Duty-Related and Sexual Stress in the Etiology of PTSD Among Women Veterans Who Seek Treatment

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Objective: The stressful experiences of women serving in the military have been a focus of increasing concern. A model of the impact of stress related to military duty and stress related to sexual abuse and harassment on the development of posttraumatic stress disorder (PTSD) among female veterans was evaluated. Methods: Structural equation modeling was applied to data from 327 women treated in a VA clinical program for women with stress disorders. The model was a chronological one and included variables related to the women's premilitary experience, their military service, and their postmilitary experience. Results: Altogether 48 percent of the sample served overseas, and 12 percent were exposed to enemy fire. A total of 63 percent reported experiences of physical sexual harassment during military service, and 43 percent reported rape or attempted rape. Both duty-related and sexual stress were found to contribute separately and significantly to the development of PTSD. Sexual stress was found to be almost four times as influential in the development of PTSD as duty-related stress. Postmilitary social support played a highly significant mediational role between sexual stress during military service and development of PTSD. Conclusions: Women's exposure to sexual stress in the military is much more prevalent than previously believed. It is particularly toxic for the development of PTSD. Correct assessment is essential to effective treatment. (*Psychiatric Services* 49:658–662, 1998)

In the years since the end of the Persian Gulf War, awareness has grown of the stress experienced by women serving in the armed forces, including both stress related to military service itself and stress related to sexual harassment and abuse (1–4). However, few studies have addressed the psychological sequelae of such stress.

In a previous paper (5), we developed a model of the contributions of war stress and sexual stress (stress related to sexual harassment and abuse) to the etiology of posttraumatic stress disorder (PTSD) among women who had served in the Vietnam theater, using data collected as part of the National Vietnam Veterans Readjustment Study (6). We used structural equation modeling to evaluate the fit of the data to the theoretical model. That study found that both war stress and sexual stress played significant roles in the development of PTSD, with each type of stress contributing approximately equally.

In the study reported here, we modified the model to apply to women veterans of all service eras who were being evaluated for treatment of traumatic stress in a specialized Department of Veterans Affairs clinical program. First, we included the service era in the model, which allowed us to represent both the increasing ages of the women and the decreasing conservatism of sociocultural mores in American society over the past 75 years. Second, we extended the category of war stress to include all types of duty-related stress. Finally, we included sexual stress that occurred before, during, and after military service. These modifications served to broaden the model considerably.

The model is a chronological one in which factors from earlier periods are presumed to affect factors in later ones. The model covers four periods in the woman's life: premilitary, military, postmilitary, and the present. Premilitary factors include educational level, age at entry into the military, African-American ethnicity, sexual stress, and service era. Military factors consist of duty-related stress and sexual stress. Postmilitary factors are represented by sexual stress and social support. The final period is the present and is represented by the severity of current PTSD.

The two major issues of interest in this study were the etiological roles played in the development of PTSD by social support and exposure to stress, particularly duty-related stress and sexual stress experienced during military service, and the relative magnitudes of the contributions of duty-related and sexual stress during military service to the severity of PTSD.

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Methods

Women's stress disorder treatment teams

In 1994 the Department of Veterans Affairs expanded its network of specialized programs for treating PTSD by establishing four women's stress disorder treatment teams, located in Boston; Brecksville, Ohio; Loma Linda, California; and New Orleans. The teams act as psychiatric outpatient clinics that strive to bring optimal sensitivity to evaluation and treatment of the special problems of women veterans, notably sexual harassment and trauma.

Sample

Between May 1, 1994, and January 30, 1997, a total of 563 women were evaluated for traumatic stress by the four teams. Complete data on the variables in the model were available for 327 of these women, who constituted the final sample. The women who were retained in the sample and those who were dropped were compared on the model variables using t tests, which revealed that a greater proportion of those who were retained had served in more recent eras, had less education before entering the military, were exposed to more sexual stress both before and during military service, and had more severe PTSD. Among those who were retained, two women (.6 percent) served in World War II, none served between World War II and Korea, eight (2.5 percent) served in Korea, 23 (7 percent) served between Korea and Vietnam, 79 (24.2 percent) served in Vietnam, 172 (52.6 percent) served between Vietnam and the Persian Gulf War, and 38 (11.6 percent) served in the Persian Gulf era.

Most served in the Army (50 percent), the Air Force (21.7 percent), or the Navy (17.4 percent); an additional 9.3 percent served in the Marines, and 1.6 percent in the Coast Guard. The current mean±SD age of the sample was 39.5±9.4 years. Sixty-two percent of the women were European American, 33 percent were African American, 2 percent were Latin American, and 3 percent were of other ancestry. They had 14±1.8 years of education. At the time of the evaluation 25.2 percent were married, 40.2 percent were divorced or separated, and 31.2 percent had never been married.

Of the 327 women in the sample, 157 (48 percent) had served overseas, and 39 (11.9 percent) were exposed to enemy fire. A total of 206 women (63 percent) reported experiences of physical sexual harassment during their military service, and 141 (43.1 percent) reported rape or attempted rape. Based on the cutoff score for the PTSD Checklist (7) that was determined to be most sensitive to detecting PTSD among female outpatients (8), 191 of the women (58.4 percent) were estimated to have PTSD at the time of the clinical evaluation.

Measures

Five premilitary factors that were found in bivariate analyses to be related to either duty-related or sexual stress in the military were included in the model: years of education (mean±SD=12.5±1.2), age at entry into the military (mean=22.1±4.9 years), African-American ethnicity (mean=.3±.5), service era (mean=2.4±.9), and sexual stress before entry into the military (mean=2.3±1.6). Service era was represented as a seven-level variable, with the era furthest back in time (World War II) coded 7 and the most recent era (Persian Gulf) coded 1. Premilitary sexual stress was measured as the sum of six types of sexual abuse: unwanted physical contact of sexual organs, unwanted sexual touching, unwanted unsuccessful attempted sexual intercourse, unwanted sexual intercourse due to alcohol or drug use, sexual intercourse due to nonphysical threats, and sexual intercourse due to actual or threatened physical force. The measure of premilitary sexual stress had moderately high internal consistency (coefficient alpha=.72).

The two military factors in the model were duty-related stress (mean=8.2±10) and sexual stress (mean=7.2±4.4). Both measures were taken from the Military Stress Inventory for Women, an extension of the Women's Wartime Stressor Scale (9) that was developed for use in the study reported here. Duty-related stress was measured as the sum of 19 5-point items, such as the number of times the woman had shifts of 24 hours or longer, made a critical error because of fatigue, saw continual casualties, was under enemy fire, or assisted someone in dying (coefficient alpha=.84). Sexual stress was measured as the sum of four 5-point items: the number of times the woman was verbally and physically harassed sexually, raped (unsuccessful and successful), and pressured to fraternize with male officers (coefficient alpha=.72).

Two postmilitary factors were represented in the model: sexual stress (mean±SD=.8±1.3) and social support (mean±SD=7.2±2.9). Sexual stress was measured as the sum of five types of sexual abuse that were the same as those for premilitary sexual abuse but did not include the unwanted physical contact of sexual organs (coefficient alpha=.82), which was considered to be a type of abuse particular to young children. Social support was measured as the sum of ten dichotomous items representing the availability of emotional and instrumental help from family and friends (coefficient alpha=.87).

In the model PTSD is measured in the present time (mean±SD=48.4±18.6). It was measured by the PTSD Checklist as the sum of 17 5-point items corresponding to *DSM-IV* criteria for the diagnosis of PTSD (10). The coefficient alpha was .95 in this study, indicating very high internal consistency.

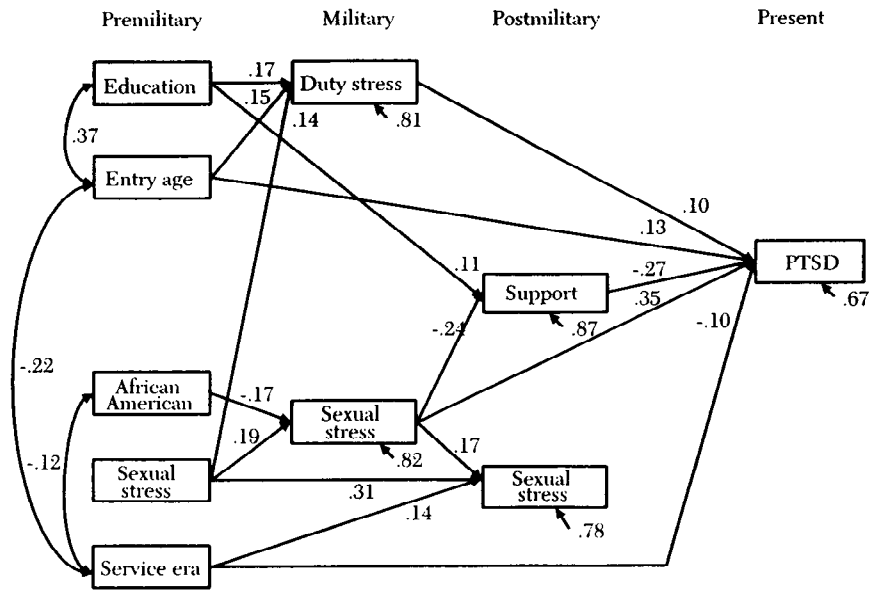
Data analyses

Although the data are cross-sectional and the reporting is retrospective, the variables have a clear chronological order, which was adopted as the logical basis for specification of the model. The five premilitary variables are exogenous variables whose causation lies outside the scope of the model. Duty-related stress, sexual stress during and after military service, social support, and severity of PTSD symptoms are endogenous variables that are posited to have been caused by the exogenous variables and historically antecedent endogenous variables.

It was not necessary to delete any cases as outliers. Before estimating the model's parameters, the data were rescaled by dividing each variable by a constant, which served to equate the standard deviations at 1.00. Conditioning of the data in this manner is recommended to obviate problems in estimation (11). The multivariate kur-

Figure 1

Etiological model of variables in four time periods—premilitary, military, postmilitary, and present time—related to the development of posttraumatic stress disorder among 327 women veterans



tosis (12) was substantially more peaked than normal. Therefore, we used generalized least squares for the method of model parameter estimation, which was performed on the covariance matrix by the CALIS procedure of the SAS software package (13).

The final model, consisting of significant paths, is diagramed in Figure 1. All significance levels are based on two-tailed tests. For ease of comparison with the path coefficients, the bivariate correlations among model variables are presented in Table 1.

Statistically, the adequacy of a model can be judged from its fit and parsimony. It is desirable to achieve a high degree of fit with the estimation of as few parameters as possible. This can be done by reducing a full model through specification of its nonsignificant and weak paths as zero in magnitude. In this way, the reduced model may increase parsimony with only a minimal erosion of fit. We used the root means square residual and the comparative fit index (14) as our indexes of fit, and the parsimonious goodness-of-fit index (15) as our index of parsimony. The analytic strategy was to first estimate the parameters of the full model. The results of this estimation were examined for nonsignificant path coefficients, which were then deleted in specifying a reduced model.

Table 1

Bivariate correlations among variables in a model to predict the development of posttraumatic stress disorder (PTSD) among 327 women veterans seeking treatment for stress disorders[1]

Variable	1	2	3	4	5	6	7	8	9	10
1. Premilitary education	—									
2. Age at service entry	.36	—								
3. African American	.04	.04	—							
4. Premilitary sexual stress	–.05	.10	.01	—						
5. Service era	–.04	–.20	–.11	–.09	—					
6. Duty-related stress	.22	.20	.01	.14	–.04	—				
7. Military sexual stress	.00	–.05	–.16	.18	–.07	.24	—			
8. Postmilitary social support	.12	.00	.00	–.09	–.03	–.06	–.23	—		
9. Postmilitary sexual stress	–.06	–.08	–.07	.34	.10	.02	.21	–.21	—	
10. Severity of PTSD	.04	.15	.00	.12	–.14	.24	.46	–.37	.13	—

[1] r=.11, significant at p=.05; r=.15, significant at p=.01

Results

The full model was estimated first (χ^2=25.24, df=2, p<.001). The root mean square residual was .05, the comparative fit index was .87, and the parsimonious goodness-of-fit index was .04. These indexes suggested that both the fit and the parsimony of the model could be improved. Several of the path coefficients were nonsignificant (p>.05), most notably those between duty-related stress and both support and postmilitary sexual stress, and between postmilitary sexual stress and PTSD. Among the exogenous variables, education, African-American ethnicity, and preservice sexual stress had nonsignificant paths to PTSD.

Accordingly, the model was re-estimated after reducing it by setting the nonsignificant paths to zero (χ^2= 38.73, df=20, p<.008). This time the root mean square residual remained at .05, the comparative fit index increased to .90, and the parsimonious goodness-of-fit index increased to .43. A test of the difference in chi squares between the full and reduced models indicated that no significant reduction in fit had taken place as a result of the deletion of the nonsignificant paths. Reduction of the model achieved a slight improvement in fit and a substantial improvement in parsimony. Therefore, the reduced model is preferred over the full model as a more streamlined representation of etiology.

The reduced model is diagramed in Figure 1. Two-headed arrows designate noncausal associations between variables. The small arrows attached to each exogenous variable designate the disturbance associated with each variable—that is, the proportion of variance for each variable that is not accounted for by the model. For example, the model shows the two variables influential in the postmilitary period—social support and sexual stress. The single-headed arrow

(beta=−.27) between social support and PTSD indicates that a high level of social support protected against the development of PTSD, while the absence of an arrow between postmilitary sexual stress and PTSD indicates the lack of a relationship between sexual stress occurring during that period and the development of PTSD.

One consideration in determining the relative contribution of different variables is the size and significance of the standardized regression (beta) coefficients. In terms of direct effects, sexual stress during military service was 3.5 times more influential in the development of PTSD than duty-related stress. However, to determine the total effects, both direct and indirect, it is necessary to compare the absolute sum of the products of the beta coefficients along all of the paths between each stress variable and PTSD. The total effects on PTSD for duty-related stress and sexual stress during military service and for the entire model were .11, .43, and 1.23, respectively. Thus in terms of the total effects of all variables in the model, sexual stress (representing 34.96 percent) was almost four times as influential in the development of PTSD as was duty-related stress (representing 8.94 percent).

Discussion and conclusions

The results of this study are consistent with those of our previous study of women serving in the Vietnam theater in suggesting that both sexual stress and duty-related stress contribute separately and significantly to the development of PTSD. They are also consistent with those obtained in a study of women who served in the war zone during the Persian Gulf era (16). The results extend the generalization of other studies' findings by their application to the experiences of women who served in peacetime as well as wartime and their inclusion of peacetime as well as wartime duty-related stress.

The results reported here are also consistent with those from previous studies (5,16) in suggesting the important mediational role that postmilitary social support plays between sexual stress experienced during military service and subsequent development of PTSD. First, the model suggests that sexual stress during military service leads to lower social support from family and friends after military service. A common experience reported by women veterans on homecoming is being stigmatized in stereotypic fashion as either "whores or lesbians" (17,18).

This experience is similar to a common reaction among civilian women who have been raped, many of whom believe that other people view them as unchaste or "bad" women (19). It is understandable, therefore, that having been sexually assaulted or harassed in the military might well heighten women's sensitivity to the stigmatization generated by societal stereotyping in general.

In turn, the degree of support from family and friends appears to play a major role in averting the development of PTSD. This role is quite similar to that reported previously for men (20), and it is reminiscent of an earlier finding that psychological isolation at the time of homecoming was the strongest single predictor of current PTSD (21). We view this role to be that of a force counterbalancing the impact of the trauma (22). When the homecoming reception is unsupportive, women are deprived of this counterbalancing force so that they are left with only their individual psychological resources to cope with any adverse consequences of their traumatic experiences.

More specifically, we have suggested elsewhere that the homecoming is a critical event in determining whether acute stress reactions are either diminished to subclinical intensity or are preserved undiminished to become recognized later as PTSD (20). Smith (23) and Parson (24), among others, have discussed the possible nature of the counterbalancing role played by social support at the time of homecoming. If the country does not sanction the war effort or family and friends do not accept the veteran's actions, the veteran is deprived of a shared, consensual basis for affirming the meaningfulness, worth, and legitimacy of his or her behavior during the war. Such a situation prohibits the "sealing over" of the traumatic experiences, whereby their immediate distressing potential is diffused and their eventual integration into the veteran's life is accomplished piecemeal over time. Veterans are necessarily thrown back on their own individual consciences to reconcile their behavior in extraordinary circumstances with standards that are applicable in ordinary circumstances.

One difference between the study reported here and the study of women in the Persian Gulf War (16) is the finding that postmilitary sexual stress did not contribute to the development of PTSD above and beyond the contribution of military sexual stress, although evidence was found of an enduring theme of sexual victimization across the lives of some women. The extent to which this difference in findings may be due to methodological differences between the two studies is not clear, but further investigation appears to be warranted into the question of whether sexual stress during military service is more severe or more pathogenic than sexual stress after military service.

Francke (1), for example, makes a detailed exposition of the systematic use of gender discrimination and devaluation in the training of male troops. One can infer from her exposition that women's realization that sexual stress in the military is a manifestation not only of individual male biases but of an institutional policy of training and career advancement is likely to confer a heightened feeling of betrayal and disillusionment on instances of sexual stress experienced in the military.

The results reported here differ from those of our previous study in that sexual stress was nearly four times as influential as duty-related stress in the development of PTSD rather than simply equally influential. One possible explanation for this difference might be that women who seek treatment emphasize the occurrence of sexual stress in the military, and that it is a particular reason they come to a stress disorder treatment program for help. Almost all women in our clinical sample reported experiencing sexual stress in the military (93 percent), whereas the earlier study found a low prevalence of sexual stress among women during military service (7 percent) (5).

However, in the study presented here, the percentage of women reporting sexual stress in the military is closer to the percentages (50 to 76 percent) found by others in studies of women who do not seek treatment

(1,16,25) than to the percentage reporting sexual stress in our previous study (5). Therefore, rather than the percentage in the current study representing an overstatement by women who seek treatment, it is likely that the percentage reported in our previous study represented an understatement of the actual prevalence due to the relatively unstructured and open-ended assessment question. A higher prevalence would be expected from the instrumentation used in this study, which is much more elaborate than that in the earlier study.

Despite issues of underreporting and study design, it is still reasonable to expect that the segment of a population that was seeking treatment for stress-related disorders would report greater exposure to all types of stressors than would the segment of the population that did not seek treatment. Therefore, based on the findings of this study, it is impossible to project precisely the relative contribution of sexual stress and duty-related stress to the development of PTSD among women veterans in the general population. However, the similarity between the prevalence of sexual stress in this study and other studies suggests that the finding that sexual stress is nearly four times as influential as duty-related stress may accurately reflect the situation for military women in general.

It is important to acknowledge the study's limitations. Although events could be ordered unambiguously by chronology, a retrospective bias in reporting might have introduced connections among variables that may not have existed as the events actually occurred. A second limitation is the omission of some possibly important etiological factors, such as a genetic predisposition to posttraumatic stress (26), that could not be included because no information was collected as part of the data set. Others, such as postmilitary employment, marital adjustment, or substance abuse, could not be modeled because an equally strong case could be made for causation in either direction. A third limitation is that it is unknown to what extent selective factors influencing entry into the military might reduce generalizability of our results to civilian women.

In summary, we believe that our model has its greatest value from two perspectives. First, it demonstrates strong empirical support for an etiological role for both duty-related and sexual stress in the development of PTSD among women veterans. Second, it suggests that sexual stress is the more toxic factor by far, and that special clinical attention should be paid to exposure to sexual stress in determining accurate diagnoses and in focusing treatment on the most relevant problems. ♦

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