



High healthcare utilization near the onset of medically unexplained symptoms



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ABSTRACT

Objective: Patients with medically unexplained syndromes (MUS) often do not receive appropriate healthcare. A critical time for effective healthcare is the inception of MUS. The current study examined data from a prospective longitudinal study of Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) soldiers to understand the relationship of increasing physical symptom burden to healthcare utilization.

Methods: Data was examined from a prospective study of OEF/OIF soldiers assessed before and one year after deployment ($n = 336$). Physical symptom burden was measured with the Patient Health Questionnaire (PHQ-15). Analyses were conducted with polynomial regression and response surface analysis (RSA).

Results: Increases in physical symptom burden predicted greater healthcare utilization one year after deployment: primary care practitioner (slope = -0.26 , $F = 4.07$, $p = 0.04$), specialist (slope = -0.43 , $F = 8.67$, $p = 0.003$), allied health therapy (e.g., physical therapy) (slope = -0.41 , $F = 5.71$, $p = 0.02$) and mental health (slope = -0.32 , $F = 4.04$, $p = 0.05$). There were no significant difference in utilization between those with consistently high levels and those with increases in physical symptom burden.

Conclusion: This is the first prospective study to examine, and show, a relationship between onset of clinically significant physical symptoms and greater healthcare utilization. Our data suggest that patients with increasing physical symptom burden have the same level of healthcare as patients with chronic physical symptom burden. Needed next steps are to better understand the quality of care at inception and determine how to intervene so that recommended approaches to care are provided from the onset.

1. Introduction

An estimated 20% of primary care patients present with medically unexplained syndromes or chronic symptom disorders (e.g., fibromyalgia, chronic fatigue syndrome) [1–5]. We use the term MUS as umbrella term to refer to conditions defined by multiple chronic physical symptoms not better defined by another disorder; for a discussion of terminology around MUS see [2,6–9]. Despite the name, MUS can be partially explained by a complex interaction of physiological and psychological factors [4]. MUS causes disability that is as severe, or worse than, the disability of medically known conditions (e.g., cancer [10,11]).

Further exacerbating the burden of MUS, patients with MUS often do not receive appropriate healthcare. They have up to double the annual healthcare costs and utilization as compared to patients without MUS [12]. This healthcare is typically focused on trying to identify the cause of the symptoms [13–17] leading to extensive diagnostic testing, hospitalizations, inappropriate prescription of opioids [12–19] and care that is not patient-centered [20,21]. In contrast, recommended approaches to care for patients with MUS focus on patient-centered management of symptoms including: [1] a primary care provider evaluating the symptoms; [2] regular visits with the primary care provider to reduce emergency and unnecessary care; and [3] use of non-pharmaceutical, evidence-based treatments such as cognitive be-

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havioral therapy as a first line approach to care [22–30].

Considering the vicious cycle of symptom occurrence, inactivity, deconditioning, and then worsening of symptoms and disability, a critical time for effective healthcare is at the inception of MUS [31,32]. Despite this, no study has followed patients at the development of MUS to understand when healthcare utilization increases and what types of healthcare are received at the onset. One reason for this knowledge gap is that it is difficult to identify who will develop MUS [32]. Combat exposure is, however, a known risk factor for developing MUS and an estimated 30% of combat veterans will develop chronic MUS [33–35]. We used data from an existing study which assessed combat veterans prospectively from before to after deployment to help us understand the frequency and type of health care utilization that occurs early in the development of MUS.

While no study has prospectively looked at the relationship between onset of MUS and healthcare utilization, there are reasons to hypothesize that healthcare utilization increases immediately. Cross-sectional evidence finds a linear relationship between greater physical symptom burden and increased healthcare utilization [12]. Studies of the development of MUS recruit patients using healthcare, suggesting that patients are seeking healthcare at the onset [14,36,37]. Thus, our primary hypothesis is that there will be an association between increases in physical symptom burden (from before to one year after deployment) and greater healthcare utilization one year after deployment.

Increases in healthcare utilization may continue to increase over the duration of MUS. Two prospective studies of patients with long-standing MUS found healthcare utilization increased over time [38,39]. Further, a cross-sectional study of unexplained symptoms near the onset of symptoms, found a relationship between greater duration and increased healthcare utilization [40]. Thus, our second hypothesis is that healthcare utilization increases with duration of MUS. Specifically, soldiers who report consistently high physical symptom burden (before and after deployment) will report more healthcare utilization one year after deployment as compared to veterans who reported an increase in physical symptom burden (new onset MUS).

To test these hypotheses, we used data from a prospective study of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) soldiers assessed before and one year after deployment. Physical symptom burden was measured with the Patient Health Questionnaire (PHQ-15), which has been used to screen for clinically significant levels of MUS [35]. Analyses were conducted with polynomial regression and response surface analysis (RSA) which allowed us to test the relationships in three dimensions and assess the influence of differing degrees of change in symptom burden on healthcare utilization.

2. Methods

2.1. Participants

The HEROES project recruited Army National Guard and/or Reserve soldiers prior to deployment to Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) from 2005 to 2008. Soldiers were approached during their standard preparation for deployment (for description see [35,41–43]). Soldiers between 18 and 60 were invited to participate. Based on their influence on physical symptoms, exclusion criteria included (a) self-reported bipolar disorder, major depression, or schizophrenia, (b) high blood pressure, (c) certain medication, or (d) pregnancy. At the start of the study, 795 participants were eligible; 28 soldiers were excluded from analysis because they (a) ultimately were not deployed, (b) were officers, or (c) were killed in action.

2.2. Procedure

All study materials and procedures were reviewed by relevant

institutional review boards and research development committees. Responses to questionnaires were collected across four phases: [1] before deployment, [2] immediately upon return from deployment, [3] three-months after deployment, and [4] one-year after deployment. Before deployment and immediately after deployment, questionnaires were administered in-person on base or through the mail. Questionnaires were administered and collected through the mail for the other phases. The current data analysis was from the before deployment ($n = 767$) and one year after deployment ($n = 336$) time points.

2.3. Measures

2.3.1. Patient Health Questionnaire-15

Participants completed the PHQ-15 which asks how burdened they were by physical symptoms over the past fourteen days. Each item was measured on a scale from 0 = not bothered at all to 2 = bothered a lot. Burden was assessed using established threshold: above 15 was high, 10 to 14 was medium, 5 to 9 was low, and 0 to 4 was no/mild [44]. We used the pre-determined physical symptom cut-offs as this allows interpretation between clinically significant (MUS; medium and high) and clinically non-significant (no-MUS; no/mild and low) levels of physical symptom burden and reduced the influence of outliers in our three dimensional graphs. The PHQ-15 is a screening instrument for MUS; the measure does not distinguish between medically explained and unexplained symptoms. The PHQ-15 had an internal consistency of $\alpha = 0.75$ before deployment and $\alpha = 0.69$ one year after deployment in our sample.

2.3.2. Healthcare utilization

Healthcare utilization questions were adapted from the National Health Interview Survey [45,46]. Items asked about healthcare utilization in the past year including primary care practitioner, specialty care, allied health therapy (e.g., physical therapy, occupational therapy) and mental health. Before deployment, soldiers were asked if they had seen any specialist. At one year after deployment, they were asked how many times they had seen a gastroenterologist, pulmonologist, rheumatologist, neurologist or other specialist; these items were added together for a total specialist score. Before deployment, the utilization questions asked if the soldier had received each type of care (yes/no) and there was one question that asked how many medical appointments they had in the past year. At one year after deployment, soldiers were asked if they had received each type of care and how many times they had received each type of care in the past year. To address the positive skew of the count items, after data collection these were transformed into a Likert scale consistent with the National Health Interview Survey (0, 1, 2–3, 4–9, 10 and above visits).

2.4. Analysis

Paired *t*-tests and McNemar test were conducted to examine if physical symptoms and healthcare utilization increased from before to after deployment, a premise of our first hypothesis. A MANOVA was used to determine the cross-sectional relationship between level of physical symptom burden at one year after deployment and each of the four types of healthcare utilization.

Hypothesis 1. There will be an association between increases in physical symptom burden (from before to one year after deployment) and greater healthcare utilization one year after deployment.

Polynomial regression and response surface analysis (RSA) [47–49] were used to examine if changes in physical symptom burden were related to healthcare utilization at one year after deployment. The advantage of polynomial regression and RSA is that the relationships are represented in three dimensions as can be seen in Fig. 1 [48–51]. This allows us to tell the influence of differing degrees and direction of change in symptom burden on healthcare utilization, for different

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