Posttraumatic Stress Disorder and the Use of Health Services

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Objective: Prior research has demonstrated increased use of medical services among persons with anxiety and depression. This investigation examined the possible association of posttraumatic stress disorder (PTSD) with the use of nonmental health services. **Method:** A case-comparison design enrolled 102 high users of health services and 54 low users who were assessed for PTSD diagnosis and severity of PTSD symptoms. Subjects were male veterans receiving services from the primary care clinics of the VA Boston Healthcare System during an 18-month period. Data were collected by interview by use of standardized instruments including the Clinician Administered PTSD Scale for DSM-IV, the Life Events Checklist, and the Beck Depression Inventory. Data analysis employed odds ratios, linear and logistic regression, and path analyses. **Results:** High users of health care were almost twice as likely as low users (27.5% vs. 14.8%) to meet diagnostic criteria for current PTSD. The two groups differed significantly on both symptom frequency and intensity. Path analyses showed an indirect positive association between PTSD and health services use, with physician-diagnosed health conditions as a mediating variable. Auxiliary analysis demonstrated that the combined mental health burden of PTSD and depression symptoms also is positively associated with number of health conditions. **Conclusions:** The findings indicate that PTSD, alone and in combination with depression, has a direct negative relationship with physical health that, in turn, is associated with more frequent use of primary health care services. These results do not suggest that PTSD leads to inappropriate (eg, distress-motivated) use of services. **Key words:** Posttraumatic stress disorder, primary care, health services utilization, veterans, health status.

PTSD = Posttraumatic Stress Disorder; DSM-IV = Diagnostic and Statistical Manual version IV; BDI = Beck Depression Inventory; CAPS-DX = Clinician Administered PTSD Scale for DSM-IV—Current and Lifetime Diagnostic Version; LSD = least significant difference; ANOVA = analysis of variance; SD = standard deviation; SES = Socio-economic status.

Numerous reports have documented the positive association of depression and anxiety with use of health services (1–5). Furthermore, there is now ample indication that traumatic stress may have a negative impact on health status (6). For example, Koss et al. (7) demonstrated that victimized women report poorer health status than nonvictimized women, and Kimerling and Calhoun (8) found that women with a history of sexual assault report more somatic symptoms and use medical services to a greater degree than age-matched women with no trauma history. Two investigations of veterans exposed to combat-related trauma (9–10) also have noted that individuals diagnosed with PTSD report more physical symptoms and use health services more frequently than do those without PTSD.

Increased understanding of the link between psychological trauma and health services use is important because the identification of exposure to traumatic events and assessment of PTSD symptoms may assist diagnosis, treatment, and allocation of health resources. The impact of this information may be particularly great, given evidence from recent community surveys indicating lifetime exposure to one or more traumatic stressors for approximately 70% of the general US population and a lifetime population prevalence for PTSD at 7% to 9% (11–12). These rates translate to millions of people in the United States alone, all of whom are likely to engage the health care system at one time or another.

This investigation examined the association of PTSD with the use of health services, including both direct and indirect (ie, mediated) effects. The target population was veterans enrolled in the primary care clinics of the VA Boston Healthcare System. Because the prevalence of PTSD is high among veterans, especially among Vietnam veterans, this population is particularly well suited for the study. The investigation employed a case-comparison design in which high users of the health services could be compared with low users with respect to the current prevalence of PTSD. Specifically, the study was designed primarily to address the following questions:

1. Are frequent users of health services more likely than infrequent users to meet DSM-IV criteria for a diagnosis of PTSD?

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2. Do frequent users of health services differ from infrequent users with respect to the severity of PTSD symptoms and level of depression symptoms?

3. Does PTSD symptom severity correlate with severity of depression symptoms and number of physician-diagnosed medical conditions?

4. Do PTSD symptoms have a direct, independent association with the use of health services, or are they mediated by either depression symptoms or physician-diagnosed medical conditions?

METHODS

Subject Identification and Contact

Study participants were male veterans under 66 years of age who had at least one visit to the primary care or general medicine clinics at the VA Boston Healthcare System during the period July 1, 1994 through June 30, 1995 and who had at least one additional visit during the period June 1, 1996 through December 31, 1996. These selection criteria aimed to prevent erroneous classification (as low users) of patients who either left the VA health system or enrolled late during the 18-month study period running from July 1, 1995 through December 31, 1996. Health services utilization was indexed by the number of visits entered in the patient's electronic medical record during the study period for care provided by a physician, nurse practitioner, or physician assistant affiliated with the departments of medicine, neurology, and surgery. Excluded from the count were examinations to determine compensation or pension status, visits to mental health or social services clinics, and medical visits required by repeated, closely spaced treatments such as dialysis, dermatology ultraviolet treatments, radiation or chemotherapy for cancer, pentamidine treatment for HIV, and rehabilitation. Visits also were excluded for care attributed to employee health, dental clinic, group and procedure clinics, and observation beds.

The 1406 eligible patients were identified and ranked in terms of total number of physical health visits during the study period. The original plan was to select as high and low users those with visit totals at least one SD above and below the mean, respectively, but this approach was abandoned because of substantial skew in the distribution (range 1–114 visits, mean = 15.4, SD = 12.3). Because insufficient numbers of potential subjects fell one or more SD below the mean, we instead assembled the groups beginning from the extreme ends of the distribution then drawing progressively less extreme individuals until final group sizes were obtained.

Recruitment of targeted patients began with a letter describing the study and participation requirements, followed 10 days later by a telephone call asking whether the recipient was willing to participate in an interview lasting approximately 90 minutes for which they would receive $15. Methods of subject recruitment, informed consent, and the study design were approved by the Human Studies Subcommittee of the Veterans Administration Boston Healthcare System.

Data Collection

Data were collected by a structured interview using standardized instruments. One hundred forty participants (89.7%) were interviewed in person either at the Medical Center, at the Outpatient Clinic, or in their homes. Sixteen subjects (10.3%) residing more than 100 miles from Boston were interviewed by telephone. Interviews elicited data on the subjects' personal, social, and demographic background; number and type of medical conditions; current depression symptoms; lifetime traumatic events; posttraumatic symptoms; and treatment for PTSD.

The index of ill health for each respondent was the number of medical conditions identified from a 45-item list covering pulmonary, gastrointestinal, cardiovascular, neurological, skeletal, dermatological, hepatic, renal, urological/genital, dental, ocular, arthritic, neoplastic, and allergic disorders. To contribute to the index, a condition had to be endorsed as meeting all three of the following criteria: 1) diagnosed or confirmed by a physician, 2) present 18 months ago, and 3) present during the past 3 months. Any conditions that had not been diagnosed by a physician or that were not present during both designated time periods were excluded from the count. Thirty of the listed conditions had endorsements by at least one respondent that met all three criteria.

Symptoms of depression were assessed by means of the BDI, a 21-item instrument eliciting symptoms for the preceding 7-day period (13). The index of depression was the sum of BDI items; these ranged from 0 to 63, with higher scores indicating more symptoms. Trauma history was obtained by the Life Events Checklist, a 17-item Likert-type checklist ascertaining potentially traumatic military and nonmilitary experiences (14).

The diagnosis of PTSD was established by CAPS-DX (14), an interview designed to assess each of the 17 core symptoms that constitute DSM-IV criteria for PTSD. CAPS-DX can be scored in three ways: 1) as a dichotomous index indicating presence or absence of PTSD diagnosis; 2) as an ordinal index indicating presence, partial presence, and absence of PTSD diagnosis; and 3) as a continuous index in which interviewer ratings for symptom frequencies are added to interviewer ratings for symptom intensities across the 17 items to provide a single score for PTSD severity. For the purposes of this study, absence of PTSD was operationalized as either failure to meet Criterion A (ie, absence of exposure to a traumatic experience) despite endorsement of other PTSD symptoms or presence of a Criterion-A experience in the absence of any other PTSD symptom endorsements. Partial PTSD was defined as the presence of a Criterion-A experience plus at least one symptom from the other three criteria. All instruments were in scannable format and were marked by the interviewer. Scanned data were maintained in an electronic database and then imported into statistical software (15) for analysis.

Data Analysis

The analytic strategy was designed to test whether either PTSD diagnosis or severity of PTSD symptoms is associated with the frequency of health services visits. Any demonstrated association was further examined with respect to possible mediating variables.

Analysis involving dichotomous variables employed unadjusted and adjusted odds ratios as measures of association. The association of dichotomous variables with continuous variables was determined by logistic regression, whereas linear regression and ANOVA were used for variables measured on a continuous scale. Path analyses were used to quantify the direct association of PTSD with use of health services, as well as indirect associations mediated through depression symptoms and the number of physician-diagnosed medical conditions.

RESULTS

Participant Recruitment

The study sample consisted of 102 high users (visit range 28–104) and 54 low users (visit range 1–4). The

group sizes differed because eligible low users were less likely to become study participants. As shown in Table 1, the lower participation rate for this group resulted from a higher number of eligible patients who could not be reached because of lack of telephone and absence of a fixed or forwarding address. Refusal rates were not significantly different between the two groups.

Participant Characteristics

The participants were predominantly white and Catholic, and the overall sample can be described as financially and socially fragile. Half the participants were not currently married, and less than half were employed. The two groups did not differ in terms of average age (high users, 56.0 and low users, 54.3); however, the low users had achieved a significantly higher level of education ($p < .02$) and were more likely to be current users of alcohol ($p < .001$), employed ($p < .001$), and to not have a Social Security disability rating ($p < .02$). We tested these differentiating characteristics as potential sources of confounding bias by applying chi-square analyses to see whether any had an association with dichotomous PTSD diagnosis. They did not show such an association; therefore, they are not likely to bias any association observed between PTSD and outcome variables.

PTSD and Use of Health Services

Thirty-six participants (23.1%) met full DSM-IV criteria for current PTSD. Of these, 28 were high users (comprising 27.5% of that group) and 8 were low users (comprising 14.8% of that group), resulting in an odds ratio of 2.17 with a 95% confidence interval of 0.006 to 4.06 ($p = .11$). When the sample was classified into Current (23.1%), Partial (45.5%), and No PTSD (31.4%) groups, there was a diminishing trend of health service use. The mean number of visits was 34.9, 26.6, and 22.6, respectively, with a statistically significant ($p < .02$) overall difference based on one-way ANOVA. Post hoc LSD tests revealed significant differences between the Current PTSD group and both the No PTSD ($p < .01$) and Partial PTSD ($p < .05$) groups. The latter two groups did not differ from one another. Last, we examined whether the severity of PTSD was associated with health service use. The mean PTSD symptom severity score for the high users was 36.7, almost twice the mean of 19.9 obtained for the low users ($t = 3.32$; $p < .001$).

PTSD and Depression Symptoms

The level of depression symptoms was associated with both health service utilization and PTSD status. The mean BDI score for the high users was 15.3, compared with 9.2 for the low users ($t = 3.71$, $p < .001$.) Subjects with a Current PTSD diagnosis had a mean BDI score of 24.4, whereas the Partial PTSD and No PTSD groups had means of 11.7 and 7.1, respectively. One-way ANOVA revealed an overall difference among the groups ($p < .001$), and follow-up comparisons indicated that all groups differed significantly from each other ($p < .01$). The correlation of CAPS-DX total score with BDI total score was $r = .36$ for the entire sample, and $r = .53$ and .29 within the high and low utilizer groups, respectively. Each of these correlations is statistically significant ($p < .001$).

PTSD and Number of Medical Conditions

Physician-diagnosed medical conditions also were associated with PTSD status. Current PTSD participants averaged 7.9 (SD, 5.1) health conditions as compared with means of 6.0 (SD, 4.4) and 3.7 (SD, 3.2) for the Partial and No PTSD groups, respectively. One-way ANOVA across the three groups was statistically significant ($p < .001$), with post hoc LSD tests showing significant differences between the No PTSD group and both the Current PTSD ($p < .001$) and Partial PTSD ($p < .01$) groups. The difference between Current and Partial PTSD groups fell just short of statistical significance, ($p < .06$).

TABLE 1. Comparison of High and Low Users Groups on Recruitment-Related Variables

Status of Recruitment	High Users		Low Users			χ^2	df	$p<$
	n	(%)	n	(%)	Total			
Completed	102	(50.0)	54	(30.1)	156	14.55	1	.001
Refused	38	(18.5)	39	(22.2)	77	0.74	1	NS
Deceased	3	(1.5)	3	(1.7)	6	0.04	1	NS
Unreachable	56	(27.5)	77	(43.8)	133	11.02	1	.001
Non compos mentis	5	(2.5)	3	(1.7)	8	0.15	1	NS
Total sought for participation	204	(100)	176	(100)	380			

Depression and Number of Medical Conditions

Path analyses were used to assess the direct association of PTSD with health services utilization, as well as its indirect association mediated through depression symptoms and medical conditions. Logistic regression analysis applied to the full sample (Figure 1) revealed that neither PTSD nor depression symptom severity had a direct association with health service utilization, although both have some association with medical conditions. Thus, the total magnitude of association of PTSD with health service utilization is 0.148, reflecting two indirect path coefficients. The analogous statistic for depression symptoms is considerably smaller at 0.0499.

Figure 2 shows the association of PTSD severity with health service utilization among the high users only. The path coefficient for the association of PTSD with number of health visits is essentially zero (−0.004). In contrast, the frequency of health visits is significantly correlated with the number of medical conditions, and medical conditions are significantly correlated with PTSD severity. Thus, the sum of direct and indirect paths of association between PTSD severity and health utilization has a statistically significant coefficient value of 0.191 ($p < .001$). Depression symptoms had no direct and only a slight indirect association with health utilization.

In contrast, among the low users (Figure 3), none of the three predictor variables was significantly correlated with number of health visits. The sum of direct and indirect paths of association between PTSD and health services utilization had only a small and nonsignificant beta (0.008).

Because the path analyses indicated that number of medical conditions was correlated with both PTSD and depression symptoms, we examined the interaction of PTSD and depression as a potential predictor of physical morbidity. The interaction variable was the product of CAPS-DX and BDI total scores after adding 1 to all raw scores to avoid multiplication by 0. It had a range from 1 to 4902 and was considered to be an index of the combined mental health burden of PTSD and depression symptoms. We ranked all subjects on this calculated variable and then divided the sample

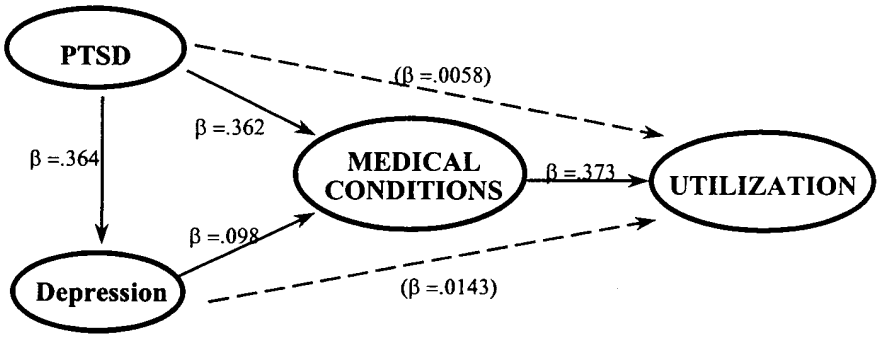

Fig. 1. Logistic regression examining the association of PTSD and depression with health services utilization status (high vs. low) for the full sample. Solid lines represent statistically significant paths. Indirect effects for PTSD on Medical Conditions are calculated as the product of significant unstandardized β weights (Direct: = .362 + .364 × .098 (Indirect) = .0356 (total). The total effect between PTSD and Utilization is the sum of two indirect paths. (Indirect: .362 × .373 = .135 + .0356 × .373 = .0133; total = .148).

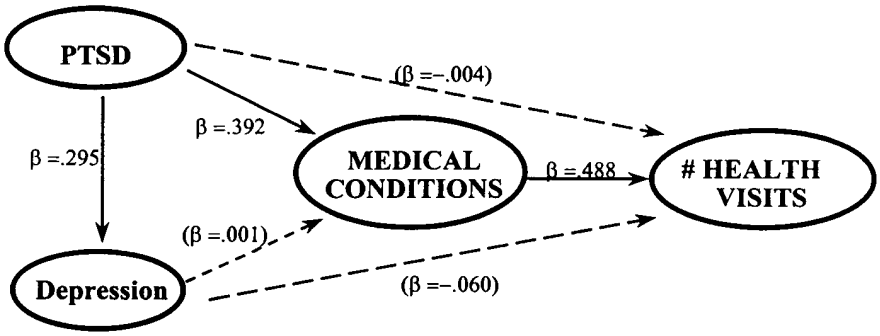

Fig. 2. Linear regression examining the association of PTSD and depression with number of health care visits for the high-user group. Solid lines represent statistically significant paths. An indirect effect based on the product of two unstandardized β weights represents the total association between PTSD and number of visits. PTSD to Medical Conditions: (Direct = .392 + (Indirect) 0 = (Total) .392. PTSD to No. of Health Visits: Indirect = .392 × .488 = .191 (Total).

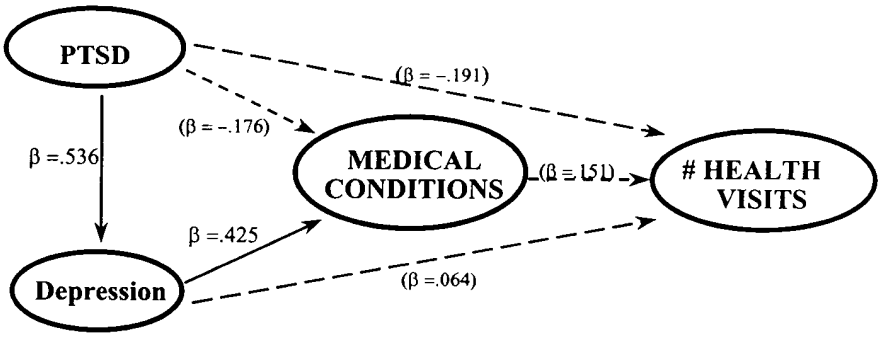

Fig. 3. Linear regression examining the association of PTSD and depression with number of health care visits for the low user group. Solid lines represent statistically significant paths. There are no significant direct or indirect paths of association between PTSD and number of visits.

into quintiles, each comprised of approximately 30 subjects. The mean number (and SD) of medical conditions ranging from the least to the most severe quintile was 3.39 (2.89), 3.87 (3.65), 5.74 (3.71), 7.00 (5.2), and 8.35 (4.94). One-way ANOVA applied to test differences across the quintiles of mental health burden was statistically significant ($p < .0001$), and follow-up tests demonstrated that both of the lower two quartiles differed significantly from both of the upper two quartiles ($p < .05$). These results suggest that physical morbidity increases with higher levels of PTSD-depression mental health burden.

Figure 4, which presents these data separately for the high and low users, reveals that the association of mental health burden and physical morbidity holds only for the high users. The absence of change in mean number of medical conditions across the quintiles of mental health burden among the low users indicates that the significant trend observed overall is attributable to the high users.

DISCUSSION

Initial analyses show that the high users are less educated, less likely to be employed, and more likely to be disabled than the low users, consistent with a picture of high users as less healthy and lower functioning. The finding that more high users report abstaining from alcohol also is consistent with this pattern if one assumes that some in this group quit drinking for medical reasons (16).

Other analyses show that a current, DSM-IV diagnosis of PTSD is almost twice as common among the high users of health services than it is among the low users. Furthermore, participants with current PTSD average at least 30% more health care visits than do participants with partial PTSD or no PTSD. PTSD symptoms also are associated with depression symptoms, depression symptoms are associated with health services utilization, and PTSD symptoms are associated with the number of physician-diagnosed medical conditions reported by study participants. This web of associations is disentangled by two additional sets of analyses.

First, path analysis, which allows simultaneous modeling of the four key variables, demonstrates that the relationship between PTSD and health utilization is mediated through number of medical conditions. Follow-up analyses reveal that the high users account for most of this effect. The absence of such an effect for low users may be due to their limited range of health visits (1–4) as compared with the high users (28–104).

Second, the groups created on the basis of the PTSD-depression symptom burden show an increasing progression of diagnosed medical conditions, with participants at the highest quintile endorsing more than twice the number of conditions than those at the lowest quintile. Consonant with the path models, this effect is found only among the high-user group, which shows elevation in

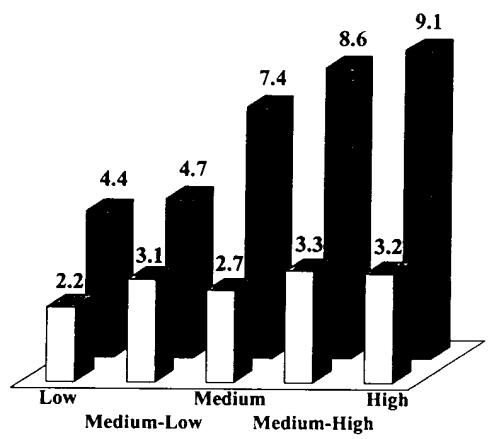

Fig. 4. Mean number of medical conditions for each user group across quintiles of mental health burden. Medical condition means are indicated by numbers above bars on the graph. The index of mental health burden is calculated as the product of PTSD (CAPS) and depression (BDI) measures. □, low user; ▨, high user.

the number of medical conditions that is most pronounced at the two highest quintiles of the burden index. This finding suggests that PTSD and depression may have some degree of non–overlapping negative impact on physical health. However, given the cross-sectional design of this study, it is also plausible that physical morbidity may enhance mental health burden or that there is reciprocal negative impact between the mental health and medical conditions.

The higher level of PTSD symptoms among the high users of health services suggests several interpretations. First, to avoid a psychiatric label, the veterans with PTSD symptoms may preferentially seek help in the medical care system. Second, they may misinterpret PTSD symptoms as having a physical basis and seek help accordingly. Third, the stress of medical care, including the burden of physical morbidity, may exacerbate symptoms of PTSD. Fourth, persons with PTSD may be subject to a greater number of physical conditions that require medical care. Among these possibilities, we favor the last interpretation, which emphasizes PTSD as a risk factor for physical morbidity, because it is most consistent with emerging research evidence. For example, new evidence reported by Schnurr et al. (17) indicates that health problems are associated with PTSD and play a mediating role in relation to self-reports of health services use. Similarly, Boscarino and Chang (18) link PTSD status with particular cardiovascular disorders, and Beckham et al. (19) demonstrate an inverse relationship between PTSD symptom severity and physician ratings of health.

Symptoms of PTSD could be proximal or secondary causes of physical morbidity by undermining proper nutrition or health behaviors (20), by increasing the use of tobacco, alcohol and other drugs (21–24), and by disrupting social and familial supports that may counteract adversity and provide material resources (25, 26). Related to this latter mechanism, a substantial proportion of eligible low users could not be located because of lack of telephones, transient residences, homelessness, and incarceration. This leads us to believe that the population of low users is an admixture of healthy individuals who require few medical services and socially isolated individuals who may need health services but neither seek them nor are accessible for outreach efforts.

A strength of the current study is the use of the CAPS interview, a valid and reliable instrument (27) that corresponds to formal diagnostic criteria and provides a continuous PTSD severity score to extend the range of symptom quantification below the diagnostic threshold. Other strengths include the use of path analyses to examine both direct and indirect associations not readily evident with less complex techniques and enrollment of subjects from a veteran population with a higher base rate for PTSD than is found in the general population.

A key limitation of the study is the cross-sectional design, which does not allow us to determine whether the observed association between number of medical conditions and use of health services reflects greater need for health services among persons with greater physical morbidity or whether individuals who have more medical appointments have increased likelihood of receiving diagnoses as a function of increased contact with medical practitioners. Another potential limitation is the imbalance in sampling as the result of difficulty recruiting low users. We believe that our sample of low users may underrepresent the most socially disadvantaged veterans, and we cannot exclude the possibility that barriers to participation in the form of homelessness, social isolation, etc., are related to PTSD. Finally, the limits on generalizability of results from this study are not clear. The sample is exclusively male and tends to be of low SES because of qualification requirements for care in the VA system, which include financial need as a condition for cost-free services. It remains to be determined whether the pattern of associations observed here will hold across genders and health care settings, with populations that have not experienced military service and for PTSD originating from other types of trauma exposure.

In conclusion, this study demonstrates a positive association between PTSD and health services use, consistent with the findings of Schnurr et al. (17) and Marshall et al. (28), who reported a PTSD-utilization link for male veterans; the findings of Kimerling and Calhoun (7), who reported increased use of medical services among victims of sexual assault, and with the findings of Samson et al. (29), who reported high rates of undiagnosed PTSD among frequent users of primary medical care services. It also complements the Arnow et al. (30) finding that psychological distress, indexed in terms of a measure featuring both anxiety and mood symptoms, is positively associated with outpatient medical utilization. In the current study, an index of mental health burden based on the interaction of PTSD and depression symptoms is related to the number of physician-diagnosed medical conditions. The fact that our path models identify medical conditions as the variable mediating between mental health symptoms and use of health services has at least two implications. First, it highlights the fundamental linkage between mental and physical health. Second, it encourages reconsideration of reasons for use of medical services by emotionally distressed individuals. As demonstrated with the current sample, increased use

by these individuals may not be as inappropriate or unwarranted as is sometimes assumed.

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