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An out-patient morbidity study of health care utilization by female and male soldiers was completed in Korea and Ft. Lewis. Over 23,000 clinic visits were analyzed and rates of conditions estimated. Women in Korea had 123 visits per 1000 per week, 10% higher than women at Ft. Lewis and 2.1 times higher than men in either location. Differences were observed in many diagnostic categories and were multifactorial in nature. A health survey was mailed to 4,000 soldiers in Korea and Ft. Lewis. The adjusted response rate approached 70% in most groups. Women in Korea reported diminished mental health and more clinic visits than women at Ft. Lewis, but were comparable in other measures of health status. The health status of women was significantly worse than men in nearly all measured categories. Efforts were made to obtain denominators from DMDC for a retrospective hospitalization study of active duty personnel at Ft. Lewis and Korea, but these were deemed unsatisfactory in quality and the Korea analysis was deferred. A separate study was conducted concurrently on hospitalizations at Ft. Lewis with another investigator, but not included here. Efforts therefore focused on the morbidity and survey studies in which the final effort was twice that estimated in the original statement of work.

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Jeffrey D. Gunzenhauser MD 5 May 97

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INTRODUCTION

Within the military medical community, substantial concern exists about health problems which women on active duty experience during deployment. Major categories of concern include non-effectiveness rates, health care utilization, pregnancy-related issues, medical determinants of early loss to operations, mental health, substance abuse, physical abuse, physical injuries, and sexually transmitted disease. These issues are broad and significant, warranting prompt attention and thoughtful consideration.

Few studies of female morbidity during recent deployments have been published [1,2]. The validity, generalizability, and scope of existing studies suffer from methodological limitations. Health-related events often derive from questionable sources (log-books of self-reported chief complaints). Catchment populations are poorly described. Measured health outcomes have not been linked to a broad array of demographic determinants. No efforts are known which attempt to associate morbidity observed in treatment facilities with self-reported morbidity or known risk factors. Very little effort has been made to measure the stresses experienced by women during deployments, how these compare with those experienced by men, and how these may relate to experienced morbidity. Furthermore, no baseline data or measures of health are available which define the morbidity experience of non-deployed soldiers (male or female) against which the status of deployed soldiers can be compared. Such deficiencies indicate that basic descriptive work in this area is strongly needed.

The conduct of studies of health outcomes and related behavioral determinants among women during military deployments face a variety of challenges. Prime among these is that medical research, even when directly related to military operations, represents a competing interest against scarce resources required to support the overall operation or the health service support mission. At the present time, the Army force structure contains no unit with an organic capability to study the broad issues of women's health. Moreover, small teams of medical researchers with the interest and

skills to conduct such studies face overwhelming barriers in gaining entrance to and operating successfully within a theater of operations. Thus, for the foreseeable future, health outcome studies among deployed female soldiers will likely be conducted in a very limited fashion, and largely after-the-fact. Such extra-theater studies will be hampered by the fact that soldiers often deploy from and redeploy to a variety of locations, include reserve units which rapidly demobilize, and often involve deployments which are of short duration. These factors will limit researchers' abilities to assemble a large enough population experience to define outcomes of interest with reasonable precision.

The continuation of US forces in Korea presents a unique opportunity for studying health outcomes and determinants among active duty women in a deployed status. In this report, we summarize two studies which we conducted to measure the health status of women soldiers serving in Korea. These include a comprehensive study of health care utilization patterns at medical treatment facilities and a large cross-sectional survey to assess self-reported health status. The studies were conducted concurrently in Korea and at Fort Lewis, WA for both male and female soldiers so that observed patterns can be broadly interpreted.

BODY

Out-Patient Morbidity Study

Methods of Out-Patient Morbidity Study

The overall purpose of the out-patient morbidity study was to measure rates and patterns of health care utilization among female US Army personnel serving in Korea. Similar measurements were made for comparative purposes among three other populations: female soldiers serving at Fort Lewis, male soldiers serving in Korea, and male soldiers serving at Fort Lewis. The primary study question was, "Does the rate of health care utilization of women serving in Korea differ from that of women serving at a CONUS installation?" Secondary study questions included: "Does the rate of health care utilization of women serving in Korea or at a CONUS installation differ from that of their respective male counterparts?" and "Does the pattern of health care utilization of women serving in Korea differ from those of women serving at a CONUS installation or from their male counterparts?" The study design as outlined below was approved by Institutional Review Boards at Madigan Army Medical Center in Tacoma, WA and at the 121st General Hospital in Seoul, Korea.

The design of the study is a prospective cohort study. The period of the study was April through August 1995. The study population consisted of soldiers assigned to units which received care at selected clinics in Korea and at Fort Lewis, WA. The main effect measure was the weekly clinic utilization rate per 1000, defined as the weekly number of clinic visits divided by the number of soldiers in the study population (in thousands) during that week. Frequency counts and diagnoses associated with clinic visits were obtained by reviewing clinic sign-in logs and abstracting information from medical records, respectively. Denominators were obtained from serial (monthly) SIDPERS databases. Only soldiers assigned to units receiving care at selected clinics were included in rate estimates.

The intent of the study was to collect information on as many primary care clinic visits made by female soldiers as possible at both locations. Because of the vast geographic dispersion of soldiers serving in Korea, not all primary care clinics could be included. Therefore, clinics included in the study were restricted to only the largest clinics at which a large proportion of female soldiers were known to receive care and a few small clinics. These included the following primary care (PC) and urgent care (UC) clinics: Yongsan Health Clinic (PC), 121st General Hospital Family Practice Clinic (PC), 121st General Hospital Emergency Room (UC), Camp Casey Clinic (PC and UC), Camp Red Cloud Clinic (PC and UC), Camp Colbern Clinic (PC), Camp Humphreys Clinic (PC and UC), Camp Carroll Clinic (PC and UC), Camp Walker Clinic (PC and UC), and the K-16 airbase clinic (PC). Thus, a broad array of clinics throughout the Korean peninsula were included. Of the 3,000 women serving in Korea in April of 1995, it was expected that these clinics would provide care to more than two thirds (2,000). Of note, virtually all primary gynecological care for women serving in Korea was provided by clinics other than the Gynecology Service of the 121st General Hospital, which provided consultative care.

At Fort Lewis, WA, data was collected from virtually all of the troop medical clinics (TMCs) at which women received care. These included: the Consolidated TMC (PC), Corps Aid Station #3, 9th Regiment (1/25 Infantry) Main Aid Station, 3rd Brigade (3/2 Infantry) Main Aid Station, TMC #5 (PC), 35th Air Defense Aid Station (PC), Madigan Army Medical Center (MAMC) Emergency Room (UC), MAMC Acute Illness Clinic, the MAMC Gynecology Service (PC), and the Special Adult Clinic (PC for sexually transmitted diseases). At Ft. Lewis, the MAMC Gynecology Service provided virtually all of the primary gynecological care to active duty women. The MAMC Family Practice clinic was not included as it provided care only for soldiers assigned to MAMC, a unit whose population was excluded from analysis as explained below.

Each study clinic was visited each week to review clinic logs and abstract diagnoses associated with clinic visits. Two contracted medical personnel (one each in Korea and Fort Lewis) completed the data collection. Clinic logs were copied and the weekly number of visits for both men and women were tabulated. For each clinic visit made by a female soldier, medical records were obtained and reviewed. Because of the much greater volume of male clinic visits, only a sample of the records associated with these visits were obtained for review. As a rule, one record from a male clinic visit was reviewed for each female clinic visit. This was normally the male visit immediately following the reference female clinic visit. In many cases, however, records for all male clinic visits at a particular site were reviewed. For each medical record reviewed, the gender, name, last four of the social security number, and the diagnosis were recorded on a log sheet.

Minimum estimates for person-weeks of exposure, expected clinic utilization rates, and expected visits considered in the design of the study were as follows:

Location	Gender	Minimum Estimated Person-Weeks	Estimated Weekly Clinic Visit Rate / 1000	Minimum Estimated Clinic Visits	Expected Minimum Records Reviewed
Korea	Women	25,000	80	2000	2000
Ft. Lewis	Women	25,000	60	1500	1500
SUBTOTAL	Women	50,000	70	3500	3500
Korea	Men	150,000	60	9000	2000
Ft. Lewis	Men	150,000	40	6000	1500
SUBTOTAL	Men	300,000	50	15,000	3500
TOTAL	W&M	350,000	-	18,500	7,000

Sample size calculations (assigning an alpha value of .05) indicated more than 99% power to detect the indicated differences associated with the primary and secondary study objectives listed above.

Each diagnosis associated with a clinic visit was classified according to the system outlined in Appendix A. This classification system was developed in a previous pilot

study conducted at Ft. Lewis in 1994 and is directly related to deployment medical surveillance classification systems currently in use or being developed by the military services. Each diagnosis was classified into one of the following 14 major diagnostic categories.

1. Injury / Orthopedic conditions
2. Respiratory conditions
3. Medical illness
4. Dermatologic conditions
5. Bites or stings
6. Environmental (heat/cold) injuries
7. Diarrhea / Gastrointestinal conditions
8. Unexplained fever
9. Sexually transmitted disease
10. Ophthalmic conditions
11. Psychiatric conditions
12. Dental
13. Substance abuse
14. Miscellaneous

Within each major category, each visit was further classified according to a specific diagnosis (see Appendix A). Within the major category "dermatological condition", for example, there were 17 specific and one "Miscellaneous" subcategories. Within the major category "injury", each diagnosis was classified both according to the type (e.g., fracture, laceration, sprain) as well as the anatomic location (e.g., face, finger, knee) of the injury.

Clinic visits associated with the following military-unique activities were excluded: periodic physical examinations, performance of HIV tests, administration of vaccinations, in-processing, out-processing, and picking up records for care at another location. Nonetheless, a variety of visits for medical evaluations which can be considered "administrative" in nature were included and coded under the major category "Miscellaneous" (e.g., to obtain lab test results or to refill medications). Clinic visits for which the medical record could not be obtained for review, for which no entry was made in the medical record, or for which the entry was illegible were classified into a 15th Major Category "No Diagnosis."

At the conclusion of the study period, all serial SIDPERS databases were collapsed into a single database. Data abstracted from the SIDPERS database included the name, social security number, rank, gender, date of birth, military occupational specialty (MOS), unit identification code, unit name, race, civilian education level, date entering military service, and date assigned to current unit. The database included additional fields to indicate each week during the study period that each soldier was present for duty in Korea (or Ft. Lewis), allowing soldiers arriving or departing from Korea (or Ft. Lewis) to contribute only the appropriate amount of person-time to the denominator in estimated rates.

Each database record contained fields to record the following information for the first clinic visit for each soldier: the name of the clinic, the week of the study in which the clinic visit occurred, and the diagnosis code associated with the visit. For any soldier who had more than one clinic visit recorded during the study period, an additional record was appended to the database to include all fields except those indicating person-time in Korea. Thus, all clinic visits for each soldier recorded during the study period were included in the database, but the person-time for each individual was counted only once. Data related to clinic visits was entered using a program written in Microsoft FoxPro both to ensure the integrity of the dataset as well as to limit entered data to within constrained requirements.

After all clinic visit information was entered in the database, records of visits for soldiers assigned to units not receiving care at the selected TMCs were excluded. Such visits occurred for a variety of reasons including the fact that some units are "sliced" into small components with only a few soldiers serving at a variety of locations and because many soldiers travel throughout Korea. Thus, estimated rates are derived only for units known to receive virtually all of their care at the selected TMCs. Also, because of concern for the medical access behaviors and non-availability of medical records for soldiers assigned to the unit staffing the major medical treatment facility in each location (121st

General Hospital in Seoul, Korea and Madigan Army Medical Center at Ft. Lewis, WA), soldiers assigned to these units were excluded from the analysis.

At the completion of data entry, all copied clinic logs and other tabular records were reviewed to recount total frequencies of clinic visits by gender, clinic, and week. These frequencies were compared to those recorded in the database. Because of the intended under-recording of male visits in the database and a slight unintended under-recording of female visits, a weight was assigned to each recorded clinic visit to adjust for missing data. Weights were gender- and clinic-specific.

Clinic utilization rates are measured in the number of visits per 1000 soldiers per week. Major outcome rates of interest are gender- and location-specific. Reported rates include repeat visits by the same soldier in the same week, including follow-up evaluations. Thus, reported rates measure health care utilization, not disease incidence. Rate differences and ratios are calculated by subtracting and dividing compared rates, respectively. Various demographic factors included in the SIDPERS database were used to estimate group-specific rates.

The effect of gender-specific medical conditions on overall rates was measured by performing separate analyses which excluded all gender-specific diagnoses. Diagnoses excluded in these analyses (see Appendix A) included all sexually transmitted diseases (all "X" category conditions), spontaneous abortion (M-10), symptoms due to pregnancy (M-11), pelvic pain (M-12), missed period (M-13), abnormal menstrual bleeding (M-14), yeast infection (M-15), bacterial vaginosis (M-16), pain on urination (M-17), unspecified vaginal symptoms (M-18), miscellaneous GYN conditions (M-19), epididymitis (M-20), cystitis or urinary tract infection (M-21), prostatitis (M-22), hernia (M-42), MAMC GYN clinic triage (M-51), MAMC GYN sick call (M-52), MAMC GYN acute GYN problem (M-53), MAMC routine GYN evaluation (M-54), Pap smear or well woman exam (M-55), pre-partum examination (M-56), exam for elective termination of pregnancy (M-57), birth

control prescription (Z-03), pregnancy test (Z-12), consultation for sterilization (Z-27), evaluation for rape (Z-30), and evaluation for shaving profile (Z-32).

Results of Out-Patient Morbidity Study
(Note: Tables and Figures for this Section are included in Appendix B).

The populations and exposure-time observed in the study are summarized in Table B-1. According to SIDPERS data, 5,230 women soldiers were assigned to Korea during the study period. Of these, 4,277 (81.8%) were assigned to units which received care at study clinics. Thus, a very large proportion of the women assigned in Korea were included in the study. The corresponding figures for women at Fort Lewis were 2,192 of 3,441 (63.7%), for men in Korea: 15,932 of 31,899 (49.9%), and for men at Fort Lewis: 11,730 of 24,790 (47.3%). The proportion of women at Ft. Lewis included in the study population was somewhat lower than in Korea because a relatively larger portion of the female population at Ft. Lewis was assigned to the supporting medical center, which was excluded. In addition, because clinics serving all-male populations (i.e., combat maneuver battalion aid stations) were excluded, the proportion of the total male populations included in the study are lower than the female populations.

The contractors in both locations provided documentation on searching for records for over 96% of female clinic visits. As designed, the number of male visits included for review in each location exceeded the number of female visits, but the proportion of all male visits reviewed was substantially lower. For Korea, this proportion was 61.7% while at Ft. Lewis the figure was 34.4%. In total, information on diagnoses was collected for 23,256 clinic visits by soldiers assigned to study units.

Within the study population, the observed person-weeks of exposure exceeded the design criteria by a substantial margin in each case (see Table B-1). In total, nearly 100,000 person-weeks of exposure were observed among female study populations, while over 400,000 person-weeks were observed for males.

Demographic information on the various study populations is summarized in Table B-2. Differences in the demographic profiles of the various study populations are summarized as follows. Women soldiers tended to be younger than male soldiers. Soldiers assigned to Ft. Lewis tended to be younger than soldiers assigned to Korea. Thus, 73% of female soldiers assigned to Ft. Lewis were less than 30 years old; while only 56% of males in Korea were in the same category. Over 60% of women were assigned to combat service support units in both locations; whereas, for men, approximately 50% were assigned to similar units. Greater proportions of men than women were assigned to combat or combat support units. While men and women serving in the same location tended to have comparable levels of education, soldiers serving in Korea had higher levels of education than soldiers assigned to Ft. Lewis. In terms of grade, a greater proportion of women served in junior enlisted ranks, while a greater proportion of males served in senior enlisted ranks. A greater proportion of women were of African-American race than men. Soldiers in Korea had a higher proportion of African-Americans than Ft. Lewis. Thus, 49% of female soldiers in Korea were African-American; whereas, only 23% of male soldiers at Ft. Lewis were African-American.

Clinic utilization rates (the main outcome of the study) are summarized in Table B-3. The estimated clinic utilization rate for female soldiers serving in Korea was 123.1 clinic visits per 1000 soldiers each week. This is approximately 10% greater than the rate for female soldiers serving at Fort Lewis (111.8 visits per 1000 per week). The visit rates for males both in Korea and at Ft. Lewis were comparable (58.2 and 59.2 per 1000, respectively), but both were less than half the rates for female soldiers. The rate difference between women in Korea and women at Ft. Lewis was 11 visits per 1000 per week; whereas, the difference between women in Korea and men at either location was over 60 visits per 1000 per week. The clinic utilization rate of female soldiers in Korea was 1.1 times that of women at Ft. Lewis, but was 2.1 times the rate of men in either location.

Standardization of rates had little effect on observed differences and ratios. Results of an analysis which standardized rates for age, race, rank, level of civilian education, and type of unit are summarized in Table B-4. The effect of this procedure was to slightly increase the difference and ratio between women in Korea and those at Ft. Lewis. In contrast, the procedure resulted in a slight decrease in the observed differences between women in Korea and men in either location. This analysis confirms that while there were some differences in the distribution of demographic characteristics among the various populations, these do not explain the variation in clinic utilization rates among the various study populations.

Table B-5 summarizes clinic visit rates after excluding gender-specific diagnoses. The proportion of all visits that were gender-specific were as follows: women in Korea--14.2%, women at Fort Lewis--11.4%, men in Korea--4.3%, and men at Fort Lewis--4.7%. Thus, eliminating gender-specific conditions reduced the observed overall rate differences and rate ratios, but only to a modest degree. Women soldiers in Korea continued to have a slightly higher rate (7%) than women at Fort Lewis and approximately 1.9 times the rate of men at either location.

Clinic utilization rates, rate differences, and rate ratios by various demographic characteristics are summarized in Tables B-6 through B-8. The age-dependent rate curve (Figure B-1) is U-shaped for women with the lowest rates occurring in soldiers in the 35-44 year-old age groups. Soldiers younger than 25 years of age had rates higher than soldiers 45 or over. For women in Korea, the curve is flat at approximately 90 visits per 1000 per week for all groups 30 years of age or older. For men in both locations, the curve is much flatter than the corresponding curves for women, with the highest rates among 20-24 year-olds. Soldiers assigned to combat support or combat service support units had higher clinic visit rates than soldiers assigned to either combat or TDA units (Figure B-2). Soldiers with a high school degree had the highest rates in comparison to soldiers with any other level of education (Figure B-3). A consistent gradient of rates was

observed in relation to military grade: junior enlisted soldiers had the highest rates, senior enlisted soldiers were moderate, and officers were lowest. White and African-American soldiers had approximately equal rates in all study groups; whereas, Asian soldiers had the lowest rates.

Clinic utilization rates for the major diagnostic categories are summarized in Table B-9. The proportion of visits for which "No Diagnosis" could be established follows: 25.1% of visits for women in Korea, 13.7% of visits for women at Fort Lewis, 25.4% of visits for men in Korea, and 9.1% of visits for men at Fort Lewis. In virtually all cases, no diagnosis could be established because the record was absent. In a minor proportion of instances, documentation was available that the record was signed out to another clinic. The "No Diagnosis" rate at Ft. Lewis is substantially lower than the rate in Korea as the contractor at Ft. Lewis was able to spend considerably more time locating missing records.

Table B-10 shows major category rates which are "adjusted" for the missing ("No Diagnosis") records. In this adjustment procedure, each of the rates shown in Table B-8 have been inflated by an amount proportional to their initial magnitude, so that the sum of all of the rates remains the same. Such a procedure assumes that the diagnosis codes associated with "missing records" is evenly distributed among the diagnoses which are observed. This assumption is certainly invalid to at least some degree, but the overall adjustment procedure probably yields category-specific rates which are more comparable than those prior to adjustment.

Injuries and other orthopedic conditions constitute a major proportion of all visits for all of the study populations. Except for women at Fort Lewis, this is the leading diagnostic category. For men both in Korea and at Fort Lewis, injuries account for over 40% of all visits. While the clinic visit rates for injuries among women are comparable to the rates for males, injury visits accounted for less than 25% of all visits among women.

"Medical Illness" conditions were the leading cause of clinic visits among women at Ft. Lewis, accounting for nearly 40% of all visits. In contrast, only 23% of visits among women in Korea were classified in this category. This apparent discrepancy may largely be due to a systematic difference in the way certain visits were categorized in Korea and at Fort Lewis. Notably, there were many more visits for "Miscellaneous" reasons among women in Korea than at Fort Lewis. Over 60% of the "Miscellaneous" visits for women in Korea were for three specific diagnoses: prescription refills, birth control prescription refills, and pregnancy test results. It is possible that at Fort Lewis, these patients would have been logged as a routine exam at the GYN or other clinic, and thus would have been classified in the "Medical Illness" rather than the "Miscellaneous" category.

Table B-11 summarizes rate differences and rate ratios between women in Korea and women at Ft. Lewis. As mentioned, rates of "Miscellaneous" conditions were substantially higher in Korea while "Medical Illness" conditions were higher at Fort Lewis. These two rate differences , while opposite in direction, are nearly equal in magnitude. "Injury / Orthopedic" conditions, "Dermatologic conditions, and "Respiratory" conditions combined for nearly 13 more visits per 1000 women per week in Korea than at Fort Lewis. Although the absolute rate of occurrence of environmental (i.e., heat) injuries was low, the rate among women in Korea was more than 4 times the rate among women at Ft. Lewis.

Four diagnostic categories accounted for more than 75% of the total rate difference (50 of 65 excess visits per 1000 soldiers per week) between women and men in Korea (Table B-12). These included "Medical Illness" (23.2 visits/1000), "Miscellaneous" (10.2 visits/1000), "Respiratory" (8.3 visits/1000), and "Gastrointestinal / Diarrhea" (8.2 visits/1000) conditions. Although the rate difference for environmental injuries was very low, women were more than 4 times as likely as men to be evaluated for conditions in this category. As well, women were much more likely to be evaluated for dental conditions (RR=5.8).

Table B-13 provides a final comparison between women in Korea and men at Fort Lewis. The three conditions with the greatest absolute rate differences are the same as in the comparison with men in Korea, accounting for nearly 70% (44 of 64 excess visits per 1000 per week) of the total difference. Conditions 4 through 6 are also identical with the "men in Korea" comparison, except that the order is slightly different. The most notable difference in table B-9 is that the location and gender risk factors for environmental injuries combine, so that women in Korea were nearly 18 times as likely to be evaluated for this condition. Also of note, women in Korea were more than 10 times as likely as men at Fort Lewis to be evaluated for substance abuse (primarily alcohol abuse).

A final measure of the comparative out-patient morbidity experience of soldiers in this study is summarized in Table B-14. This table displays the frequency distribution of the number of clinic visits for each soldier who was present for duty during the entire study period. In Korea, the total study period was 21 weeks, while at Ft. Lewis the study period was 18 weeks. Thus, among 1,781 women who were present for duty during the entire 21-week study in Korea, 465 (26.1%) made no clinic visits to any study clinic. Two caveats complicate the interpretation of this table, however. First, the study period was longer in Korea, so soldiers in that location had an increased "exposure" duration for time at-risk of making a clinic visit. Second, not all visits were recorded. While nearly all visits (96%) for female soldiers were recorded, only 61.7% of male visits in Korea and 34.4% of male visits at Ft. Lewis were recorded. Undoubtedly, if the completeness of data collection for male visits had approached that for females, the distribution would change to reflect an increasing tail toward higher numbers of visits. This aspect makes virtually any comparison of the frequency distribution of visits between male and female populations uninterpretable.

Nonetheless, two general conclusions may be ventured. First, given the comparable completeness of data for women and the 3 additional weeks of study in Korea, the

distributions for both female populations appear comparable. With 3 additional weeks of study it is quite possible that the two distributions might nearly overlap (see Figure B-6). Second, the relatively few number of female soldiers with more than 11 visits suggests that the higher overall rates of clinic utilization observed among women is not due in large part to greatly increased utilization by a relatively small segment of the population. These conclusions are, of course, tentative and deserve further analysis.

Discussion of Out-Patient Morbidity Study

The results of this study demonstrate that female soldiers serving in Korea access primary and urgent care clinics at a higher rate than women serving at Fort Lewis. While the magnitudes of the absolute differences in the rates and rate ratios are small, they are nonetheless significant. Eleven (11) extra visits per 1000 female soldiers each week generates approximately 2,000 excess visits each year among a population of 3,500 women serving in Korea. This represents a 10% increase (22,000 versus 20,000) above the number that would be expected if women in Korea had the same rates as women at Fort Lewis.

This study attempted to identify the underlying reason(s) for the differences in these rates. Several hypotheses were entertained. First, it is possible that the observed rate differences may be attributable to differences in the distribution of demographic factors among the two populations. For example, since women in combat support units have the highest clinic utilization rates and a higher proportion of women in Korea are assigned to combat support units than at Ft. Lewis, this may explain the difference. The standardization of rates which we performed failed to confirm this possibility, however. In fact, the standardization procedure indicated that the different profiles in the distribution of demographic factors tended to under-estimate the actual rates of clinic utilization by women in Korea in comparison to women at Ft. Lewis.

A second hypothesis considers the possibility that women in Korea may experience higher overall clinic utilization rates due solely to conditions that are gender-related. This could occur for a variety of reasons. For example, some women at Ft. Lewis may access private or public clinics off-post in the greater Seattle-Tacoma metropolitan community; whereas, in Korea this sort of alternate care is not available. Alternatively, different environmental or behavioral determinants of gender-related medical conditions may expose women in Korea to a higher risk of such conditions. In our analysis, we estimate that approximately 40% (4.5 of 11.1 excess clinic visits per 1000) of the rate difference is attributable to gender-related diagnoses. This explanation, however, is not as simple as it may seem. For example, summation of the individual rates of the three categories in which all of the gender-specific conditions are classified (i.e., "Medical Illness", "Sexually Transmitted Disease", and "Miscellaneous") reveals that women at Ft. Lewis actually had 2.7 excess visits (per 1000 per week) in comparison to women in Korea. Thus, gender-related diagnoses are more than offset by other conditions in these three categories.

It is possible that one or more other diagnostic categories may account for the excess clinic visits. Our analysis reveals that significant excesses occurred in three categories: "Dermatologic" conditions, "Injury/Orthopedic" conditions, and "Respiratory" conditions. Collectively, these three categories contributed 12.8 excess clinic visits per 1000. Among these, injuries constituted the largest portion. Women in Korea experienced 6 additional visits per 1000 each week for "Injury/orthopedic" conditions; moreover, the rate in Korea was 25% higher than that at Fort Lewis. Thus, injuries and orthopedic conditions define a greater difference than gender-related conditions. Although not a major contributor to overall morbidity, heat injuries occurred much more frequently among women in Korea (four times as often). In summary, these observations indicate that the cause of higher rates of care utilization among women in Korea are multifactorial.

A final hypothesis entertained in this analysis was the possibility that increased clinic usage in Korea may be due to a small number of women who access clinics at very high rates. The ability of this study to test this hypothesis was limited by the fact that the length of the study periods differed in the two locations. Nonetheless the observed frequency distributions of clinic visits suggest that if the study period at Ft. Lewis had been as long as in Korea, the two distributions may have been nearly identical. It does not appear that high clinic utilization by a few individuals can account for the overall excess visits.

Interpretation of the patterns of clinic utilization by women in the study is augmented by the results obtained for men. Because rates of health care utilization by women in civilian populations are known to be higher than rates for men, we expected that female soldiers would have higher rates than male soldiers. We did not, however, anticipate that the rates would be twice as high. While gender-related conditions accounted for approximately 15 of 64 (23%) of the excess visits (per 1000) each week, these are a minority. In total, "Medical illness" and "Miscellaneous" conditions accounted for over 50% of the excess visits (33 of 64 excess visits). Four other conditions ("Respiratory", "Diarrhea / Gastrointestinal", "Injury / Orthopedic", and "Dermatologic") accounted for an additional 25 (40%) of the excess visits. Thus, 6 of the 14 diagnostic categories explain over 90% of the rate differences between men and women. As was the case in female-female comparisons, it appears that the reasons for female-male differences are multifactorial.

It is unlikely that bias or errors in data collection account for observed differences. Substantial effort was made in this study to ensure that data collection in the two locations were synchronized and standardized. The two investigators from each location traveled to the other location during the conduct of the study to review procedures. The fact that the overall male rates at the two locations are within 2% of each other serves as a measure of the study's robustness. If one were to hypothesize that rates among women

in Korea were higher than those among women at Ft. Lewis due to a flaw in the study's methods, one would have to accept the conclusion that the same bias would also affect rates among male soldiers. Under this hypothesis, the actual rates among males at Ft. Lewis would then be higher than among males in Korea; a conclusion we consider unlikely. We conclude that the rate measurements are valid and that the observed rate differences are substantial.

The results of this study are important for several reasons. First, they indicate that the health care needs of women do increase when deployed. This is especially significant in comparison to male soldiers, for whom the rates were virtually unchanged. Second, the causes of the overall rate increase are not due primarily to gender-related conditions, but rather appear to be multifactorial in nature. It is likely that unique aspects of military service are the prime determinants of varying rates of experienced morbidity. Third, rates of health care utilization are much higher among women in comparison to men than expected. The underlying reasons for such a wide margin cannot be explained by this study alone. Finally, the rates of morbidity measured in this study should serve as a standard of comparison for future studies of military populations. This study highlights the substantial differences in the health care needs which exist between men and women, and how these interact with deployment.

Health Survey

Methods of Health Survey

The overall purpose of the health survey was to estimate the self-reported health status of female US Army personnel serving in Korea. "Health status" was estimated using a variety of measures as described below. Similar measurements were made for comparative purposes among three other populations: female soldiers at Fort Lewis, male soldiers in Korea, and male soldiers at Fort Lewis. The primary study question was, "Does the health status of women serving in Korea differ from that of women serving at a CONUS installation?" The secondary study question was: "Does the health status of women serving in Korea or at Fort Lewis differ from that of their respective male counterparts?" The study design was approved by Institutional Review Boards at Madigan Army Medical Center in Tacoma, WA and at the 121st General Hospital in Seoul, Korea.

The design of the study is a cross-sectional survey. The structure of the survey was a stratified, random sample of male and female soldiers serving in Korea and at Fort Lewis. The sampling frame for the study was the first SIDPERS database available in April from each location. The sample was stratified on location, gender, age and race. Gender and location strata were included to ensure that 1,000 soldiers were selected from each of four location-gender cells (i.e., Korea-females, Korea-males, Ft. Lewis-females, and Ft. Lewis-males) for a total sample of 4,000 soldiers. Race categories were classified according to the categories included in the SIDPERS database as follows: Caucasian, African-American, Asian, Native American, Other. Age categories were assigned according to the following groupings: <20 years of age, 20-24 years old, 25-29, 30-34, 35-39, 40-44, 45-49, and 50 or higher. The age and race strata thus defined 40 (5x8) cells within each of the four location-gender samples. Cells of low frequency were over-sampled according to the following strategy: all individuals in a race-age cell were included in the

sample if the sampling frame included 10 or less persons in that cell. After this "first pass" on the sampling frame, the remainder of the sample was selected with sampling proportional to the remaining size of the cell. This sampling strategy ensured that low-frequency strata were sampled at a high rate, while also allowing high-frequency cells to receive a large proportion of representation.

The data collection instrument was a self-completed questionnaire (Appendix C). The questionnaires used in Korea and at Fort Lewis were identical except the words "Korea" and "Ft. Lewis" were substituted as appropriate. The content of the questionnaire included numerous questions from other recognized validated instruments, including the Behavioral Risk Factor Surveillance Survey (BRFSS) of the CDC. Areas covered in the questionnaire included the following: demographics, personal and family information about current assignment, quality of life, stress, PT scores, alcohol, tobacco, illness/injury occurrence, sick call utilization, weight, medical profiles, sexual behavior, sexually transmitted diseases, violence, access to medical care, medical screening, and common medical problems (women only). Each questionnaire was labeled with a study number which permitted linkage of individual responses with SIDPERS information. The surveys did not request names, social security names, or dates of birth.

Eight questions on the survey assessed health status. These questions are listed in Figure D-1. In brief, these included four questions on overall quality of life (self-perceived general health, recent physical health, recent mental health, and recent activity limitations) recommended by the Centers for Disease Control (9). Four additional measures of health status included recent occupational activity limitations, recent physical injury, recent "other medical problems", and recent sick call utilization.

The conduct of the survey consisted of three separate mailings. Surveys were delivered through local mail distribution systems using each individual's military address as listed in the SIDPERS database. The second and third mailings followed the previous mailing by three or four weeks. Each mailing included a cover letter signed by

appropriate individuals as follows: 1st mailing: local hospital commander, 2nd mailing: chief of Preventive Medicine Service, 3rd mailing: local investigator (i.e., Dr. Pavlin in Korea and Dr. Gunzenhauser at Ft. Lewis). Each mailing also included an instruction sheet with an explicit statement that all information was provided on a voluntary basis, that all information received would be handled in a strictly confidential manner, that the soldier could indicate their desire to not participate by simply returning the uncompleted survey, and that failure to complete the survey would not affect their service or medical care in any way. Surveys were received through September of 1995.

Overall response rates were determined by dividing the number of received, completed surveys by the number of soldiers who were "available" to respond. Soldiers were considered "not available" if the survey was returned and labeled as "undeliverable" by the post office, the survey was returned by the unit and marked "soldier not in unit", or the survey was returned by the unit with a notation that the soldier had retired, left the Army, or moved to another location.

All questionnaire responses were entered into a database using Epi Info version 6.01. SIDPERS information was linked with the surveys through the study number. Personal identifying information contained in the original SIDPERS database was removed from the database prior to analysis.

Data analysis was completed using version 6.1 of SPSS. Results of the various measures in the survey are reported according to each of the four major study groups (women in Korea, women at Fort Lewis, men in Korea, and men at Fort Lewis). Categorical responses are summarized by reporting proportions in each category. Adjusted population estimates within each of these groups were obtained by weighting the values of each respondent to account both for the proportion of individuals sampled within each age-race cell and also for the response rate among that sample. Thus, if only 20 of 100 individuals in a particular cell were included in a sample, and only 10 of

those individuals responded, the response of each individual was assigned a weight of 10 (100/20 x 20/10 = 5 x 2 = 10).

To facilitate comparison of the health status of women serving in Korea with each of the other three study populations, a system for classifying the collected evidence was devised. This system is as follows. The evidence that the health status of women in Korea was "worse" than any of the other three populations was assigned one of the following four levels: None - no appreciable difference in any pair-wise comparison; Weak - at least one pair-wise comparison is appreciably difference, but none is statistically significant; Moderate - only one pair-wise comparison is statistically significant; or Strong - two or more pair-wise comparisons are statistically significant.

Results of Health Survey
(Note: Tables and Figures for this Section are included in Appendix D).

Of the 4,000 soldiers selected to participate in the health survey study, 2,243 (56.1%) completed and returned the questionnaire. The overall adjusted response rate was 66.8%. Response rates among the four study populations were comparable (Table D-1), except that men at Ft. Lewis (63.5%) had a significantly lower rate than any of the other three groups. Response rates are classified according to sampling strata in Figure D-2. In general, younger soldiers in each of the study populations were less likely to respond than older soldiers. At Ft. Lewis, African-American soldiers had the lowest response rates.

Although women in Korea reported that their general health was "excellent" at a lower rate (15.7%) than women at Ft. Lewis (19.3%), this difference was not statistically significant. As shown in Table D-2, the distribution of responses by women at either location is comparable. While men at Ft. Lewis reported "excellent" health at a statistically significant, higher rate (26.7%) than women in Korea (15.7%), men at Ft. Lewis were just as likely to report their health was only "Fair" or "Poor". In summary,

there is little evidence from the self-reports of general health to indicate significant differences between the study populations.

Women in Korea and at Ft. Lewis also reported similar frequencies in the number of days during the preceding 30 days when their physical health was not good (Table D-3). Overall, approximately 43% of women indicated that their physical health was good during all 30 days. Approximately 20.1% of women in Korea and 21.9% of women at Fort Lewis indicated that their physical health had not been good during 10 or more of the 30 days. In comparison men in either location reported significantly higher rates of having good physical health on all 30 days. Men in Korea also had significantly lower rates of experiencing 10 or more days when their physical health was not good. The mean number of days of poor physical health for the four groups were: women in Korea--5.7 days, women at Ft. Lewis--5.7 days, men in Korea--3.9 days, and men at Ft. Lewis--5.4 days.

Women in Korea reported more days during which their mental health was not good than any of the other three study groups (Table D-3). For example, only 41% of women in Korea reported 2 or less "poor" days of mental health; whereas, the rates for women at Ft. Lewis, men in Korea, and men at Ft. Lewis were 52%, 52% and 60%, respectively. Similarly, 38.1% of women in Korea reported that their mental health was not good for 10 or more of the preceding 30 days. This rate is significantly higher than any of the other three groups. Although, women at Ft. Lewis reported no days of "poor" mental health at a statistically significant, lower rate than either of the male study groups, the frequency distribution of responses in other categories suggests that their overall mental health was nearly comparable to the men. For example, 30% of women at Ft. Lewis reported 10 or more "poor" mental health days; the corresponding rates for men in Korea and at Ft. Lewis are 29% and 26%, respectively. The mean number of days of poor mental health for the four groups were: women in Korea--8.5 days, women at Ft. Lewis--6.9 days, men in Korea--6.5 days, and men at Ft. Lewis--6.1 days.

Several questions in the survey asked soldiers about their current level of stress. Nearly 20% of soldiers reported a "great deal" of stress at work; there were no appreciable differences between the study groups. A modestly higher proportion of women in Korea (15.4%) and at Fort Lewis (16.6%) reported a "great deal" of stress in their family life (or in a relationship) than men in Korea (13.7%) or men at Ft. Lewis (10.9%). More female and male soldiers in Korea reported that their current assignment was "much more stressful" than their expectations of an "average" assignment (28.4% and 27.1%, respectively) than female or male soldiers at Ft. Lewis (15.4% and 19.5%, respectively). Similarly, 32% of women and 29% of men in Korea reported that their current assignment was "much more stressful" than their previous assignment; whereas, only 19% of women and 18% of men at Ft. Lewis reported this level. Among soldiers who reported a single "greatest source of stress", women and men in Korea indicated that "being separated from my family" was the primary cause (38% and 43%, respectively). These rates are more than twice as high as those for men and women at Ft. Lewis (17% and 19% respectively) where "stress related to my job" was the leading source.

One block of questions on the survey asked about the prevalence and care-seeking behaviors for symptoms possibly secondary to stress. These conditions included "headache which interferes with work", "difficulty sleeping", "difficulty concentrating at work", "feeling unusually tired", and "loss of appetite". The results of responses to these questions are summarized in Table D-4. Women in Korea and at Ft. Lewis reported higher rates for all of the symptoms than men at either location. While women in Korea were more likely to report two of the symptoms ("difficulty sleeping" and "loss of appetite") than women at Ft. Lewis, women at Ft. Lewis were more likely to have received care from a doctor for all five of the symptoms. This higher care rate at Ft. Lewis is most likely due to the fact that soldiers at Ft. Lewis were on station for a much longer average period of time than soldiers in Korea.

Women in Korea and at Ft. Lewis reported comparable rates of restricted activity during the preceding 30 days (Table D-5). Rates of limited activity were higher among women than among men, however; but most of the difference was reported in the lowest limitation categories. Thus, there was little difference in the mean number of days of restricted activity: women in Korea--3.8 days, women at Ft. Lewis--3.0 days, men in Korea--2.5 days, and men at Ft. Lewis--3.3 days.

A large majority of all four study populations reported no days off work during the preceding 30 days (Table D-5). A significantly lower rate was, however, reported among women (approximately 74%) than among men (approximately 90%). There were no differences in reported days off work between women in Korea and women at Ft. Lewis. The estimated mean number of days off work during the preceding 30 days was low for all groups: women in Korea--1.0 days, women at Ft. Lewis--1.2 days, men in Korea--0.3 days, and men at Ft. Lewis--0.9 days.

Women in Korea reported having experienced a physical injury in the preceding two months at a rate (30.3%) which was slightly lower than all of the other study populations (Table D-6). In each of the four study populations, physical training was reported as the most frequent cause of these injuries: women in Korea--43%, women at Ft. Lewis--58%, men in Korea--41%, and men at Ft. Lewis--46%. For men in Korea, recreational activities were listed as a cause of injury at a much higher rate (40%) than for any of the other groups (women in Korea--21%, women at Ft. Lewis--13%, and men at Ft. Lewis--15%). On the other hand, job-related activities (excluding physical training) was a much less common cause of injuries among men in Korea (18%) than among women in Korea (36%), women at Ft. Lewis (28%), or men at Ft. Lewis (35%).

In contrast to the pattern seen for injury rates, women in Korea and at Ft. Lewis reported experiencing some other type of medical problem in the preceding two months (58% and 56%, respectively) at a significantly higher rate than men in Korea or at Ft. Lewis (both 34%). Among eight categories of "medical problems" queried on the survey,

women in Korea and at Fort Lewis differed in two. Women in Korea were more likely to have had a cold; whereas, women at Ft. Lewis were more likely to have had medical problems relating to pregnancy. In comparison to men, women reported significantly higher rates for four conditions ("nausea or vomiting", "abdominal pain", "pregnancy", and "mental health") and a modestly higher rate for "headache". Results are listed in Table D-7.

As a result, women in Korea reported significantly higher rates of sick call utilization than men (Table D-6). Women in Korea also reported a significantly higher rate of attending sick call than women at Ft. Lewis, but the rate difference for "any sick call attendance" (6.7%) was small in comparison to the observed differences between women and men. Women in Korea also reported a greater frequency of "high" sick call utilization than any of the other groups. In Korea, 2.5% of women reported 9 or more sick call visits during in the preceding 60 days; whereas, for the other three groups the rate was less than 1%.

Table D-8 summarizes the evidence collected in this study that the health status of women in Korea is different from the other study populations. For two of the eight measures ("recent mental health" and "sick call visits"), there is moderate evidence that the health status of women in Korea is worse than women serving at Ft. Lewis. In comparison, for six of the eight measures there is moderate or strong evidence that the health status of women in Korea is worse than that of male soldiers in either location. Rates of self-reported injury are significantly lower among female soldiers in Korea than among any of the other study groups.

Interpretation of these outcomes must be made in light of other known or possible predictors of health status. These are briefly summarized as follows:

- Women and men in Korea were much less likely to report that they "wanted this assignment" (25% and 24%, respectively) in comparison to women and men at Ft. Lewis (39% and 44%, respectively).

- Women in Korea were much more likely to be single (47%) than women at Ft. Lewis (31%), men in Korea (35%), or men at Ft. Lewis (29%).
- Among married women and men assigned in Korea, a much smaller percentage were currently living with their spouse (24% and 16%, respectively), than women (85%) or men (94%) at Ft. Lewis.
- Among soldiers with children, only 30% of women and 31% of men in Korea were living with their children; whereas, the corresponding figures for women and men at Ft. Lewis were 72% and 74% respectively.
- Soldiers in Korea were much more likely to use alcohol than soldiers at Ft. Lewis. For example, the percentage of soldiers who reported drinking alcohol on 10 or more days during the preceding 30 days were: women in Korea--18%, women at Ft. Lewis--9%, men in Korea--36%, men at Ft. Lewis--21%.
- Women in Korea and at Ft. Lewis reported comparable rates of current cigarette use (21% and 22%, respectively). Men in Korea were much more likely to be current smokers (37%) than women at either location or men at Ft. Lewis (28%).
- Prevalences of smokeless tobacco use were: women in Korea--1.3%, women at Ft. Lewis--1.5%, men in Korea--14%, and men at Ft. Lewis--15%.
- Total current tobacco use (smoking and/or smokeless tobacco) were: women in Korea--22%, women at Ft. Lewis--23%, men in Korea--45%, and men at Ft. Lewis--36%.
- Over 95% of soldiers in each study group reported having ever had sexual intercourse. The median number of lifetime sexual partners was: women in Korea--6, women at Ft. Lewis--6, men in Korea--10, and men at Ft. Lewis--10.
- The percentage of soldiers who reported 5 or more new sexual partners since arriving at their current duty station were: women in Korea--4.4%, women at Ft. Lewis--4.3%, men in Korea--4.4%, and men at Ft. Lewis--12.1%.

- The percentage of soldiers who reported 5 or more new sexual partners in the preceding 6 months were: women in Korea--3.5%, women at Ft. Lewis--2.7%, men in Korea--2.1%, and men at Ft. Lewis--5.1%.
- The percentage of soldiers diagnosed with a sexually transmitted disease since arriving at their current duty station: women in Korea--3.2%, women at Ft. Lewis--8.7%, men in Korea--2.6%, and men at Ft. Lewis--5.5%.
- The percentage of soldiers who reported having been physically assaulted since arriving at their current duty station: women in Korea--3.4%, women at Ft. Lewis--5.3%, men in Korea--4.1%, and men at Ft. Lewis--2.7%.
- The percentage of soldiers who reported having been "forced to have sex" since arriving at their current duty station: women in Korea--3.1%, women at Ft. Lewis--1.9%, men in Korea--0.3%, and men at Ft. Lewis--0.2%.
- The percentage of soldiers who reported having "difficulty obtaining medical appointments" since arriving at their current duty station: women in Korea--27.6%, women at Ft. Lewis--32.0%, men in Korea--20.8%, and men at Ft. Lewis--24.1%.

In summary, women in Korea reported more severe characteristics which might adversely affect their health status than women at Ft. Lewis in the following categories: preference for assignment, separation from spouse, separation from children, alcohol use, and having been "forced to have sex". In contrast, women at Ft. Lewis reported more adverse conditions for diagnosis with a sexually transmitted disease, having been physically assaulted, and having difficulty obtaining medical appointments. Men had more severe reports than women in the following areas: alcohol use, cigarette use, smokeless tobacco use, and total number of lifetime sexual partners. Thus, there was a wide distribution in the direction of disparities for a variety of determinants likely to affect overall health status.

Discussion of Health Survey

The findings of this study indicate that the health status of female soldiers serving on active duty in Korea differs from women serving at Fort Lewis, WA in several ways. Among the eight measures of health status assessed in this study, women at Ft. Lewis measured significantly better in two categories, while women in Korea were significantly better in only one area. In each of these three areas, the actual differences in rate estimates were small or moderate in magnitude, their statistical significance owing to the overall high power of this large survey. Nonetheless, the observed differences most likely are real and deserve special consideration.

Among the four questions assessing "Quality of Life" advocated by the US Centers for Disease Control, women in Korea reported results which were comparable to women at Ft. Lewis in three categories (general health, physical health, and restricted activity). Only in the category of "mental health" did women in Korea score more poorly. Here, approximately seven percent of women in the best category (no poor days) at Ft. Lewis were "shifted" to poorer categories (especially 10 or more poor days) in Korea. This represents a substantial shift.

We attempted to illuminate this finding by analyzing other questions on the survey possibly related to mental health. While the overall level of "job stress" appeared equal in all four groups, women and men in Korea indicated that family separation was the most significant source of stress for them. At the same time, women in Korea reported experiencing two symptoms possibly related to stress at a higher rate than women at Ft. Lewis. Symptoms which interfered with work did not occur more frequently. Although many factors other than stress contribute to an individual's overall perception of their mental health, it is quite possible that family separation contributes to self-reports of decreased mental health among women serving in Korea. It is interesting to compare the observed distribution of mental health reports among men in Korea with men at Ft.

Lewis. The observed absolute differences (Table D-3) are comparable to those observed for female soldiers. Thus, although male soldiers report higher scores of mental health overall, "family separation" may have a similar, though smaller, attenuating affect on the mental health status of male soldiers deployed to Korea.

Among four additional measures of health status, women in Korea scored worse than women at Fort Lewis only in "sick call visits". This observation is consistent with the findings of the out-patient morbidity study reported previously. It is inconsistent, however, with lower self-reports of recent injury and nearly equal rates of recent medical problems among women in Korea in comparison to women at Ft. Lewis. One possible explanation for this apparent discrepancy is that women in Korea seek care for injuries and/or medical problems at a higher rate than women at Ft. Lewis.

It is possible that the findings of this study are invalid at least to some degree due to response bias. It is possible that non-responders, or those "not available" to respond, differed from responders in significant ways. No extraordinary effort was made to contact non-available participants or non-responders in order to elucidate how they may have differed from responding participants. Our method of weighting responses assumes that non-responders are similar to responders in measures of health status. Our assessment of response bias indicates that age and race were significant predictors of non-response; these may also be significantly associated with measures of health status. Our overall adjusted response rate of nearly 70% is comparable to other studies which are labeled as "high response" in military populations. It is likely that the true adjusted response rate was higher than we measured, as we relied on messages voluntarily submitted by the post office and unit personnel to indicate which soldiers could not be located or had departed. In summary, it is likely that response bias may have at most a modest effect on the measures of health status which we have estimated.

The findings of this study are important for several reasons. First among these is that we establish a benchmark for future studies which attempt to measure "health

status" or "quality of life" among military populations. In particular, our measures are specific for gender and deployment status, two predictors of primary interest in all military research. As military medicine continues to shift toward a managed care structure, population outcomes such as those we measured will be increasingly important in defining the relationship and value of that care to customer needs. Second, this study has attempted to define parameters associated with differences among women who are deployed in Korea and those who are stationed in CONUS. As discussed above, we have identified some modest differences. It is likely that deployment in a "higher intensity" situation may accentuate these differences. Finally, this study highlights substantial differences in the self-reported health status of male and female soldiers. This gender differential is much more significant than the effect of deployment, at least as measured in this study.

CONCLUSIONS

The studies which have been described in this report document that the health care utilization and health status of women serving in Korea differ in significant ways from women serving at a large CONUS installation. Women in Korea access primary and urgent care clinics at approximately a 10 percent higher rate than women at Ft. Lewis, WA, resulting in 11 additional visits per 1000 women each week. "Excess" visits by women in Korea are not explained by one or even a few categories of diagnosis. Rather, many categories, including injuries and other orthopedic conditions, various medical conditions, respiratory conditions, dermatologic conditions, and other miscellaneous conditions, play a role in the observed variation of health care utilization.

Self-reports of health status by women show that women in Korea have substantially worse mental health than women at Ft. Lewis, resulting in 1.6 fewer days of "good" mental health per month. This difference is likely due to personal factors such as separation from family, but does not appear to contribute to restricted activities, including time away from work. Other measures of health status document that in most ways, women in Korea are similar to women at Ft. Lewis.

The US presence in Korea is unique in the many ways in which it "simulates" other recent deployments or may be like deployments in which US forces may participate in the near future. These similarities include the fact that most married active duty women are separated from their spouses and families [3], living conditions are generally below those found on CONUS-based installations, medical resources are limited, time in theater is generally of short duration (< 1 year), the culture shock is tremendous, and most individuals are assigned to TOE units. Of particular concern in Korea is a sociocultural environment which has adapted to a US presence and amplified potential exposure to sexually transmitted disease and alcohol. Current political tensions in Korea highlight that service there is similar to deployment to a "hot spot".

Thus, it is perhaps surprising not to find more significant differences in the health status of the two female populations which were studied. Both the out-patient morbidity study and the health survey substantiate that major demographic and behavioral determinants of health exist between the two groups. Yet, in summary, our results indicate that overall health differs between the two groups in relatively modest ways.

It is particularly interesting to note that one determinant of health in military populations--gender--is a more significant predictor of health disparity than any other measure. Both studies document in numerous ways that the health status of women at Ft. Lewis and in Korea is "worse" than that of their male counterparts. Women access clinics at twice the rate of men and report significantly worse results in nearly all measures of health status. While it is likely that these differences are at least in part explained by differences in health-seeking behaviors and perceptions of health among the various groups, it is more likely that these discrepancies represent effects of environmental, social, or cultural determinants of health.

In spite of the large proportion of women in the US Army and an on-going expansion of roles which they fill, few studies have assessed unique health problems which women experience during deployment. Some reports from recent deployments highlight current concerns. In a retrospective analysis, Markenson et al [2] concluded that many of the gynecological health problems experienced by women deployed in the Persian Gulf War could have been prevented by a pre-deployment gynecological health screen. In contrast, an analysis by Hines [3] in the same war concluded that the health care needs of women deployed in an armored division did not pose a considerable burden and should be easily met by deployed providers. While we have shown that the clinical care needs of women are approximately twice those of men, gender-specific medical conditions account for only a minor proportion of this difference. Overall, gender-related conditions of women seen in out-patient settings accounted for only a very small proportion of all visits, and the vast majority of diagnoses are easily managed by a general medical officer.

While Jones et al [4] have reported a substantially increased rate of time-loss injuries among women as compared to men in basic training, the out-patient morbidity study we describe indicates that women suffer injuries and other orthopedic conditions at approximately the same rate as men. Similarly, we were unable to reproduce the findings of Hines [5] who reported that men deployed in the Persian Gulf War were more likely to present with orthopedic and dermatologic disorders, while women were more likely to have psychiatric and optometric disorders. In contrast, we found that women had higher rates of dermatologic disorders, and that psychiatric and ophthalmic conditions represented only a small proportion of all clinic visits. While a variety of studies document high rates of sexually transmitted disease among male military personnel in a variety of deployment situations, we did not find substantially higher rates of these conditions in any of the study populations. In fact, rates of STD measured in our study appear to be low. Some of the confusion or discrepancies in these comparisons may be attributable to varying terminology between investigators. Depending upon whether one reports absolute rates, rate differences, rate ratios, or proportions of all visits, different inferences may be made. We have reported our data in all of these formats so that our results can be easily compared with prior and future studies.

In a concurrent study of active duty hospitalizations at Madigan Army Medical Center during the period 1989-1993, Hendrix et al [unpublished] reported that women were hospitalized at nearly twice the rate of their male counterparts, even after excluding pregnancy-related conditions. This rate ratio was observed across all age categories. Men and women were hospitalized at nearly the same rate for musculoskeletal conditions, but these disorders accounted for a much higher proportion of all admissions for men (30%) than for women (16%). Mental disorders occurred at a much higher hospitalization rate among women. The results of the study by Hendrix are remarkably similar to the findings of the out-patient morbidity study which we have described. The increased rate of hospitalization for mental disorders among women may

indicate that the decreased mental health of women in Korea may contribute to excess hospitalizations there, even though excess visits for psychiatric conditions in out-patient visits were not observed.

The studies which this report documents were both large and of high quality. The results which they have provided should serve as a benchmark for future studies of the health of both women and men on active duty, whether in garrison, serving overseas, or deployed. Our results indicate that additional work is needed to identify the determinants of observed differences in health care utilization. Ultimately, interventions must be developed that reduce both discrepancies in health events which occur between groups as well as overall rates of ill health in all groups. In addition further descriptive work is needed to define acceptable levels of health status and to establish goals in improvement toward which we should aim. One immediate area for additional work is further description of the determinants of diminished mental health among women serving in Korea. Ultimately, this work will lead to improved quality of life for female soldiers and enhanced readiness in the US Army.

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Appendix A

Classification System for Coding Out-Patient Visits

MEDICAL RECORD REVIEW CODES

A - Diagnosis Unknown

01 - Record found, entry found
02 - Record found, no entry
03 - Record not pulled
04 - Record out to OB/GYN
05 - Record out to 121st Gen Hosp
06 - Record out to MAMC
07 - Record out elsewhere
08 - Other
09 - Record not found
10 - Unspecified or illegible

B - BITES AND STINGS

01 - Animal
02 - Snake
03 - Scorpion
04 - Spider
05 - Other Insects
06 - Human
99 - Miscellaneous

D - DERMATOLOGICAL CONDITION

01 - Heat rash
02 - Any other rash
03 - Sunburn alone (see E24)
04 - Burn
05 - Blisters
06 - Painful or ingrown toenail
07 - Cellulitis
08 - Abscess
09 - Jock itch, tinea cruris
10 - Athlete's foot, tinea pedis
11 - Tinea (chest or other body part
12 - Warts (non-genital)
13 - Oral herpes / cold sore
14 - Lipomas / fibromas (see M26 and M36)
15 - Acne
16 - Moles
17 - Pediculosis pubis
99 - Miscellaneous

E - ENVIRONMENTAL INJURY

11 - Hypothermia
12 - Chillblains
13 - Trenchfoot
14 - Frostbite
21 - Heat exhaustion
22 - Heat stroke
23 - Dehydration
24 - Sunburn w/ dehydration
99 - Miscellaneous

F - UNEXPLAINED FEVER

01 - Any documented fever (>100.5 degress F or 38 degrees Celsius/Centigrade) (unless accompanied by diarrhea, heat injury, or respiratory illness)
02 - Chills (without documented fever)
03 - Flu-like illness (without documented fever)
04 - Viral syndrome
99 - Miscellaneous

G - GASTROINTESTINAL CONDITION

01 - Diarrhea with fever
02 - Diarrhea without fever
03 - Vomiting
04 - Nausea
05 - Gastritis
06 - Ulcer disease
07 - Hepatitis, possible or definite
08 - Pancreatitis
09 - Abdominal pain/cramps
10 - Constipation
11 - Hemorrhoids, piles
12 - Blood in stool (melena or hematochezia)
13 - Hematemesis (vomit up blood)
99 - Miscellaneous

I - INJURY / ORTHOPEDIC CONDITION

01 - Low back pain
02 - Costochondritis
03 - Shin splints
04 - Baker's cyst
05 - Plantar fascitis
06 - Pes planus
07 - Achilles tendonitis

11 xx - Fracture
12 xx - Stress fracture
13 xx - Dislocation
14 xx - Puncture
15 xx - Laceration
16 xx - Abrasion
17 xx - Contusion
18 xx - Blunt trauma
19 xx - Sprain
20 xx - Muscle strain
21 xx - Muscle cramp
22 xx - Torn ligament
23 xx - Swollen Joint
24 xx - Bursitis
25 xx - Pain
26 xx - Tendonitis
27 xx - Arthritis
99 xx - Unspecified

xx 11 - Head
xx 12 - Neck
xx 13 - Face
xx 21 - Chest
xx 22 - Back
xx 23 - Abdomen
xx 24 - Pelvis
xx 31 - Shoulder
xx 32 - Arm
xx 33 - Elbow
xx 34 - Forearm
xx 35 - Wrist
xx 36 - Hand
xx 39 - Upper Extremity (other)
xx 37 - Finger
xx 41 - Hip
xx 42 - Thigh
xx 43 - Knee
xx 44 - Calf
xx 45 - Ankle
xx 46 - Foot
xx 47 - Toe
xx 49 - Lower Extremity (other)
xx 99 - Other

M - MEDICAL ILLNESS

10 - Spontaneous abortion / miscarriage
11 - Symptoms due to pregnancy (leg swelling, nausea, vomiting, ligament pain, etc.)
12 - Pelvic pain (not due to an STD)
13 - Missed period
14 - Abnormal menstrual bleeding
15 - Yeast infection
16 - Bacterial vaginosis (or vaginitis)
17 - Pain on urination (Women only)
18 - Vaginal symptoms (unspecified)
19 - GYN, miscellaneous
20 - Epididymitis
21 - Cystitis / Urinary Tract Infection, possible or definite
22 - Prostatitis
23 - Kidney stone / nephrolithiasis
24 - Headache
25 - Dizzy, lightheaded (see M38)
26 - Unexplained bumps (not lipomas or fibromas - D14)
27 - Chest pain, unclear etiology (including palpitations)
28 - Drug reaction
29 - Chicken pox
30 - Ear pain, external ear infection, otitis externa, wax impaction
31 - Tinnitus
32 - Vertigo
33 - Bloody nose
34 - Toxic exposure
35 - Hypertension
36 - Ganglion cyst (see 26)
37 - Other cyst
38 - Syncope / fainting (see M25)
39 - Seizure / epileptic fit
40 - Hematuria (blood in urine)
41 - Neuralgia
42 - Hernia
43 - Infection, unspecified
51 - Triage (MAMC GYN clinic only)
52 - Sick call (MAMC GYN clinic only)
53 - Acute GYN problem (MAMC GYN clinic only)
54 - Routine GYN evaluation (MAMC GYN clinic only)
55 - Pap smear, well woman exam
56 - Pre-partum examination
57 - Exam for elective termination of pregnancy (ETOP)
99 - Miscellaneous

O - OPHTHALMIC CONDITION

01 - Corneal ulcer
02 - Corneal abrasion
03 - Foreign body
04 - Penetrating injury
05 - Other injury
06 - Conjunctivitis
07 - Other eye infection
08 - Eye pain, unclear etiology
09 - Blurry vision
99 - Miscellaneous

P - PSYCHIATRIC CONDITION

01 - Acute stress reaction / Anxiety
02 - Depression
03 - Suicidal ideation
04 - Panic disorder
99 - Miscellaneous

R - RESPIRATORY CONDITION

01 - URI, Upper respiratory infection, Cold
02 - Sore throat, strep throat, pharyngitis
03 - Cough
04 - Bronchitis
05 - Ear infection, Middle ear infection, otitis media
06 - Pneumonia
07 - Sinusitis
08 - Asthma / Reactive airway disease (RAD)
09 - Sinus, allergies, seasonal allergic rhinitis (SAR)
10 - Difficulty breathing, dyspnea, shortness of breath (SOB)
99 - Miscellaneous

S - SUBSTANCE ABUSE

01 - EtOH (alcohol)
02 - All others

T - TEETH / DENTAL CONDITIONS

01 - Tooth pain
02 - Loose tooth or filling
03 - Gingivitis
04 - Jaw pain, pain on mastication, clicking in jaw, TMJ syndrome
99 - Miscellaneous

X - SEXUALLY TRANSMITTED DISEASE

01 - Dysuria / pain / tingling on urination / urethral discharge (men only)
02 - PID / Pelvic inflammatory disease (women only)
03 - Cervicitis (women only)
04 - Gonorrhea
05 - Chlamydia
06 - Genital warts
07 - Herpes
08 - Non-gonococcal urethritis (NGU) (men only)
99 - Miscellaneous

Z - MISCELLANEOUS

01 - Prescription
02 - Refill
03 - Birth contol pill (or shots) prescription / refill (unless Pap smear)
04 - Shots, immunization
10 - Dressing change / wound check / suture removal
11 - Blood pressure check
12 - Pregnancy test
13 - Other medical test
14 - Check lab / test results
15 - Hearing test / audiogram
21 - Physical exam
25 - Eye exam
26 - Other exam
27 - Consultation for sterilization
28 - Overweight / nutrition evaluation (counseling)
29 - Evaluation for assault (Note: code as injury if a specific injury occurred)
30 - Evaluation for rape
31 - Flight status determination (Up- or down-slip)
32 - Shaving profile
33 - Other profile
99 - Miscellaneous

Appendix B

Tables and Figures

* * * * *

Out-Patient Morbidity Study

Table B-1

Study Populations

TOTAL CLINIC POPULATION	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
Persons	5,230	3,441	31,899	24,790
Person-Weeks	77,394	50,813	480,702	374,557
Crude Clinic Visits	8,183	4,469	10,883	4,991
Adjusted Clinic Visits	8,283	4,803	16,508	14,314

STUDY POPULATION	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
Persons	4,277	2,192	15,932	11,730
Person-Weeks	63,359	33,181	238,205	178,667
Crude Clinic Visits	7,616	3,449	8,549	3,642
Adjusted Clinic Visits	7,787	3,711	13,855	10,585

Table B-2
Study Population Demographics

	Korea Female Soldiers (%)	Ft. Lewis Female Soldiers (%)	Korea Male Soldiers (%)	Ft. Lewis Male Soldiers (%)
AGE				
<20	8.1	6.5	6.1	3.6
20-24	34.7	41.1	29.1	34.4
25-29	22.8	23.9	20.8	24.0
30-34	17.1	14.1	17.3	15.9
35-39	11.4	9.1	15.7	13.3
40-44	3.8	3.4	7.0	5.6
45-49	1.2	1.3	2.6	2.2
>50	0.2	0.2	0.6	0.6
Unknown	0.7	0.5	0.8	0.4
TYPE OF UNIT				
Combat	11.8	7.4	17.7	16.9
Combat Support	16.7	13.6	18.8	22.7
Combat Service Support	62.9	65.3	53.3	47.1
TDA	8.7	13.7	10.1	13.3
CIVILIAN EDUCATION LEVEL				
< High School	1.1	0.3	1.0	0.5
High School Graduate	58.0	64.3	57.6	65.9
Some College	25.5	19.9	24.4	19.4
College Graduate	9.7	12.3	10.2	10.7
Graduate Work	3.2	2.2	4.1	2.6
Unknown	2.5	0.9	2.7	0.9
GRADE				
E-1 thru E-4	52.6	59.6	41.1	46.4
E-5 thru E-9	35.4	28.2	43.0	41.1
Warrant Off + O-1 thru O-3	9.3	10.2	10.8	9.4
O-4 thru O-6	2.7	2.0	5.0	3.1
Unknown	0.0	0.0	0.1	0.0
RACE				
White	41.4	52.4	59.6	66.0
Asian	2.3	2.3	2.9	1.9
African-American	49.1	37.2	29.5	23.0
Native American	0.7	0.7	0.4	0.4
Other	6.0	4.1	4.0	8.4
Unknown	0.5	0.3	0.6	0.3

Table B-3

Clinic Utilization Rates
-- All Diagnoses --

(Weekly Visits / 1000 soldiers)

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
Weekly Clinic Visits / 1000	122.9	111.8	58.2	59.2
Rate Difference	- - -	11.1	64.7	63.7
Rate Ratio	- - -	1.10	2.11	2.07

Table B-4

Standardized* Clinic Utilization Rates
-- All Diagnoses --

(Weekly Visits / 1000 soldiers)

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
Weekly Clinic Visits / 1000	116.8	103.4	59.7	60.4
Rate Difference	- - -	13.4	57.1	56.4
Rate Ratio	- - -	1.13	1.96	1.93

*Standardized for age, race, rank, level of civilian education, and type of unit. Rates were standardized by the direct method using a combined population from all four populations as the standard population.

Table B-5

Clinic Utilization Rates
Excluding Gender-Specific Diagnoses

(Weekly Visits / 1000 soldiers)

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Korea Male Soldiers
Weekly Clinic Visits / 1000	105.5	99.0	55.7	56.4
Rate Difference	- - -	6.6	49.8	49.1
Rate Ratio	- - -	1.07	1.89	1.87

Table B-6

Clinic Visit Rates by Demographic Category

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
AGE				
<20	180.7	169.8	64.1	70.0
20-24	148.9	120.9	72.8	72.3
25-29	108.7	108.7	55.6	59.1
30-34	95.3	96.0	50.1	52.0
35-39	92.7	84.0	47.9	44.1
40-44	83.8	69.6	48.2	37.0
45-49	96.6	103.1	54.4	50.4
>50	95.2	158.6	45.7	29.7
Unknown	60.7	12.4	29.7	39.0
TYPE OF UNIT				
Combat	124.4	94.4	50.9	34.6
Combat Support	153.3	104.4	69.3	63.8
Combat Service Support	120.3	122.2	60.0	72.1
TDA	81.7	79.4	40.4	37.1
CIVILIAN EDUCATION LEVEL				
< High School	87.2	48.0	43.5	43.9
High School Graduate	145.5	126.5	66.4	66.7
Some College	109.8	104.8	53.4	53.0
College Graduate	74.1	64.4	39.7	34.1
Graduate Work	39.3	48.7	33.3	30.3
Unknown	45.1	48.1	37.9	40.6
GRADE				
E-1 thru E-4	156.7	134.4	74.3	77.1
E-5 thru E-9	99.3	90.7	52.1	48.8
Warrant Off + O-1 thru O-3	46.3	53.1	33.9	27.8
O-4 thru O-6	39.3	38.5	30.6	27.1
RACE				
White	132.9	110.6	56.2	57.1
Asian	68.6	95.7	28.8	49.0
African-American	120.5	116.1	65.7	70.4
Native American	141.3	101.1	55.9	27.9
Other	96.5	109.0	58.2	49.8
Unknown	78.7	9.7	22.6	55.4
OVERALL	122.9	111.8	58.2	59.2

Table B-7

Clinic Visit Rate Differences by Demographic Category

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
AGE				
<20	-	10.9	116.6	110.7
20-24	-	27.9	76.0	76.5
25-29	-	0.0	53.1	49.6
30-34	-	-0.7	45.2	43.3
35-39	-	8.6	44.8	48.5
40-44	-	14.2	35.6	46.7
45-49	-	-6.5	42.2	46.2
>50	-	-63.4	49.5	65.5
Unknown	-	48.3	31.0	21.8
TYPE OF UNIT				
Combat	-	30.0	73.5	89.7
Combat Support	-	48.9	84.0	89.4
Combat Service Support	-	-1.9	60.2	48.1
TDA	-	2.3	41.3	44.6
CIVILIAN EDUCATION LEVEL				
< High School	-	39.1	43.6	43.3
High School Graduate	-	19.0	79.0	78.8
Some College	-	5.1	56.4	56.9
College Graduate	-	9.7	34.4	40.0
Graduate Work	-	-9.4	6.0	9.0
Unknown	-	-3.0	7.1	4.5
GRADE				
E-1 thru E-4	-	22.3	82.4	79.6
E-5 thru E-9	-	8.6	47.2	50.5
Warrant Off + O-1 thru O-3	-	-6.8	12.4	18.5
O-4 thru O-6	-	0.8	8.7	12.2
RACE				
White	-	22.3	76.7	75.8
Asian	-	-27.0	39.8	19.6
African-American	-	4.4	54.8	50.0
Native American	-	40.2	85.4	113.4
Other	-	-12.5	38.3	46.7
Unknown	-	69.0	56.1	23.3
OVERALL	-	11.1	64.7	63.7

Table B-8

Clinic Visit Rate Ratios by Demographic Category

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
AGE				
<20	-	1.06	2.82	2.58
20-24	-	1.23	2.04	2.06
25-29	-	1.00	1.96	1.84
30-34	-	.99	1.90	1.83
35-39	-	1.10	1.93	2.10
40-44	-	1.20	1.74	2.26
45-49	-	.94	1.78	1.92
>50	-	.60	2.08	3.21
Unknown	-	4.90	2.04	1.56
TYPE OF UNIT				
Combat	-	1.32	2.44	3.59
Combat Support	-	1.47	2.21	2.40
Combat Service Support	-	.98	2.00	1.67
TDA	-	1.03	2.02	2.20
CIVILIAN EDUCATION LEVEL				
< High School	-	1.81	2.00	1.99
High School Graduate	-	1.15	2.09	2.18
Some College	-	1.05	2.05	2.07
College Graduate	-	1.15	1.87	2.17
Graduate Work	-	.81	1.18	1.30
Unknown	-	.94	1.19	1.11
GRADE				
E-1 thru E-4	-	1.17	2.11	2.03
E-5 thru E-9	-	1.09	1.91	2.04
Warrant Off + O-1 thru O-3	-	.87	1.37	1.67
O-4 thru O-6	-	1.02	1.29	1.45
RACE				
White	-	1.20	2.36	2.33
Asian	-	.72	2.38	1.40
African-American	-	1.04	1.83	1.71
Native American	-	1.40	2.53	5.06
Other	-	.88	1.66	1.94
Unknown	-	8.11	3.48	1.42
OVERALL	-	1.10	2.11	2.07

Table B-9

Clinic Utilization Rates by Diagnostic Category

(Weekly Visits / 1000 soldiers)

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
No Diagnosis	30.8	15.3	14.8	5.4
Bites	0.9	0.7	0.4	0.4
Dermatologic	6.3	3.5	4.1	2.3
Environmental	1.2	0.3	0.3	0.1
Fever	2.3	3.2	0.9	1.6
Diarrhea / Gastrointestinal	8.9	11.3	2.8	5.6
Injury / Orthopedic	22.1	20.3	17.6	25.0
Medical	21.2	37.7	3.8	6.5
Ophthalmologic	2.0	1.1	0.9	1.2
Psychiatric	0.5	0.8	0.3	0.2
Respiratory	12.8	12.5	6.5	6.8
Substance Abuse	0.3	0.3	0.5	0.0
Dental	0.2	0.5	0.0	0.3
Sexually Transmitted Disease	1.1	1.2	0.7	1.3
Miscellaneous	12.4	3.3	4.7	2.7
TOTAL	122.9	111.8	58.2	59.2

Table B-10

Clinic Utilization Rates by Diagnostic Category Adjusted for "No Diagnosis" Visits

(Weekly Visits / 1000 soldiers)

	Korea Female Soldiers	Ft. Lewis Female Soldiers	Korea Male Soldiers	Ft. Lewis Male Soldiers
No Diagnosis	-	-	-	-
Bites	1.2	0.8	0.5	0.4
Dermatologic	8.4	4.1	5.5	2.5
Environmental	1.6	0.4	0.4	0.1
Fever	3.1	3.7	1.2	1.7
Diarrhea / Gastrointestinal	11.9	13.1	3.7	6.2
Injury / Orthopedic	29.5	23.5	23.6	27.5
Medical	28.2	43.7	5.0	7.1
Ophthalmologic	2.7	1.3	1.3	1.3
Psychiatric	0.7	0.9	0.3	0.2
Respiratory	17.0	14.5	8.7	7.4
Substance Abuse	0.4	0.3	0.7	0.0
Dental	0.3	0.5	0.0	0.4
Sexually Transmitted Disease	1.5	1.4	0.9	1.4
Miscellaneous	16.5	3.8	6.3	3.0
TOTAL	122.9	111.8	58.2	59.2

Table B-11

Clinic Utilization Rate Differences and Rate Ratios
Women in Korea v. Women at Ft. Lewis
Adjusted for "No Diagnosis" Visits

(Weekly Visits / 1000 soldiers)

	Rate Difference	Rate Ratio
Miscellaneous	12.68	4.32
Injury/Orthopedic Conditions	5.96	1.25
Dermatologic	4.34	2.07
Respiratory	2.58	1.18
Ophthalmic	1.38	2.05
Environmental Injury	1.23	4.39
Bites/Stings	0.43	1.57
STDs	0.13	1.09
Subst. Abuse	0.09	1.33
Psychiatric	-0.22	0.75
Teeth	-0.22	0.59
Fever	-0.67	0.82
Diarrhea / Gastrointestinal	-1.20	0.91
Medical Illness	-15.42	0.65
TOTAL	11.08	1.10

Table B-12

Clinic Utilization Rate Differences and Rate Ratios
Women in Korea v. Men in Korea
Adjusted for "No Diagnosis" Visits

(Weekly Visits / 1000 soldiers)

	Rate Difference	Rate Ratio
Medical Illness	23.20	5.61
Miscellaneous	10.16	2.60
Respiratory	8.34	1.96
Diarrhea / Gastrointestinal	8.15	3.19
Injury / Orthopedic	5.94	1.25
Dermatologic	2.88	1.52
Fever	1.89	2.62
Ophthalmic	1.43	2.14
Environmental Injury	1.21	4.16
Bites / Stings	0.64	2.18
STDs	0.61	1.68
Psychiatric	0.33	1.99
Teeth	0.27	5.80
Substance Abuse	-0.29	0.57
TOTAL	64.74	2.11

Table B-13

Clinic Utilization Rate Differences and Rate Ratios
Women in Korea v. Men at Ft. Lewis
Adjusted for "No Diagnosis" Visits

(Weekly Visits / 1000 soldiers)

	Rate Difference	Rate Ratio
Medical Illness	21.11	3.96
Miscellaneous	13.53	5.56
Respiratory	9.59	2.29
Dermatologic	5.88	3.34
Diarrhea / Gastrointestinal	5.69	1.92
Injury / Orthopedic	2.03	1.07
Environmental Injury	1.50	17.85
Ophthalmic	1.41	2.11
Fever	1.35	1.79
Bites / Stings	0.76	2.81
Psychiatric	0.42	2.77
Substance Abuse	0.35	10.66
STD	0.10	1.07
Teeth	-.05	0.86
TOTAL	63.66	2.07

Table B-14

Frequency Distribution of the Number of Visits for Soldiers Present for Duty during the Entire Study Period*

Number of Visits	Females Korea N	(%)	Females Ft. Lewis N	(%)	Males Korea N	(%)	Males Ft. Lewis N	(%)
0	465	(26.1)	484	(32.3)	4143	(58.6)	6149	(70.5)
1	375	(21.1)	350	(23.3)	1651	(23.3)	1776	(20.4)
2	264	(14.8)	227	(15.1)	740	(10.5)	515	(5.9)
3	220	(12.4)	156	(10.4)	292	(4.1)	180	(2.1)
4	142	(8.0)	100	(6.7)	154	(2.2)	57	(0.7)
5	119	(6.7)	70	(4.7)	42	(0.6)	27	(0.3)
6	53	(3.0)	34	(2.3)	21	(0.3)	8	(0.1)
7	48	(2.7)	28	(1.9)	8	(0.1)	6	(0.1)
8	34	(1.9)	17	(1.1)	6	(0.1)	3	(0.0)
9	23	(1.3)	8	(0.5)	4	(0.1)	3	(0.0)
10	14	(0.8)	6	(0.4)	8	(0.1)	0	(0.0)
11	11	(0.6)	11	(0.7)	2	(0.0)	1	(0.0)
12	3	(0.2)	4	(0.3)	0	(0.0)	0	(0.0)
13	4	(0.2)	3	(0.2)	0	(0.0)	0	(0.0)
14	1	(0.1)	1	(0.1)	0	(0.0)	0	(0.0)
15	1	(0.1)	0	(0.0)	0	(0.0)	0	(0.0)
16	2	(0.1)	0	(0.0)	1	(0.0)	0	(0.0)
17	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
18	2	(0.1)	0	(0.0)	1	(0.0)	0	(0.0)
Total Persons	1783		1499		7073		8725	

*In Korea, the total study period was 21 weeks in duration. At Fort Lewis, the total study period was 18 weeks in duration.

Figure B-1

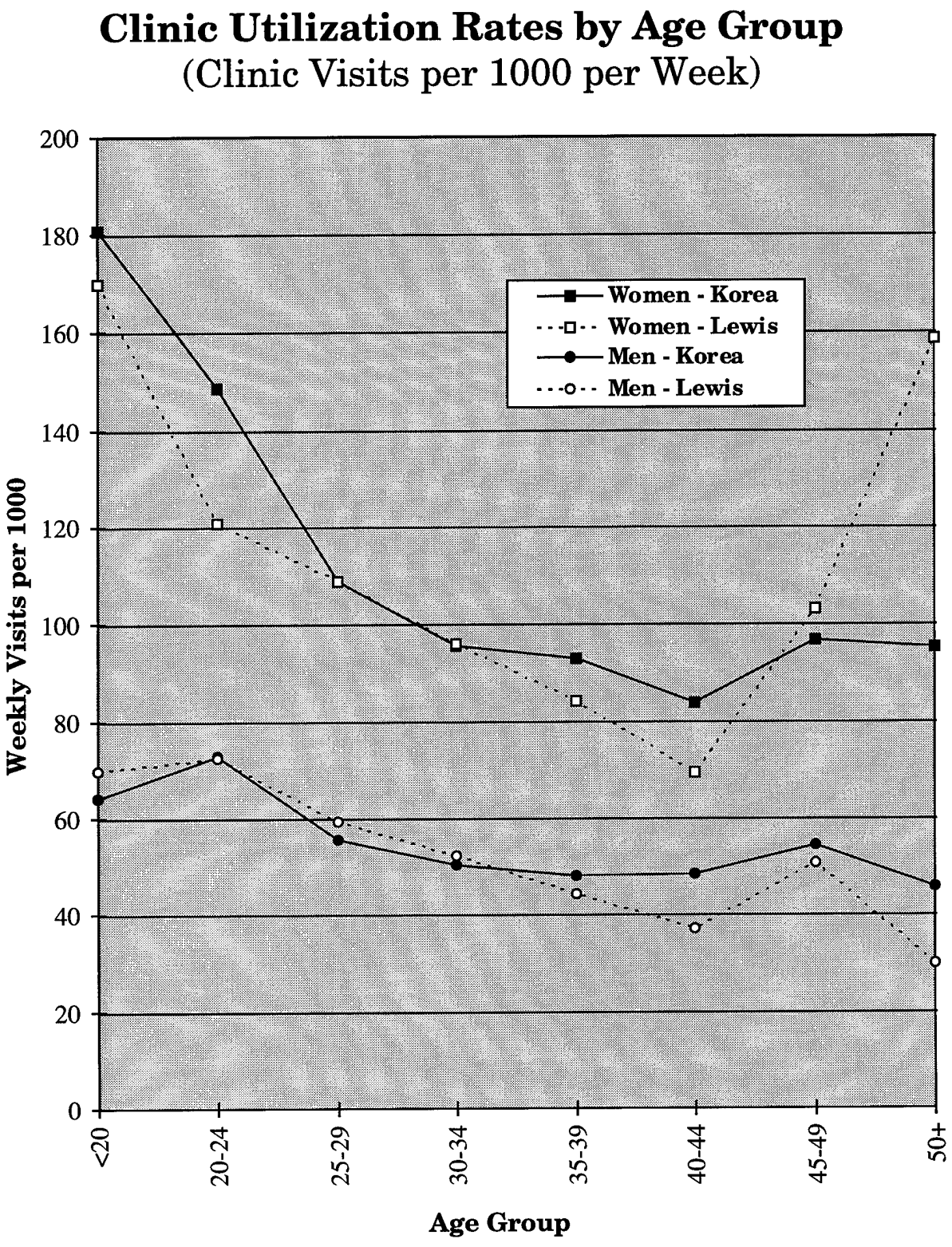

Clinic Utilization Rates by Age Group
(Clinic Visits per 1000 per Week)
Weekly Visits per 1000
200
180
160
140
120
100
80
60
40
20
0
Women - Korea
Women - Lewis
Men - Korea
Men - Lewis
<20
20-24
25-29
30-34
35-39
40-44
45-49
50+
Age Group

Figure B-2

Clinic Utilization Rates by Type of Unit
(Clinic Visits per 1000 per Week)

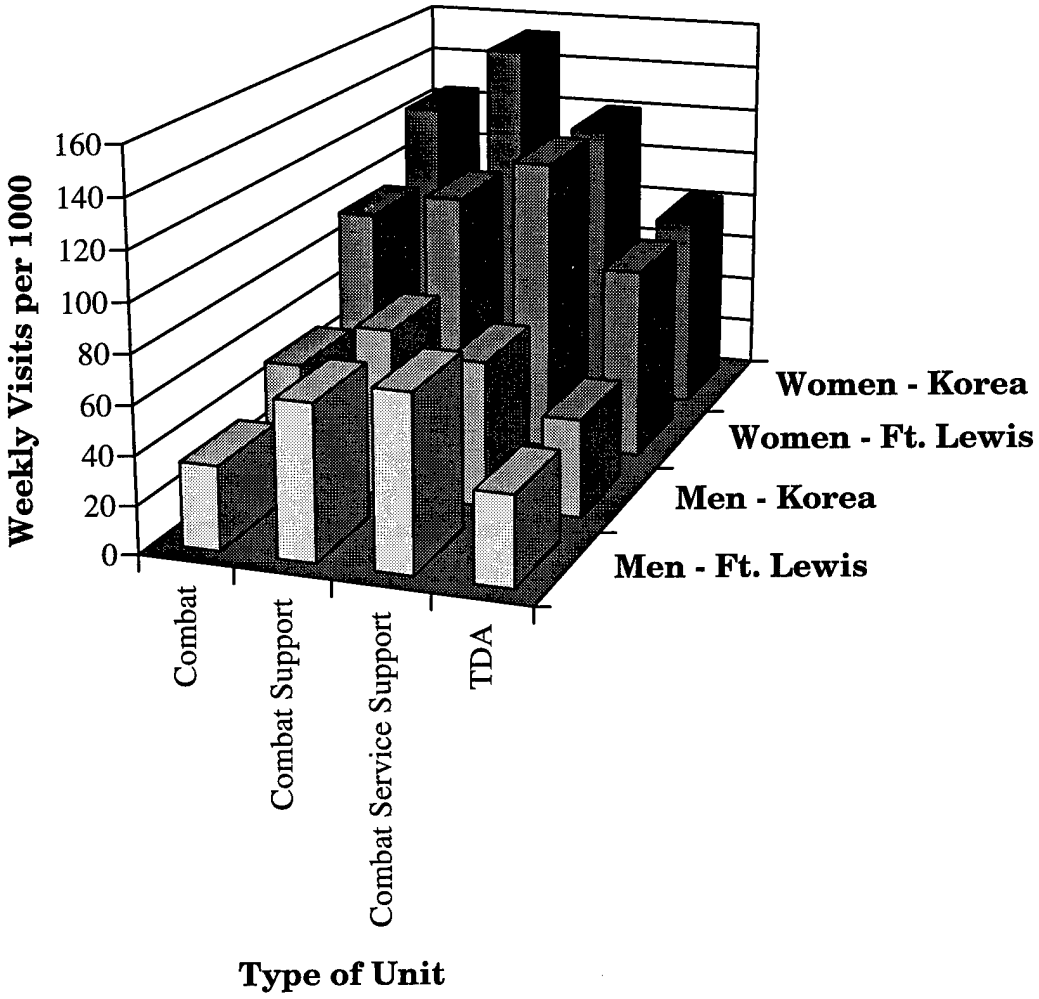


Figure B-3

Clinic Utilization Rates by Level of Education
(Clinic Visits per 1000 per Week)

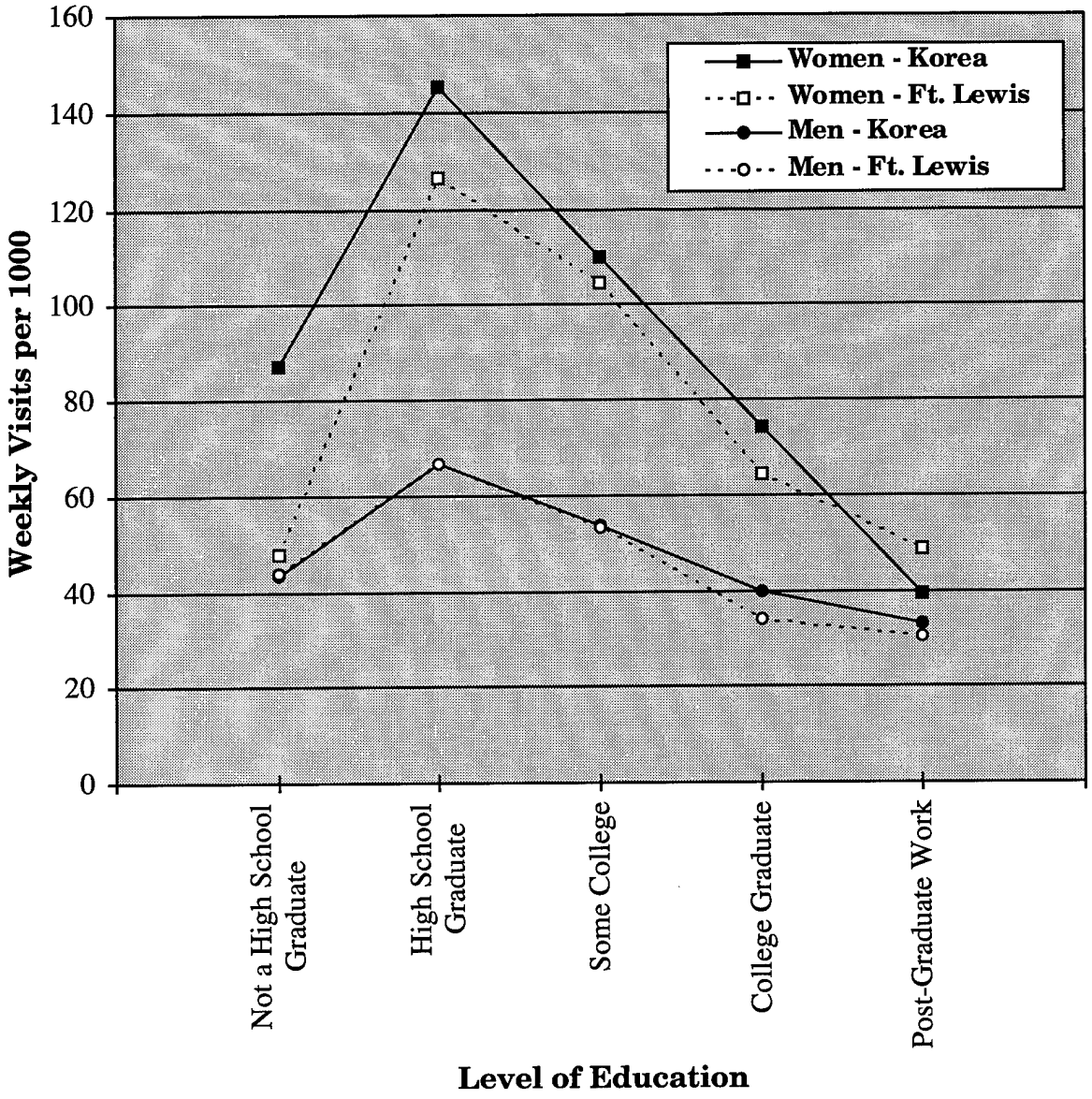


Figure B-4

Clinic Utilization Rates by Grade
(Clinic Visits per 1000 per Week)

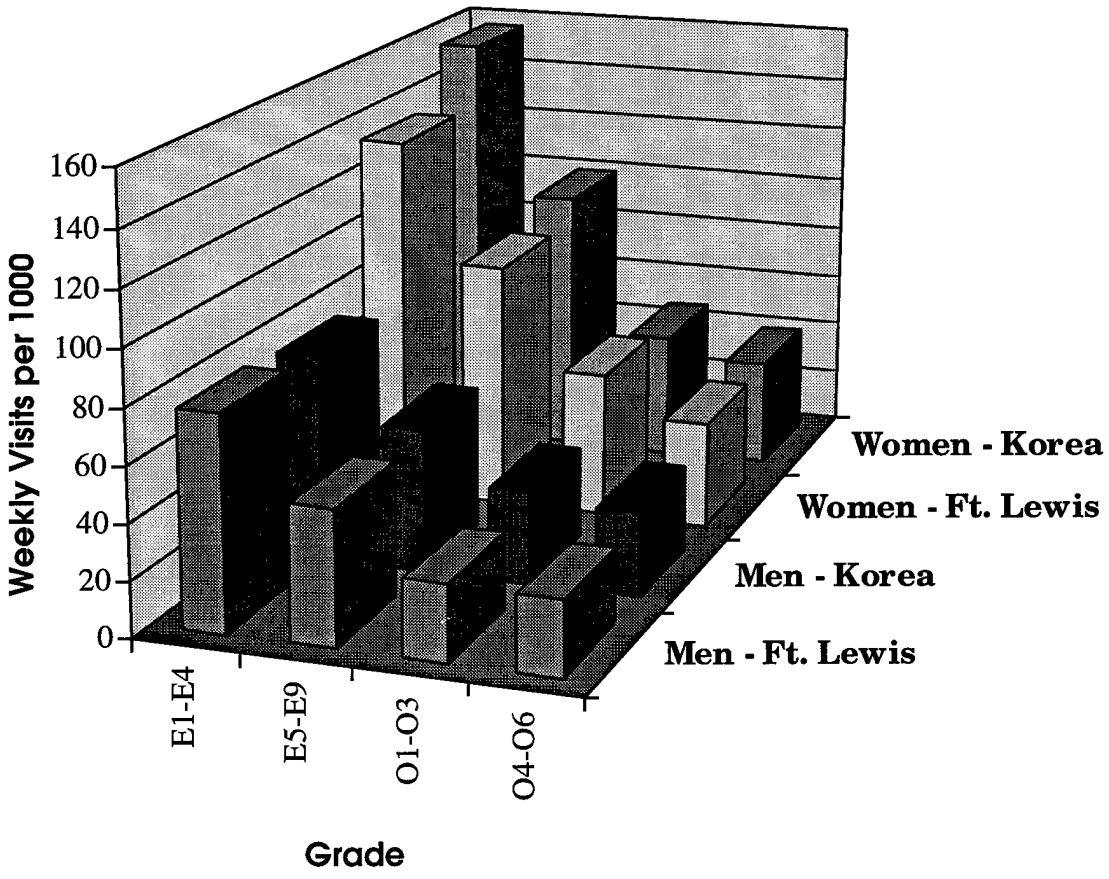


Figure B-5

Clinic Utilization Rates by Race
(Clinic Visits per 1000 per Week)

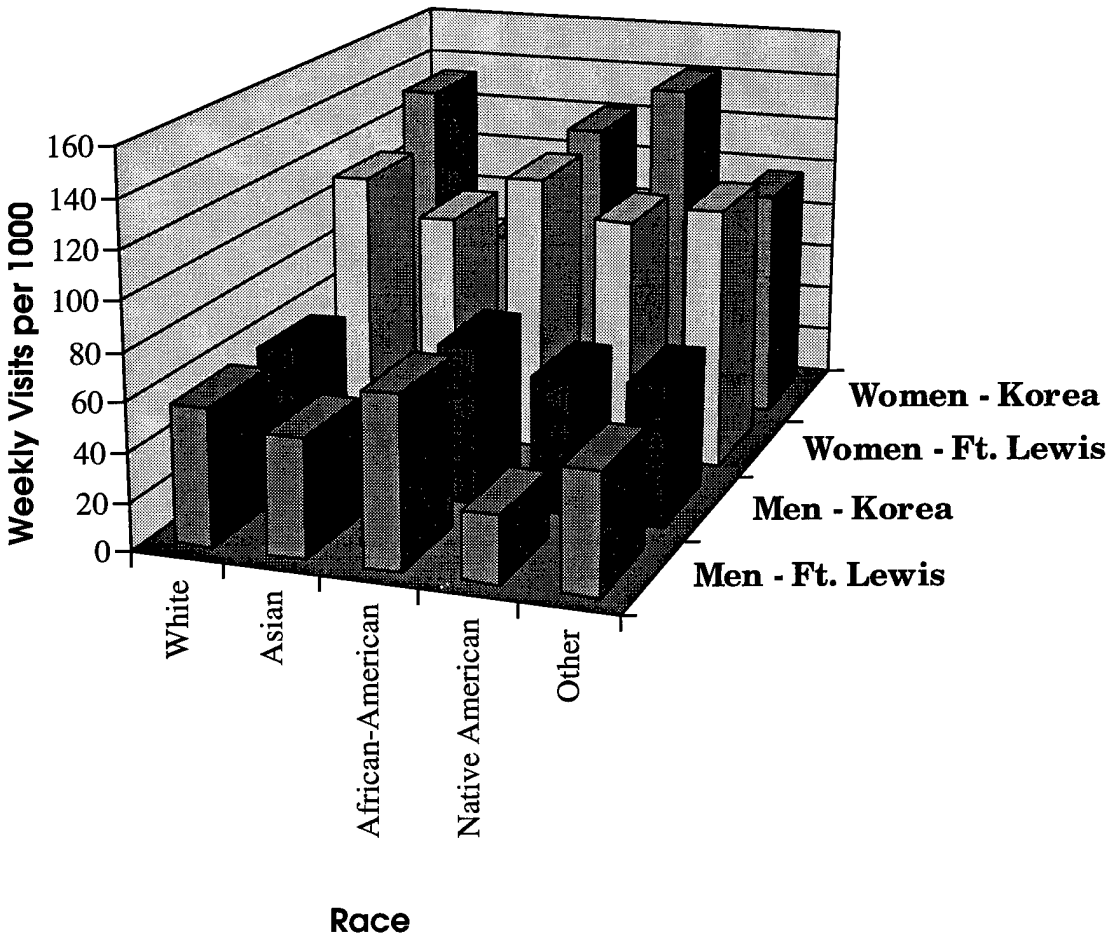
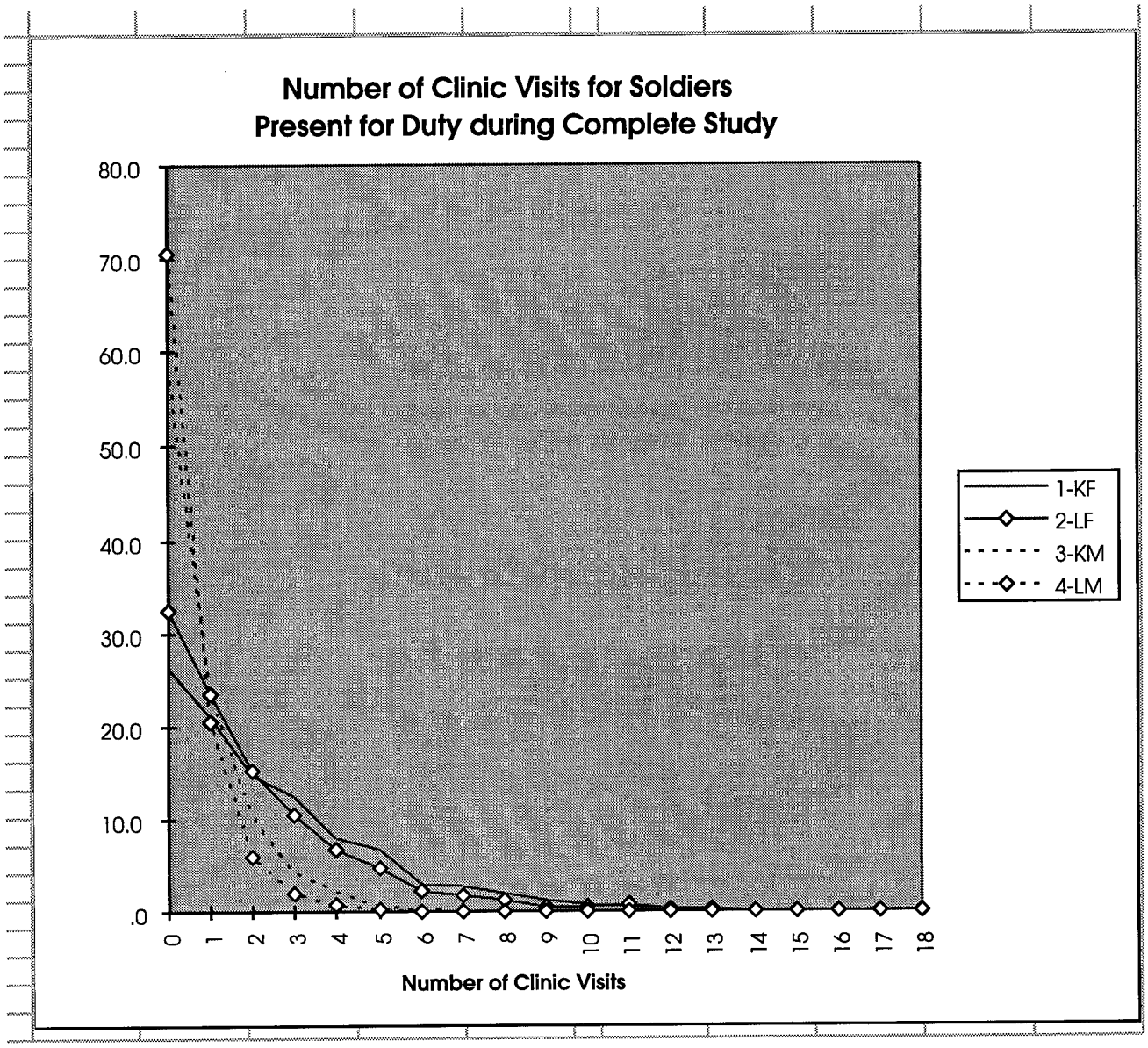


Figure B-6



Note: "KF" = Korea, Females; "LF" = Lewis, Females; "KM" = Korea, Males; and "LM" = Lewis, Males.

Appendix C

Sample Health Survey

Version used in Korea

U.S. Army Soldier Health Survey

v K-1.1

Today's Date: _____

Age: _____

Gender: ☐ Male ☐ Female

What is your race / ethnicity?

- ☐ White, non-Hispanic
- ☐ Black, non-Hispanic
- ☐ White Hispanic
- ☐ Black Hispanic
- ☐ Other: _____
- ☐ Alaskan/American Native
- ☐ Asian
- ☐ Pacific Islander

What is your rank?

☐ E1 ☐ E2 ☐ E3 ☐ E4 ☐ E5 ☐ E6 ☐ E7 ☐ E8 ☐ E9
☐ O1 ☐ O2 ☐ O3 ☐ O4 ☐ O5 ☐ O6 ☐ O7 ☐ O8 ☐ O9
☐ WO1 ☐ CW2 ☐ CW3 ☐ CW4 ☐ MW5

MOS: _____

When did you first arrive in Korea? _____ (Month) / _____ (Year)

Which of the following best describes your current assignment?

- ☐ I wanted this assignment
- ☐ This assignment was offered to me and was acceptable
- ☐ I did not want this assignment

What are your current living arrangements?

- ☐ Barracks
- ☐ Post housing
- ☐ Off-post housing
- ☐ Other

What is your marital status?

- ☐ Single
- ☐ Married
- ☐ Separated
- ☐ Divorced
- ☐ Widow

If married, where does your spouse currently live?

- ☐ Is living with me now
- ☐ Also in Korea, but at another installation
- ☐ Lives in the US - Which state? _____
- ☐ Other: _____

If married, is your spouse also on active duty?

☐ Yes ☐ No ☐ I am not married

If married, does your spouse work outside the home?

☐ Yes ☐ No ☐ I am not married

How many children have you had?

☐ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 or more

If you have had children, are they under your legal custody?

☐ Yes ☐ No ☐ I have had no children

If you have had children, what are their current ages?

_____

Do any of your children currently live with you?

☐ No ☐ Yes, how many? ____ Ages: _____

Would you say that in general your health is:

- ☐ Excellent
- ☐ Very Good
- ☐ Good
- ☐ Fair
- ☐ Poor

Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good? → _____ days

Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good? → _____ days

During the past 30 days for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation? → _____ days

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

- ☐ A great deal
- ☐ A fairly large amount
- ☐ Some
- ☐ A little
- ☐ None at all

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

- ☐ A great deal
- ☐ A fairly large amount
- ☐ Some
- ☐ A little
- ☐ None at all

Please check any of the following which describe how you have handled stress in the past 12 months.

- ☐ I have always handled it on my own
- ☐ I have sometimes called on friends or family for support
- ☐ I have sought professional help from chaplains, counsellors, or health personnel

Please give the date and score of your most recent PT test:

Date: _____ (Month) / _____ (Year) Approximate score: _____

How would you describe your performance on this last PT test?

- ☐ Much better than usual
- ☐ A little better than usual
- ☐ About the same as usual
- ☐ A little worse than usual
- ☐ Much worse than usual

If you checked "a little worse than usual" or "much worse than usual", what do you attribute this change to?

- ☐ Decreased exercising
- ☐ I had an illness
- ☐ I am recovering from an injury
- ☐ Other: _____

PLEASE CONTINUE ON THE REVERSE SIDE OF THIS PAGE.

For Office Use Only:

During the past 30 days, on how many days did you have at least one drink of alcohol?

☐ 0 days ☐ 1 or 2 days ☐ 3 to 5 days ☐ 6 to 9 days ☐ 10 to 19 days ☐ 20 to 29 days ☐ All 30 days

During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

☐ 0 days ☐ 1 day ☐ 2 days ☐ 3 to 5 days ☐ 6 to 9 days ☐ 10 to 19 days ☐ 20 or more days

Before you came to Korea, during an average 30 days, on how many did you have at least one drink of alcohol?

☐ 0 days ☐ 1 or 2 days ☐ 3 to 5 days ☐ 6 to 9 days ☐ 10 to 19 days ☐ 20 to 29 days ☐ All 30 days

Please check the one response that best describes your use of tobacco products?

☐ I have never used them
☐ I first began using tobacco before I joined the Army
☐ I first began using tobacco after I joined the Army

Have you smoked at least 100 cigarettes in your entire life?

☐ Yes ☐ No

If yes, how old were you when you first started smoking cigarettes fairly regularly? _____ years old

Have you smoked ANY cigarettes in the last 30 days?

☐ Yes ☐ No

If yes, how many cigarettes do you smoke per day? _____ cigarettes

Have you used a can of dip or more in your lifetime?

☐ Yes ☐ No

If yes, how old were you when you started using smokeless tobacco products? _____ years old

Have you used ANY dip in the last 30 days?

☐ Yes ☐ No

If yes, how much dip do you use per day?

☐ Less than 1 can ☐ About 1 can ☐ More than 1 can

If you have used any type of tobacco product in the past six months, please answer the questions below. If you have not used tobacco products, please skip ahead to the top of the next column.

Have you taken any type of action to quit using tobacco within the past six months? ☐ Yes ☐ No

Do you intend to quit using all tobacco products within the next six months? ☐ Yes ☐ No

Do you intend to quit using all tobacco products within the next month? ☐ Yes ☐ No

Have you ever made a serious attempt to quit using tobacco products in the past? ☐ Yes ☐ No

If yes, how many times? _____

During the past 30 days, how many days have you been away from work because of illness or injury?

☐ 0 days ☐ 1 or 2 days ☐ 3 to 5 days ☐ 6 to 9 days ☐ 10 to 19 days ☐ 20 to 29 days ☐ All 30 days

During the past two months, have you had any type of physical injury? ☐ Yes ☐ No

If yes, please check the part of your body that was injured:

☐ Head ☐ Neck or body ☐ Back ☐ Shoulder or arm ☐ Hand or wrist ☐ Hip or leg ☐ Knee ☐ Ankle ☐ Calf or foot

If yes, please categorize the cause of the injury as one of the following:

☐ PT ☐ Job-related ☐ Recreational

During the past two months, have you had any other type of medical problem? ☐ Yes ☐ No

If yes, please check any problems that you have had:

☐ Skin problem ☐ Cold or "flu" ☐ Nausea or vomiting ☐ Abdominal pain ☐ Headache ☐ Pregnant ☐ Mental health ☐ Other: _____

During the past two months, how many times have you gone on sick call for any reason? _____ times

Please check any of the following problems that you may have had since you arrived in Korea:	Did you see a doctor for this problem? Yes	No
☐ Headache which interferes with work →	☐	☐
☐ Difficulty sleeping →	☐	☐
☐ Difficulty concentrating at work →	☐	☐
☐ Feeling unusually tired →	☐	☐
☐ Loss of appetite →	☐	☐

Please check one of the following which applies to your body weight since you arrived in Korea:

☐ I have GAINED weight: _____ pounds
☐ My weight has stayed the same.
☐ I have LOST weight: _____ pounds

Please check one of the following concerning medical profiles:

☐ I do not currently have a medical profile
☐ I currently have a TEMPORARY medical profile
☐ I currently have a PERMANENT medical profile

If you currently have a medical profile, what was the medical condition for which you were given the profile?

☐ Orthopedic injury ☐ Heat or cold injury ☐ I just had an operation ☐ I just got out of the hospital ☐ I am currently pregnant ☐ I just delivered a baby ☐ Mental health ☐ Other: _____

If you currently have a medical profile, please check any of the following concerning your profile:

☐ I can take the normal PT test ☐ I cannot do PUSH-UPS
☐ I cannot do SIT-UPS ☐ I cannot do the TWO-MILE RUN

PLEASE CONTINUE ON THE NEXT PAGE.

Have you ever had sexual intercourse? ☐ Yes ☐ No

How old were you when you first had sexual intercourse? _____ years

How many different sexual partners have you had during your lifetime? (Please estimate if unsure.) _____

How many different sexual partners have you had during the past six months? _____

How many new sexual partners have you had since coming to Korea? _____

Which of the following best describes your sex life since you came to Korea?
- ☐ It has increased
- ☐ It has stayed the same
- ☐ It has decreased

Do you or your partner currently use any form of birth control?
☐ Yes ☐ No

If yes, please check the type(s) of birth control you use.
- ☐ Birth control pill
- ☐ Depo-Provera (shot)
- ☐ Norplant (implant)
- ☐ Condoms
- ☐ IUD
- ☐ Diaphragm
- ☐ Sponge
- ☐ Foam
- ☐ Vasectomy
- ☐ Tubes have been tied
- ☐ Uterus has been removed
- ☐ Withdrawal
- ☐ Rhythm method
- ☐ Other: _____

In the past six months, how often have you or your partner used condoms?
- ☐ I have not had sex in the past six months
- ☐ Never
- ☐ Rarely
- ☐ Some of the time
- ☐ About half of the time
- ☐ Most of the time
- ☐ Almost all of the time
- ☐ Always

Have you ever been diagnosed with a sexually transmitted disease? ☐ Yes ☐ No

If yes, write the number of times next to each infection. If you are unsure of the infection you had, use "Unsure".
- ___ Gonorrhea
- ___ Chlamydia
- ___ Syphilis
- ___ Non-gonococcal urethritis (NGU or NSU)
- ___ Venereal Warts
- ___ Pelvic inflammatory disease
- ___ Herpes
- ___ Unsure
- ___ Other: _____

Have you been diagnosed with a sexually transmitted disease since you came to Korea? ☐ Yes ☐ No

If yes, write the number of times next to each infection.
- ___ Gonorrhea
- ___ Chlamydia
- ___ Syphilis
- ___ Non-gonococcal urethritis (NGU or NSU)
- ___ Venereal warts
- ___ Pelvic inflammatory disease
- ___ Herpes
- ___ Unsure
- ___ Other: _____

In comparison to what you expect from an "average" duty assignment, how would you describe your current assignment?
- ☐ Much less stressful than I would normally expect
- ☐ Somewhat less stressful than I would normally expect
- ☐ About the same level of stress as an average assignment
- ☐ Somewhat more stressful than I would normally expect
- ☐ Much more stressful than I would normally expect

In comparison to your assignment immediately before coming to Korea, how would you describe your current assignment?
- ☐ Much less stressful than my last assignment
- ☐ Somewhat less stressful than my last assignment
- ☐ About the same level of stress as my last assignment
- ☐ Somewhat more stressful than my last assignment
- ☐ Much more stressful than my last assignment

During your current assignment, what has been the greatest source of stress to you?
- ☐ Being separated from my family
- ☐ Other stress related to my family
- ☐ Stress related to my job
- ☐ Being stationed in a foreign country
- ☐ Problems with weight or passing the PT test
- ☐ Problems with my health or an injury
- ☐ Other: _____

Since arriving in Korea, have you been physically assaulted or forced to have sex? ☐ No ☐ Yes (assaulted) ☐ Yes (forced sex)

In the past six months, how many times were you involved in a physical fight?
- ☐ 0 times
- ☐ 1 time
- ☐ 2 or 3 times
- ☐ 4 or 5 times
- ☐ 6 or 7 times
- ☐ 8 or 9 times
- ☐ 10 or 11 times
- ☐ 12 or more times

The last time you were in a physical fight, with whom did you fight?
- ☐ I have never been in a fight
- ☐ My spouse
- ☐ Another family member
- ☐ A boyfriend, girlfriend, or date
- ☐ A friend or someone I know
- ☐ A total stranger
- ☐ Other: _____

In the past six months, how many times were you in a physical fight where you were injured and had to be treated by a doctor or nurse?
- ☐ 0 times
- ☐ 1 time
- ☐ 2 or 3 times
- ☐ 4 or 5 times
- ☐ 6 or more times

PLEASE CONTINUE ON THE REVERSE SIDE OF THIS PAGE.

Have you had any difficulty obtaining medical appointments since you arrived in Korea? ☐ Yes ☐ No

If yes, please indicate the kinds of care for which you have had difficulty obtaining appointments:

- ☐ Care for acute injuries
- ☐ Routine Pap smear
- ☐ Care for acute illness
- ☐ Stress problems
- ☐ Care for chronic injuries
- ☐ Other: _____
- ☐ Care for chronic illness _____

If you have had difficulty obtaining care, what is the main reason why?

- ☐ Care not available
- ☐ My unit won't release me
- ☐ Unit alerts interrupt scheduled appointments
- ☐ Other: _____

FOR WOMEN ONLY
(Men please continue at "FOR MEN ONLY" in the next column)

How long has it been since your last Pap smear was done?

- ☐ I have never have had a Pap smear
- ☐ More than a year ago
- ☐ Less than a year ago
- ☐ I cannot remember

Have you had a Pap smear since you arrived in Korea? ☐ Yes ☐ No

How long has it been since you had a breast exam by a doctor or nurse?

- ☐ I have never had a breast exam
- ☐ More than two years ago
- ☐ More than one year, but less than two years ago
- ☐ Less than one year ago
- ☐ I cannot remember

Have you had to seek care for any type of obstetrical or gynecological problem since you arrived in Korea?

☐ Yes ☐ No

Please check any of the following problems that you may have had since you arrived in Korea:	Did you see a doctor for this problem? Yes	No
☐ Unusual vaginal discharge →	☐	☐
☐ Pain when I urinated →	☐	☐
☐ Urinary tract infection →	☐	☐
☐ Unusually heavy menstrual bleeding →	☐	☐
☐ My period stopped →	☐	☐
☐ Pelvic cramping or pain →	☐	☐

FOR WOMEN ONLY - continued

Have you ever used birth control pills? ☐ Yes ☐ No

If yes, how many years have you used them? _____ years

Since arriving in Korea, have you had a pregnancy test?

- ☐ No, I have not had a pregnancy test
- ☐ Yes, it was negative
- ☐ Yes, it was positive

FOR MEN ONLY
(Women please skip this question)

How often do you do a testicular exam for lumps?

- ☐ Never
- ☐ About once a year
- ☐ A few times a year
- ☐ Every month
- ☐ Several times a month

PLEASE PROVIDE ANY ADDITIONAL COMMENTS THAT YOU WOULD LIKE TO MAKE IN THE SPACE BELOW.

THANK YOU VERY MUCH FOR YOUR COOPERATION!

Appendix D

Tables and Figures

* * * * *

Health Survey

Table D-1

Survey Response Rates

	--Women--		-- Men --	
	Korea	Lewis	Korea	Lewis
Total Military Population	3,716	2,517	22,743	17,559
Sample Size	1,000	1,000	1,000	1,000
Sampling Fraction (%)	26.9	39.7	4.4	5.7
Non-Available to Respond	216	102	228	96
Available to Respond	784	898	772	904
Survey Responders	533	613	523	574
Crude Response Rate (%)	53.3	61.3	52.3	57.4
Adjusted* Response Rate (%)	68.0	68.3	67.7	63.5†

*Adjusted Response Rate = Survey Responders / Available to Respond

†Significantly different from value for women in Korea ($p<.05$)

Table D-2

Self-Report of General Health

Percent (%) within Each Category	- -Women - - Korea (N=533)	Lewis (N=603)	- -Men- - Korea (N=517)	Lewis (N=563)
Excellent	15.7	19.3	20.7	26.7†
Very Good	39.4	38.4	41.3	38.2
Good	34.7	33.7	32.5	25.1 †
Fair	8.6	7.9	4.8	7.8
Poor	1.6	0.7	0.7	2.2
TOTAL	100.0	100.0	100.0	100.0

† - Significantly different from value for women in Korea ($p<.05$)

Table D-3

Self-Reported Days of Poor Physical and Mental Health in Last 30 Days

Physical Health (%)

Poor Days	Women		Men	
	Korea (N=518)	Lewis (N=595)	Korea (N=509)	Lewis (N=562)
0	43.8	43.0	58.2†	54.2†
1 to 2	11.3	16.3†	11.6	12.7
3 to 5	18.5	15.5	12.4†	10.5†
6 to 9	6.3	3.3	2.8†	2.8†
10 to 19	9.2	12.1	7.9	8.5
20 to 29	4.2	2.4	2.2	4.4
30	6.0	6.4	4.3	6.0
>30	0.7	1.0	0.7	0.9

Mental Health (%)

Poor Days	Women		Men	
	Korea (N=513)	Lewis (N=596)	Korea (N=507)	Lewis (N=557)
0	31.2	38.5†	46.6†	51.6†
1 to 2	10.5	13.0	5.8	8.3
3 to 5	16.9	13.1	16.1	10.6
6 to 9	3.4	5.1	2.5	3.6
10 to 19	19.7	16.7	14.7	12.0
20 to 29	8.7	6.6	7.0	7.7
30	9.7	6.7	6.8	5.9†
>30	0.0	0.3	0.5	0.4

† - Significantly different from value for women in Korea ($p<.05$)

Table D-4

Prevalence and Care-Seeking Behaviors for Possible Stress-Related Symptoms

	- -Women- -		- -Men- -	
Prevalence of . . .	Korea	Lewis	Korea	Lewis
Headache (%)	21.4	24.1	8.8	12.7
Sleeping difficulty (%)	32.2	25.9	21.9	18.8
Decreased work concentration (%)	14.6	13.9	11.6	9.4
Feeling unusually tired (%)	35.6	32.0	25.2	23.2
Loss of appetite (%)	19.5	14.5	8.8	8.9
Sought care from a doctor for . . .				
Headache (%)	13.3	16.1	5.5	10.2
Sleeping difficulty (%)	10.2	13.1	10.5	4.8
Decreased work concentration (%)	4.3	7.0	4.7	3.9
Feeling unusually tired (%)	14.6	17.5	11.1	8.0
Loss of appetite (%)	6.0	9.5	3.6	3.9

Table D-5

Self-Reported Days of Limited Activity and Lost Work Days in Last 30 Days

Limited Activity Days (%)

Days	Women		Men	
	Korea (N=516)	Lewis (N=594)	Korea (N=502)	Lewis (N=562)
0	62.0	65.6	73.8†	71.7†
1 to 2	9.2	9.0	5.3	5.8
3 to 5	10.6	8.8	8.2	8.6
6 to 9	2.4	4.8	2.9	0.9
10 to 19	8.3	6.9	6.5	5.7
20 to 29	4.4	2.5	0.2	3.0
30	2.7	2.1	2.3	4.1
>30	0.4	0.3	0.7	0.2

Days Off of Work (%)

Days	Women		Men	
	Korea (N=523)	Lewis (N=605)	Korea (N=515)	Lewis (N=561)
0	74.7	73.7	92.1†	86.1†
1 to 2	14.0	14.2	3.0†	6.7†
3 to 5	7.1	6.4	3.7	2.9
6 to 9	1.2	1.9	0.5	0.6
10 to 19	2.5	2.5	0.7	2.6
20 to 29	0.0	0.2	0.0	0.5
30	0.6	1.2	0.0	0.9

† - Significantly different from value for women in Korea ($p<.05$)

Table D-6

Injury and Illness Prevalance and Sick Call Visits in Last Two Months

Prevalence of . . .	--Women-- Korea	Lewis	--Men-- Korea	Lewis
Injury (%)	30.3	36.4 †	35.2	39.4 †
Other Medical Problem (%)	57.8	55.5	33.5 †	33.5 †
Sick Call Visits				
None	41.1	47.8 †	60.4 †	61.4 †
1-2	43.3	37.0	34.3	28.1
3-5	11.8	11.6	5.3	8.1
6-8	1.3	3.2	0.0	1.8
9 or more	2.5	0.4	0.0 †	0.7

† - Significantly different from value for women in Korea ($p<.05$)

Table D-7

Self-reported Prevalence of Other Medical Problems During the Preceding Two Months

Prevalence of . . .	--Women--		--Men--	
	Korea	Lewis	Korea	Lewis
Skin problem (%)	17.3	15.0	16.3	20.8
Cold or "flu" (%)	48.1	31.3	52.0	44.2
Nausea or vomiting (%)	18.1	14.1	5.9	9.7
Abdominal pain (%)	17.2	20.1	3.3	9.3
Headache (%)	37.0	32.1	27.6	29.9
Pregnant (%)	10.2	20.1	- - -	- - -
Mental health (%)	8.4	5.3	2.5	3.3
Other (%)	28.3	28.9	25.7	27.2

Table D-8

Levels of Evidence that the Health Status of Women Assigned in Korea is Worse than Three Comparison Populations

	Level of Evidence* that the Health Status of Women in Korea is worse than . . .		
	Women at Ft. Lewis	Men in Korea	Men at Ft. Lewis
CDC Questions on Quality of Life			
General Health	Weak	Weak	Moderate
Recent Physical Health	None	Strong	Strong
Recent Mental Health	Moderate	Moderate	Strong
Activity Limitation	None	Moderate	Moderate
Other Measures of Health Status			
Days Off of Work	None	Strong	Strong
Recent Injury	None	None	None
Recent Other Medical Problem	None	Moderate	Moderate
Sick Call Visits	Moderate	Strong	Moderate

*Level of Evidence based on the following criteria: None - No appreciable difference in any pair-wise percentage comparison; Weak - At least one pair-wise comparison with an appreciable difference, but none is statistically significant; Moderate - only one pair-wise comparison is statistically significant; Strong - two or more pair-wise comparisons are statistically significant

Figure D-1

Questionnaire: Questions relating to health status

Self-Perceived Health

Would you say that in general your health is:

o Excellent o Good o Poor

o Very good o Fair

Recent Physical Health

Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

Recent Mental Health

Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?

Recent Activity Limitation

During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

Recent Occupational Activity Limitation

During the past 30 days, how many days have you been away from work because of illness or injury?

o 0 days o 6-9 days o All 30 days

o 1-2 days o 10-19 days

o 3-5 days o 20-29 days

Recent Physical Injury

During the past two months, have you had any type of physical injury?

o Yes o No

Recent "Other" Medical Problem

During the past two months, have you had any other type of medical problem?

o Yes o No

Recent Sick Call Utilization

During the past two months, how many times have you gone on sick call for any reason?

Note: The first four questions on the left were designed by the Centers for Disease Control to measure Quality of Life as part of the Behavioral Risk Factor Surveillance System (Hennessy et al, Pub Hlth Rep 1994;109:665-72.

Figure D-2

Adjusted Response Rates by Location, Gender, Age, and Race