.0	0	0.0	0	0.0
Total	790	100.0	889	100.0	1,679	100.0

*This question was only administered to a subset of participants (N= 2,822)

Table 7. — *Continued* – Number of children (natural, adopted, or stepchildren) under the age of 21 living in a household of a survey respondent,by age group of child and respondent gender, US Navy Women Aboard Ship Study 15 NOV 1994 to 31 DEC 1996.

Age group / No. of children	Women (N = 1,446)*		Men (N = 1,376)*		Total (N=2,822)*	
	Number	Percent	Number	Percent	Number	Percent
3 to 5 years						
0	599	75.8	699	78.6	1,298	77.3
1	171	21.6	164	18.4	335	20.0
2	20	2.5	24	2.7	44	2.6
3 or more	0	0.0	2	0.2	2	0.1
Total	790	100.0	889	100.0	1,679	100.0
6 to 9 years						
0	643	81.4	699	78.6	1,342	79.9
1	123	15.6	149	16.8	272	16.2
2	21	2.7	36	4.0	57	3.4
3 or more	3	0.4	5	0.6	8	0.5
Total	790	100.0	889	100.0	1,679	100.0
10 to 12 years						
0	715	90.5	778	87.5	1,493	88.9
1	64	8.1	93	10.5	157	9.4
2	10	1.3	15	1.7	25	1.5
3 or more	1	0.1	3	0.3	4	0.2
Total	790	100.0	889	100.0	1,679	100.0
13 to 15 years						
0	753	95.3	806	90.7	1,559	92.9
1	35	4.4	70	7.9	105	6.3
2	2	0.3	13	1.5	15	0.9
3 or more	0	0.0	0	0.0	0	0.0
Total	790	100.0	889	100.0	1,679	100.0

*This question was only administered to a subset of participants (N= 2,822)

Table 7. — *Continued* — Number of children (natural, adopted, or stepchildren) under the age of 21 living in a household of a survey respondent, by age group of child and respondent gender, US Navy Women Aboard Ship Study 15 NOV 1994 to 31 DEC 1996.

Age group / No. of children	Women (N = 1,446)*		Men (N = 1,376)*		Total (N= 2,822)*	
	Number	Percent	Number	Percent	Number	Percent
16 to 20 years						
0	759	96.1	836	94.0	1,595	95.0
1	28	3.5	35	3.9	63	3.8
2	3	0.4	13	1.5	16	1.0
3 or more	0	0.0	5	0.6	5	0.3
Total	790	100.0	889	100.0	1,679	100.0

*This question was only administered to a subset of participants (N= 2,822)

Table 8. Number of children (natural, adopted, or step children) under the age of 21 years living in households of naval personnel, by marital status, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

		Single †						Married					
Age group		Women (N=478)		Men (N=354)		Total (N=832)		Women (N=306)		Men (N=533)		Total (N=839)	
	No. of children	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Under 6 Weeks													
	0 *	874	99.7	625	99.0	1,499	99.4	557	99.1	700	94.3	1,257	96.4
	1	3	0.3	6	1.0	9	0.6	3	0.5	38	5.1	41	3.1
	2	0	0.0	0	0.0	0	0.0	2	0.4	3	0.4	5	0.4
	3 or more	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Total		877	100	631	100	1,508	100	562	100	742	100	1,304	100
6 Weeks to 1 Year													
	0	866	98.7	623	98.7	1,489	98.7	541	96.3	652	87.9	1,193	91.5
	1	11	1.3	8	1.3	19	1.3	21	3.7	86	11.6	107	8.2
	2	0	0.0	0	0.0	0	0.0	0	0.0	3	0.4	3	0.2
	3 or more	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Total		877	100	631	100	1,508	100	562	100	742	100	1,304	100
12 to 23 Months													
	0	856	97.6	623	98.7	1,479	98.1	499	88.8	650	87.6	1,149	88.1
	1	21	2.4	7	1.1	28	1.9	61	10.9	86	11.6	147	11.3
	2	0	0.0	1	0.2	1	0.1	2	0.4	5	0.7	7	0.5
	3 or more	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.1
Total		877	100	631	100	1,508	100	562	100	742	100	1,304	100
24 to 35 Months													
	0	844	96.2	619	98.1	1,463	97.0	513	91.3	653	88.0	1,166	89.4
	1	33	3.8	12	1.9	45	3.0	48	8.5	85	11.5	133	10.2
	2	0	0.0	0	0.0	0	0.0	1	0.2	4	0.5	5	0.4
	3 or more	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total		877	100	631	100	1,508	100	562	100	742	100	1,304	100

Table 8. — *Continued* — Number of children (natural, adopted, or step children) under the age of 21 years living in households of naval personnel, by marital status, US Navy Women Aboard Ship Study 15 November 1994 to 31 December 1996.

	Single †						Married					
Age group	Women (N=478)		Men (N=354)		Total (N=832)		Women (N=306)		Men (N=533)		Total (N=839)	
No. of children	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
3 to 5 Years												
0	816	93.0	609	96.5	1,425	94.5	426	75.8	567	76.4	993	76.2
1	58	6.6	20	3.2	78	5.2	118	21.0	151	20.4	269	20.6
2	3	0.3	2	0.3	5	0.3	18	3.2	22	3.0	40	3.1
3 or more	0	0.0	0	0.0	0	0.0	0	0.0	2	0.3	2	0.2
Total	877	100	631	100	1,508	100	562	100	742	100	1,304	100
6 to 9 Years												
0	826	94.2	610	96.7	1,436	95.2	461	82.0	569	76.7	1,030	79.0
1	46	5.2	17	2.7	63	4.2	82	14.6	135	18.2	217	16.6
2	3	0.3	4	0.6	7	0.5	18	3.2	33	4.4	51	3.9
3 or more	2	0.2	0	0.0	2	0.1	1	0.2	5	0.7	6	0.5
Total	877	100	631	100	1,508	100	562	100	742	100	1,304	100
10 to 12 Years												
0	851	97.0	620	98.3	1,471	97.5	511	90.9	638	86.0	1,149	88.1
1	23	2.6	10	1.6	33	2.2	43	7.7	86	11.6	129	9.9
2	3	0.3	1	0.2	4	0.3	7	1.2	15	2.0	22	1.7
3 or more	0	0.0	0	0.0	0	0.0	1	0.2	3	0.4	4	0.3
Total	877	100	631	100	1,508	100	562	100	742	100	1,304	100
13 to 15 Years												
0	864	98.5	624	98.9	1,488	98.7	537	95.6	664	89.5	1,201	92.1
1	11	1.3	7	1.1	18	1.2	24	4.3	65	8.8	89	6.8
2	2	0.2	0	0.0	2	0.1	1	0.2	13	1.8	14	1.1
3 or more	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	877	100	631	100	1,508	100	562	100	742	100	1,304	100

Table 8. — *Continued* — Number of children (natural, adopted, or step children) under the age of 21 years living in households of naval personnel, by marital status, US Navy Women Aboard Ship Study 15 NOV 1994 to 31 DEC 1996.

Age group		Single †						Married					
		Women (N=478)		Men (N=354)		Total (N=832)		Women (N=306)		Men (N=533)		Total (N=839)	
	No. of children	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
16 to 20 Years													
	0	870	99.2	624	98.9	1,494	99.1	536	95.4	693	93.4	1,229	94.2
	1	7	0.8	6	1.0	13	0.9	22	3.9	32	4.3	54	4.1
	2	0	0.0	1	0.2	1	0.1	4	0.7	12	1.6	16	1.2
	3 or more	0	0.0	0	0.0	0	0.0	0	0.0	5	0.7	5	0.4
Total		877	100	631	100	1,508	100	562	100	742	100	1,304	100

Table 8. — *Continued* — Number of children (natural, adopted, or step children) under the age of 21 years living in households of naval personnel, by marital status, US Navy Women Aboard Ship Study 15 NOV 1994 to 31 DEC 1996.

Age group		Total (Single † and Married)					
		Women (N=784)		Men (N=887)		Total (N=1.671)	
	No. of children	No.	Percent	No.	Percent	No.	Percent
Under 6 Weeks							
	0	1,431	99.4	1,325	96.5	2,756	98.0
	1	6	0.4	44	3.2	50	1.8
	2	2	0.1	3	0.2	5	0.2
	3 or more	0	0.0	1	0.1	1	0.0
	Total	1,439	100	1,373	100	2,812	100
6 Weeks to 1 Year							
	0	1,407	97.8	1,275	92.9	2,682	95.4
	1	32	2.2	94	6.8	126	4.5
	2	0	0.0	3	0.2	3	0.1
	3 or more	0	0.0	1	0.1	1	0.0
	Total	1,439	100	1,373	100	2,812	100
12 to 23 Months							
	0	1,355	94.2	1,273	92.7	2,628	93.5
	1	82	5.7	93	6.8	175	6.2
	2	2	0.1	6	0.4	8	0.3
	3 or more	0	0.0	1	0.1	1	0.0
	Total	1,439	100	1,373	100	2,812	100
24 to 35 Months							
	0	1,357	94.3	1,272	92.6	2,629	93.5
	1	81	5.6	97	7.1	178	6.3
	2	1	0.1	4	0.3	5	0.2
	3 or more	0	0.0	0	0.0	0	0.0
	Total	1,439	100	1,373	100	2,812	100

Table 8. — *Continued* — Number of children (natural, adopted, or step children) under the age of 21 years living in households of naval personnel, by marital status, US Navy Women Aboard Ship Study 15 NOV 1994 to 31 DEC 1996.

Age group	Total (Single † and Married)					
	Women (N=784)		Men (N=887)		Total (N=1.671)	
No. of children	No.	Percent	No.	Percent	No.	Percent
3 to 5 Years						
0	1,242	86.3	1,176	85.7	2,418	86.0
1	176	12.2	171	12.5	347	12.3
2	21	1.5	24	1.7	45	1.6
3 or more	0	0.0	2	0.1	2	0.1
Total	1,439	100	1,373	100	2,812	100
6 to 9 Years						
0	1,287	89.4	1,179	85.9	2,466	87.7
1	128	8.9	152	11.1	280	10.0
2	21	1.5	37	2.7	58	2.1
3 or more	3	0.2	5	0.4	8	0.3
Total	1,439	100	1,373	100	2,812	100
10 to 12 Years						
0	1,362	94.6	1,258	91.6	2,620	93.2
1	66	4.6	96	7.0	162	5.8
2	10	0.7	16	1.2	26	0.9
3 or more	1	0.1	3	0.2	4	0.1
Total	1,439	100	1,373	100	2,812	100
13 to 15 Years						
0	1,401	97.4	1,288	93.8	2,689	95.6
1	35	2.4	72	5.2	107	3.8
2	3	0.2	13	0.9	16	0.6
3 or more	0	0.0	0	0.0	0	0.0
Total	1,439	100	1,373	100	2,812	100

Table 8. — *Continued* — Number of children (natural, adopted, or step children) under the age of 21 years living in households of naval personnel, by marital status, US Navy Women Aboard Ship Study 15 NOV 1994 to 31 DEC 1996.

Age group	No. of children	Total (Single † and Married) Women (N=784) No.	Percent	Men (N=887) No.	Percent	Total (N=1.671) No.	Percent
16 to 20 Years							
	0	1,406	97.7	1,317	95.9	2,723	96.8
	1	29	2.0	38	2.8	67	2.4
	2	4	0.3	13	0.9	17	0.6
	3 or more	0	0.0	5	0.4	5	0.2
Total		1,439	100	1,373	100	2,812	100

† Includes single parents (either never married, separated, divorced, or widowed)
* Zero values for all age groups include survey respondents who are assumed not to have children by a null response

Table 9. Personnel reporting being medically screened prior to deployment, by gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Were you medically screened preceding this deployment? *	Women		Men		Total	
	No.	Percent	No.	Percent	No.	Percent
Yes	95	3.3	108	3.8	203	3.5
No	475	16.3	501	17.6	976	17.0
Not applicable, not currently deployed	1,841	63.2	1,652	58.1	3,493	60.7
Not reported	503	17.3	580	20.4	1,083	18.8
Total	2,914	100	2,841	100	5,755	100

* Deployment is defined as a ship scheduled at sea for 30 days or more.

Table 10. Self-reported medical conditions during the past 30 days whether or not they resulted in a sick call visit, by gender, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

	Women (N = 2,914)					
	Had Condition		Didn't Have Condition		Not reported	
Condition	Number	Percent	Number	Percent	Number	Percent
Headache	1,986	68.2	872	29.9	56	1.9
Common cold symptoms	1,577	54.1	1,280	43.9	57	2.0
Cough	1,199	41.1	1,629	55.9	86	3.0
Sore throat	1,156	39.7	1,668	57.2	90	3.1
Sinus trouble	1,071	36.8	1,732	59.4	111	3.8
Pain in stomach or abdominal area	1,056	36.2	1,767	60.6	91	3.1
Back problems	864	29.6	1,943	66.7	107	3.7
Stomach problems	772	26.5	2,032	69.7	110	3.8
Dizziness	700	24.0	2,108	72.3	106	3.6
Irritated eyes	691	23.7	2,103	72.2	120	4.1
Nausea / vomiting	682	23.4	2,110	72.4	122	4.2
Fever	628	21.6	2,178	74.7	108	3.7
Skin problems	608	20.9	2,194	75.3	112	3.8
Muscle sprain or strain	599	20.6	2,184	74.9	131	4.5
Indigestion	551	18.9	2,222	76.3	141	4.8
Chills	533	18.3	2,259	77.5	122	4.2
Constipation	494	17.0	2,292	78.7	128	4.4
Shortness of breath	435	14.9	2,357	80.9	122	4.2
Hoarseness	352	12.1	2,430	83.4	132	4.5
Hay fever	304	10.4	2,473	84.9	137	4.7
Trouble seeing with one or both eyes even if wearing glasses or contacts	292	10.0	2,485	85.3	137	4.7
Hearing problems	283	9.7	2,504	85.9	127	4.4
Diarrhea lasting at least 3 days	269	9.2	2,511	86.2	134	4.6
Flu	261	9.0	2,519	86.4	134	4.6

Table 10. — *Continued* — Self-reported medical conditions during the past 30 days whether or not they resulted in a sick call visit, by gender, US Navy women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

	Men (N = 2,841)					
	Had Condition		Didn't Have Condition		Not reported	
Condition	Number	Percent	Number	Percent	Number	Percent
Headache	1,407	49.5	1,374	48.4	60	2.1
Common cold symptoms	1,305	45.9	1,509	53.1	27	1.0
Cough	1,008	35.5	1,779	62.6	54	1.9
Sore throat	871	30.7	1,906	67.1	64	2.3
Sinus trouble	815	28.7	1,958	68.9	68	2.4
Back problems	676	23.8	2,095	73.7	70	2.5
Muscle sprain or strain	544	19.1	2,205	77.6	92	3.2
Irritated eyes	497	17.5	2,259	79.5	85	3.0
Skin problems	420	14.8	2,331	82.0	90	3.2
Stomach problems	413	14.5	2,350	82.7	78	2.7
Indigestion	405	14.3	2,349	82.7	87	3.1
Fever	398	14.0	2,366	83.3	77	2.7
Pain in stomach or abdominal area	385	13.6	2,364	83.2	92	3.2
Dizziness	334	11.8	2,411	84.9	96	3.4
Chills	308	10.8	2,434	85.7	99	3.5
Hearing problems	305	10.7	2,442	86.0	94	3.3
Hay fever	252	8.9	2,495	87.8	94	3.3
Flu	232	8.2	2,515	88.5	94	3.3
Shortness of breath	231	8.1	2,514	88.5	96	3.4
Diarrhea lasting at least 3 days	200	7.0	2,551	89.8	90	3.2
Nausea / vomiting	200	7.0	2,545	89.6	96	3.4
Trouble seeing with one or both eyes even if wearing glasses or contacts	195	6.9	2,547	89.7	99	3.5
Hoarseness	191	6.7	2,553	89.9	97	3.4
Constipation	147	5.2	2,598	91.4	96	3.4

Table 11. Availability of counseling during the past 30 days according to respondent, by gender, personnel aboard 22 U.S. Navy ships, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Type of counseling *	Strongly agree				Agree				Neither agree or disagree				Disagree				Strongly disagree			
	Men		Women		Men		Women		Men		Women		Men		Women		Men		Women	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
a. Alcohol abuse	144	16.3	131	15.0	304	34.5	263	30.1	157	17.8	188	21.5	46	5.2	35	4.0	32	3.6	57	6.5
b. Birth control methods	120	13.6	160	18.3	280	31.8	290	33.1	168	19.1	171	19.5	39	4.4	34	3.9	38	4.3	52	5.9
c. Drug abuse	139	15.8	127	14.5	301	34.2	260	29.7	160	18.2	182	20.8	43	4.9	41	4.7	35	4.0	56	6.4
d. Family planning	118	13.4	103	11.8	274	31.1	248	28.3	199	22.6	208	23.8	61	6.9	56	6.4	36	4.1	63	7.2
e. Medical concerns	134	15.2	114	13.0	317	36.0	299	34.2	184	20.9	185	21.1	51	5.8	71	8.1	30	3.4	65	7.4
f. Quitting smoking	105	11.9	102	11.7	255	28.9	224	25.6	197	22.4	225	25.7	54	6.1	54	6.2	51	5.8	61	7.0
g. Stress management	121	13.7	94	10.7	261	29.6	244	27.9	197	22.4	202	23.1	71	8.1	92	10.5	52	5.9	85	9.7
h. Weight control	115	13.1	99	11.3	248	28.1	231	26.4	206	23.4	204	23.3	58	6.6	94	10.7	50	5.7	73	8.3

* This table presents answers to the following question:
"During the past 30 days, I felt counseling was readily available to me on: (type of counseling)"
Totals represent all participants including nonrespondents on this question

Table 11 —*Continued*— Availability of counseling during the past 30 days according to respondent, by gender, personnel aboard 22 U.S. Navy ships, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Type of counseling *	Not applicable				Did not answer				Total			
	Men		Women		Men		Women		Men		Women	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
a. Alcohol abuse	131	14.9	165	18.9	67	7.6	36	4.1	881	100.0	875	100.0
b. Birth control methods	154	17.5	133	15.2	82	9.3	35	4.0	881	100.0	875	100.0
c. Drug abuse	133	15.1	173	19.8	70	7.9	36	4.1	881	100.0	875	100.0
d. Family planning	124	14.1	159	18.2	69	7.8	38	4.3	881	100.0	875	100.0
e. Medical concerns	97	11.0	99	11.3	68	7.7	42	4.8	881	100.0	875	100.0
f. Quitting smoking	148	16.8	173	19.8	71	8.1	36	4.1	881	100.0	875	100.0
g. Stress management	111	12.6	118	13.5	68	7.7	40	4.6	881	100.0	875	100.0
h. Weight control	134	15.2	135	15.4	70	7.9	39	4.5	881	100.0	875	100.0

* This table presents answers to the following question:
"During the past 30 days, I felt counseling was readily available to me on: (type of counseling)"

Table 12. Availability of gynecological supplies, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Supplies*	Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Did not need		Did not respond	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
a. Birth control pills	972	33.4	545	18.7	180	6.2	70	2.4	74	2.5	875	30.0	198	6.8
b. Depo-Provera, Norplant	736	25.3	436	15.0	278	9.5	61	2.1	57	2.0	1,136	39.0	210	7.2
c. Condoms	964	33.1	524	18.0	164	5.6	25	0.9	31	1.1	999	34.3	207	7.1
d Diaphragm	406	13.9	322	11.1	476	16.3	62	2.1	40	1.4	1,373	47.1	235	8.1
e. Pregnancy testing or test kit	768	26.4	496	17.0	218	7.5	46	1.6	38	1.3	1,127	38.7	221	7.6
f. Family planning information	521	17.9	433	14.9	412	14.1	77	2.6	43	1.5	1,197	41.1	231	7.9
g. Appropriately staffed and equipped Ob/Gyn medical support	520	17.8	471	16.2	440	15.1	256	8.8	308	10.6	696	23.9	223	7.7

* This table presents answers to the following question from 2,914 women:
"During the past 30 days, the following were readily available to me from the ship's medical department"

Table 13. Self-reported occupational exposures, by gender, US Navy women aboard ship study, 15 NOV 1994 to 31 DEC 1996.

	Women (N = 2,914)									
	Exposed		Not exposed		Uncertain		Not reported		Total	
Occupational exposures	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Adhesives or gluing compounds	586	20.1	2,045	70.2	193	6.6	90	3.1	2,914	100.0
Asbestos (loose)	233	8.0	2,206	75.7	417	14.3	58	2.0	2,914	100.0
Carbon monoxide	196	6.7	2,348	80.6	285	9.8	85	2.9	2,914	100.0
Diesel exhaust within 50 feet	417	14.3	2,211	75.9	227	7.8	59	2.0	2,914	100.0
Diesel fuel within 50 feet	412	14.1	2,235	76.7	207	7.1	60	2.1	2,914	100.0
Dry cleaning solvent	330	11.3	2,388	81.9	132	4.5	64	2.2	2,914	100.0
Dust or particles	1,458	50.0	1,278	43.9	93	3.2	85	2.9	2,914	100.0
Ethylene dibromide (EDB)	15	0.5	2,537	87.1	297	10.2	65	2.2	2,914	100.0
Exhaust from gasoline engine	496	17.0	2,182	74.9	168	5.8	68	2.3	2,914	100.0
Explosives (nonnuclear) within 50 feet	184	6.3	2,517	86.4	133	4.6	80	2.7	2,914	100.0
Gasoline (liquid or vapor)	596	20.5	2,101	72.1	146	5.0	71	2.4	2,914	100.0
Guided missile fuel	23	0.8	2,725	93.5	92	3.2	74	2.5	2,914	100.0
High temperature (above 95 degrees F)	1,187	40.7	1,583	54.3	73	2.5	71	2.4	2,914	100.0
Hypodermic needles (used)	162	5.6	2,634	90.4	48	1.6	70	2.4	2,914	100.0
Insecticides	230	7.9	2,496	85.7	125	4.3	63	2.2	2,914	100.0
Jet exhaust within 50 feet	46	1.6	2,757	94.6	58	2.0	53	1.8	2,914	100.0
Jet fuel within 50 feet	125	4.3	2,658	91.2	65	2.2	66	2.3	2,914	100.0
Lifting 25 to 49 pounds	1,572	53.9	1,236	42.4	49	1.7	57	2.0	2,914	100.0
Lifting 50 or more pounds	846	29.0	1,898	65.1	87	3.0	83	2.8	2,914	100.0
Loud noise (such as jets)	835	28.7	1,967	67.5	43	1.5	69	2.4	2,914	100.0

Table 13. —*Continued*— Self-reported occupational exposures, by gender, US Navy women aboard ship study, 15 NOV 1994 to 31 DEC 1996.

Occupational exposures	Women (N = 2,914)									
	Exposed		Not exposed		Uncertain		Not reported		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Low temperature (below 32 degrees F)	302	10.4	2,497	85.7	49	1.7	66	2.3	2914	100.0
Metal scrapings or filings	451	15.5	2,278	78.2	91	3.1	94	3.2	2914	100.0
Microwave oven within 3 feet	1,303	44.7	1,498	51.4	45	1.5	68	2.3	2914	100.0
Nitrous oxide	28	1.0	2,565	88.0	245	8.4	76	2.6	2914	100.0
Nuclear fuel within 50 feet	27	0.9	2,681	92.0	143	4.9	63	2.2	2914	100.0
Nuclear medicines (radioisotopes)	37	1.3	2,662	91.4	135	4.6	80	2.7	2914	100.0
Nuclear ordnance within 50 feet	44	1.5	2,637	90.5	162	5.6	71	2.4	2914	100.0
Nuclear reactor within 50 feet	80	2.7	2,644	90.7	126	4.3	64	2.2	2914	100.0
Paint (oil based, or thinner)	1,091	37.4	1,674	57.4	83	2.8	66	2.3	2914	100.0
Paint scrapings or paint sanding	894	30.7	1,878	64.4	62	2.1	80	2.7	2914	100.0
Paint, other or unknown type	904	31.0	1,806	62.0	121	4.2	83	2.8	2914	100.0
Perchlorethylene (PERC)	27	0.9	2,522	86.5	293	10.1	72	2.5	2914	100.0
Radar antenna or array within 50 feet	258	8.9	2,370	81.3	207	7.1	79	2.7	2914	100.0
Torpedo fuel	34	1.2	2,740	94.0	70	2.4	70	2.4	2914	100.0
Transmitting antenna within 50 feet	178	6.1	2,456	84.3	214	7.3	66	2.3	2914	100.0
Video display terminal (VDT, CRT)	556	19.1	2,123	72.9	152	5.2	83	2.8	2914	100.0

Table 13. —*Continued*— Self-reported occupational exposures, by gender, US Navy women aboard ship study, 15 November 1994 to 31 December 1996.

Occupational exposures	Men (N = 2,841)									
	Exposed		Not exposed		Uncertain		Not reported		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Adhesives or gluing compounds	901	31.7	1,698	59.8	152	5.4	90	3.2	2841	100.0
Asbestos (loose)	389	13.7	1,959	69.0	423	14.9	70	2.5	2841	100.0
Carbon monoxide	426	15.0	2,049	72.1	269	9.5	97	3.4	2841	100.0
Diesel exhaust within 50 feet	676	23.8	1,914	67.4	174	6.1	77	2.7	2841	100.0
Diesel fuel within 50 feet	603	21.2	2,002	70.5	161	5.7	75	2.6	2841	100.0
Dry cleaning solvent	486	17.1	2,161	76.1	122	4.3	72	2.5	2841	100.0
Dust or particles	1,401	49.3	1,229	43.3	117	4.1	94	3.3	2841	100.0
Ethylene dibromide (EDB)	18	0.6	2,434	85.7	320	11.3	69	2.4	2841	100.0
Exhaust from gasoline engine	784	27.6	1,830	64.4	141	5.0	86	3.0	2841	100.0
Explosives (nonnuclear) within 50 feet	314	11.1	2,350	82.7	106	3.7	71	2.5	2841	100.0
Gasoline (liquid or vapor)	749	26.4	1,891	66.6	123	4.3	78	2.7	2841	100.0
Guided missile fuel	39	1.4	2,646	93.1	72	2.5	84	3.0	2841	100.0
High temperature (above 95 degrees F)	1,384	48.7	1,324	46.6	65	2.3	68	2.4	2841	100.0
Hypodermic needles (used)	147	5.2	2,548	89.7	63	2.2	83	2.9	2841	100.0
Insecticides	253	8.9	2,405	84.7	110	3.9	73	2.6	2841	100.0
Jet exhaust within 50 feet	101	3.6	2,625	92.4	41	1.4	74	2.6	2841	100.0
Jet fuel within 50 feet	186	6.5	2,538	89.3	42	1.5	75	2.6	2841	100.0
Lifting 25 to 49 pounds	1,901	66.9	822	28.9	47	1.7	71	2.5	2841	100.0
Lifting 50 or more pounds	1,613	56.8	1,071	37.7	66	2.3	91	3.2	2841	100.0

Table 13. —*Continued*— Self-reported occupational exposures, by gender, US Navy women aboard ship study, 15 November 1994 to 31 December 1996.

Occupational exposures	Men (N = 2,841)									
	Exposed		Not exposed		Uncertain		Not reported		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Loud noise (such as jets)	962	33.9	1,734	61.0	55	1.9	90	3.2	2841	100.0
Low temperature (below 32 degrees F)	424	14.9	2,299	80.9	37	1.3	81	2.9	2841	100.0
Metal scrapings or filings	736	25.9	1,932	68.0	79	2.8	94	3.3	2841	100.0
Microwave oven within 3 feet	57	2.0	2,491	87.7	219	7.7	74	2.6	2841	100.0
Nitrous oxide	100	3.5	2,550	89.8	119	4.2	72	2.5	2841	100.0
Nuclear fuel within 50 feet	42	1.5	2,585	91.0	136	4.8	78	2.7	2841	100.0
Nuclear medicines (radioisotopes)	91	3.2	2,548	89.7	128	4.5	74	2.6	2841	100.0
Nuclear ordnance within 50 feet	255	9.0	2,423	85.3	98	3.4	65	2.3	2841	100.0
Nuclear reactor within 50 feet	1,048	36.9	1,626	57.2	78	2.7	89	3.1	2841	100.0
Paint (oil based, or thinner)	905	31.9	1,713	60.3	141	5.0	82	2.9	2841	100.0
Paint scrapings or paint sanding	20	0.7	2,416	85.0	331	11.7	74	2.6	2841	100.0
Paint, other or unknown type	384	13.5	2,183	76.8	184	6.5	90	3.2	2841	100.0
Perchlorethylene (PERC)	816	28.7	1,844	64.9	102	3.6	79	2.8	2841	100.0
Radar antenna or array within 50 feet	42	1.5	2,648	93.2	64	2.3	87	3.1	2841	100.0
Torpedo fuel	290	10.2	2,257	79.4	215	7.6	79	2.8	2841	100.0
Transmitting antenna within 50 feet	597	21.0	1,994	70.2	167	5.9	83	2.9	2841	100.0
Video display terminal (VDT, CRT)	784	27.6	1,902	66.9	84	3.0	71	2.5	2841	100.0

Table 14. Availability of protective gear for use in current job, by gender, US Navy women aboard ship study 15 NOV 1994 to 31 DEC 1996.

Women (N=2,914)

Protective Gear	Is this item available?								Does it fit you properly?							
	No		Yes		Sometimes		Did not answer		No		Yes		Sometimes		Did not answer	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Gloves	267	9.2	2,178	74.7	310	10.6	159	5.5	322	11.1	1,507	51.7	407	14.0	678	23.3
Respirator or mask	379	13.0	2,169	74.4	167	5.7	199	6.8	150	5.1	1,840	63.1	117	4.0	807	27.7
Protective gloves	343	11.8	2,108	72.3	239	8.2	224	7.7	344	11.8	1,443	49.5	316	10.8	811	27.8
Boots	434	14.9	2,131	73.1	112	3.8	237	8.1	267	9.2	1,626	55.8	163	5.6	858	29.4
Ear plugs	186	6.4	2,453	84.2	98	3.4	177	6.1	68	2.3	2,099	72.0	66	2.3	681	23.4
Film Badges	1,417	48.6	754	25.9	112	3.8	631	21.7	-	-	-	-	-	-	-	-
Hazardous material suit	997	34.2	1,355	46.5	138	4.7	424	14.6	472	16.2	817	28.0	217	7.4	1,408	48.3
Fire fighting suit	651	22.3	1,889	64.8	70	2.4	304	10.4	608	20.9	894	30.7	307	10.5	1,105	37.9

Protective Gear	Do you wear it when needed?								Does it seriously interfere with your ability to do your work?							
	No		Yes		Sometimes		Did not answer		No		Yes		Sometimes		Did not answer	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Gloves	68	2.3	1,905	65.4	266	9.1	675	23.2	1,312	45.0	266	9.1	631	21.7	705	24.2
Respirator or mask	143	4.9	1,784	61.2	178	6.1	809	27.8	1,542	52.9	203	7.0	316	10.8	853	29.3
Protective gloves	92	3.2	1,805	61.9	199	6.8	818	28.1	1,272	43.7	282	9.7	508	17.4	852	29.2
Boots	96	3.3	1,887	64.8	69	2.4	862	29.6	1,693	58.1	168	5.8	159	5.5	894	30.7
Ear plugs	65	2.2	2,018	69.3	153	5.3	678	23.3	1,902	65.3	142	4.9	148	5.1	722	24.8
Film Badges	485	16.6	689	23.6	54	1.9	1,686	57.9	1,076	36.9	51	1.8	88	3.0	1,699	58.3
Hazardous material suit	305	10.5	1,112	38.2	93	3.2	1,404	48.2	1,132	38.8	150	5.1	216	7.4	1,416	48.6
Fire fighting suit	180	6.2	1,564	53.7	53	1.8	1,117	38.3	1,062	36.4	384	13.2	336	11.5	1,132	38.8

Table 14. — *Continued* — Availability of protective gear for use in current job, by gender, US Navy women aboard ship study 15 NOV 1994 - 31 DEC 1996.

Men (N=2,841)

Protective Gear	Is this item available?								Does it fit you properly?							
	No		Yes		Sometimes		Did not answer		No		Yes		Sometimes		Did not answer	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Gloves	179	6.3	2,292	80.7	282	9.9	88	3.1	127	4.5	1,863	65.6	323	11.4	528	18.6
Respirator or mask	235	8.3	2,311	81.3	182	6.4	113	4.0	74	2.6	2,058	72.4	108	3.8	601	21.2
Protective gloves	228	8.0	2,262	79.6	240	8.4	111	3.9	128	4.5	1,857	65.4	256	9.0	600	21.1
Boots	399	14.0	2,209	77.8	112	3.9	121	4.3	161	5.7	1,889	66.5	127	4.5	664	23.4
Ear plugs	100	3.5	2,550	89.8	92	3.2	99	3.5	42	1.5	2,243	79.0	52	1.8	504	17.7
Film Badges	1,350	47.5	954	33.6	115	4.0	422	14.9	-	-	-	-	-	-	-	-
Hazardous material suit	905	31.9	1,515	53.3	154	5.4	267	9.4	399	14.0	1,135	40.0	156	5.5	1,151	40.5
Fire fighting suit	473	16.6	2,120	74.6	73	2.6	175	6.2	339	11.9	1,366	48.1	302	10.6	834	29.4

Protective Gear	Do you wear it when needed?								Does it seriously interfere with your ability to do your work?							
	No		Yes		Sometimes		Did not answer		No		Yes		Sometimes		Did not answer	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Gloves	72	2.5	1,975	69.5	258	9.1	536	18.9	1,291	45.4	298	10.5	706	24.9	546	19.2
Respirator or mask	88	3.1	1,938	68.2	206	7.3	609	21.4	1,576	55.5	238	8.4	392	13.8	635	22.4
Protective gloves	76	2.7	1,925	67.8	223	7.8	617	21.7	1,332	46.9	307	10.8	571	20.1	631	22.2
Boots	98	3.4	1,982	69.8	74	2.6	687	24.2	1,797	63.3	179	6.3	165	5.8	700	24.6
Ear plugs	50	1.8	2,109	74.2	161	5.7	521	18.3	1,966	69.2	173	6.1	156	5.5	546	19.2
Film Badges	505	17.8	847	29.8	70	2.5	1,419	49.9	1,192	42.0	94	3.3	110	3.9	1,445	50.9
Hazardous material suit	332	11.7	1,260	44.4	98	3.4	1,151	40.5	1,254	44.1	195	6.9	226	8.0	1,166	41.0
Fire fighting suit	178	6.3	1,746	61.5	65	2.3	852	30.0	1,232	43.4	392	13.8	348	12.2	869	30.6

Table 14. — *Continued* — Availability of protective gear for use in current job, by gender, US Navy women aboard ship study 15 NOV 1994 - 31 DEC 1996.

Women and Men (N=5,755)

Protective Gear	Is this item available?								Does it fit you properly?							
	No		Yes		Sometimes		Did not answer		No		Yes		Sometimes		Did not answer	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Gloves	446	7.7	4,470	77.7	592	10.3	247	4.3	449	7.8	3,370	58.6	730	12.7	1,206	21.0
Respirator or mask	614	10.7	4,480	77.8	349	6.1	312	5.4	224	3.9	3,898	67.7	225	3.9	1,408	24.5
Protective gloves	571	9.9	4,370	75.9	479	8.3	335	5.8	472	8.2	3,300	57.3	572	9.9	1,411	24.5
Boots	833	14.5	4,340	75.4	224	3.9	358	6.2	428	7.4	3,515	61.1	290	5.0	1,522	26.4
Ear plugs	286	5.0	5,003	86.9	190	3.3	276	4.8	110	1.9	4,342	75.4	118	2.1	1,185	20.6
Film Badges	2,767	48.1	1,708	29.7	227	3.9	1,053	18.3	-	-	-	-	-	-	-	-
Hazardous material suit	1,902	33.0	2,870	49.9	292	5.1	691	12.0	871	15.1	1,952	33.9	373	6.5	2,559	44.5
Fire fighting suit	1,124	19.5	4,009	69.7	143	2.5	479	8.3	947	16.5	2,260	39.3	609	10.6	1,939	33.7

Protective Gear	Do you wear it when needed?								Does it seriously interfere with your ability to do your work?							
	No		Yes		Sometimes		Did not answer		No		Yes		Sometimes		Did not answer	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Gloves	140	2.4	3,880	67.4	524	9.1	1,211	21.0	2,603	45.2	564	9.8	1,337	23.2	1,251	21.7
Respirator or mask	231	4.0	3,722	64.7	384	6.7	1,418	24.6	3,118	54.2	441	7.7	708	12.3	1,488	25.9
Protective gloves	168	2.9	3,730	64.8	422	7.3	1,435	24.9	2,604	45.2	589	10.2	1,079	18.7	1,483	25.8
Boots	194	3.4	3,869	67.2	143	2.5	1,549	26.9	3,490	60.6	347	6.0	324	5.6	1,594	27.7
Ear plugs	115	2.0	4,127	71.7	314	5.5	1,199	20.8	3,868	67.2	315	5.5	304	5.3	1,268	22.0
Film Badges	990	17.2	1,536	26.7	124	2.2	3,105	54.0	2,268	39.4	145	2.5	198	3.4	3,144	54.6
Hazardous material suit	637	11.1	2,372	41.2	191	3.3	2,555	44.4	2,386	41.5	345	6.0	442	7.7	2,582	44.9
Fire fighting suit	358	6.2	3,310	57.5	118	2.1	1,969	34.2	2,294	39.9	776	13.5	684	11.9	2,001	34.8

Table 15. Number and percent of women who reported requesting a gynecological appointment prior to deployment US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Appointment requested	Women	
	No.	Percent
Yes	216	7.4
No	1,647	56.5
Not reported	1,051	36.1
Total	2,914	100.0

This table pertains to the following question: "Did you request a pre-deployment appointment with a gynecologist or obstetrician from a Navy medical facility prior to this deployment ?"

Table 16. Number and percent of women requesting a gynecological appointment prior to deployment who reported receiving one, US Navy Women Aboard Ship Study, 15 NOV 1994 to 31 DEC 1996.

Received requested appointment	Women	
	No.	Percent
Yes	177	81.9
No	33	15.3
Not reported	6	2.8
Total	216	100.0

This table pertains to the following question: "Were you given a gynecological or obstetrical appointment ?" as answered by women who reported requesting an appointment

CONCLUSIONS

This tabular presentation has provided information on the population participating in the U.S. Navy Women Aboard Ship Study with a focus on demographics, family structure, women's health-related issues, and occupational exposures. This population consisted primarily of young (under age 30) and enlisted personnel. The vast majority of women agreed that counseling for a wide range of medically-related issues was readily available. However, 83.3% report having not been medically screened prior to deployment.

REFERENCES

1. Norris F. Screening for traumatic stress. J Appl Soc Psychol 1990; 20:1704-18.

2. Bernstein E. Development, reliability, and validity of a dissociation scale. J Nerv Ment Dis 1986; 174:285-93.

3. Centers for Disease Control and Prevention, National Health Interview Survey.

4. Centers for Disease Control and Prevention, Health Interview Survey Form HIS-1, 1992.

5. Centers for Disease Control and Prevention, Health Interview Survey Form HIS-2, 1992.

6. Centers for Disease Control and Prevention, National Ambulatory Health Care Survey, 1994, 1995, 1996.

7. Centers for Disease Control and Prevention, Youth Behavior Survey.

8. Radloff L. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Measurement 1977; 1:385-401.

9. Naval Health Research Center. NHRC Technical Report 88-43, reporting on Andrews-Withey 1976 Quality of Life Scale, 1988.

REPORT TOPIC AREA: **Expected Occurrence of Ectopic Pregnancies and Spontaneous Abortions During the First 20 Weeks of Pregnancy in Navy Women Serving Aboard Ship**

LEAD AUTHOR: Frank C. Garland, Ph.D., Edward D. Gorham, M.P.H., Cedric F. Garland, Dr.P.H., and D. Stephen Nice, Ph.D.

ABSTRACT

In order to determine the expected number of ectopic pregnancies and spontaneous abortions in the first 20 weeks of pregnancy in women aboard ship, data were obtained from three studies of reproductive outcomes in active-duty U.S. Navy women: (1) the Hospitalized Pregnancy Study, (2) the Women Aboard Ship Study, and (3) the Enlisted Personnel Pregnancy Study. Each study had unique advantages for the purpose of estimation of expected numbers of events. The overall pregnancy rate in women assigned aboard ship in the 53 ships available from the Women Aboard Ship Study was 19 per 100 woman-years, with the highest mean rates reported for submarine tenders (27 per 100 woman-years) and the lowest mean rates for amphibious assault ships (0 per 100 woman-years).

INTRODUCTION

This is a report of the expected occurrence of ectopic pregnancy and spontaneous abortion during the first 20 weeks of pregnancy in Navy women serving aboard various types of ships. Rates of ectopic pregnancy and spontaneous abortion were obtained from three studies of reproductive outcomes in active-duty U.S. Navy women: (1) the Hospitalized Pregnancy Study, (2) the Women Aboard Ship Study, and (3) the Enlisted Personnel Pregnancy Study. The Women Aboard Ship study also provided the additional information required for calculation of expected numbers of adverse events (pregnancy rates by ship and percent time at sea and deployed). Due to differences in methodology, each study had unique advantages for the purpose of projecting rates of expected adverse events.

The incidence rates used for calculation of expected numbers of adverse pregnancy outcomes were 2.7 per 100 pregnancies for ectopic pregnancy and 9.5 per 100 pregnancies for spontaneous abortion. Expected numbers of adverse outcomes according to ship type were calculated using pregnancy rates that were specific for type of ship.

From modeled data, for example, the projected annual number of ectopic pregnancies by ship type was: 1 for an aircraft carrier with 274 women aboard, with 0.4 expected while deployed (approximately one every two and one-half years); 3 for a submarine tender with 398 women aboard, with 0.1 while deployed; and 2 for a destroyer tender with 454 women aboard, with 0.5 while deployed. The projected annual number of spontaneous abortions was: 4 for an aircraft carrier with

274 women aboard, with 1.5 while deployed; 10 for a submarine tender with 398 women aboard, with 0.4 while deployed; and 6 for a destroyer tender with 454 women aboard, with 1.6 while deployed.

The projected annual number of ectopic pregnancies for all women serving aboard ship (N=8,293), and remaining aboard for the first 20 weeks of pregnancy, was 44, with 8 occurring during deployments. The projected annual expected number of spontaneous abortions was 156, with 28 occurring while deployed.

METHODS

A brief description of each study is provided below, with a discussion of strengths and limitations of methods used.

(1) Hospitalized Pregnancy Study. (Principal investigators: S. Nice, R. Calderon) Naval Health Research Center

Population: All active-duty Navy enlisted women hospitalized in Navy hospitals for pregnancy-related outcomes during 1982-1992. The sample size included 33,130 pregnancies. Rates of adverse outcomes were calculated per 100 hospitalized pregnancies.

Strengths: Includes all hospitalizations for active-duty Navy enlisted women in Navy facilities for pregnancy-related outcomes, and therefore is not subject to low response rates or forms of response biases possibly encountered in self-reported data. This study provides a good estimate of the occurrence of ectopic pregnancy, since this is a serious condition requiring hospitalization.

Limitations: Uses hospitalized pregnancy outcomes to identify pregnancies. This approach is most appropriate for ascertaining serious early adverse outcomes such as ectopic pregnancies. It is less likely to completely ascertain early events in pregnancy, such as spontaneous abortions, that do not necessarily result in hospitalization. Elective abortions, as such, are not performed in Navy Medical Facilities as a matter of policy. Since this study is limited to hospitalizations in Navy facilities, pregnancy-related hospitalizations or births outside Navy facilities were not included. All ectopic pregnancies were assumed to have been diagnosed in the first 20 weeks of pregnancy.

(2) Women Aboard Ship Study (Principal investigator, F. Garland) Naval Health Research Center

Population for rates of adverse outcomes: A total of 2,914 women assigned aboard 36 U.S. Navy ships (65% response rate) during 15 November 1994 - 31 December 1995 with 621 women providing self-reported information on the outcome of their most recent pregnancy. The analysis was restricted to women whose most recent pregnancy outcome was 260 days before the date of filling out the questionnaire. This time interval allowed women with normal pregnancies time to

return to ships and become part of the shipboard population (specifically, weeks 20 through the end of a normal pregnancy, followed by 4 weeks of family leave from the ship). Elective abortions (N=69) were excluded from numerators and denominators in calculation of rates.

Strengths: Data were collected directly from women regarding their most recent pregnancy. Pregnancies that ended in any outcome were ascertained, regardless of whether the mother was hospitalized or treated in a Navy facility. This approach is suitable for ascertaining early reproductive outcomes that do not necessarily result in hospitalization, such as spontaneous abortions.

Limitations: Outcomes in respondents may have differed from those in women who did not respond to the questionnaire. This could cause underestimation of adverse outcomes if women who had such outcomes were less likely to complete the questionnaire, or overestimation if women with adverse outcomes were more likely to complete the questionnaire. This study is ongoing, and eventually will include more events.

Population for pregnancy rates for women aboard ship: The number of women crew and pregnancies during specified time intervals were obtained from the personnel and medical departments, respectively, aboard all ships participating in the Women Aboard Ship study. Data from 6,166 women aboard 53 ships (accounting for 75% of women serving aboard Navy ships) were available for this report. These included the 36 ships (above) analyzed for adverse pregnancy outcomes plus 17 ships visited more recently. The number of women crew assigned at the time of interview of medical department personnel was multiplied by the duration of the reporting period of shipboard pregnancies to obtain women-years aboard each ship. Pregnancies aboard ship were ascertained directly from the medical department of each ship. This procedure eliminated non-response and other biases associated with self-reporting of pregnancy, but depended on accurate recording and reporting of pregnancies by each ship's medical department. The pregnancy rate was calculated by dividing the number of pregnancies reported by the medical department (identified from all sources) occurring in women assigned aboard each ship by the number of women-years for the ship. The 95% confidence intervals on pregnancy rates were calculated using the normal approximation to the binomial distribution [1].

Days in port, at sea, and deployed (at sea more than 30 days) were estimated from review of ship schedules which were available for most ships in the study at the time of this report. The percent times were discussed with appropriate personnel at COMNAVSURFPAC to assess the validity of the range of estimates. However, the great variability in scheduling due to maintenance and operational factors make the estimates approximate estimations at best, and they may not be applicable to any single ship at a particular point in time. The Navy Bureau of Personnel provided number of women assigned aboard all Navy ships as of November 1996 for use in projections applicable to women aboard all Navy ships.

(3) **Enlisted Personnel Pregnancy Study (Principal Investigators, P.J. Thomas, J.E. Edwards)**
Naval Personnel Research and Development Command

Population: A cross-sectional study performed in 1988 of approximately N=200 Navy enlisted women who currently were pregnant and N=900 who had ever been pregnant [2]. The purpose of this study was to estimate pregnancy rates according to pay grade and other service and demographic factors. This study reported an adverse pregnancy outcome category of miscarriage only, and did not provide data on ectopic pregnancy.

Strengths: This study identified a moderately large sample of women who were currently or ever had been pregnant, providing adequate sample size.

Limitations: Pregnancy outcomes experienced by women who responded to the questionnaire may have differed from those in women who did not respond. Specific categories of adverse outcomes, including spontaneous abortion, were not provided. For this reason, this study primarily was used to assess consistency of estimates of specific adverse pregnancy outcomes obtained from the Hospitalized Pregnancy Study and the Women Aboard Ship Study.

RESULTS

Shipboard Pregnancy Rate Analysis

There were 778 pregnancies ascertained in 6,166 women crew members aboard 53 ships with 4,129 person-years of reporting during 1995-1996 (Table 1). The overall mean pregnancy rate was 19 per 100 woman-years (95% confidence interval 18-20 per 100 woman-years). The rate varied somewhat according to ship type. The highest mean pregnancy rate was in submarine tenders (27 per 100 woman-years) and the lowest was aboard amphibious assault ships (0 per 100 woman-years).

Ectopic pregnancy

The rate of ectopic pregnancies during the first 20 weeks of pregnancy was 2.7% in the Hospitalized Pregnancy Study and 1.1% in the Women Aboard Ship Study (Table 2). The rate of 2.7% from the Hospitalized Pregnancy Study was used for projection of the number of ectopic pregnancies expected aboard ship. This yielded an estimated annual 33 ectopic pregnancies for 6,166 women aboard 53 ships, had all pregnant women remained aboard for the first 20 weeks of pregnancy. Of these ectopic pregnancies, 6 were projected to occur among women on deployments (Table 3).

Based on modeling of observed data, the projected annual number of ectopic pregnancies was: 1 for an aircraft carrier with 274 female crew, with 0.4 expected while deployed (approximately one every two and one-half years); 3 for a submarine tender with 398 women aboard,

with 0.1 while deployed, and; 2 for a destroyer tender with 454 women aboard, with 0.5 while deployed (Table 4). If the experience of the women and ships not available in the study to date were the same as those participating, the expected total number of ectopic pregnancies for all women serving aboard ship (N=8,293) is 44 with 8 occurring during deployments.

Spontaneous abortion

The rate of spontaneous abortion in the first 20 weeks of pregnancy was 7.4% in the Hospitalized Pregnancy Study and 9.5% in the Women Aboard Ship Study. There was a rate of miscarriage (spontaneous abortion) of 10.3% in the Enlisted Personnel Pregnancy Study (Table 2). The rate 9.5% in the Women Aboard Ship Study was used for projection of the number of spontaneous abortions expected aboard ship. This yielded an estimated annual 117 spontaneous abortions in 6,166 women aboard 53 ships had they remained for the full 20 weeks aboard ship (Table 3). Of these spontaneous abortions, 21 were estimated to occur during deployments.

Based on modeling of observed data, the projected annual number of spontaneous abortions was: 4 for an aircraft carrier with 274 women aboard, with 1.5 while deployed; 10.3 for a submarine tender with 398 women aboard, with 0.1 while deployed; and 6 for a destroyer tender with 454 women aboard, with 1.6 while deployed (Table 4). If the experience of the women and ships not available in the study to date were the same as those participating, the projected total number of spontaneous abortions for all women serving aboard ship (N=8,293) is 156 with 28 occurring during deployments.

DISCUSSION

The overall mean pregnancy rate of 19 per 100 woman-years reported from the Women Aboard Ship Study is consistent with previous research [3]. This rate was calculated using the number of women-years aboard ship, determined from the number of women crew assigned aboard times the duration of the period of observation. The overall rate reported here of 19 pregnancies per 100 woman-years was similar to an annualized rate of 20 per 100 women-years calculated from a study of Combat Logistic Force ships with a medical officer aboard of [3].

The variation in rates for specific adverse pregnancy outcomes between the studies reported here is probably due to the different methods of ascertainment of pregnancies and their outcomes rather than true differences. Best available estimates were made by selecting data from the study with the most appropriate methodology for the particular outcome. The Hospitalized Pregnancy Study was chosen to provide the ectopic pregnancy rate because such pregnancies are likely to result in hospitalization and would have been ascertained with reasonable completeness. This rate is higher than a population estimate for the United States of 1.7 ectopic pregnancies per 100 pregnancies (calculated after excluding elective abortions) [4]. However, given unknown differences in the distribution of risk factors for adverse pregnancy outcomes in these populations, a difference of this

magnitude between Navy and civilian rates may not be surprising. The ectopic pregnancy rate of 2.7% obtained from this study provides the high end of expected ectopic pregnancies.

The Women Aboard Ship Study self-reported survey information was used to provide the spontaneous abortion rate since many spontaneous abortions do not require hospitalization. A similar rate of miscarriage of 10.3% reported from the Enlisted Personnel Pregnancy Study [2] lends confidence to the rate or 9.5% reported from the Women Aboard Ship Study, but both rates are somewhat lower than estimates from other non-military populations which have reported that 15 to 40% of pregnancies may result in spontaneous abortion [5].

There are many assumptions made in this estimation of the number of events including the assumption that risk of an adverse outcome is equal in port, at sea, and when deployed. Other assumptions required for modeling included that all pregnant women remain onboard for the full 20 weeks, the experience of women and ships not in the study was the same as for women in the study, that the periods of observation were representative of shipboard experience overall, that the rates of adverse reproductive outcomes were similar aboard all ship types, that the estimates of the proportion of time each ship type is deployed are valid, and others. The Women Aboard Ship Study helps to make these assumptions valid because of the study's large scope and sample size (covering 75% of women aboard ship for this report), the inclusion of a wide-range of ship types (14 classes of ship, with a total of 53 ships), and the broad geographic distribution of ships. The results and estimates of adverse pregnancy outcomes reported here are currently the best available.

REFERENCES

1. Babbie EL. Health survey research methods. Belmont CA: Wadsworth, 1972:376.

2. Thomas PJ, Edwards JE. Incidence of pregnancy and single parenthood among enlisted personnel in the Navy. Technical Report No. 90-1. San Diego: Naval Personnel Research and Development Command, 1989.

3. Nice DS. Health care requirements for women aboard combat logistic force (CLF) ships. Interim Briefing. San Diego: Naval Health Research Center, October 1989.

4. Ventura SJ, Taffel SM, Mosher WD, Wilson JB, Henshaw S: Trends in pregnancies and pregnancy rates, estimates for the United States, 1980-1992. In: Monthly Vital Statistics Report, May 25, 1995;43 (11, Suppl.):1-23.

5. Durfee RB, Pernoll ML. Early pregnancy risks. In: Pernoll ML, ed. Obstetrical and gynecological diagnosis and treatment. Norwalk CT: Appleton and Lange, 1991: 300.

Table 1. Mean pregnancy rate per 100 woman-years and annual number of expected adverse outcomes in the first 20 weeks of pregnancy by ship type, 6,166 women aboard 53 Navy ships, Naval Health Research Center, Women Aboard Ship Study, 1995-1996

Ship type	Description	No. of ships	Number of pregnancies	Number of woman-years of observation	Mean pregnancy rate per 100 woman-years	95% confidence interval	
						Lower	Upper
Combatant and amphibious warfare ships, medical officer assigned							
CVN	Aircraft carrier	2	100	731	14	11	16
LHA	Amphibious assault ship	3	0	31	0	0	10
LHD	Amphibious assault ship	2	0	22	0	0	14
LCC	Amphibious command ship	1	12	83	14	5	15
LSD	Landing ship dock	5	10	133	8	4	13
Combatant and amphibous warfare ships, independent duty corpsman assigned							
DD	Destroyer	7	6	191	3	1	7
DDG	Guided missile destroyer	3	7	45	16	11	21
Combat Logistic Force ships, medical officer assigned							
AS	Submarine tender	6	387	1,427	27	25	29
AE	Ammunition ship	5	51	218	23	18	30
AOE	Fast combat support ship	6	50	297	17	13	22
AD	Destroyer tender	3	90	612	15	12	18
Combat Logistic Force ships, independent duty corpsman assigned							
AO	Fleet oiler	4	44	214	21	15	27
ARS	Salvage ship	4	5	53	9	7	22
Miscellaneous ships, medical officer assigned							
AGF	Command ship	2	16	72	22	14	30
TOTAL		53	778	4,129	19	18	20

Source: Women Aboard Ship Study, interviews with medical department staff aboard each ship.

*Deployment was defined as 30 or more days at sea away from homeport.

Table 2. Adverse pregnancy outcomes in the first 20 weeks of pregnancy, per 100 pregnancies, excluding elective abortions, active-duty Navy women*

	No. of pregnancies	Adverse pregnancy outcomes							
		Ectopic pregnancy		Spontaneous abortion†		Total		95% confidence interval on rate	
		No.	Rate	No.	Rate	No.	Rate	Lower	Upper
Hospitalized Pregnancy Study, 1982-1992‡	33,130	893	2.7	2,436	7.4	3,329	10.0	9.5	10.5
Women Aboard Ship Study, 1994-1995	621	7	1.1	59	9.5	66	10.6	8.2	13.0
Enlisted Personnel Pregnancy Study, 1988‡	957	-	-	99	10.3	-	-	-	-

*Denominators exclude elective abortions.

†The Enlisted Personnel Pregnancy Study used the category of miscarriage only.

‡Enlisted women only.

Table 3. Annual Fleet summary of expected adverse pregnancy outcomes, 6,166 women aboard 53 Navy ships, Women Aboard Ship Study, Naval Health Research Center, 1995-1996

Ship type	Description	Estimated annual number of pregnancies	At sea						All locations (including in port)		
			Deployed			Other					
			Ectopic pregnancy	Spontaneous abortion	Total	Ectopic pregnancy	Spontaneous abortion	Total	Ectopic pregnancy	Spontaneous abortion	Total
Combatant and amphibious warfare ships, medical officer assigned											
(CVN, LHA, LHD, LCC, LSD) (N = 13)		99	1.0	3.6	4.6	0.5	1.8	2.3	2.6	9.3	11.9
Combatant and amphibious warfare ships, independent duty corpsman assigned											
(DD, DDG) (N =10)		15	0.1	0.4	0.6	0.0	0.1	0.1	0.4	1.4	1.8
Combat Logistic Force ships, medical officer assigned											
(AD, AE, AOE, AS) (N = 20)		1,011	4.0	14.2	18.2	5.2	18.2	23.3	27.3	95.9	123.2
Combat Logistic Force ships, independent duty corpsman assigned											
(AO, ARS) (N = 8)		79	0.7	2.4	3.1	0.1	0.3	0.4	2.1	7.5	9.6
Miscellaneous ships, medical officer assigned											
(AGF) (N = 2)		27	0.0	0.0	0.0	0.2	0.6	0.8	0.7	2.5	3.3
TOTAL		**1,230**	6	21	**27**	6	21	**27**	33	117	**150**

Source: Women Aboard Ship Study, interviews with medical department staff aboard each ship.

*Deployment was defined as 30 or more days at sea away from homeport.

Table 4. Average number of projected adverse pregnancy outcomes per ship, modelled from data obtained from the Naval Heath Research Center, Women Aboard Ship Study, 1995-1996

Ship type	Description	Average female crew size	Mean pregnancy rate per 100 woman-years	Estimated annual no. of pregnancies per ship	Ship location: Proportion of days: At sea deployed*	At sea other	In port
Combatant and amphibious warfare ships, MO							
CVN	Aircraft carrier †	274	14	38	0.41	0.19	0.39
LHA	Amphibious assault ship	8	0	0	0.30	0.18	0.52
LHD	Amphibious assault ship	10	0	0	0.30	0.18	0.52
LCC	Amphibious command ship	93	14	13	0.32	0.20	0.48
LSD	Landing ship dock	34	8	3	0.30	0.18	0.52
Combatant and amphibous warfare ships, IDC							
DD	Destroyer	33	3	1	0.30	0.05	0.65
DDG	Guided missile destroyer	21	16	3	0.30	0.05	0.65
Combat Logistic Force ships, MO							
AS	Submarine tender	398	27	108	0.04	0.17	0.79
AE	Ammunition ship	82	23	19	0.45	0.19	0.35
AOE	Fast combat support ship	71	17	12	0.45	0.19	0.35
AD	Destroyer tender	454	15	67	0.25	0.25	0.50
Combat Logistic Force ships, IDC							
AO	Fleet oiler	83	21	17	0.38	0.02	0.60
ARS	Salvage ship	29	9	3	0	0.18	0.82
Miscellaneous ships, MO							
AGF	Command ship	60	22	13	0	0.24	0.76
All ships, all women aboard‡			19	1,640			

Abbreviations: IDC, Independent duty corpsman; MO, Medical Officer

Table 4. --*Continued*-- Average number of projected adverse pregnancy outcomes per ship, modelled from data obtained from the Naval Health Research Center, Women Aboard Ship Study, 1995-1996

		Projected annual adverse outcomes per ship								
		At sea deployed			At sea other			In port		
Ship type	Description	Ectopic pregnancy	Spontaneous abortion	Total	Ectopic pregnancy	Spontaneous abortion	Total	Ectopic pregnancy	Spontaneous abortion	Total
Combatant and amphibious warfare ships, MO										
CVN	Aircraft carrier †	0.4	1.5	1.9	0.2	0.7	0.9	0.4	1.4	1.8
LHA	Amphibious assault ship	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LHD	Amphibious assault ship	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LCC	Amphibious command ship	0.1	0.4	0.5	0.1	0.3	0.3	0.2	0.6	0.8
LSD	Landing ship dock	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.2
Combatant and amphibous warfare ships, IDC										
DD	Destroyer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
DDG	Guided missile destroyer	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.3
Combat Logistic Force ships, MO										
AS	Submarine tender	0.1	0.4	0.5	0.5	1.7	2.2	2.3	8.1	10.4
AE	Ammunition ship	0.2	0.8	1.1	0.1	0.3	0.4	0.2	0.6	0.8
AOE	Fast combat support ship	0.1	0.5	0.7	0.1	0.2	0.3	0.1	0.4	0.5
AD	Destroyer tender	0.5	1.6	2.0	0.5	1.6	2.0	0.9	3.2	4.1
Combat Logistic Force ships, IDC										
AO	Fleet oiler	0.2	0.6	0.8	0.0	0.0	0.0	0.3	1.0	1.2
ARS	Salvage ship	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3
Miscellaneous ships, MO										
AGF	Command ship	0.0	0.0	0.0	0.1	0.3	0.4	0.3	1.0	1.2
All ships, all women aboard‡		**8**	**28**	36	8	28	36	28	100	128

Table 4. --*Continued*-- Average number of projected adverse pregnancy outcomes per ship, modelled from data obtained from the Naval Heath Research Center, Women Aboard Ship Study, 1995-1996

		All locations		
		Ectopic pregnancy	Spontaneous abortion	Total
Combatant and amphibious warfare ships, MO				
CVN	Aircraft carrier †	1.0	3.6	4.6
LHA	Amphibious assault ship	0.0	0.0	0.0
LHD	Amphibious assault ship	0.0	0.0	0.0
LCC	Amphibious command ship	0.4	1.3	1.6
LSD	Landing ship dock	0.1	0.2	0.3
Combatant and amphibous warfare ships, IDC				
DD	Destroyer	0.0	0.1	0.1
DDG	Guided missile destroyer	0.1	0.3	0.4
Combat Logistic Force ships, MO				
AS	Submarine tender	2.9	10.3	13.2
AE	Ammunition ship	0.5	1.8	2.3
AOE	Fast combat support ship	0.3	1.1	1.4
AD	Destroyer tender	1.8	6.3	8.1
Combat Logistic Force ships, IDC				
AO	Fleet oiler	0.5	1.6	2.1
ARS	Salvage ship	0.1	0.3	0.3
Miscellaneous ships, MO				
AGF	Command ship	0.4	1.3	1.6
All ships, all women aboard‡		**44**	**156**	**200**

Abbreviations: IDC, Independent duty corpsman; MO, Medical Officer

Source: Women Aboard Ship Study, interviews with medical department staff aboard each ship.

*Deployment was defined as 30 or more days at sea away from homeport.

†Ship's company only.

‡Based on a population of N=8,293 women aboard all Navy ships in November 1996. Columns do not add to these projected values, which are based on all ships with women crew aboard.

REPORT TOPIC AREA: Organizational Influences On Gender Differences in Stress and Strain Aboard U.S. Navy Ships

LEAD AUTHORS: Ross R. Vickers, Jr., Ph.D. and James A. Martin, Ph.D., BCD

ABSTRACT

The present study found that Women aboard U.S. Navy ships report slightly higher stress and strain than men aboard the same ships, and that this trend is magnified aboard some ships and in some Navy ratings, but reversed in other ratings. Ship effects occurred because women aboard some ships reported higher than average stress, while men aboard the same ships reported lower than average stress. Rating effects occurred because men reported lower than average stress in some jobs commonly held by women (e.g., storekeeper), but higher than average stress in some traditionally male jobs (e.g., signalman, quartermaster). Women reported average stress in each of these jobs. The processes underlying gender differences may be different in each ship or rating. This inference derives from the fact that different combinations of stress indicators were affected on each ship and in each rating. Ship assignment and rating were investigated to determine gender differences in stress. Studies of specific ships and ratings will be needed to understand the processes producing such gender differences.

SUMMARY

Previous research has shown that women assigned to shipboard duty in the U.S. Navy generally report only slightly higher psychological stress and strain than their male shipmates. However, average trends might mask substantial gender differences between selected groups of men and women. The present study investigated whether ship assignment, Navy rating, or previous deployment experience was related to the magnitude of gender differences in stress. Gender differences in stress and strain items in the Women Aboard Navy Ships survey were determined for 19 ships, 24 Navy ratings, and for personnel assigned to ships either in home port or away from home port. The differences observed for each ship, rating, and port status were compared to the average difference for the whole sample to identify groups with exceptionally large or small gender differences. Overall, women generally reported slightly higher stress and strain than men, but the differences were small on the average. Ship assignment was associated with differences on 3 of the 19 ships. On those ships, women tended to reported slightly higher stress than women aboard other ships, while men reported slightly lower stress than men aboard other ships. Women assigned to Damage Controlman (DC), Signalman (SM), Quartermaster (QM), and Hull Technician (HT) ratings reported less stress and strain than their male counterparts. Women in the Storekeeper (SK) and Mess Management Specialist (MS) ratings reported more stress and strain than their male counterparts. Men in the SK and MS ratings reported lower than average stress for men, while men in the DC, SM, QM, and HT ratings reported higher than average stress for men.

Women's stress reports for these ratings were comparable to the other women in the sample. Crew size, port status, deployment experience, and proportion of women aboard ship had little or no effect on the magnitude of gender differences. Particular stresses and strains affected by ship assignment and rating tended to be specific to the particular ship or rating considered. Being aboard a particular ship or being assigned to a specific rating is related to the extent of gender differences in stress. The present study does not provide an empirical basis for explaining the observed differences. Detailed study of processes determining stress levels aboard different ships and in different ratings was beyond the scope of this general overview. These results identify groups which could be studied further to understand gender differences in stress associated with the assignment of women to Navy ships and could provide the basis for designing programs to alleviate such differences.

INTRODUCTION

Shipboard living and working conditions generate significant stress for U.S. Navy personnel [1]. Understanding the pattern of stress and the processes that produce stress is necessary in order to reduce stress. Earlier work in the Women Aboard Navy Ships study indicates that stress and strain differences between men and women were slight on average [1,2]. However, ship type and Navy occupation are known to influence organizational climate and habitability variables that are similar to the stresses investigated in the earlier study [3,4]. The objective of this study is to examine occupational factors as correlates of stress and strain and to determine whether those relationships differ for women and men.

Aggregate data can be misleading. People with significant stresses and strains may be concealed in the larger population that experiences relatively minor reactions to shipboard life. Thus, although men and women in the present study differed little in overall stress and strain, slight tendencies toward differences may be the result of subsets who experience particularly high stress. Identifying factors related to exceptional stress may provide insights that can be used to reduce such stress. This study examined the effects of the following three factors on gender differences in stress levels.

In recent years women have had increasing opportunities to fill all types of jobs in the military. However, the proportion of women varies across occupational specialities. When the proportion of women is low, they may face a different social environment and new tasks without pre-existing support or a mentoring network to help them adjust to the situation.

Living conditions are an important source of shipboard stress [3] and prior evidence indicates that these conditions vary as a function of ship type [3]. If women are more susceptible to some sources of stress than men, then pronounced experiential differences may occur only when stress-eliciting conditions are severe.

Some stresses may only occur during, or be exacerbated by, deployment. For example, if one ordinarily does not live aboard ship, shipboard living conditions become relevant only during deployment. Similarly, family stresses may be increased (e.g., by making it more difficult to communicate) or decreased by deployment (e.g., by removing the individual from a difficult social relationship). Deployment may increase stress levels because the ship becomes a total institution encompassing all aspects of a person's life [5]. If so, deployment can act as a multiplier because different types of stress reinforce one another (e.g., by increasing carryover from work to leisure settings). The impact of deployment on an individual's stress may vary depending on prior deployment experience. However, a case probably can be made that experience could act to either increase stress (e.g., because the deployment itself is the cause of stress) or to decrease it (e.g., because the person develops effective methods of coping with stress).

Based on the preceding considerations, the present tested three general hypotheses:

A. Gender differences in stress will be higher for women in nontraditional jobs.

B. The size of gender differences in stress will vary between ships.

C. Deployment will be associated with larger gender differences in stress.

These hypotheses were examined in a series of moderator analyses. Rating (i.e., navy occupational category), ship, and deployment status were examined as factors which may influence the size of female-male differences in stress. The general procedure first tested the hypothesis that a given moderator in fact affects gender differences in stress. Subsequent analyses compared groups with large and small gender differences to define the moderator effects in more detail.

METHODS

Population

The sample consisted of male servicemembers matched to the female service members on work division, department, ethnicity, paygrade, rating, and age [6]. Participants completed either form 7, 8, or 9 of the questionnaire. This subset of the overall study consisted of 2,822 crewmembers. The mean age was 26.3 (SD = 6.2) years. The most common educational level was a high school graduate (52.0%) or Graduate Equivalency Diploma (3.7%). A substantial number (32.4%) indicated "Some college/Associate of Arts" and 5.8% had a Bachelor's degree. Crewmembers with graduate degrees were as common as crewmembers with less than a high school education (1.2% each). Finally, 3.6% had attended trade or technical school after high school. 46.6% were "Never married" and 41.4% were "Married." 5.0% were "Separated" while 6.8% were "Divorced. A small minority, .3% were "Widowed."

The sample was ethnically diverse. "Non-Hispanic white" was the most common ethnic designation chosen by the respondents (53.0%), followed by "Non-Hispanic black" (29.6%). Hispanics comprised 7.4% of the total (the sum of 5.3% who designated themselves as "White, Hispanic" and 2.1% who designated themselves "Black, Hispanic"). "Asian/Pacific Islander" was chosen by 3.5% of the sample and "Native American" by 1.2%. The remaining 5.4% of the sample chose "Other race/ethnicity."

Paygrades were widely distributed as would be expected given the rank structure of the U.S. Navy and the sampling procedures used. The majority of the sample were enlisted (95.6%) rather than officers (4.4%). Few enlisted personnel were below the E-3 Paygrades (E-1, 3.0%; E-2, 10.7%). E-3s (18.5%), E-4s (26.0%), and E-5s (19.4%) comprised the majority of the sample (63.9%). E-6s (12.8%) were three times as common as E-7s (4%). E-8s (0.8%) and E-9s (0.4%) each represented less than 1% of the sample.

The study was designed to sample all women serving aboard ship, and an equal number of men matched on important characteristics [6]. The proportions of men to women in this sample, therefore, were not representative of the proportions in the overall shipboard populations. Information on the number of men and women in each crew were taken from a combination of computerized records maintained at the Naval Health Research Center and information provided by the personnel department of each ship studied [6]. This information was used to determine the overall size of the ship's population and the proportions of men and women aboard ship. The original intent of the study was to include analyses at the Department and Division levels within ships if possible. However, this detailed analysis was judged unlikely to yield any definitive results given the small sample sizes that would be available within departments on ship. Analyses of ships as moderators suggested that generalizing too broadly across ships would not be wise. In addition, a division-by-division analysis or department-by-department analysis would be expected to be confounded with the analysis of stress as a function of rate given that many people in the same rate would be assigned to the same organizational unit within a ship. Given these considerations, an evaluation of ship and rate as moderator variables provided a reasonable first step in the identification of potential stress hot spots.

Stress Questionnaire

Stress and distress were measured by self-report items in the Women Aboard Navy Ships questionnaire. The stress/distress content of the questionnaire consisted of a 50-item self-report questionnaire. Stresses were assessed by 36 items, 33 describing specific types of conditions or situations that can occur in Navy shipboard life and 3 describing effects of those conditions or situations on the individual's personal life, job performance, and coping. Responses to these stress items were made on a 5-point Likert scale with options ranging from "None at all" (scored "1") to "Extreme amount" (scored "5").

An additional 14 items were treated as strains, i.e., as presumed consequences of stress. Seven of the items dealt with quality of life in the Navy. These items were answered on a 7-point scale with options ranging from "Terrible" (scored "1") to "Delighted" (scored "7") with "Mixed" (scored "4") as the midpoint of the scale. Seven depression items from the CES-D scale [7] were the other strain indicators. Responses to these items employed an 8-point scale indicating the number of days during the past week the person had experienced the feelings described in the item. Response options ranged from "No days" (scored "0") to "Seven days" (scored "7").

Previous reports have described the stress items and their response distributions [1] and the measurement structure of stress and distress [2]. Appendix A lists the questions.

Rating

Shipboard occupation was defined by responses to a question asking the respondent "If you are Navy enlisted, what is your rating?" Respondents were asked to enter a two- or three-letter code for their rating. This code was entered in the data set and used to define rating groups.

Deployment Status

Deployment status was determined from two questions. One question asked "If you are currently aboard ship, what is your ship's current status?" Response options were "In home port," "At sea," "In port other than home port," "In shipyard," and "Other." The large majority of respondents indicated they were "In home port," so this variable was recoded to a two-level indicator. The two levels were home port versus all other locations.

Deployment experience was evaluated by combining responses to two questions. The first question was "How many times have you deployed aboard Navy ships (30 days or more), not counting the present deployment?" If the respondent had never deployed, he/she filled in a blank marked "0" on the questionnaire. If the respondent had deployed one or more times, he/she was asked to write in the number of deployments. Responses to the second question ranged from 1 to more than 90. These responses were recoded to yield a six-level variable with levels of 0 deployments, 1 deployment, 2 deployments, 3 or 4 deployments, 5 to 8 deployments, and 9 or more deployments.

Analysis Procedures

Analyses were conducted with the SPSS statistical package [8] except where otherwise noted. Initial analyses examined gender, ship, rating, deployment status, and deployment experience as correlates of stress and strain in the overall sample. In each case, the stress and strain items were considered as dependent variables which were assumed to be influenced by the categorical predictors. Point biserial correlations were computed between gender and these items using the correlations procedure in SPSS. One-way analyses of variance (ANOVA) were

performed for the other predictors. The results of those analyses were used to compute ω^2 values which can be interpreted as the proportion of variance in the dependent variable explained after adjusting for the amount of variance expected by chance [9]. The results are reported as ω to provide an effect size index comparable to r_{pb}. Effect sizes were emphasized in reporting the results because the large sample size meant that even small effects would be statistically significant [10]. Therefore, significance testing alone is a poor guide to the importance of various differences.

Analysis procedures were directed toward determining whether situational factors affected the relationship between gender and stress or strain. The analyses were conducted with individual items as the gender correlates. Previous analyses indicated that the items can be classified into higher-level composites [3,4]. The expectation was that moderator variables which affected a general attribute or dimension would affect a large proportion of the items representing that domain. If so, general effects could be identified by a pattern of similar moderator variables for items comprising different categories. However, if all the items were combined into overall indicators initially, the resulting composite would be a poor tool for identifying any specific facets of stress and strain with moderated relationships to gender. The use of individual items presented a risk of capitalizing on chance as a result of multiple significance tests. At this stage in the understanding of possible gender differences in stress aboard ship, a leniency error was more acceptable than stringent significance tests which might overlook important differences.

Gender differences were examined in terms of effects sizes. Effect sizes were expressed as point biserial correlations in which scores on the item represented the (approximately) continuous stress variables and gender represented a two-level correlate. The same relationships often are expressed as mean differences with a *t*-test between means used to assess statistical significance. These correlations are related to this typical procedure as follows:

$$t = \frac{r_{pb} * \sqrt{(n-2)}}{\sqrt{(1-r_{pb}^2)}}$$

where *t* is the value of the *t*-test, r_{pb} is the point biserial correlation, and n is the sample size. Thus, *t* increases as the sample size, n, and as the effect size, r_{pb} , increases. Because some ns were large, small effect sizes potentially would yield statistically significant effects. There was a risk, therefore, that results would be reported as significant when they were of little or no practical or theoretical significance. Reporting r_{pb} focused attention directly on the effect size.

The r_{pb} also provided a statistic with a simple interpretation. This statistic can be roughly interpreted as the difference between the proportion of women who would score above the median on the stress or strain indicator and the proportion of men who would score above the median [11]. While this interpretation is only approximate, it does give the effects a more intuitive meaning.

The r_{pb}s were analyzed further to identify the presence of moderator effects:

A. Frequency distributions were obtained for the potential moderator. Those categories within the moderator which had a sufficiently large sample size were identified for further analysis.

B. Point biserial correlations were computed between gender and each stress and strain item in each of the selected groups. The SPSS correlation procedure performed the computations.

C. Fisher's r-to-z transformation was applied to the computed correlations and a weighted average correlation was obtained as an estimate of the average within-group correlation.

D. Hays' [9] V statistic for testing the variability of a set of correlations from independent groups was applied to the within-group correlations. This formula produces a χ^2 value that indicates the presence of greater than chance variation between groups when it exceeds its critical value. The number of groups being compared in the analysis determines the degrees of freedom used to determine the critical value given the chosen significance level ($p < .05$ in the present instance).

E. Significant χ^2 values were followed by an examination of the correlations within different groups to determine which groups contributed to the significant χ^2. This follow-up to the χ^2 tests was necessary because each χ^2 was an omnibus test which involved more than one degree of freedom [10]. These omnibus tests indicate whether the full set of differences taken together could reasonably be attributed to chance. However, these omnibus tests combine all groups being compared and, therefore, do not indicate which groups deviated from the average gender difference. The examination of correlations within specific groups provided the basis for identifying those groups with gender differences that deviated from the average. The difference between the gender difference in each group and the average gender difference was converted to a z-score. A z-score in excess of 1.65 (absolute value) was the initial basis for identifying atypical gender differences for a specific stress or strain indicator. Discrepancies which met this minimal criterion as contributors to the overall χ^2 are noted in the presentation of results with cautions regarding their interpretation. Again, the objective was to ensure a complete analysis in this exploratory work so that later work could attempt replications.

Note that the contribution of any group within a moderator analysis to the overall χ^2 depends on two factors. The first factor is the size of the difference between the correlation observed in that group and the average correlation. The second factor is the size of the sample in the specific group. Larger χ^2 values occur when the difference is large, when the sample size is large, or when both occur. The critical point here is that a large discrepancy between the average value and the value for a given group does not guarantee a large contribution to the χ^2. The observed difference may be attributed to chance if the sample size in that group is small. Thus, substantial deviations from the weighted mean do not necessarily indicate a statistically

significant difference for a given group. Interpretations are based solely on those cases where chance is not a likely explanation for the observed difference.

RESULTS

The general pattern of relationships between stress and strain, gender and the potential moderator variables is shown in Table 1. Effects accounting for more than 1% of the variance are shown in bold. Note that the number of degrees of freedom varied across predictors ranging from 1 for gender, port status, and crew size to 18 for ships and 23 for rating. Ordinarily, the larger the number of degrees of freedom, the greater the proportion of variance accounted for by a model. In the present case, an attempt was made to correct for this tendency by using ω^2 as the measure of association for variables with more than a single degree of freedom. This statistic includes an adjustment for the amount of variance that would be expected if only chance factors were operating. Each statistic in the table, therefore, can be interpreted as roughly comparable indicators of the amount of true score variance accounted for by the predictor.

Sample size varied depending on the stress or strain being analyzed. The primary source of variation was the fact that items pertaining to one's spouse and children did not apply to people who were not married and/or were not parents. Thus, the sample sizes were much smaller for the quality of life items pertaining to spouse (N = 1,294) and children (N = 1,191) than for other quality of life items (minimum N = 2,740). Similarly, exceptionally small sample sizes were noted for the stress items dealing with children (N = 1,392), discipline of children (N = 1,374), and child-care arrangements (N = 1,358) compared to all other stress items. Other than those items, the items with the smallest sample size dealt with concerns over possibly breaking up (N = 2,368) and alcohol problems (N = 2,452). The maximum sample size for any item was 16.4% larger than the sample size for breaking up (N = 2,756 vs N = 2,368). By comparison, the maximum was 98.0% larger than the largest sample size for the stress questions pertaining to children (N = 2,756 vs N = 1,392).

Table 1 illustrates several general points. First, predictors had variable relevance for the stress and strain indicators. Ship assignment produced the largest number of noteworthy effects (N = 21), followed by rating (N = 17), gender (N= 8), proportion of women aboard ship (N 6), port status (N = 5), deployment experience (N = 2), and crew size (N = 0).

Table 1. Stress/Strain Correlations to Gender and Navy Variables, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Gender	Rating	Port Ship	Deploy. Status	Crew Exp.	% Size	Women
Quality of Life							
Job	-.01	**.19**	**.12**	.00	.07	.01	.02
Personal life	.00	.06	.05	-.05	.03	.01	.03
Health	**-.11**	.06	.08	-.02	.04	.05	.05
Life as whole	-.02	.02	.00	-.05	.04	.04	.04
Family	.00	.04	.00	-.01	.00	.02	.01
Spouse	**-.11**	**.15**	.00	.01	.00	-.05	-.06
Children	.07	.07	.08	-.05	.00	.01	.03
Depression							
Not going	.07	**.11**	.09	.07	.06	-.02	-.06
Sad	**.13**	**.13**	.09	.07	.09	-.03	-.07
Sleep	.07	.05	.09	.07	.04	-.05	-.06
Effort	.04	**.12**	.09	.07	.05	-.03	-.05
Lonely	.05	**.11**	.08	**.10**	.09	-.02	-.05
Blues	.08	**.13**	.09	.07	.07	-.05	-.07
Concentration	.04	**.11**	.07	.05	.06	-.03	-.04
Stress							
Life as whole	.05	.03	.09	.03	.00	-.03	-.06
Financial	-.03	.04	**.14**	**-.11**	.00	.04	.09
Personal health	**.12**	.00	.00	-.01	.05	-.03	.00
Family Health	.01	.06	.03	-.01	.00	.00	.01
Being aboard	.04	.09	**.16**	.07	.01	-.06	**-.13**
Crowding	.03	.07	**.16**	.09	.06	-.03	-.08
Safety	.03	.08	**.12**	.06	.05	-.02	-.06
Hygiene	.02	.07	**.10**	.02	.04	.03	.04
Privacy	.09	**.11**	**.14**	.09	.04	-.04	-.06
Exercise	.06	**.11**	**.15**	.08	.00	-.06	**-.12**
Recreation	.02	**.10**	**.20**	**.13**	.04	-.04	**-.13**
Nutrition	.06	**.14**	**.14**	.06	.01	-.02	-.04
Supervisor	.02	.06	.08	.06	.04	-.03	-.08
Peers	.07	.08	.08	.07	.02	.01	-.06
Subordinates	-.02	**.16**	**.11**	.02	**.13**	-.03	-.05
Procedures	.04	**.10**	**.13**	.08	.00	-.03	-.08
Living space	.09	.04	**.17**	.09	.00	-.04	-.08

Table 1. --*Continued*-- Stress/Strain Correlations to Gender and Navy Variables, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Gender	Rating	Ship	Port Status	Deploy. Exp.	Crew Size	% Women
Duties	**.10**	.00	**.12**	.07	.01	-.04	-.06
Promotion	.00	.07	.05	.01	.07	.02	.00
Downsizing	-.01	.05	**.10**	-.05	.09	.04	.05
Stress							
Special friend	.01	.00	.00	-.01	.00	-.02	-.01
Breaking up	.00	.00	.07	.04	.00	-.03	-.07
Communications	.05	.08	.08	.09	.02	-.04	-.06
Post-deployment	.02	.00	**.22**	.09	.00	-.04	**-.12**
Confined	.05	.09	**.13**	.08	.07	-.08	**-.12**
Future	.06	.00	.00	.03	.03	-.03	-.05
Alcohol	**-.12**	.07	.03	.08	.05	-.01	-.05
Isolation	.03	.03	**.10**	**.10**	.05	-.04	-.08
Out of touch	.02	.09	**.18**	**.15**	.05	-.06	**-.11**
Life	.07	.00	.00	.04	.04	-.02	-.04
Children	**.20**	**.15**	**.13**	.09	.05	-.02	-.08
Discipline	.08	**.12**	.01	.01	.03	.00	-.01
Child-care	**.25**	**.10**	.05	-.01	**-.10**	.05	.02
Effect on:							
Personal life	.04	.00	.04	.01	.01	.00	-.04
Performance	.01	.03	**.13**	.07	.00	-.05	-.09
Coping	-.02	.07	.02	-.01	.00	-.02	.02

Note. Table entries are point-biserial correlations for gender and port status. Entries are ωs for rating and ship. Pearson product-moment correlations given for all other variables.

Second, the probability of a substantial relationship to the predictors depended on the criterion variable considered. Stresses were most likely to show substantial relationships (59 of 243 associations, 24.3%), followed by depression (8 of 49 associations) 16.3%, and Quality of Life (5 of 49 associations, 10.2%). The bulk of the strain relationships (8 of 13) were obtained in the analysis of rating differences.

Third, relationships between predictors and stresses tended to be stress-specific even though stresses showed a broader general tendency to be related to the predictors than did strains.

One-quarter of the stress indicators were not related to any predictor. No stress was related to more than four predictors.

These general trends showed that each predictor and each stress/ strain indicator tended to have a distinct profile of associations. The patterns for specific predictors are considered in the following paragraphs.

Gender. Women showed a tendency to report poorer quality of life with respect to personal health ($r = -.11$) and their spouses ($r = -.11$). The only evidence for higher depression was a greater tendency to report sadness ($r = .12$). Reports of stress indicated that the most substantial gender differences were greater stress associated with children ($r = .20$) and child-care arrangements ($r = .25$). Women also were higher on stress related to personal health ($r = .12$) and performance of duties ($r = .10$). The only stress which women scored substantially lower on than men was concern related to the use of alcohol ($r = -.12$). Although only 8 of 50 indicators produced substantial associations, women did demonstrate a broad general tendency toward higher stress and strain. Allowing for the fact that high quality of life scores indicate lower strain, 43 of 50 correlations were positive. Thus, there was a general tendency toward greater stress and strain in women, but most differences were small.

Rating. Ratings differences in stress involved three types of measures. Ratings differed on several indicators of shipboard habitability, including privacy ($\omega = .11$), exercise opportunities ($\omega = .11$), recreation opportunities ($\omega = ,10$), and nutritional concerns ($\omega = .14$). Rating also was associated with concerns about children ($\omega = .15$), concerns about child discipline ($\omega = .12$), and child-care arrangements ($\omega = .10$). The third general type of stress concerned work group relationships, including items pertaining to the behavior of subordinates ($\omega = .16$) and the way things typically were done ($\omega = .10$). In addition, ratings demonstrated a broad general tendency toward differences in strain with substantial differences occurring for 8 of 14 strain indicators, primarily because of a consistent trend toward differences in depression (6 of 7 indicators).

Ship Assignment. Ship assignment was related to 19 of 36 stress indicators, but only 1 of 14 strain indicators. The largest differences were noted for adaptation after deployment ($\omega = .22$), lack of recreational opportunities ($\omega = .20$), feeling out of touch ($\omega = .18$), having to share living space ($\omega = .17$), being aboard ship ($\omega = .16$), and crowding aboard ship ($\omega = .16$). The general trend appeared to be that ship assignment affected living and working conditions, but not family and interpersonal variables. The latter assertion is based on the small effects for quality of life indicators other than the job and stress indicators related to life as a whole, personal health, family health, relationships to special friends, breaking up with a significant other, and personal future.

Port Status. Sailors aboard ships which were not in their home ports reported more stress from limited recreation opportunities ($r = .13$), feeling isolated ($r = .10$), and feeling out of

touch (r = .15). Being absent from the home port was associated with lower reports of stress from finances (r = -.11). The only evidence of increased strains associated with absence from the home port was increased reporting of loneliness (r = .10).

Deployment Experience. Greater deployment experience was associated with higher stress from subordinates (ω = .13) and less concern about child-care arrangements (ω = -.10).

Crew Size. Crew size was not substantially related to any stress or strain.

Proportion of Women Aboard Ship. Having a larger proportion of women aboard ship was associated with lower stress and strain. All six of the substantial relationships obtained for this variable were negative relationships to stresses. These stresses included being aboard ship (ω = -.13), opportunities to exercise (ω = -.12), lack of recreation opportunities (ω = -.13), adapting after deployment (ω = -.12), feeling confined (ω = -.12), and feeling out of touch (ω = -.11). All of the variables in this profile were more strongly related to ship assignment than to the proportion of women in the crew. The differences therefore may reflect the fact that women were more likely to be assigned to some ships than others.

Moderator Effects Overview

Cumulative χ^2 values assessed overall tendencies for moderators to affect the size of gender differences. The values shown in the "Total" column of Table 2 indicate the χ^2 results obtained when all 50 items were considered as a single group. The overall χ^2 tests indicated that only ship assignment, rating, and proportion of women aboard the ship were related to the size of gender differences. All three significant moderators were related to the size of gender differences in stress ($p < .002$ or better), but only ship assignment was related to the size of gender differences in strain.

Table 2. Summary of Tests for Moderator Effects, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

		Item Set:			
		Quality of Life	Depression	Stress	Total
Ship Assignment	χ^2	= **163.07**	**193.22**	**771.45**	***1127.73***
	df	= 126	126	648	***900***
	Sig.	= .015	.001	.001	***.001***
Rating	χ^2	= 163.0	175.74	**959.59**	**1296.16**
	df	= 161	161	828	1150
	Sig.	= .508	.202	.001	.002

Table 2. --*Continued*-- Summary of Tests for Moderator Effects, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

		Item Set:			
		Quality of Life	Depression	Stress	Total
Port Status	χ^2 =	8.32	4.47	32.34	45.12
	df =	7	7	36	50
	Sig. =	.305	.726	.644	.669
Deployment Experience	χ^2 =	30.38	25.84	165.56	221.78
	df =	35	35	180	250
	Sig. =	.692	.871	.772	.901
Ship Size	χ^2 =	38.43	15.15	148.62	202.20
	df =	28	28	144	200
	Sig. =	.091	.977	.379	.444
Proportion of Women	χ^2 =	34.68	16.69	**223.53**	**274.90**
	df =	28	28	144	200
	Sig. =	.180	.955	.001	.001

Note: "df" is the number of degrees of freedom for the χ^2 statistic. "Sig." is the statistical significance of the χ^2. Statistically significant ($p < .05$) χ^2 values shown in bold italics.

Ship Assignment and Gender Differences

Table 3 breaks down the overall ship moderator effects on a ship-by-ship basis. The table indicates which ships deviated significantly from the average gender differences. Significant total effects were the basis for choosing individual ships to be described in more detail. The total χ^2 was used to identify ships for more detailed analysis because this procedure avoided describing an effect for a ship based on a single substantial deviation from the weighted group averages. Given the large number of implied significance tests, there was a substantial probability that at least one significant deviation from the weighted average would occur for each ship.

Table 3. Ship Assignment Moderator Effects, U.S. Navy Women Aboard Ship Study, 15 NOV 1996 - 31 DEC 1996.

	Item Set:			
Ship Number	Quality of Life	Depression	Stress	Total
1	2.89	2.05	38.18	43.12
2	*5.63*	*5.23*	*64.28**	*75.14**
3	***11.61****	***47.53****	***74.17****	***123.31****
4	5.16	2.20	37.34	44.70
5	16.10*	4.70	38.84	59.64

Table 3. --*Continued*-- Ship Assignment Moderator Effects, U.S. Navy Women Aboard Ship Study, 15 NOV 1996 - 31 DEC 1996.

	Item Set:			
Ship Number	Quality of Life	Depression	Stress	Total
6	9.79	4.91	37.27	51.97
7	6.72	4.93	14.02	25.67
8	***22.78****	***14.71****	***55.29****	***92.78****
9	6.29	6.54	22.14	34.93
10	7.38	6.09	22.91	36.38
11	6.01	2.02	24.24	32.27
12	8.01	5.21	18.01	31.23
13	5.09	4.91	51.06	61.06
14	15.43*	9.08	23.03	47.54
15	3.64	9.26	36.74	50.64
16	*2.76*	*15.37**	*77.77**	*95.90**
17	*22.23**	*15.85**	*42.35*	*80.43**
18	*3.28*	*22.21**	*57.06**	*82.55**
19	2.28	7.83	36.30	46.41
Cumulative χ^2	163.07	193.22	771.45	1127.43
Significance	.015	.001	.001	.001

Note. Italics indicate ships with significant moderator effects in two of three indicator sets. Bold italics indicate ships with significant moderator effects in all three indicator sets.

Table 4 presents the detailed results for ships which had significant ($p < .05$) total χ^2 values. Because this table is the first description of a set of moderator effects, some general comments are in order regarding the approach that produced the table contents and the interpretation of those contents. The sample-size weighted average of the within-groups r_{pb}s for gender and each stress variable are reported in the "Pooled" column. The average within-ship correlation is reported because this value can differ from the full-sample correlations in Table 1. Differences can occur because the within-group correlations remove between-group differences as a source of variance. While this effect generally was slight, the pooled column reports the actual correlation used in determining which correlations would be reported in the remainder of the table.

Other columns in the table report gender-stress correlations for individual groups (i.e., ships in this instance). The table includes all correlations that differed enough from the pooled correlation to produce an absolute z-score of 1.65 or greater. This z-score criterion for table

entries means that any differences which would meet a one-tailed $p < .05$ significance test have been reported for individual items. This criterion was lenient given that the direction of the effects for a given ship was not predicted prior to the analysis and that 50 differences were computed for each ship. However, a statistically lenient criterion provided a more complete picture of the moderator effects for a given group. This picture provided a general sketch of tendencies within the different moderator groups. Note, also, that the criterion has been applied only to subgroups which produced significant overall χ^2 values. This initial screening helps protect against reporting the mere chance deviations from the average correlation that would occur if the z-score criterion were applied to all of the gender-stress correlations. Nevertheless, caution is appropriate in evaluating specific correlations. The general profile for a moderator group should be a more reliable guide to the nature of moderator effects than is the item-by-item interpretation of specific correlations.

As might be expected, most ships typically produced gender differences which were close to the average difference. In fact, 13 of 19 ships produced nonsignificant total χ^2 values. Two of the 13 did produce significant χ^2s for quality of life items, but those tendencies must be viewed with caution when taken in the context of the failure to produce a significant total χ^2. Therefore, only the six ships which produced significant total χ^2s are considered further.

Ship 8. This ship amplified the general tendency for women to feel more stress than men. The differences often exceed $r_{pb} = .30$ in absolute value, moving them from the category of small effects to moderate effects in Cohen's [12] classification. The stresses included lack of recreation opportunities ($r_{pb} = .30$), supervisor ($r_{pb} = .30$), sharing living space ($r_{pb} = .31$), communications ($r_{pb} = .35$), feeling confined ($r_{pb} = .34$), feeling out of touch ($r_{pb} = .33$), and impact on job performance ($r_{pb} = .35$). These feelings of stress were accompanied by greater differences in strain in the form of having trouble getting going ($r_{pb} = .37$), feeling lonely ($r_{pb} = .34$), poor quality of life as a whole ($r_{pb} = -.34$) and relative to family ($r_{pb} = -.46$), and children ($r_{pb} = -.29$).

Table 4. Moderator Effects of Ship Assignment, U.S. Navy Women Aboard Ship, 15 NOV 94 - 31 DEC 96.

		Ship					
Item	Pooled	8	16	17	18	2	3
Quality of Life							
1 Job	-.01						
2 Personal life	.00						
3 Health	-.11						
4 Life as a whole	-.04	-.34		.14			
5 Family	-.01	-.46		.13			
6 Spouse	-.09						-.42

Table 4. *--Continued--* Moderator Effects of Ship Assignment, U.S. Navy Women Aboard Ship, 15 NOV 1994 - 31 DEC 1996.

		Ship					
Item	Pooled	8	16	17	18	2	3
7 Children	.09	-.29					-.30
Depression							
8 Not going	.08	.37			-.20		.43
9 Sad	.14		.00				.51
10 Sleep	.07			-.07			
11 Effort	.03		-.09				.49
12 Lonely	.07	.34			-.29		.31
13 Blues	.10		-.03		-.18		.48
14 Concentration	.04						.27
Stress							
15 Life as whole	.06						
16 Financial	-.03						.31
17 Personal health	.13				-.07		.39
18 Family health	.03				-.22		
19 Aboard ship	.05		-.15			.18	
20 Crowding	.03		-.14		.30	.13	.35
21 Safety	.03		-.13				.31
22 Hygiene	.03						
23 Privacy	.09					.22	.49
24 Exercise	.07					.21	
25 Recreation	.03	.30				.14	
26 Nutrition	.06						.36
27 Supervisor	.02	.30					
28 Peers	.08						
29 Subordinates	-.02						
30 Procedures	.04		-.11			.15	

Table 4. *--Continued--* Moderator Effects of Ship Assignment, U.S. Navy Women Aboard Ship, 15 NOV 1994 - 31 DEC 1996.

		Ship					
Item	Pooled	8	16	17	18	2	3
31 Living space	.06	.31			.40	.20	
32 Duties	.09		-.07				
33 Promotion	.01		-.18				.29
34 Downsizing	-.01		-.15				
35 Special friend	.01						
36 Breaking up	.01						
37 Communications	.06	.35					
38 Post-deployment	.00						
Stress							
39 Confined	.05	.34				.18	.40
40 Future	.07		-.04				
41 Alcohol	-.12						
42 Isolated	.03						
43 Out of touch	.03	.33	-.10				
44 Life	.08						
45 Children	.21				-.43	.35	
46 Discipline	.07						
47 Child-care	.25				-.36	.39	
48 Personal life	.05						
49 Performance	.02	.35	-.11				
50 Coping	-.02						

Note. See pp. 162-163 for a general discussion of the approach to defining moderator effects. This table includes all ships with significant cumulative χ^2 for the full set of stress and strain items (cf., Table 3). Item entries restricted to those subsets for which the ship showed a significant subset χ^2. The "Pooled" column provides the weighted average within-ship correlation (see text, p. 160). Entries are correlations which differed from the pooled within-ship correlation ($z > 1.65$; see text for details). Ship numbers assigned arbitrarily; these numbers do not correspond to numbering in other project publications.

Ship 16. Gender differences on this ship reversed the tendency for women to feel more stress than men. The basis for the significant χ^2 for this ship were the stresses of being aboard ship (r_{pb} = -.15), shipboard crowding (r_{pb} = -.14), shipboard safety (r_{pb} = -.13), typical shipboard procedures (r_{pb} = -.11), performance of duties (r_{pb} = -.07), promotion opportunities (r_{pb} = -.18), downsizing (r_{pb} = -.15), feeling out of touch (r_{pb} = -.10), and effects of stress on job performance (r_{pb} = -.11). Women aboard this ship also failed to demonstrate the typical tendency toward greater concern for their personal future (r_{pb} = -.04). A tendency toward less depression was noted for effort (r_{pb} = -.09), while women did not display the general tendency toward greater feelings of the blues (r_{pb} = -.03) or sadness (r_{pb} = .00). The absolute magnitude of the effects was small, but the cumulative χ^2 was significant because the small effects were widespread and contrary to the general trend aboard most ships.

Ship 17. This ship produced a moderator effect that was limited to strains. Women aboard this ship reported better quality of life for life as a whole (r_{pb} = .14) and family (r_{pb} = .13) and slightly less depression in the form of trouble sleeping (r_{pb} = -.07). Like the reversal in general trends noted in the previous ship, these results were based on differences which were small in absolute magnitude. Unlike the previous ship, however, the trends were not widespread. Instead, the significant cumulative effects appeared to arise from the combination of a few small deviations from the general trends combined with a large sample size.

Ship 18. The women aboard this ship demonstrated reversals of the normal gender differences for several types of stress. These stresses included concerns over personal health (r_{pb} = -.07), children (r_{pb} = -.43), and child-care arrangements (r_{pb} = -.36). These reversals were accompanied by several indicators of lower depression than the average male aboard ship, including feeling unable to get going (r_{pb} = -.20), loneliness (r_{pb} = -.29), and blues (r_{pb} = -.18). These reversals contrast with the amplification of the general tendency for women to experience greater stress from crowding (r_{pb} = .30) and sharing living space (r_{pb} = .40). Thus, the general tenor of this ship was a substantial reversal of some typical sources of stress for women even in the face of exceptional crowding in their living spaces.

Ship 2. Stress differences were amplified aboard this ship, but the amplification was not associated with increased strain differences. Women aboard this ship reported substantially higher stress associated with being aboard ship (r_{pb} = .18), crowding (r_{pb} = .13), privacy (r_{pb} = .22), exercise (r_{pb} = .21), recreation (r_{pb} = .14), typical procedures (r_{pb} = .15), sharing living space (r_{pb} = .20), feeling confined (r_{pb} = .18), children (r_{pb} = .35), and child-care (r_{pb} = .39). There was no evidence of a corresponding increase in strain. A thumbnail sketch of this ship suggests primarily increased stresses associated with habitability and having children.

Ship 3. This ship was similar to ship 8 in that stress and strain difference both were amplified. However, the patterns of specific stresses and strains that were affected were quite different. Women reported substantially higher levels of the stress items pertaining to finances (r_{pb} = .31), personal health (r_{pb} = .39), crowding (r_{pb} = .35), safety (r_{pb} = .31), privacy (r_{pb} =

.49), nutrition (r_{pb} = .36), promotion (r_{pb} = .29), and feeling confined (r_{pb} = .40). Higher strain was clearly evident for depression with much larger than average differences for 6 of 7 items (r_{pb} = .27 to r_{pb} = .51). Quality of life differences were amplified for spouse (r_{pb} = -.42) and children (r_{pb} = -.30). Clearly, this ship produced a significant overall moderator effect because of a generalized tendency toward exceptionally large differences in stress and strain with women experiencing substantially more stress than men.

The general trends in the preceding descriptions can be summarized by classifying ships into general categories. Three ships tended to exacerbate the general tendency for women to report higher stress than men. In two ships, larger than average differences in stress were associated with larger than average differences in strain. One ship demonstrated a tendency toward lower reported stress among women. The remaining two ships did not fit either general pattern. One produced effects that were limited to strain. The other produced a weak tendency to reverse typical stress/strain differences between men and women, but the reversal was limited to only a few stresses and offset by enhancement of other stresses. On the whole, the only repeated tendency was for some ships to magnify the trend toward higher stress and strain in women. This tendency was notable in 3 of the 19 ships.

The presence of larger than average gender differences on some ships raised a secondary question. Did the differences arise because women on those ships experienced more stress than the average female or because the men on those ships experienced less stress than the average male? Follow-up analyses comparing stress levels aboard ships with larger than average gender differences to those with average differences indicated that both tendencies were present. This inference was arrived at by splitting the sample into two groups, those aboard the ships with larger than average gender differences and all others. Point biserial correlations then were computed between this group membership variable and stress and strain indicators. A separate set of correlations was computed for men and for women. The primary results were stress on personal life and performance. Also, four of seven depression items produced substantial differences.

A. Men aboard the ships with large gender differences tended to report lower than average stress for men. Among men, the signs of 44 of 50 r_{pb}s were consistent with this summary statement.

Table 5. Rating as a Moderator of Gender Differences, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

		Item Set:		
	Quality of Life	Depression	Stress	Total
Boatswain's Mate (BM)	10.94	1.11	26.47	38.52
Boiler Technician (BT)	8.61	2.16	30.15	40.92
Damage Controlman (DC)	9.35	8.22	61.86*	79.43*
Data-Processing Technician(DP)	6.56	1.66	39.99	48.21

Table 5. --*Continued*-- Rating as a Moderator of Gender Differences, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

	Item Set:			
	Quality of Life	Depression	Stress	Total
Electrician's Mate (EM)	6.83	9.59	30.97	47.33
Engineman (EN)	1.22	7.78	28.37	37.37
Electronics Technician (ET)	3.43	6.43	36.56	46.42
Fireman Apprentice (FA)	2.16	1.11	33.40	36.67
Fireman (FN)	5.11	9.07	37.45	51.63
Hospital Corpsman (HM)	6.21	3.30	34.51	44.02
Hull Technician (HT)	8.99	7.13	59.01*	75.13*
Interior Communications Technician (IC)	1.79	3.02	29.77	34.58
Machinist's Mate (MM)	19.32*	7.08	27.21	53.61
Machinery Repairman (MR)	1.43	4.25	46.72	52.40
Mess Management Specialist (MS)	8.99	11.90*	75.24*	96.13*
Personnelman (PN)	2.49	1.54	27.74	31.77
Quartermaster (QM)	8.60	6.57	53.50*	68.67*
Radioman (RM)	4.06	3.28	21.06	28.40
Ship's Serviceman (SH)	4.40	1.78	18.55	24.73
Storekeeper (SK)	8.52	16.99*	50.84	76.35*
Signalman (SM)	2.32	14.77*	78.35*	95.44*
Seaman (SN)	4.90	15.42*	37.39	57.71
Torpedoman's Mate (TM)	17.71*	15.14*	34.38	69.23*
Yeoman (YN)	6.89	6.80	40.10	53.79
Cumulative χ^2	160.83	175.74	959.59	1296.16
Significance	.508	.202	.001	.001

B. Women aboard the ships with large gender differences tended to report greater than average stress for women. Among women, the signs of 43 of 50 r_{pb}s were consistent with this summary statement.

C. The moderator effects can be broadly interpreted as depending on both trends. The absolute size of the differences was small for both men and women. In fact, the largest absolute value for r_{pb} was .089.

A general description of the situation on ships with substantial gender differences, therefore, is that the ships were not substantially more stressful on the average than other ships. Instead, those ships tended to be less stressful than average for men and more stressful than average for women.

Rating and Gender Differences

About one-third (7 of 24) of the ratings contributed to the cumulative tendency for rating to be related to the size of gender differences in stress and strain (Table 6). However, because several of the ratings which were related to stress also demonstrated depression effects, depression was considered as part of the total picture.

Damage Controlman (DC). This rating demonstrated a reversal of the tendency toward higher stress in women for a number of stresses. The stresses included performance of duties, communications, concern for the future, children, discipline of children, and the impact of stress on personal life.

Hull Technician (HT). This rating demonstrated a stress reversal tendency. Women scored lower than men on crowding, privacy, exercise, recreation, and living space stresses.

Mess Management Specialist (MS). This rating demonstrated magnified gender differences in stress. The relevant stresses included life as a whole, hygiene, privacy, peers, subordinates, typical procedures on ship, communications, post-deployment adjustment, children, discipline of children, and child-care arrangements.

Quartermaster (QM). This rating showed substantial reversals on a small number of stresses. The reversals included lower scores on concern about promotion, concern about a special friend, discipline of children, and child-care arrangements.

Storekeeper (SK). This rating was of special interest, because the primary reason for the signitiven total χ^2 was the presence of several larger than average differences in depression items. The χ^2 for gender differences in stress was nonsignificant, but approached the significance criterion ($\chi^2 = 50.84$, 36 df, $p < .052$). The exceptional depression differences in the absence of sizable stress differences was curious if one assumes that stress is an antecedent to strain, including increased depression. Given this point, the exceptional stress differences were of interest even though they only approached significance when considered as a set. The SK rating showed greater than average differences for exercise, recreation, special friend, concern about the future, life, and the effects of Table 6.

Table 6. Moderator Effects of Rating, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

		Rating:					
	Pooled	DC	HT	MS	QM	SK	SM	TM
Quality of Life								
1 Job	-.02					-.20		.37
2 Personal life	.00							
3 Health	-.12							.25
4 Life as whole	-.02							
5 Family	-.01				.42			
6 Spouse	-.11		-.31					
7 Children	.06							
Depression								
8 Not going	.07			.34				-.25
9 Sad	.14							
10 Trouble sleep	.08					.23		
11 Effort	.05							
12 Lonely	.06					.21		
13 Blue	.08					.25	-.29	
14 Concentration	.05					.20	-.25	
Stress								
15 Life as whole	.04			.25				
16 Financial	-.01						-.30	-.37
17 Personal health	.13							
18 Family health	.03							
19 Being aboard	.03						-.27	-.23
20 Crowding	.04		-.11				-.31	
21 Safety	.03						-.30	
22 Hygiene	.03			.22			-.32	
23 Privacy	.10		-.09	.20				
24 Exercise	.04		-.16			.24	-.22	
25 Recreation	.02		-.16			.19		
26 Nutrition	.06							
27 Supervisor	.01							
28 Peers	.08			.30				
29 Subordinates	-.03			.18			-.35	
30 Procedures	.03			.20				
31 Living space	.10		-.14					
32 Performance	.09	-.14						
33 Promotion	.03				-.37			

Table 6. *--Continued--*Moderator Effects of Rating, U.S. Navy Women Aboard Ship Study, 15 NOV 1994 - 31 DEC 1996.

		Rating:						
	Pooled	DC	HT	MS	QM	SK	SM	TM
34 Downsizing	.03						-.35	
35 Special friend	.02				-.45	.17		
36 Breaking up	.00							
37 Communications	.06	-.25		.31			-.30	
38 Post-deployment	.02			.26			-.34	
Stress								
39 Confined	.05							
40 Future	.06	-.16				.24	-.51	
41 Alcohol	-.13							
42 Isolated	.03						-.29	
43 Out of touch	.01							
44 Life	.08					.26		
45 Children	.19	-.37		.41				
46 Discipline	.06	-.47		.35	-.45			
47 Child care	.25			.48	-.53			
Stress Effects on:								
48 Personal life	.05	-.19				.27		
49 Performance	.01					.23		
50 Coping	-.01							

Note. See pp. 162-163 for a general discussion of the approach to defining moderator effects. Table includes all ratings with significant total χ^2 for the full set of stress and strain items (cf., Table 3). Item entries restricted to those subsets for which the ship showed a significant subset χ^2. Entries are correlations which differed from the pooled within-ship correlation ($z > 1.65$; see text for details).

Signalman (SM). Women in this rating reported less stress than their male counterparts, thereby reversing the average tendency. The stresses included financial, being aboard ship, crowding, safety, hygiene, exercise, subordinates, downsizing, communications, post- deployment adjustment, concern for the future, and feeling isolated. Most effect sizes were in the $r_{pb} = -.22$ to $r_{pb} = -.35$ range, but the $r_{pb} = -.51$ for concern about the future.

Torpedoman's Mate (TM). This rating evidence lower stress for financial concerns ($r_{pb} = -.37$) and being aboard ship ($r = -.23$), but much of the cumulative χ^2 for this group was associated with a tendency for women to score higher on quality of life for the job ($r_{pb} = .37$) and health ($r_{pb} = .25$) and less depression in the form of not being able to get going ($r_{pb} = -.25$).

The general trends in the preceding descriptions can be characterized as showing that women experienced less stress than men in four ratings (Damage Controlman, Hull Technician, Quartermaster, and Signalman) while the general tendencies toward higher stress in women were magnified in only two ratings (Mess Management Specialist and Storekeeper). As was the case with ships, the specific stresses that were relevant to these trends varied from one rating to another. Thus, general directions of effect could be discerned but no two ratings could be considered equivalent in the sense of having the same profile of effects.

Additional analyses were performed to answer questions about the bases for the reversals and magnifications. Rating was recoded to a three-level variable which combined all the magnification ratings in one group, all the ratings which showed no substantial trends with respect to gender differences into a second group, and all the reversal ratings into a third group. These groups were assigned values of 1, 2, and 3, respectively. Correlations between this "rating effect" variable and stresses then were computed separately for men and women. The question addressed with these correlations was whether the variability in gender differences was the result of rating differences in stress for women, for men, or both.

Gender differences in stress and strain varied across ratings because the levels of stress differed across ratings for men, but not women. Considering the correlations between stress and strain reports and the rating effect variable defined in the preceding paragraph for men and women, the following results were obtained. Men consistently produced positive correlations (49 of 50) which were significantly different from zero with greater than chance frequency ($p < .05$ for 21 of 50 correlations, binomial $p < .001$) and exceeded .10 in absolute value for two variables (Food, $r = .111$; Children, $r = .108$). By comparison, women produced generally negative correlations (39 of 50), but the correlations were only infrequently significantly different from zero (4 of 50, binomial $p < .001$). The largest correlation for women was $r = -.072$. Among men, the absolute value of 12 of 50 correlations exceeded $r = .072$. This overall pattern of results indicated a pattern of very small negative correlations in women in contrast with somewhat larger, but still small, positive correlations in women.

Proportion of Women Aboard Ship

Proportion of women aboard ship was related to the size of gender differences in stress ($\chi^2 = 223.53$, 144 df, $p < .001$), but not to gender differences in quality of life ($\chi^2 = 34.68$, 28 df, $p < .180$) or depression ($\chi^2 = 16.69$, 28 df, $p < .955$). Two groups contributed to the stress effects as described below.

19%-26% Women. This group showed a larger than average difference for crowding ($r_{pb} = .16$ vs $r_{pb} = .03$), hygiene ($r_{pb} = .13$ vs $r_{pb} = .02$), privacy ($r_{pb} = .20$ vs $r_{pb} = .09$), living space ($r_{pb} = .24$ vs $r_{pb} = .08$), and promotion opportunities ($r_{pb} = .13$ vs $r_{pb} = .01$). This group showed no difference on the two stresses that women usually were substantially higher on than men, children ($r_{pb} = .00$ vs $r_{pb} = .21$) and child-care arrangements ($r_{pb} = .02$ vs $r_{pb} = .26$).

27%-29% Women. This group demonstrated a number of reversals for the usual trend toward higher stress in women. All of the reversals resulted in correlations that were quite small in absolute value, so the cumulative χ^2 was attributable primarily to the combination of a weak tendency toward reversal with a large sample size. Relevant items were family health (r_{pb} = -.04 vs r_{pb} = .04), being aboard ship (r_{pb} = -.06 vs r_{pb} = .03), peers (r_{pb} = .00 vs r_{pb} = .07), typical procedures (r_{pb} = -.04 vs r_{pb} = .04), living space (r_{pb} = -.02 vs r_{pb} = .08), performance (r_{pb} = .01 vs r_{pb} = .10), promotion (r_{pb} = -.10 vs r_{pb} = .01), feeling confined (r_{pb} = -.03 vs r_{pb} = .05), and isolation (r_{pb} = -.07 vs r_{pb} = .03).

DISCUSSION

Women aboard Navy ships generally reported higher stress and strain than men assigned to the same ships. This trend was consistent and was noted for 43 of the 50 stress and strain items. The trend also was significant because the large sample size in the present study meant that the hypothesis that men and women had equivalent stresses could be ruled out with greater than chance frequency. Such trends and tests only indicate the presence of some differences which were not equal to zero. Consideration of the actual size of those differences paints a different picture. The typical relationship was too small to be considered of either practical or theoretical significance according to current standards [12]. The results thus can be summarized as indicating that gender differences are real, but small enough on the average to be of little concern.

The qualifier "on the average" can be a significant limitation to the conclusions drawn from a study. Averages can hide subgroups that differ markedly from that average. The present moderator analyses attempted to identify such subgroups. Ship assignment, rating, and proportion of women aboard ship produced evidence of greater than chance deviations from the average trend.

The deviations from the general tendency for women to be slightly higher than men on stress and strain indicators took two forms. One form consisted of magnified gender difference in some groups. In these instances, the gender difference was in the same direction as observed in the sample as a whole, but the difference was larger. The magnified differences often were several times the size of the difference in the full sample. In some cases, the magnified differences reached a magnitude that would be considered moderate in size [12]. The second form of moderator involved cases where the direction of female-male differences in stress was opposite to the direction of the difference in the sample as a whole. In these cases, women reported lower stress on at least some items. Typically, the differences still were small in absolute magnitude. These differences deviated significantly from overall trends not because they were large, but because they were in the opposite direction. Such differences are referred to as "reversals" in the following discussion. The label is useful in that it suggests that processes are at work in some groups that can reverse typical male-female differences in stress even though the net effect is largely to cancel those differences rather than to produce a pronounced favoring for women.

The hypothesis that ship assignment would affect gender differences in stress was supported. Approximately 15% (3 of 19) of the ships with large enough samples to permit within-ship analysis of gender differences demonstrated magnified stress effects. While the specific stresses involved tend to vary from ship to ship, the stresses most often affected tended to be related to shipboard habitability issues, particularly crowding and privacy. Pugh, *et. al.* [3] demonstrated that ship type and the specific ship within type influenced reports of crowding, so the fact that ship assignment affects habitability has been established for some time. Follow-up analysis of the gender differences in stress, however, suggest that in some ships habitability is better than average for men and worse than average for women. These differences may be a product of the configuration of work and living spaces aboard specific ships. More detailed studies would be needed to identify the specific factors related to the gender differences in habitability. Such studies might provide insight into methods of eliminating the largest gender differences aboard ships.

An association between rating and the size of gender differences in stress was noted, but the differences did not support the hypothesis that nontraditional jobs would amplify gender differences. The analysis of gender differences indicated that women reported less stress than men in four ratings, Damage Controlman (DC), Quartermaster (QM), Signalman (SM), and Hull Technician (HT). The gender differences were moderately large in the first three ratings. The typical trend toward higher reported stress among women was magnified in only two ratings, Mess Management Specialist (MS) and Storekeeper (SK). Thus, four ratings reversed the average trend for women to report more stress than men, while two substantially magnified the average trend.

The initial hypothesis regarding ratings was that women's stress would be greater in nontraditional jobs. If the hypothesis were true, the four reversal ratings would be "traditional" jobs for women, and the two magnification ratings would be nontraditional. The opposite appears to be true. DCs perform damage control, firefighting, and chemical/ biological/radiological warfare defense functions. QMs are responsible for ship safety, navigation, and communication. These individuals stand watch, steer the ship, and perform other duties related to navigation and communication. SMs serve as lookouts and send and receive signals by flags and flashing lights. These individuals stand bridge watches as part of their work. HTs are responsible for maintaining the ships hulls, fitting, piping systems and machinery. These individuals work substantially with plumbing and piping systems. These jobs clearly involve nontraditional activities for female sailors in that normal professional development for these ratings would require shipboard duty assignments. Obviously, such assignments were not available to women until recently.

The two ratings that magnified typical female-male differences involved more stereotypical female activities. MSs are responsible for food preparation and maintaining food service and preparation spaces aboard ship. SKs are supply clerks with duties similar to those of stock clerks, sales clerks, and bookkeepers in civilian life. These activities approximate old stereotypes of the kind of work that women can do in the workplace and home. The contrast between the work done

in these ratings and that done in the ratings which demonstrated stress reversals leaves little doubt that the second hypothesis in this study not only was not supported, but actually was reversed.

Simple claims that nontraditional jobs reverse gender differences in stress while traditional jobs magnify those differences would be misleading. Some clearly nontraditional jobs did not produce reversals (e.g., Machinist's Mate (MM)), and some stereotypically traditional jobs did not magnify stress (e.g., Yeoman (YN)). This point makes understanding gender differences in stress and strain more complicated. It is not enough to explain the unexpected finding that traditional jobs magnify gender differences while nontraditional jobs actually are less stressful for women. An explanation must also be found for why these trends are evident only in selected traditional and nontraditional jobs. These two points can be addressed only by detailed study of stress dynamics in specific ratings. This level of detail was beyond the scope of the Women Aboard Navy Ships project as it was designed as an overview of life aboard ship. Additional research building on these initial findings would be required to account for the observed pattern of gender differences in stress and strain between ratings.

Additional moderator analyses examined two ship attributes that might affect gender differences in stress. Crew size had no effect on gender differences in stress. The proportion of women aboard ship had some minor effects, but these effects were difficult to interpret. In general, it might be expected that increasing the number of women aboard ship would reduce stress by making women less obvious as a minority group, by providing better opportunities for same gender support networks, by providing more mentoring from senior women, and so on. The results did not support the existence of any such general trend. The ships with the high and low proportions of women were essentially average. The moderator effects noted in women aboard ships with intermediate proportions of women appeared to arise primarily from small deviations from average. These small deviations became statistically significant evidence for moderator effects because the groups used in the analyses were quite large. Overall, this moderator effect was modest in scope and not readily interpretable. The results cumulatively suggest that crew size and the proportion of women aboard a ship have little to do with gender differences in stress. While this conclusion is based on a relatively small sample of ships, the ships studied varied widely in crew size (60 to 1,569 sailors) and proportions of women in the crew (1% to 38%). The results are applicable to Navy ships falling within these size and proportion ranges studied if the ships studied are representative of other ships with similar characteristics. At this time, there is no reason to believe the ships studied are not representative of other ships.

One important point in the findings was not covered by the study hypotheses. Moderator effects tended to be very specific. Each ship or rating had a unique profile of deviations from average. This specificity suggests that different processes may be at work on different ships and in different ratings. If similar processes are occurring, a complete understanding of those processes will require some way of specifying why they affect one stress on one ship and a different stress on another ship, for example. This observation makes it difficult to speak of moderator effects in any general way. In light of the lack of generality, the key point here is that

the present analyses demonstrated that gender differences in stress vary from one ship to another and one rating to another, but this result only sets the stage for studying the processes that yield those differences. The processes must be understood if steps are to be taken to modify stress. An understanding of those processes is beyond the scope of the present study, but this study does suggest that further research can identify factors that influence gender differences in stress. Appropriately chosen comparisons between groups that magnify and groups that reverse the average stress trends could provide insight into those factors. The specificity of effects implies that there are different causal factors at work in different settings, so attempts to modify gender differences in stress probably would require diagnosis of the specific factors affecting an organizational unit or group, followed by interventions targeted at the relevant factors for that group.

The study findings also provide perspective on the magnitude of gender differences in stress. One element of that perspective is the fact that although women broadly report more stress and strain than men, the differences are small in absolute magnitude. The primary area of difference appears to be related to responsibility for children among those women and men who have children. A second element of that perspective is that ship assignment and rating were much more substantial sources of variations in stress. Given the number of questions pertaining to habitability in the stress questionnaire, the effect of ship assignment was predictable based on prior research [3]. However, it still is important that which ship one is assigned to has more effect on the reported level of stress and strain than whether it is a woman or man assigned to that ship. Gender differences occur, but they are only one of several influences on stress and strain and a relatively modest influence at that.

CONCLUSIONS

Interpretations of the findings from the present study are subject to several qualifications. The results represent a snapshot of gender differences at a specific point in time. The process of integrating women into ships' crews is ongoing. The nature and scope of gender differences in stress may change as that process develops further. The snapshot also applied to each specific ship and rating as it exists at the time of the study. On a ship, for example, the stress levels can be a result of recent deployments, rate of crew turnover, ship's policies, manning levels, and other factors. Changes in any of these factors could modify the stress profile for the ship. Also, the study was designed to provide an overview of life aboard ship for U.S. Navy women. The processes affecting stress could not be examined in detail in such an overview. The bases for various gender differences in stress, therefore, cannot be specified at this time. Speculative interpretations have been offered at several points. Further research to test those speculations would be appropriate if the gender differences in stress noted here are of sufficient magnitude to merit stress reduction programs. The present study has documented differences which might be of concern. This information can be used to design focused studies to better understand the gender differences in stress where such studies are deemed appropriate.

The most important conclusion from the present study is that although gender differences in stress are slight on the average for Navy shipboard personnel, these differences are amplified in some situations. The key considerations appear to be ship assignments and rating. These observations provide the background required to design and implement efficient investigations into the bases for gender differences in stress and strain for shipboard personnel.

REFERENCES

1. Martin JA, Acevedo G, & Vickers RR, Jr. Comparison of men and women aboard Navy ships: Life stress conditions, psychological stress, distress, coping and quality of life issues. In press.

2. Vickers RR, Jr., & Martin JA. Exploration of stress differences by gender aboard U.S. Navy ships. San Diego, CA: Naval Health Research Center, in review.

3. Pugh WM, Gunderson, EKE, & Dean LM. Sources of situational variance in environmental perceptions. Tech. Rep. 75-11. San Diego, CA: Naval Health Research Center, 1975.

4. Rubin RT, Gunderson EKE, & Arthur RJ. Life stress and illness patterns in the U.S. Navy. IV. Environmental and demographic variables in relation to illness onset in a battleship's crew. J Psychosom Res 1971;15:89-94.

5. Goffman E. Asylums. Garden City, N.Y.: Anchor Books, 1961.

6. Garland FC, & Timberlake DS. Descriptive tables of demographic characteristics, family structure, and women's health-related issues, and occupational exposures of personnel participating in the U.S. Navy Women Aboard Ship Study. San Diego, Ca: Naval Health Research Center, 1995.

7. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Appl Psychol Meas 1977;1:385-401.

8. SPSS, Inc. SPSS reference guide. Chicago: SPSS, Inc.. 1992.

9. Hays WL. Statistics for the social sciences. NY: Holt, Rinehart & Winston, 1963.

10. Rosenthal R, & Rosnow RL. Essentials of behavioral research. NY: McGraw-Hill, 1984.

11. Rosenthal R, & Rubin DB. A simple, general purpose display of magnitude of experimental effect. J Ed Psychol 1982;74:166-169.

12. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. N.Y.: Academic Press, 1988.

Appendix A

Stress and Strain Items

The wording of the questions for stress and strain is given below. The response options for the items are described in the Methods section of the report. Items are given in the order in which they appeared in the questionnaire.

Strain Items

40. How do you feel about your:

a. Job.
b. Personal life
c. Health and physical condition.
d. Life as a whole.
e. Family.
f. (If married) Spouse.
g. (If you have children) Children.

41. How many days during the past 7 days have you:

a. Felt you just couldn't get going.
b. Felt sad.
c. Had trouble getting to sleep or staying asleep.
d. Felt that everything was an effort.
e. Felt lonely.
f. Felt you couldn't shake the blues.
g. Had trouble keeping your mind on what you were doing.

Stress Items

42. Think about your whole life over the past 2 weeks. On the whole, how much stress do you think is in your life right now.

43. Of the stress that you experience, how much comes from problems or concerns with:

a. Financial matters
b. My personal health
c. Personal or health matters of a family member
d. Being aboard ship

Stress Items --Continued--

e. Crowded conditions aboard ship
f. My personal safety aboard ship
g. Maintaining personal hygiene aboard ship
h. My lack of privacy aboard ship
I. My inability to get enough exercise aboard ship
j. The lack of recreational activities aboard ship
k. My nutrition, the unavailability of desired foods aboard ship
l. The person I work for (my immediate supervisor)
m. The people I work with (my peers)
n. The people who work for me (those I supervise)
o. The way things are typically done aboard ship
p. The people with whom I share living space aboard ship
q. My ability to perform my duties
r. My career and chances for promotion
s. Being able to stay in the Navy because of downsizing or force reductions
t. My relationship with my spouse or boyfriend/girlfriend
u. Breaking up with my spouse or boyfriend/girlfriend because of being aboard ship
v. My ability to communicate with my family and friends
w. Adapting to life after I return from this deployment
x. Feeling confined or trapped
y. My personal future and the meaning of my life
z. My use of alcohol
aa. Feeling isolated and excluded
bb. Feeling out of touch with the rest of the world
cc. My life as a whole
dd. *(If you have children)* My children because of being aboard ship
ee. *(If you have children)* Discipline of children
ff. *(If you have children)* child-care arrangements