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HEALTH STATUS OF WOMEN IN THE ARMED FORCES

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NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND
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Health Status of Women in the Armed Forces

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SUMMARY

Problem

Since 1973, women's role in the military has expanded into nontraditional occupations, combat-support positions, and sex-integrated duty assignments. Each environmental setting constitutes a unique set of physical agents, toxic hazards, and exposures. Working in one of approximately 100 different occupations introduces additional risks for women. Being in the military alone could have a deleterious impact on women's health because of the stress associated with being a minority in a predominantly male organization or a victim of sexual harassment. These environmental, occupational, and psychosocial factors, therefore, may contribute to an increased risk of ill health among women in the military.

Objective

The purpose of this longitudinal study was to assess the health status of enlisted women in the U.S. Navy and to identify changes in women's illness, injury, and career patterns over the 15-year period since the advent of the all-volunteer force. Comparisons also will be conducted with women's data from other services.

Approach

The population of Navy women who enlisted between 1973 and 1987 was divided into three cohorts based on year of entry ($\underline{n}$ = 31,822 in 1973-77; $\underline{n}$ = 48,562 in 1978-82; and $\underline{n}$ = 38,783 in 1983-87). Data from the career history file provided information for each woman on the duration of service in months until the separation date and the reason for that discharge from active duty. Hospitalization data for each cohort were compiled by 1-to-2-year intervals throughout the 15 years until the end of 1987. After calculating person years at risk, hospitalization rates per 10,000 strength were computed for each of the 16 major ICD-9 diagnostic categories and several specific diagnoses.

Results

During the 15 years of this longitudinal study, 91,724 hospital admissions were recorded, with pregnancy-related conditions accounting for the largest proportion (33.7 percent) of the total across cohorts. The rank ordering of other diagnostic categories was genitourinary disorders (10.3 percent), mental disorders

(9.4 percent), and accidental injuries (6.4 percent). During the first year of active duty, the highest hospitalization rates were observed for induced abortions and acute upper respiratory infection for the 1973-77 cohort; alcohol abuse and complications of pregnancy for the 1978-82 cohort; and complications of pregnancy and transient situational disturbances for the 1983-87 cohort. The most vulnerable time for the occurrence of hospitalizations for mental disorders, respiratory diseases, accidental injuries, and infective and parasitic disorders was during the first year of active duty. After the first year, rates for childbirth outranked all other diagnoses in each cohort; rates for spontaneous abortions were the highest during this 1-to-2.5-year time interval. During the 2.5-to-4-year interval and throughout subsequent years, pregnancy-related conditions remained at relatively high levels. The number of premature separations were the highest for pregnancy/parenthood at 13.2 percent of the total across the 15 years.

Conclusions

Results pointed to many improvements in Navy women's health status, which mirrored findings reported on Army women. Pregnancy-related conditions, primarily childbirth, were the leading reasons for a hospitalization, followed by genitourinary conditions and mental disorders. The most frequently occurring reasons for a premature separation were pregnancy/parenthood and unsuitability. The time interval of greatest vulnerability for a hospitalization or separation tended to be after the first year of active duty.

Recommendations

With a large increase observed in pregnancy-related hospitalizations after the first year of active duty, it is recommended that a comprehensive course on planned parenthood be presented during recruit training and possibly during other career phases. Another suggestion is to conduct a study on the environmental and psychosocial factors that may be associated with increases in hospitalization rates for pregnancy complications and spontaneous abortions. Also recommended is the implementation of a more comprehensive orientation program to prepare women for military life, which may have an impact on reducing stress-related hospitalizations during the first year of active duty.

Health Status of Women in the Armed Forces

Since 1973, a fivefold increase in the number of women in the U.S. military has occurred. At present, the four branches of the military have one of the largest populations of female members in the world--a population of approximately 229,000 officers and enlisted women, which accounts for 10.8% of the total force. The percentages of women by branch are as follows: 12.8% in the Air Force, 10.9% in the Army, 10.5% in the Navy, and 4.9% in the Marine Corps.

The impetus for the beginning of the increase in women's enlistments was the discontinuation of conscription and the corresponding initiation of the all-volunteer force (AVF), changes that were expected to result in a shortfall of male applicants. With a shrinking pool of eligible, high-quality male applicants interested in serving in the AVF, the numbers of military women began to increase which has continued throughout the ensuing years. The need for high-quality individuals, those with at least a high school diploma, is not likely to diminish; each branch is seeking applicants who can be trained to use and maintain technologically sophisticated equipment.¹ As a result, the military may have to depend increasingly on women, who have a higher rate of high school graduation than men.²

Not all young men and women in the U.S. are eligible for active military service. In the process of selecting youths for military service, 22% of all young men and women are eliminated because their aptitude scores are lower than the required level or their educational achievements are deficient. Another 15% would be expected to fail the physical standards, with excessive weight accounting for the largest proportion of physical disqualifications.³ The Air Force, for example, estimates that 56% of men and 46% of women are qualified to enlist, individuals who meet the criteria based on physical health, nonuse of drugs, lack of recorded criminal involvement, level of education, and Armed Forces Qualification Test scores.⁴ Because of such eliminations and restrictions, it is presumed that individuals accepted for military service are physically and mentally fit.

The occupations to which women are assigned include all specialties except those directly related to combat. In the Air Force, women serve primarily in such support fields as administrative, medical, dental, and repair specialties. The

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nonspecificity of these jobs has led Stiehm to conclude that "U.S. Air Force enlisted personnel could be mostly women," and that the Air Force could be "given to women."⁵ Specific examples of nontraditional jobs for Air Force women are security specialists and assignments to Titan II and Minuteman missile crews. Army and Marine Corps women serve in a wide range of occupational specialties from military police to mechanical repairperson although they are excluded from all direct combat positions. After a brief period when women Marines were restricted from security guard duty in high-risk locations, they once again hold the prestigious job of embassy guard. Navy women have been assigned to noncombatant ships since 1978 when the U.S. Congress approved modifications to Section 6015 and President Jimmy Carter signed P.L. 96-485 into law. By the beginning of 1992, the Navy planned to have approximately 600 women officers and almost 9,000 enlisted women assigned to ships.⁶ Navy women serve in such diverse environments as the industrialized ships in the tender and repair classes and the sterile environment of an operating room.

Since the beginning of the AVF, therefore, women's role in the military has gradually expanded into nontraditional occupations, combat-support positions, and sex-integrated duty assignments. Each environmental setting, whether onboard a ship in the Navy or ashore in the Army, constitutes a unique set of physical agents, toxic hazards, and exposures. Working in one of approximately 100 different occupational specialties introduces additional risks for women, which may adversely affect their health status. Being in the military alone could have a deleterious impact on women's health because of the stress associated with being a minority in a predominantly male organization or with being a victim of sexual harassment. These environmental, occupational, and psychosocial factors, therefore, may contribute to an increased risk of ill health among women in the military. The objective of this longitudinal study is to assess the health status of enlisted women in the Navy and to determine whether or not women's illness, injury, and career patterns have changed over the 15-year period since the advent of the AVF. Comparisons with women's data from the other services also will be conducted.

Factors Affecting Women's Health

Historically, one of the most important considerations associated with women's utilization in the military was concern about the impact of active duty on their health. Another centered on women's health problems as a possible adverse influence on military readiness. During World War II, for example, gynecological and obstetrical disorders were most frequently cited as the major reasons against the increased use of women.⁷ The sick call rate of Army women for all reasons was reported at 36% more than men's rate in 1943; industrial surveys conducted at the same time indicated that women's medical care visits were twice those of men. The Director of the Women's Army Corps, Oveta Culp Hobby, requested that efforts should be initiated to reduce the number of women's sick call visits, but the Surgeon General's Office responded that the tendency to report to sick call was desirable preventive medicine. The major complaints were not associated with female disorders but were primarily for respiratory and digestive disorders. Women reported 70% more colds than men and double the incidence rate of dysentery. Men, on the other hand, sought medical treatment more often than women for such serious conditions as pneumonia and rheumatic fever, and their hospital stays tended to be of longer duration than those for women. Pregnancy rates were so low during World War II that no special pregnancy policy was enacted.

When women began to enter the military in relatively large numbers during the 1970s, their hospitalization rates were significantly higher than men's for almost all diagnostic categories and for such stress-related disorders as transient situational disturbances, neuroses, personality disorders, and gastrointestinal problems. Women's higher rates for these specific conditions were attributed to selection criteria; administrative policies and practices, e.g., many women may have been hospitalized because there were no brig facilities or holding companies for them; and psychosocial factors unique to women, i.e., when ill, more women than men seek medical treatment.⁸

Another explanation was that the incidence of a stress-related disorder may be a manifestation of the adverse health effects associated with being a minority or "token" in a predominantly male (or "skewed") organization.⁹ Kanter's work in

the late 1970s described a "skewed" population as one in which the percentage of the minority group was less than 15%, e.g., women in the military.¹⁰ Until the percentage of women in a group exceeded 15 to 20%, they would be expected to experience more stress, which could result in an increased incidence of stress-related problems. Interestingly, this hypothesis was tested in a research project conducted on officers, specifically, the Navy Nurse Corps where men represented a minority in a female-dominated profession.¹¹ Both male and female Navy nurses were reported as having elevated hospitalization rates for several major diagnostic categories in comparison with other officer designators. Of the 11 stress-related disorders, however, male nurses' rates were significantly higher than their female counterparts only for the two disorders of ulcers and hypertension, conditions that typically have been reported as having a higher incidence rate among men than women.¹² Results of that study of Navy officers, therefore, did not support the theoretical position of the potentially distressing health effects related to being a "token" or a member of a minority in an occupation or organization. Similarly, in Ott's study of skewed occupations, it was shown that male nurses acknowledged experiencing advantages, as specified on several criteria, whereas policewomen reported experiencing disadvantages.¹³ The author concluded that the theory of numerical imbalance did not apply to men as a minority group in an organization, primarily because the high status of men as a minority group was an important factor influencing their acceptance.

Extent of experience also has been considered a factor associated with the incidence of stress-related conditions. In the Navy studies cited above, it was noted that the largest differences in hospitalization rates between men and women were evidenced at the lowest pay grade and age levels. The rate differential in these hospital admissions between the sexes decreased at higher pay grades and ages. Such results suggested that as increasingly more women remained in the military and gained job experience, their hospitalization rates would be expected to decrease.

Another hypothesis formulated was that as women attained positions of increased responsibility in an organization, or as they assumed increasingly more roles, e.g., motherhood, wife, career woman, care giver to aging parents, their

health status would be adversely affected. This prediction has been tested in the private sector, where the results indicated that the workplace was not more stressful for women than being in the home.¹⁴ The reasons women did not manifest stress-related symptoms were that the workplace seemed to enhance their sense of accomplishment and self-esteem, provided social support and interesting social contacts, and added to their economic well-being. The authors concluded that there was no evidence to show that employment was harmful to women. Moreover, as women reached higher levels of responsibility in the workplace, the risks of disease and mortality did not increase to the levels of their male counterparts, as had been expected. For women, therefore, employment seemed to offer a buffering effect against the stressors of their family roles as contrasted with men who seemed to view the home situation as a sanctuary from the stressors of work.

Comparisons across time have revealed that Navy women continued to have higher total hospitalization rates than men, although the rate differentials showed a gradual decline with time and a considerable narrowing for the major categories of infectious diseases, disorders of the respiratory system, and digestive conditions.¹⁵ Similar to reports from World War II, women's rates for acute upper respiratory diseases throughout the 1970s were higher than men's as contrasted with men's higher rates for pneumonia. By 1984, however, women's rates for acute upper respiratory infection, diarrheal disease, rubella, and infectious mononucleosis had declined to such an extent that the only significant difference between the sexes was observed for diarrheal disease. These results correspond in part with those reported on Army data in that an overall decline in rates for respiratory disorders also was noted among Army men and women from 1982 to 1985.¹⁶

Another area of concern and limited knowledge was that of determining whether or not military environments represented an increased risk of reproductive dysfunction and cancer. Few, if any, research projects have been conducted on the incidence of spontaneous abortions recorded in military hospitals. To meet this need, a project should be designed to identify specific conditions in the environment that may be associated with these mishaps. Other proposed

studies included assessments of birth defects, low birth weights, and infant mortality. Military personnel also are exposed to multiple carcinogens as are civilian workers in the private sector. With regard to the incidence of cancer among military women, results of a study conducted from 1965 through 1976 showed that women's reproductive organs were the sites of greatest susceptibility to neoplastic growth, although the number of cases was low.¹⁷ A disproportionately high percentage of cases was noted for Black women. The most frequently observed malignancies were for cervical cancer and unspecified neoplasms of the genital organs. No data on cancer incidence among Navy women have been published since those collected during the 1960s and 1970s.

Also to be examined were the incidence rates of pregnancy-related conditions, which have been identified as the most frequently occurring reasons for women's hospitalizations since the pregnancy policy was modified in 1975 to allow a pregnant woman to remain on active duty.¹⁸ Parenthetically, a pregnant woman can request a separation from active duty, which may not be honored if the woman's skills are deemed necessary for mission accomplishment. Estimates from the early 1980s indicated that approximately ten percent of active duty military women were pregnant at any time; the pregnancy rate for Army active duty women in 1985 was reported at nine percent for enlisted women and five percent for officers.¹⁹ About 11 percent of Navy women's separations from active duty during the early 1980s were recorded for reasons of pregnancy and parenthood; a higher percentage, 16.4 percent, was reported for Marine Corps women during the time frame from 1981 through 1985.²⁰

The final area to explore was that of accidental injury hospitalization rates throughout the years of the AVF. Since the mid- to late 1970s, women have been assigned to nontraditional jobs, ranging from aircraft mechanic to military police, as well as to such industrialized ships as tenders and repair vessels. Because of this shift to more physically demanding work, the risk of an injury would be greater than that predicted for women working in traditional jobs or stationed at shore installations. In addition, their relative inexperience with shipboard or field life may increase the risks of an accidental injury. Results of other research showed that younger, inexperienced men and women had higher accidental injury

hospitalization rates than their older, more experienced counterparts.²¹ Also associated with injury rates is the possibility of a corresponding increase in the incidence of musculoskeletal conditions.

The purpose of this study is to assess the impact of time on such major events as a hospital admission and separation from service by examining diagnoses for all hospitalizations, reasons for separation from active service, and time of occurrence of these events across a 15-year period and phases of a career among three cohorts of Navy enlisted women. Specific questions posed in this study are (1) Do the diagnoses of hospitalizations differ among the three cohorts and across time frames within each group? (2) Are there shifts in the reasons for hospitalizations across years within each of the three cohorts? (3) Do reasons for separations from active service differ by duration of months and years among the three cohorts?

Method

Data used for this study consisted of medical inpatient and career history information extracted from files maintained at the Naval Health Research Center, San Diego, CA. These files included data collected since 1965 on hospitalizations, separations from active duty, and demographic changes. All women who enlisted between 1973 and 1987 were identified from the service history files ($n = 119,167$ women), and their medical inpatient records were extracted for the same time period. To examine the impact of time on hospitalizations and separations, the population across the 15 years of data was divided into three cohorts of women who enlisted during 1973 to 1977 ($n = 31,822$) or the early years of the AVF, 1978 to 1982 ($n = 48,562$) or the beginning of women's assignments to ships, and 1983 to 1987 ($n = 38,783$) or the end of women's newness period.

For each of the three cohorts (i.e., 1973-77, 1978-82, and 1983-87), hospitalization data were compiled by 1-to-2-year intervals across years throughout the entire 15-year period or until the end of 1987. Data from the career history file provided information on the duration of service in months until the separation date and identified types of attrition for various selected reasons, e.g., pregnancy/parenthood, personality disorders. Using months of service, person

years at risk were computed for each time interval within each of the three groups. Hospitalization rates per 10,000 strength were computed for each of the 16 major ICD-9 diagnostic categories and several specific diagnoses with relatively high numbers of hospital admissions. Comparisons across and within cohorts were conducted across phases of a career. Frequency and percentage distributions of hospital admissions and premature separations from active duty were compiled to provide overall values across and within cohorts.

Results

Hospitalizations of Enlisted Women across 15 Years

A total of 91,724 hospital admissions was recorded during the 15 years of this longitudinal study. After computing frequency and percentage distributions on these records, results showed that pregnancy-related conditions represented the leading reason for women's hospitalizations, accounting for 33.7 percent of all admissions across the three cohorts. The second-ranking diagnostic category was genitourinary disorders at 10.3 percent. The categories that ranked third and fourth in numbers of admissions across cohorts were mental disorders (9.4 percent) and accidental injuries (6.4 percent). Percentages for the majority of the other categories were approximately 5 percent each.

Table 1 presents the rank ordering of diagnostic categories and the most frequently occurring specific disorders for the three cohorts. As shown, the highest hospitalization rates were noted for the category of pregnancy-related conditions in each cohort: 545.0 per 10,000 for the 1973-77 group, 711.6 for the 1978-82 cohort, and 709.0 in 1983-87. A delivery was the most frequent reason for being hospitalized, with a total of 17,981 births recorded in naval hospitals for women who enlisted between 1973 and 1987. The second-ranked specific diagnosis was complications of pregnancy, which showed a more than twofold increase in hospitalization rates from the first to third cohort. Possibly corresponding in part with this increase across cohorts was a decrease in hospitalizations for prenatal care, as shown under the category of supplementary classifications. A spontaneous abortion was the third-ranking specific pregnancy-related diagnosis with a total of 3,363 recorded in naval hospitals during the 15 years. From 1973, when

Table 1

Hospitalization Rates per 10,000 among Three Cohorts of Navy Women by Year of Enlistment, 1973-1987

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related Conditions	8,222	545.0	15,427	711.6	7,253	709.0
Deliveries	4,398	291.5	9,594	442.6	3,989	390.0
Complications of pregnancy	1,428	94.7	4,202	193.8	2,376	232.3
Spontaneous/other abortions	332	61.8	1,560	72.0	871	85.1
Induced abortions	1,464	97.0	71	3.3	17	1.7
Genitourinary Disorders	3,093	205.0	4,458	205.6	1,923	188.0
Diseases of parametrium/pelvic	621	41.2	991	45.7	435	42.5
Disorders of menstruation	489	32.4	590	27.2	173	16.9
Diseases of the ovary	255	16.9	598	27.6	310	30.3
Mental Disorders	2,807	186.1	3,913	180.5	1,951	190.7
Alcohol abuse	536	35.5	1,190	54.9	371	36.3
Transient sit. disturbances	567	37.6	652	30.1	580	56.7
Personality disorders	575	38.1	798	36.8	344	33.6
Neuroses	523	34.7	300	13.8	177	17.3
Accidental Injuries	2,131	141.3	2,526	116.5	1,192	116.5
Symptoms/ill-defined Conditions	1,713	113.5	2,315	106.8	1,149	112.3
Symptoms--gastrointestinal	662	43.9	725	33.4	256	25.0
Symptoms--genitourinary	269	17.8	525	24.2	314	30.7
Diseases--Musculoskeletal System	1,738	115.2	2,386	110.1	966	94.4
Supplementary Classifications	2,166	143.6	2,167	100.0	713	69.7
Medical/surgical aftercare	779	51.6	623	28.7	220	21.5
Prenatal care	559	37.1	347	16.0	84	8.2
Diseases--Digestive System	1,791	118.7	2,201	101.5	1,021	99.8
Diseases--Respiratory System	2,148	142.4	1,874	86.4	756	73.9
Hypertrophy of tonsils	357	23.7	485	22.4	207	20.2
Acute respiratory infection	437	29.0	84	3.9	25	2.4
Infective/Parasitic Diseases	1,723	114.2	1,579	72.8	822	80.4
Neoplasms	846	56.1	676	31.2	252	24.6
Malignancies	115	7.6	149	6.9	57	5.6
All Other Diagnostic Categories	2,405	159.4	2,488	114.8	933	91.2
Total Hospitalization Rate	30,783	2040.5	42,010	1,937.9	18,931	1,850.6
Person Years at Risk		150,861.0		216,782.5		102,294.5

funding for voluntary termination of pregnancy in federal inpatient medical facilities had been approved, until 1977, the number of hospitalizations for induced abortions across cohorts was the highest for the 1973-77 cohort. The discontinuation of funding for abortions in 1978 was reflected by a corresponding decrease in rates beginning with the 1978-82 cohort.

Hospitalization rates for the category of genitourinary disorders were fairly comparable across the three cohorts. Rates decreased across cohorts for disorders of menstruation whereas rates increased from the first cohort to the last for diseases of the ovary. This trend mirrored a similar increase in rates for symptoms of the genitourinary system (subsumed under the category of symptoms and ill-defined conditions).

Mental disorders occupied the position of the third-ranked diagnostic category with the highest hospitalization rates observed for alcohol abuse, followed by transient situational disturbances and personality disorders. Changes across cohorts from the first to the third included an increase in rates for transient situational disturbances and a decrease in rates for neuroses.

Other findings showed that hospitalization rates for accidental injuries were higher for the earliest cohort than for the other two groups, which represented the time frame when women began to be assigned with greater frequency to nontraditional jobs and to shipboard duty. Decreases in rates across cohorts also were noted for gastrointestinal symptoms, one of the stress-related conditions, and for acute upper respiratory infections. Hospitalization rates for malignant neoplasms were low with the leading forms being cervical, ovarian, and breast cancer, which accounted for 52.6 percent of all 321 cancer hospitalizations.

Time of Occurrence of A Hospitalization

In Table 2 are presented the hospitalization rates that were reported for each cohort during the first year of active duty. The highest hospitalization rates were observed for the categories of respiratory diseases (primarily acute upper respiratory infection) for the 1973-77 cohort and the category of mental disorders for the other two cohorts, with the highest rates observed for alcohol abuse and transient situational disturbances, respectively. Other specific diagnoses with high

Table 2

Hospitalization Rates per 10,000 among Three Cohorts of Navy Women during First Year of Service by Year of Enlistment, 1973-1987

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related Conditions	913	306.2	686	150.3	743	206.4
Deliveries	94	31.5	125	27.4	174	48.3
Complications of pregnancy	105	35.2	297	65.1	336	93.3
Spontaneous/other abortions	170	57.0	234	51.3	223	61.9
Induced abortions	544	182.5	30	6.6	10	2.8
Genitourinary Disorders	587	196.9	794	174.0	566	157.2
Diseases of parametrium/pelvic	145	48.6	225	49.3	141	39.2
Disorders of menstruation	92	30.9	108	23.7	65	18.1
Diseases of the ovary	28	9.4	102	22.3	108	30.0
Mental Disorders	910	305.2	1,305	285.9	962	267.2
Alcohol abuse	115	38.6	384	84.1	161	44.7
Transient sit. disturbances	153	51.3	203	44.5	335	93.0
Personality disorders	222	74.5	291	63.8	156	43.3
Neuroses	228	76.5	97	21.3	83	23.1
Accidental Injuries	746	250.2	791	173.3	529	146.9
Symptoms/ill-defined Conditions	498	167.0	564	123.6	402	111.7
Symptoms--gastrointestinal	237	79.5	209	45.8	102	28.3
Symptoms--genitourinary	28	9.4	54	11.8	72	20.0
Diseases--Musculoskeletal Sys.	295	98.9	354	77.6	221	61.4
Supplementary Classifications	773	259.3	419	91.8	139	38.6
Prenatal care	94	31.5	38	8.3	21	5.8
Diseases--Respiratory System	1,044	350.2	641	140.4	310	86.1
Acute respiratory infection	397	133.2	55	12.1	14	3.9
All Other Diagnostic Categories	2,016	676.2	1,702	372.9	1,021	283.6
Total Hospitalization Rate	7,782	2,610.2	7,256	1,589.7	4,893	1,359.1
Person Years at Risk		29,814.0		45,642.5		36,002.5

rates included induced abortions, gastrointestinal symptoms, neuroses, and personality disorders in the 1973-77 cohort; complications of pregnancy and personality disorders for the 1978-82 cohort; and complications of pregnancy and spontaneous abortions for the other cohort.

As shown in Table 3, hospitalization rates for pregnancy-related conditions ranked highest for each cohort after the first year of active duty. Rates for childbirth outranked all other diagnoses in each cohort, followed by induced abortions in the 1973-77 cohort and complications of pregnancy for the other two cohorts. Spontaneous abortions occurred at relatively comparable frequencies across cohorts during this interval of a career. Rates for all other specific diagnoses were considerably lower than those observed for pregnancy-related conditions. Decreases in rates from the 1973-77 cohort to the 1983-87 cohort were the largest for the categories of induced abortions and prenatal care.

Hospitalization rates computed for the 2.5-to-4-year interval are presented in Table 4. Rates for pregnancy-related conditions tended to peak during this interval and remained at relatively high levels throughout subsequent years. Even after nine to ten years of service, for example, the hospitalization rate for deliveries was 288.3 per 10,000 in the 1973-77 cohort and 441.0 per 10,000 in the 1978-82 cohort. Similarly, hospitalizations for complications of pregnancy continued at high levels after four years of service for each cohort. Also comparable to statements drawn from data presented in Tables 2 and 3, the rates in Table 4 for the 1983-87 cohort were considerably lower than those for the 1973-77 cohort for the categories of mental disorders and respiratory diseases.

In comparing rates after four years of service or the first enlistment, decreases were observed for almost all categories, except for slight increases in rates for genitourinary disorders and diseases of the musculoskeletal system. As stated above, the most vulnerable time for the occurrence of hospitalizations for mental disorders; respiratory diseases, e.g., acute upper respiratory infection; accidental injuries; and infective and parasitic disorders was during the first 12 months of active duty, which was followed by quite consistent declines in rates throughout subsequent years. Comparisons of rates for these categories across time intervals revealed large decreases in rates for each of the three cohorts.

Table 3**Hospitalization Rates per 10,000 among Three Cohorts of Navy Women during 1 to 2.5 Years of Service by Year of Enlistment, 1973-1987**

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related Conditions	2,405	661.2	4,684	819.4	4,030	1,028.0
Deliveries	1,103	303.2	2,925	511.7	2,282	582.1
Complications of pregnancy	324	89.1	1,236	216.2	1,321	337.0
Spontaneous/other abortions	322	88.5	496	86.8	422	107.6
Induced abortions	656	180.4	27	4.7	5	1.3
Genitourinary Disorders	740	203.4	1,260	220.4	816	208.1
Diseases of parametrium/pelvic	145	39.9	274	47.9	185	47.2
Disorders of menstruation	122	33.5	184	32.2	65	16.6
Diseases of the ovary	57	15.7	206	36.0	115	29.3
Mental Disorders	851	234.0	1,197	209.4	725	184.9
Alcohol abuse	128	35.2	416	72.8	165	42.1
Transient sit. disturbances	172	47.3	167	29.2	167	42.6
Personality disorders	201	55.3	270	47.2	137	34.9
Neuroses	163	44.8	91	15.9	77	19.6
Accidental Injuries	624	171.6	762	133.3	463	118.1
Symptoms/ill-defined Conditions	459	126.2	666	116.5	480	122.4
Symptoms--gastrointestinal	192	52.8	251	43.9	107	27.3
Symptoms--genitourinary	61	16.8	148	25.9	141	36.0
Diseases--Musculoskeletal Sys.	426	117.1	600	105.0	409	104.3
Supplementary Classifications	352	96.8	450	78.7	332	84.7
Prenatal care	223	61.3	140	24.5	46	11.7
Diseases--Respiratory System	545	149.8	496	86.8	301	76.8
Acute respiratory infection	21	5.8	10	1.7	8	2.0
All Other Diagnostic Categories	1,888	519.1	1,912	334.5	1,253	319.6
Total Hospitalization Rate	8,290	2,279.1	12,027	2,104.0	8,809	2,247.0
Person Years at Risk		36,373.5		57,163.5		39,204.0

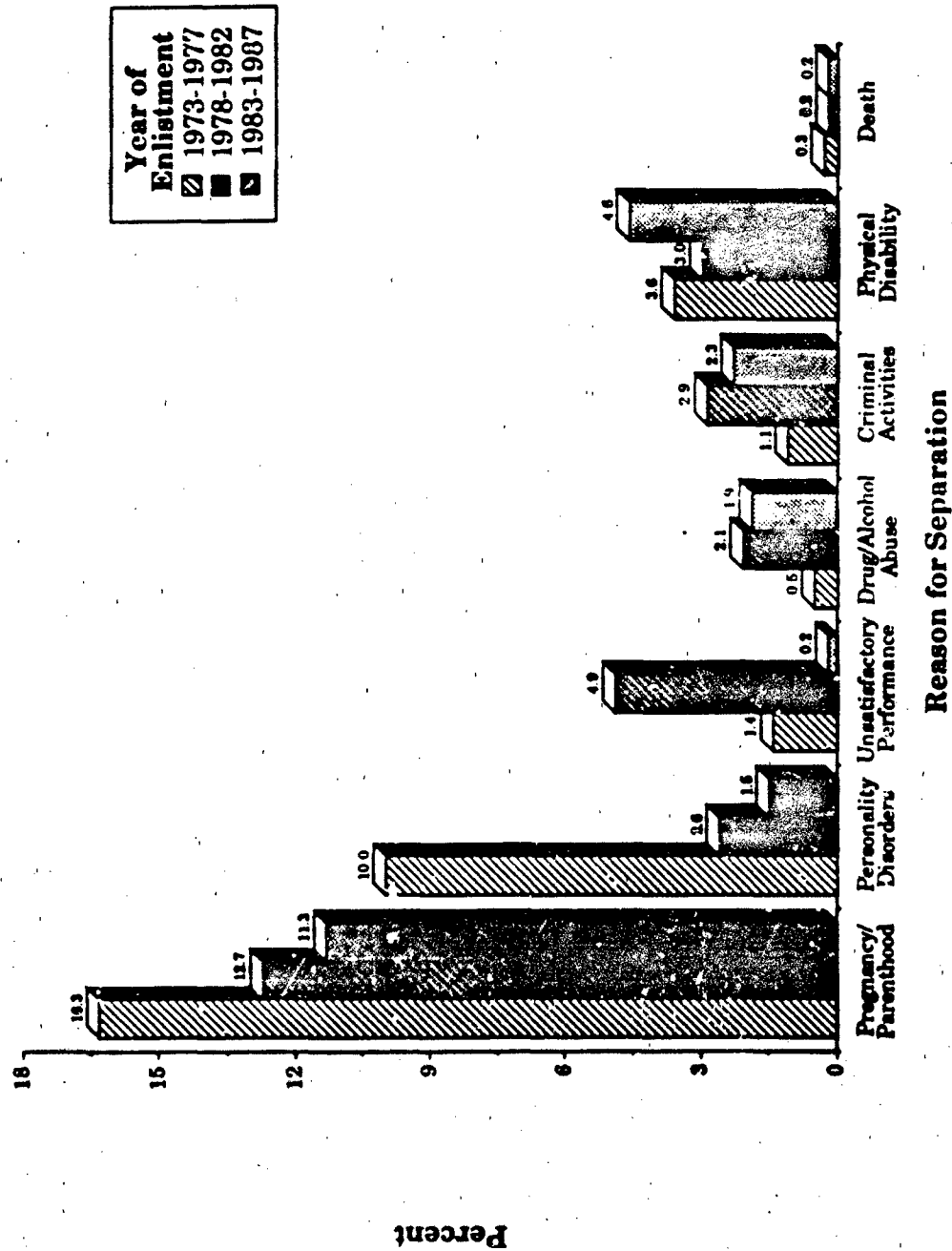
Table 4

Hospitalization Rates per 10,000 among Three Cohorts of Navy Women during 2.5 to 4 Years of Service by Year of Enlistment, 1973-1987

Diagnostic Category/Diagnosis	1973-1977		1978-1982		1983-1987	
	No.	Rate	No.	Rate	No.	Rate
Pregnancy-related Conditions	2,010	720.6	4,774	991.3	2,146	966.9
Deliveries	1,217	436.3	3,114	646.6	1,316	593.0
Complications of pregnancy	359	128.7	1,260	261.6	625	281.6
Spontaneous/other abortions	200	71.7	393	81.6	204	91.9
Induced abortions	234	83.9	7	1.5	1	0.5
Genitourinary Disorders	658	235.9	1,139	236.5	448	201.9
Diseases of parametrium/pelvic	139	49.2	256	53.2	92	41.5
Disorders of menstruation	78	28.0	148	30.7	34	15.3
Diseases of the ovary	65	23.3	149	30.9	74	33.3
Mental Disorders	442	158.5	707	146.8	227	102.3
Alcohol abuse	94	33.7	200	41.5	38	17.1
Transient sit. disturbances	117	41.9	132	27.4	67	30.2
Personality disorders	84	30.1	141	29.3	47	21.2
Neuroses	64	22.9	57	11.8	11	5.0
Accidental Injuries	306	109.7	502	104.2	176	79.3
Symptoms/ill-defined Conditions	256	91.8	474	98.4	225	101.4
Symptoms--gastrointestinal	108	38.7	142	29.5	39	17.6
Symptoms--genitourinary	49	17.6	107	22.2	84	37.8
Diseases--Musculoskeletal Sys.	378	135.5	587	121.9	267	120.3
Supplementary Classifications	325	116.5	475	98.6	188	84.7
Prenatal care	152	54.5	93	19.3	17	7.7
Diseases--Respiratory System	283	101.5	365	75.8	125	56.3
Acute respiratory infection	8	2.9	11	2.3	2	0.9
All Other Diagnostic Categories	1,252	448.9	1,490	309.4	650	292.9
Total Hospitalization Rate	5,910	2,118.9	10,513	2,183.1	4,452	2,006.0
Person Years at Risk		27,892.0		48,157.0		22,193.5

Figure 1

Reasons for Premature Separation among Navy Women who Enlisted from 1973-1987



Specific conditions that reflected this trend in declining rates included all of the stress-related disorders, such as transient situational disturbances, personality disorders, neuroses, and gastrointestinal symptoms. Rates for spontaneous abortions were the highest during the 1-to-2.5-year time interval in each cohort, followed by gradually decreasing rates across subsequent time frames. Other results showed that the time of cancer incidence varied, as would be expected, because of differences in durations of latency periods for neoplastic growth, e.g., a long latency for lung cancer as contrasted with Hodgkin's disease which strikes along a wide spectrum of ages.

Reasons for Premature Attrition from the Navy

In examining reasons for premature attrition from the Navy, as shown in Figure 1, the percentages indicated that pregnancy and parenthood accounted for the largest proportions for each of the three cohorts, falling within a range from 16.3 percent for the 1973-77 cohort to 11.3 percent for the 1983-87 cohort. Across the 15 years, the number of separations for pregnancy and parenthood was 15,730 or 13.2 percent of the total. Discharges for reasons of personality disorders and physical disabilities were the second- and third-leading reasons for a premature separation from service. The time interval when pregnancy or parenthood separations were most likely to occur with greatest frequency was determined to be during the 1-to-2.5-year time frame, which was followed by a gradual decline in rates across the remaining years of a career.

Discussion

Results of this study indicate that Navy enlisted women's health status has changed across the 15 years, a conclusion drawn from trends observed in their hospitalization rates. Both increases and decreases in rates occur across years and within cohorts. Also to be discussed are the shifts in reasons for women's early separations from active duty.

Increases in hospitalization rates for pregnancy-related conditions across the years are shown in this study, a change that corresponds with the implementation of the pregnancy policy which stipulates that women can remain on active duty

during and after their pregnancies. The percentage of all hospitalizations that are pregnancy related is 33.7 percent for the 15 years of this study; researchers report a similar percentage among Army women, more than one-third of all hospital admissions. The research by Verbrugge also corroborates the high rates for these conditions among women in the private sector.²² An explanation for these elevated rates is that such findings would be expected for women of the ages reported in these studies, i.e., the fecund or child-bearing years. Perhaps a more important finding is the time interval of an enlistment when hospitalizations for these conditions occur with greatest frequency. Of particular concern is the large increase in hospitalizations for childbirth reported after the first year of active duty, with the peak reported at the 2.5-to-4-year interval and high levels recorded throughout the years of the follow-up period. These results reflect a need to examine the psychosocial circumstances of Navy life in order to determine why women would assume the role of motherhood during such an early phase of a Navy career. Specific preventive programs also should be considered for development and implementation, such as a comprehensive course on planned parenthood to be presented during recruit training and possibly during other phases of a career. Another program is a case management interventive process which prepares the pregnant woman for meeting the immediate demands of motherhood and provides education on planned parenthood for the future.²³

Another large rate increase in hospitalizations across the years is noted for complications of pregnancy. Possibly associated with this finding are the increased admission rates for spontaneous abortions, diseases of the ovary, and symptoms of the genitourinary system. The increase in these rates seems to correspond in part with a decrease in hospitalizations for prenatal care, which should be examined in terms of finding a possible relationship between a prenatal care hospitalization and a subsequent admission for complications of pregnancy or a normal delivery. The relatively high rates of spontaneous abortions suggest that further research is needed to identify the factors that may be associated with these incidents. A study of spontaneous abortions recorded in military hospitals would provide the baseline information required to determine the incidence by occupations and environmental settings. Perhaps a type of occupational

reproductive hazard, such as a biologic agent, chemicals and metals, radiation, or stress, will be found in conjunction with the reported spontaneous abortion. Also to be considered is the finding that the incidence of these mishaps is the highest for the most recent cohort, 1982-87. Overall, these results suggest a need to identify the circumstances potentially associated with hospitalizations for reproductive dysfunction. This examination would assess the impact on these conditions of such factors as age, occupation, work environment, stress, and health history. Results would establish the importance of these considerations in relation to a biologic factor or a woman's increased vulnerability to reproductive dysfunction.

Earlier research has postulated that being members of a minority group in a male-dominated environment, i.e., women in the military, would engender an increase in women's incidence rates of stress-related conditions.²⁴ Results of this study show that the first 12 months of active duty is the time frame of greatest risk for such conditions. During subsequent year intervals, a decrease in hospitalization rates is noted for all stress-related conditions, particularly for such diagnoses as gastrointestinal symptoms and mental disorders. Presentation of a more comprehensive orientation program to prepare women for military life may have an impact on reducing the incidence of these disorders. Also shown in these data is a decrease across cohorts in percentages of separations and rates of hospitalizations for personality disorders, which probably reflects an improvement not only in the quality of women applicants but also a possible change in selection criteria. Other findings of this study indicate that gaining experience and assuming more responsibilities in the military do not result in an increased incidence of stress-related problems; for example, after ten years of service, women's hospitalization rates for these conditions are less than 20 per 10,000 strength. Ballweg and Li also report that military women's perceived health status improves with age; results of their research show that as women become older, the number of self-reported health concerns decreases.²⁵ Conversely, the age group with the least positive health status is 20 years of age and younger.

Other results indicate that since the late 1970s hospitalization rates have decreased for mental disorders, respiratory diseases, infective diseases, and

supplementary conditions. The continuing trend in declining admission rates for these conditions seems to point to a change in either the health status of Navy women who enlisted in the 1980s or in the type of treatment prescribed for such conditions. The decreases in rates for such acute disorders as upper respiratory infection and gastrointestinal problems no doubt correspond with changes that have occurred in treatment therapies. It seems likely that with the high cost of inpatient medical care reported at naval hospitals, a greater reliance is being observed in prescribing outpatient treatment and medications. The treatment modalities adapted since the 1970s have centered increasingly on outpatient care combined with various types of prescribed medications.

The decrease in accidental injury rates noted in this study counters the hypothesis that rates would increase as a result of an increment in the number of women assigned to nontraditional jobs and to shipboard duty. This prediction is based on women's overall lack of experience with physically demanding jobs and unfamiliarity with the circumstances of shipboard life. The decline in rates across cohorts is attributed to a difference in the quality of Navy enlisted women, effectiveness of the Navy's occupational training programs, and implementation of less risky ways to do a particular job. The decrease in rates across year intervals is associated with the positive impact of experience as a factor in the prevention of accidental injuries, a conclusion that supports earlier research findings.²⁶

In conclusion, results of this study point to many improvements in Navy women's health status and no major decrements. The findings mirror those reported on the health status of women in the Army.²⁷ The decrease in the proportion of women prematurely separated from service for reasons of a personality disorder would also suggest improvements in the quality of women applicants and/or initial screening criteria. Other specific reasons for explaining the decline in women's rates include changes in treatment modalities, such as increases in the prescription of medications and outpatient care; modifications in policies concerning women; assignment of women to ships and other duty stations where inpatient medical facilities are less available; and cost containment endeavors. Future research efforts will explore the relationships of these factors with hospitalization and attrition rates.

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