

Sexual Assault Victimization and Mental Health Treatment, Suicide Attempts, and Career Outcomes Among Women in the US Army

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Objectives. To examine associations of administratively recorded sexual assault victimization during military service with subsequent mental health and negative career outcomes among US Army women controlling for nonrandom victimization exposure.

Methods. We used data from the Army Study to Assess Risk and Resilience in Servicemembers to apply propensity score methods to match all 4238 female Regular Army soldiers with administratively recorded sexual assault victimization during 2004 to 2009 to 5 controls per case with similar composite victimization risk. We examined associations of this victimization measure with administratively recorded mental health treatment, suicide attempt, and Army career outcomes over the subsequent 12 months by using survival analysis for dichotomous outcomes and conditional generalized linear models for continuous outcomes.

Results. Women with administratively recorded sexual assault had significantly elevated odds ratios (ORs) of subsequent mental health treatment (any, OR=2.5; 95% confidence interval [CI]=2.4, 2.6; specialty, OR=3.1; 95% CI=2.9, 3.3; inpatient, OR=2.8; 95% CI=2.5, 3.1), posttraumatic stress disorder treatment (any, OR=6.3; 95% CI=5.7, 6.9; specialty, OR=7.7; 95% CI=6.8, 8.6; inpatient, OR=6.8; 95% CI=5.4, 8.6), suicide attempt (OR=3.0; 95% CI=2.5, 3.6), demotion (OR=2.1; 95% CI=1.9, 2.3), and attrition (OR=1.2; 95% CI=1.1, 1.2).

Conclusions. Sexual assault victimization is associated with considerable suffering and likely decreased force readiness. (*Am J Public Health.* 2017;107:732–739. doi:10.2105/AJPH.2017.303693)

 See also Kimerling, p. 642.

Sexual assault is a significant problem in the US military,¹ with recent surveys indicating that 1% of active duty men and nearly 5% of active duty women are victimized in any given 12-month period.² A growing literature suggests that service members experience severe emotional suffering after sexual assault victimization. For example, these victims subsequently (while still active duty and after separating from service) have elevated rates of mental health problems, especially posttraumatic stress disorder (PTSD).^{1,3–10} Although less attention has been given to other outcomes, evidence suggests that sexual assault during service is also associated with increased risk of suicide attempt^{3,11} and poor career outcomes.^{6,7}

Similar findings have been observed among civilian victims.^{12–14} Several hypotheses have been forwarded to account for the high

prevalence and negative consequences of sexual assault, most of which focus on unique aspects of military culture (e.g., being assaulted by a fellow unit member in the context of the military emphasis on team allegiance and performance).¹⁵ Regardless of the underlying mechanisms, the negative outcomes experienced by victims may threaten force readiness.

Existing research on the consequences of during-service sexual assault victimization is limited in 3 ways. First, results come largely from retrospective reports of veterans.^{1,3–5,8,9,11} Second, when active duty personnel have been studied, samples were typically small or nonrepresentative.^{6,7} Third, analyses generally did not adjust for the fact that some sexual assault victims have preassault characteristics that are risk factors for poor mental health and career outcomes even in the absence of sexual assault (e.g., histories of mental disorders and crime victimization/perpetration, young age, short time in service, low rank).^{16,17} We report here the results of an attempt to address these problems by comparing all female Regular US Army soldiers with administratively recorded sexual assault victimizations in 2004 to 2009 to a matched

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(on previously documented predictors of sexual assault victimization¹⁷) sample of other female Regular US Army soldiers on administratively recorded mental health treatment, suicide attempt, and career outcomes over the subsequent 12 months.

METHODS

Data came from the Historical Administrative Data System (HADS) of the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS),¹⁸ an integrated de-identified data set of Army and Department of Defense administrative data systems for all 975 057 Regular US Army soldiers serving from 2004 to 2009. This population includes 153 250 women, 4238 of whom had an administrative record indicating a sexual assault victimization that occurred during active duty over the course of the study period.

On the basis of an earlier HADS analysis of risk factors for sexual assault victimization,¹⁷ we knew that administratively recorded victims differed markedly from other female soldiers on a wide range of pre-existing administrative variables that also predict the outcomes of interest in the current report (most notably previous treatment of mental disorders, previous involvement in crime victimization or perpetration, young age, and low rank). On the basis of this knowledge, we used a propensity score weighting procedure to select a matched control sample.¹⁹ This was done in 2 steps.

In the first step, we used exact matching of assault victims and controls on the cross-classification of 7 broad variables that are known to be strongly related to risk of sexual assault victimization, all defined as of the month of the administratively recorded victimization (Table A, available as a supplement to the online version of this article at <http://www.ajph.org>, for coding): month and year, treatment of a mental disorder in the previous 6 months, time in service, rank, occupation, geographic location, and Army Command.

In the second step, we used nearest-neighbor matching within cells of this cross-classification to select 5 controls for each assault victim based on similarities in predicted probabilities of victimization in our previously reported HADS model.¹⁷ As detailed in our

earlier report, we used 10-fold cross-validation in developing that model to reduce overfitting and considered a wide range of Army and Department of Defense administrative variables to predict administratively recorded sexual assault victimization. The key predictors in the model were indicators of low career status, previous crime victimization, and previous treatment of mental disorders (i.e., characteristics of individuals at high risk for victimization). The model had a cross-validated area under the receiving operating characteristic curve of 0.88 with subsequent administratively recorded sexual assault victimization. We used the R version 3.1.2 package MatchIt (R Foundation, Vienna, Austria) to select these matched controls.²⁰

We combined data from 5 criminal justice data systems described more fully elsewhere¹⁷ to identify date, type, and judicial outcome of all unrestricted records of military (non-familial) sexual assault victimizations. Qualifying crimes included penetrating crimes of rape (i.e., forcible vaginal intercourse) and forcible sodomy (i.e., attempted or forcible oral or anal sex), and “other” sexual assault attempt and contact crimes (attempted rape, fondling, indecent assault), coded with the Bureau of Justice Statistics National Corrections Reporting Program classification system.²¹

Outcomes

We constructed time-varying administrative outcomes for the 12 months subsequent to each assault. Mental disorder treatment measures included 3 dichotomous measures of any treatment (inpatient or outpatient with any type of provider, inpatient or outpatient with a mental health specialty provider, mental health inpatient treatment) and 3 parallel continuous measures representing number of days (with outpatient visits or in inpatient treatment—i.e., treatment intensity) of each type of treatment based on *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)*²² codes 290.0–319 (excluding traumatic brain injury, 310.2), V15.81, V61–62.9, and V71.01–71.09. The same 6 measures were constructed specifically for treatment of PTSD (*ICD-9-CM* codes 308.0–308.9 and 309.81) given the

importance of this diagnosis for victims of traumatic events.

We abstracted information about these outcomes from 3 HADS data systems: the Medical Data Repository, Theater Medical Data Store, and Transcom Regulating and Command and Control Evacuation System. We identified suicide attempts through the Department of Defense Suicide Event Report database and through *ICD-9-CM* suicide attempt codes (E950–959) in treatment records. The 2 career outcomes we considered were demotion and attrition, both of which we defined on the basis of records in the Defense Manpower Data Center/Master Personnel and Transaction Files.

Analysis Methods

Harvard Medical School analysts carried out data analysis remotely on the secure Army STARRS Data Coordination Center server at the University of Michigan.

Outcome correlations and distributions. We examined associations between dichotomous outcomes by calculating tetrachoric correlations. We then calculated the frequency (prevalence for dichotomous outcomes; means for continuous outcomes) of each outcome for the averaged (across person-months) 12-month follow-up periods after each month in service over the years 2004 to 2009 for all 153 250 female Regular US Army soldiers in service during that time period (distribution in the population), for the 21 190 female matched controls for the 12 months after the assaults to which they were matched (distribution among controls), and for the 4238 female assault victims (distribution among victims).

Associations between victimization and the subsequent outcomes. We then carried out regression analyses in SAS version 9.4 (SAS Institute, Cary, NC) to examine the associations between administratively recorded sexual assault and the outcomes. It was necessary to control for time in service after assault to account for attrition. That is, we might expect a downward bias in assessing treatment (especially intensity of treatment) because time in service available for providing treatment was reduced among assault victims (higher rates of attrition) compared with controls. We thus examined associations between sexual assault (dummy predictor)

and the dichotomous outcomes in a discrete time survival analysis framework with person-month the unit of analysis with SAS version 9.4 PROC LOGISTIC.²³

We exponentiated coefficients and standard errors to obtain odds ratios (ORs) with 95% confidence intervals (CIs). We then examined associations with the conditional measures of treatment intensity among soldiers in treatment with generalized linear models (GLMs²⁴; controlling for number of months between the start of treatment and end of the 12-month observation period) with SAS PROC GENMOD. As the distributions of these continuous outcomes were highly skewed, we selected the optimal link function and error distribution for each outcome according to standard empirical model comparison procedures.²⁵

Even though nearest-neighbor propensity score matching adjusted for aggregate imbalance between assault victims and controls, we also added control variables to improve precision of comparisons. We evaluated the 741 HADS sociodemographic, career, medical, crime, and contextual variables used previously to develop our machine learning model for sexual assault victimization¹⁷ for this purpose (Table B, available as a supplement to the online version of this article at <http://www.ajph.org>). We selected controls by using 10-fold cross-validated forward stepwise regression²⁶ and then added them to the survival models and GLMs. We selected the optimal number of controls to maximize sensitivity in the top 5% of predicted risk. For most outcomes, we identified no more than 5 controls (Table C, available as a supplement to the online version of this article at <http://www.ajph.org>), attesting to the completeness of the matching based on the nearest-neighbor method.

Conditional models for career and suicide attempt outcomes. We then conducted additional survival analyses in subgroups defined by the type of treatment received between the sexual assault and end of the observation period to determine if associations with some outcomes were contingent on associations with previous treatment (in the 12-month follow-up period). There were 2 such analyses. First, we tested whether the association of victimization with suicide attempt was limited to women without mental health treatment in an effort to

evaluate indirectly the extent to which the elevated treatment rates among assault victims might have reduced their suicide attempt rates. Second, we tested if the associations of victimization with demotion and attrition were confined to women who received inpatient treatment of mental disorders to determine if the elevated demotion and attrition rates of victimized women were attributable to severe psychiatric problems.

RESULTS

Suicide attempt, demotion, and attrition had tetrachoric correlations (r_t) with each other in the range of 0.20 to 0.34 (Table 1). Demotion and attrition had correlations with the dichotomous treatment variables in the range r_t of 0.12 to 0.33, whereas suicide attempt and treatment were more strongly correlated (range $r_t = 0.44$ – 0.84). All these correlations were comparable in magnitude for assault victims and controls.

Controls had significantly higher rates than did the population of all female soldiers on all dichotomous outcomes, confirming the importance of constructing the matched control group (Table 2). Comparisons of outcomes among assault victims and controls showed the former to have significantly higher rates of all dichotomous outcomes and higher mean levels of all but 1 measure of treatment intensity among the treated.

Associations of Victimization With the Outcomes

Associations of administratively recorded sexual assault victimization with all 9 dichotomous outcomes were significant and of similar magnitude in both the partially adjusted ($\chi^2_1 = 40.7$ – 1946.3 ; $P < .001$) and fully adjusted ($\chi^2_1 = 19.8$ – 1868.3 ; $P < .001$) models (Table 3). These associations are all so robust that they would remain significant even if we had used a Bonferroni correction for multiple testing. Victims had significantly elevated fully adjusted relative odds of the mental health and career outcomes compared with controls, with ORs of 2.5 to 3.1 for treatment of any mental disorder, 6.3 to 7.7 for treatment of PTSD, 3.0 for suicide attempt, 1.2 for attrition, and 2.1 for demotion.

Associations of victimization with intensity of treatment (all assuming a logarithmic link function with an error variance proportional to the mean) among those in treatment were also significant for all 6 types of mental health treatment in both the partially adjusted ($\chi^2_1 = 13.2$ – 4405.4 ; $P < .001$) and fully adjusted ($\chi^2_1 = 17.0$ – 5013.6 ; $P < .001$) models. All these associations were positive with the exception of a negative association between victimization and intensity of PTSD inpatient treatment. Given the use of a logarithmic link function, these parameter estimates can be interpreted as multiplicative effects. For example, the fully adjusted coefficient of 0.5 for intensity of any mental health treatment indicates that victims of sexual assault had an average of 1.648 times (64.8%), or $\exp(0.5)$, more treatment days than did controls. Victims of sexual assault had roughly 22% to 65% more treatment of any mental disorder and 35% more PTSD outpatient and specialty treatment than did controls.

Conditional Associations by Treatment

The association of victimization with suicide attempt was found to be significant among women with no previous treatment (OR = 6.2; 95% CI = 1.4, 28.0), but not among women with either previous outpatient (OR = 1.3; 95% CI = 0.8, 2.0) or inpatient (OR = 1.0; 95% CI = 0.8, 1.3) treatment. The association of victimization with demotion was somewhat stronger among women who did not receive treatment as of the time of the demotion (OR = 2.3; 95% CI = 1.9, 2.8) than it was among women who had received treatment before demotion (OR = 1.5; 95% CI = 1.3, 1.7), although both associations were statistically significant at the .05 level.

The association of victimization with attrition, in comparison, was significant only among women who had been hospitalized for mental disorders before termination of service (OR = 1.2; 95% CI = 1.0, 1.4; $P = .011$ vs OR = 1.0; 95% CI = 1.0, 1.1 among other women). Importantly, this means that the attrition rate of psychiatrically hospitalized sexual assault victims was significantly higher than was the already substantially elevated attrition rate that exists

TABLE 1—Tetrachoric Correlation Matrix of the Dichotomous Outcomes Among US Army Women in the Historical Administrative Data System: 2004–2009

Variables	Any Mental Treatment	Specialty Mental Treatment	Inpatient Mental Treatment	Any PTSD Treatment	Specialty PTSD Treatment	Inpatient PTSD Treatment	Suicide Attempt	Attrition	Demotion
Total sample (n = 25 428)									
Any mental disorder treatment	...								
Specialty mental disorder treatment	...	...					
Inpatient mental disorder treatment	...	0.70*	...						
Any PTSD treatment	...	0.74*	0.60*	...					
Specialty PTSD treatment	...	...	0.56*	...	...		
Inpatient PTSD treatment	...	0.79*	...	...	0.75*	...			
Suicide attempt	0.74*	0.73*	0.84*	0.48*	0.44*	0.67*	...		
Attrition	0.13*	0.27*	0.33*	0.17*	0.16*	0.33*	0.34*	...	
Demotion	0.33*	0.33*	0.28*	0.16*	0.12*	0.26*	0.23*	0.20*	...
Victims (n = 4238)									
Any mental disorder treatment	...								
Specialty mental disorder treatment	...	...					
Inpatient mental disorder treatment	...	0.68*	...						
Any PTSD treatment	...	0.72*	0.55*	...					
Specialty PTSD treatment	...	...	0.49*	...	...		
Inpatient PTSD treatment	...	0.74*	...	...	0.65*	...			
Suicide attempt	0.64*	0.62*	0.81*	0.47*	0.42*	0.66*	...		
Attrition	0.26*	0.30*	0.36*	0.17*	0.14*	0.29*	0.34*	...	
Demotion	0.26*	0.19*	0.15*	0.02	0.00	0.12*	0.11*	0.23*	...
Nonvictim controls (n = 21 190)									
Any mental disorder treatment	...								
Specialty mental disorder treatment	...	...					
Inpatient mental disorder treatment	...	0.68*	...						
Any PTSD treatment	...	0.68*	0.58*	...					
Specialty PTSD treatment	...	...	0.55*	...	...		
Inpatient PTSD treatment	...	0.77*	...	...	0.76*	...			
Suicide attempt	0.76*	0.75*	0.85*	0.42*	0.37*	0.63*	...		
Attrition	0.10*	0.25*	0.31*	0.14*	0.15*	0.36*	0.33*	...	
Demotion	0.31*	0.33*	0.31*	0.14*	0.09*	0.30*	0.26*	0.18*	...

Note. PTSD = posttraumatic stress disorder. Ellipses are used to indicate a correlation of 1.0. The sample size was n = 25 428.

*Significant at the .05 level, 2-sided test.

TABLE 2—Mental Health Treatment, Suicide Attempt, and Career Outcomes With Mean Number of Treatment Days in the 12 Months Following Administratively Recorded Sexual Assault Victimization Among US Army Women in the Historical Administrative Data System: 2004–2009

Variables	Population of Women (n = 153 250)	Nonvictim Controls (n = 21 190)	Victims of Sexual Assault (n = 4238)
Dichotomous outcomes, % (SE)			
Mental disorder treatment			
Any treatment	32.7 ^a (0.3)	46.5 ^b (0.3)	74.3 (0.7)
Specialty treatment	18.3 ^a (0.3)	27.4 ^b (0.3)	58.7 (0.8)
Inpatient treatment	2.4 ^a (0.1)	4.5 ^b (0.1)	12.4 (0.5)
Any PTSD treatment	3.1 ^a (0.2)	4.0 ^b (0.1)	23.5 (0.7)
Specialty PTSD treatment	2.0 ^a (0.1)	2.4 ^b (0.1)	17.4 (0.6)
Inpatient PTSD treatment	0.3 ^a (0.0)	0.6 ^b (0.1)	4.2 (0.3)
Suicide attempt	0.6 ^a (0.1)	1.4 ^b (0.1)	4.2 (0.3)
Attrition	16.5 ^a (0.3)	21.1 ^b (0.3)	25.7 (0.7)
Demotion	4.8 ^a (0.2)	6.6 ^b (0.2)	13.8 (0.5)
Mental disorder treatment intensity (no. of treatment days) among patients,^c mean (SE)			
Any treatment	6.4 ^a (0.2)	7.2 ^b (0.1)	11.8 (0.3)
Specialty treatment	7.2 (0.2)	7.5 ^b (0.1)	10.1 (0.3)
Inpatient treatment	9.7 (0.8)	9.3 ^b (0.4)	11.1 (0.6)
Any PTSD treatment	7.0 ^a (0.6)	5.9 ^b (0.4)	8.3 (0.5)
Specialty PTSD treatment	6.5 ^a (0.6)	4.4 ^b (0.3)	6.2 (0.3)
Inpatient PTSD treatment	15.1 (2.9)	12.8 (1.7)	12.0 (1.2)

Note. PTSD = posttraumatic stress disorder.

^aSignificant difference between the total population and controls, .05 level, 2-sided test.

^bSignificant difference between controls and victims, .05 level, 2-sided test.

^cNumber of days of treatment in the 12 months after victimization (or control person-month among nonvictims).

among the larger set of female psychiatric inpatients, arguing against the notion that hospitalization mediates the association between victimization and attrition.

DISCUSSION

Our study addresses the problems of reliance on retrospective reports, small unrepresentative samples, and lack of controls for nonrandom exposure to sexual assault victimization in previous studies examining the consequences of sexual assault among service members, although we did this in a data set that only considered administratively reported sexual assault victimization, thereby introducing the possibility of bias in excluding cases that were not reported to authorities. Administratively recorded sexual assault victimization was associated

significantly with virtually all the negative outcomes studied. Given the high absolute rates of some of the outcomes among victims, the associations found here underscore the public health significance of sexual assault victimizations identifiable in administrative records.

Our findings regarding rates of mental disorder treatment among sexual assault victims are consistent with previous survey studies of active duty soldiers^{6,7} and veterans.^{8,9,11} The 7-fold elevated odds of PTSD treatment is particularly noteworthy in the context of qualitative data suggesting that many female veterans who experience PTSD after a sexual assault never seek treatment.²⁷ Our finding of generally positive associations of victimization with treatment intensity among the treated suggests that the treatment system is responsive to the presumably higher service needs of sexual assault victims once

these soldiers get into treatment. At the same time, the fact that anonymous surveys of military personnel find that high proportions of military sexual assault victims do not report their assaults to authorities and do not obtain treatment raises questions about other ways in which the system could increase responsiveness among victims who do not currently make administrative reports and obtain treatment.

Another indicator of the presumed high need for treatment of administratively recorded sexual assault victims is their 3-fold elevated odds of suicide attempts. Although suicide attempts have been studied less often than mental disorders among military sexual assault victims, the 2 previous studies that examined suicidality among military sexual assault victims found that a consolidated self-report of sexual harassment or sexual assault during service based on Veterans Health Administration screening was associated with significantly elevated odds of both past-year suicide attempts in Veterans Health Administration administrative records³ and self-reported lifetime suicide attempts.¹¹ An interesting specification in our analysis was that the association of administratively recorded victimization with suicide attempts was confined to women who had not sought treatment. Although this specification cannot be interpreted as evidence that treatment reduces risk of suicide attempt, as nonrandom selection processes into treatment might have led to the specification, it highlights the importance of expanding efforts to reduce barriers to treatment among soldiers who are sexually assaulted during service.

Although the associations of victimization with adverse career outcomes were weaker than they were with treatment of mental disorders or suicide attempts, it is nonetheless striking that we found significant associations of administratively recorded sexual assault victimization with both demotion and attrition. The most plausible pathway to these negative career outcomes is that sexual assault during service might cause emotional reactions that lead to impaired occupational functioning^{6,7} and possible indiscipline (e.g., failure to follow orders, substance-related offenses) that ultimately result in demotion, attrition, or both. Consistent with this interpretation,

TABLE 3—Associations Between Administratively Recorded Sexual Assault Victimization and Mental Health and Career Outcomes Among US Army Women in the Historical Administrative Data System: 2004–2009

Variables	Partially Adjusted Model ^a	Fully Adjusted Model ^b
Dichotomous outcomes, OR^c (95% CI)		
Mental disorder treatment		
Any treatment	2.5* (2.4, 2.6)	2.5* (2.4, 2.6)
Specialty treatment	3.0* (2.9, 3.2)	3.1* (2.9, 3.3)
Inpatient treatment	2.9* (2.6, 3.2)	2.8* (2.5, 3.1)
Any PTSD treatment	6.7* (6.1, 7.4)	6.3* (5.7, 6.9)
Specialty PTSD treatment	8.1* (7.2, 9.1)	7.7* (6.8, 8.6)
Inpatient PTSD treatment	7.5* (5.9, 9.4)	6.8* (5.4, 8.6)
Suicide attempt	3.1* (2.6, 3.8)	3.0* (2.5, 3.6)
Attrition	1.2* (1.2, 1.3)	1.2* (1.1, 1.2)
Demotion	2.2* (2.0, 2.4)	2.1* (1.9, 2.3)
Mental disorder treatment intensity (no. of treatment days) among patients,^d est^e (95% CI)		
Any treatment	0.4* (0.4, 0.4)	0.5* (0.4, 0.5)
Specialty treatment	0.2* (0.2, 0.2)	0.3* (0.2, 0.3)
Inpatient treatment	0.2* (0.1, 0.2)	0.2* (0.1, 0.2)
Any PTSD treatment	0.2* (0.2, 0.3)	0.3* (0.3, 0.3)
Specialty PTSD treatment	0.2* (0.1, 0.2)	0.3* (0.3, 0.4)
Inpatient PTSD treatment	-0.1* (-0.2, -0.1)	-0.1* (-0.2, -0.1)

Note. CI = confidence interval; est = estimate; OR = odds ratio; PTSD = posttraumatic stress disorder. The sample size was $n = 25\,428$.

^aPartially adjusted models controlled for the number of follow-up months between the month of the assault (survival models) and the month of starting treatment (generalized linear models) and the end of the observation period.

^bIn addition to controlling for follow-up months, fully adjusted models also controlled for the variables selected by 10-fold cross-validated forward stepwise regression.

^cCoefficient estimates represent ORs. A dummy predictor variable was used to represent administratively recorded sexual assault victimization (victim = 1). Accordingly, the reference group for all ORs is women with no administrative record of sexual assault victimization.

^dFor all 6 continuous outcomes, the generalized linear model that assumed a logarithmic link function with an error variance proportional to the mean was selected as the best overall model based on mean squared error and coefficient prediction strength (though results were similar with other link functions and error distributions; see Table D and Figures A–F, available as supplements to the online version of this article at <http://www.ajph.org>).

^eGiven the use of a logarithmic link function, parameter estimates from the generalized linear models can be interpreted as multiplicative effects. For example, the fully adjusted coefficient of 0.5 for intensity of any mental health treatment indicates that victims of sexual assault had (on average) $\exp(0.5) = 1.65$ times (65%) more treatment days than controls.

*Significant at the .05 level, 2-sided test.

we found that the association of victimization with attrition was limited to the subsample of soldiers who were hospitalized for mental health problems. This is somewhat unsurprising given regulations about remaining active duty when experiencing severe medical impairments.²⁸ However, the fact that the association between victimization and demotion was significant both among those in treatment and among those not in treatment means that we are not able to rule out alternate explanations. It is

noteworthy, for example, that a recent survey found that 52% of women who were sexually assaulted during service and filed an administrative report perceived some type of negative social or occupational consequence of the assault (e.g., feeling ignored by peers, being transferred to a different assignment)²⁹ that could also contribute to negative career outcomes subsequent to assault. Unfortunately, our administrative data cannot tease apart such alternate explanations.

Strengths and Limitations

The strengths of our study design include the availability of data on all unrestricted administratively recorded victimizations in the 2004 to 2009 active duty population, the systematic approach to selecting control cases and control variables, and the identification of negative outcomes in the months that followed the sexual assault.

The major limitation of the design is that it relies on administrative data in the years 2004 to 2009. Higher rates of administratively recorded sexual assault would have been found in more recent cohorts,² but we had access to no more recent administrative data than 2009. The administrative data we had access to, furthermore, were limited to unrestricted administrative records of sexual assault victimization, which represent only about 29%¹⁷ of all female Army sexual assaults (including unreported cases) and 75%³⁰ of all administrative reports (the other 25% being restricted reports that allow victims to receive medical treatment or counseling without recording the assault in the victim's personnel file). The significant associations documented here might not generalize to victims who do not report the assault or use the restricted reporting method. It is noteworthy in this regard that survey data suggest that reported assaults are more likely than unreported assaults to be perpetrated by strangers and involve victim injuries,³¹ and that perceived life threat and injury during sexual assault is associated with experiencing more severe PTSD symptoms.³² In other words, administratively recorded sexual assault might represent a particularly severe form of assault that is more likely (than unreported assaults) to be associated with the negative outcomes studied here.

It is noteworthy that associations between administratively recorded sexual assault and treatment might be stronger than between other sexual assaults and treatment, especially in light of the fact that service members who report sexual assaults are encouraged, and provided numerous opportunities, to obtain mental health evaluations³³ that may subsequently increase the likelihood of treatment. The associations of reported assaults with treatment might also be inflated because many victims with unreported cases of military sexual assault do not seek treatment

because they do not want their assaults to be known to officials.²⁷

Another limitation is that we excluded male victims from the analysis. This was because the number of men with unrestricted records of sexual assault victimization was quite small even though survey data suggest that the true number of such men might exceed that of women, as these men have a much lower rate of reporting to authorities than do female victims.^{17,29} As we noted elsewhere,¹⁷ correcting these limitations would require the implementation of very large prospective surveys linked to administrative records that would allow capture–recapture methods³⁴ to be used to estimate true prevalence of sexual assault victimization at baseline and allow prospective self-report data to be merged with prospective administrative data to assess true prevalence of mental health outcomes as well as to study patterns and determinants of barriers to help seeking among mentally ill sexual assault victims who fail to obtain treatment.

Public Health Implications

Our findings suggest that the public health consequences of sexual assault during military service are substantial by showing elevated absolute rates and relative odds of mental disorder treatment, increased suicide attempts, and negative career outcomes among victims who filed unrestricted administrative reports. Viewing these findings in the context of women's expanding role in the military,³⁵ we (and others^{6,15}) hypothesize that sexual assault is very likely to have deleterious effects on overall force readiness. Collectively, this underscores the ongoing need for continued research and policy initiatives aimed at effectively preventing sexual assault in the military and facilitating the access of sexual assault victims to timely and effective mental health interventions. *AJPH*

CONTRIBUTORS

R. C. Kessler was the lead investigator of the project. R. J. Ursano, S. G. Heeringa, M. B. Stein, and R. C. Kessler were responsible for the design of the Army Study to Assess Risk and Resilience in Servicemembers. A. J. Rosellini, A. E. Street, R. J. Ursano, S. G. Heeringa, J. Monahan, J. A. Naifeh, B. Y. Reis, N. A. Sampson, P. D. Bliese, M. B. Stein, A. M. Zaslavsky, and R. C. Kessler formulated the analysis plan. W. T. Chiu and M. V. Petukhova were responsible for data analysis and provided critical comments on drafts of the article. A. J. Rosellini, A. E. Street, and R. C. Kessler wrote the first

draft of the article. All authors were involved in analysis interpretation, provided feedback on the first draft and critical revisions of the article, and contributed to and have approved the final article.

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HUMAN PARTICIPANT PROTECTION

De-identified analysis was approved by the human subjects committees of the Uniformed Services University of the Health Sciences for the Henry M. Jackson Foundation (the primary Army Study to Assess Risk and Resilience in Servicemembers grantee), the University of Michigan, and Harvard Medical School. The governing institutional review boards did not require informed consent because the data were de-identified.

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