WORKING
PAPER

Invisible Wounds

Predicting the Immediate and Long-Term Consequences of Mental Health Problems in Veterans of Operation Enduring Freedom and Operation Iraqi Freedom

BENJAMIN R. KARNEY, RAJEEV RAMCHAND, KAREN CHAN OSILLA, LEAH B. CALDARONE, AND RACHEL M. BURNS

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Executive Summary

Introduction

The aftermath of every war includes caring for those maimed or wounded in battle. Although Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) are still ongoing, there are already several reasons to expect that the needs of service members returning from these conflicts may be especially great. First, as many observers have noted, the pace of deployment in the current conflicts has been unprecedented in the history of the all-volunteer force. Second, whereas in the recent past being deployed has not necessarily meant being deployed to the field of battle, more of today's armed forces are being exposed directly to combat (Mental Health Advisory Team, 2006). Third, due to advances in medical technology, more service members are surviving experiences that would have lead to death in prior wars. Thus, not only are more service members being exposed to dangerous conditions, but more of them are likely to be returning from their service bearing the scars of their experiences.

As service members begin to return from Afghanistan and Iraq, those with physical wounds and impairments may be easily identified and assigned to treatment. Yet the scars of battle are not always physical. Increasingly, military leaders and policy-makers have been acknowledging the fact that exposure to combat can damage the mental, emotional, and cognitive faculties of service members, even if their physical integrity remains intact. Between the mental and emotional problems associated with exposure to combat and the cognitive impairments associated with traumatic brain injuries, substantial numbers of returning service members may suffer from significant wounds that are invisible to the eye. Although there is an emerging consensus that mental health problems stemming from service in OEF and OIF are likely to have severe and broad consequences if left untreated, allocating resources toward particular treatments and interventions requires a detailed understanding of what the consequences of these problems are likely to be.

To inform current discussions of how best to serve those returning from the current conflicts, the goal of this report is to draw upon the available literature to describe the likely immediate and emergent consequences of the invisible wounds of war, i.e., the mental, emotional, and cognitive injuries sustained during OEF and OIF. In reviewing this literature, our aim was to understand, based on existing research, what to expect the impact of these problems

will be on service members, their families, and society at large, and to understand not only the immediate concerns but those that might emerge over time. To address these goals, we conducted a search of the research literature on the correlates and consequences of the three major mental and cognitive disorders that are being assessed most extensively in service members returning from combat: major depressive disorder (MDD) and depressive symptoms, post-traumatic stress disorder (PTSD), and traumatic brain injury (TBI). When possible, our review addressed research that has examined these issues within military populations. When research that directly addressed the military was unavailable, we reviewed and have extrapolated from the extensive bodies of research that have examined the correlates and consequences of these disorders in civilian populations.

Prevalence of Mental Health Problems in Returning Service Members

To map the current landscape of mental health problems among members of the military, we began this review by identifying epidemiologic studies on mental health subsequent to deployment to Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). In total, we identified 12 independent studies that have provided specific evidence of the prevalence of depression, PTSD, and brain injury among troops deployed to OEF and OIF. Together, these studies support several broad generalizations. First, PTSD is the most prevalent mental health disorder among deployed service members, and affects roughly 5 to 15% of service members, depending on who is assessed and when they are assessed. Second, the prevalence of depression among service members ranges from 2 to 10%, and also depends on who is assessed and when they are assessed. Third, because many studies employ the same screening tools, prevalence estimates across studies are generally comparable. Thus, variability across studies is likely due to differences in study samples or the time of assessment. Fourth, because different studies have been conducted at different time periods during and post-deployment, comparing across studies suggests that the prevalence of PTSD and depression increases as the time since returning from deployment increases. Fifth, across studies, service members who experience combat exposure and who have been wounded are more likely to meet criteria for PTSD. Finally, service members deployed in OIF and OEF are more likely to meet criteria for mental health problems relative to non-deployed troops, though those deployed to Iraq have higher rates of mental health problems than those deployed to Afghanistan. Although it has been deemed a “signature” wound of the current conflicts, data on the prevalence of traumatic brain injury is lacking. The analysis and

publication of prevalence data from the mandatory TBI screens required for all service members post-deployment will be crucial for understanding the burden that brain injury poses on the US military.

Theoretical Perspectives on the Consequences of Mental Health Disorders

Although emotional, cognitive, and neurological disorders are sources of individual suffering in their own right, they are likely to have broader consequences for individual development and for society at large. From the perspective of understanding how these disorders impact the lives of those who suffer from them, there are likely to be developmental processes common to all three. At least two prominent perspectives have highlighted ways that mental, emotional, and cognitive impairments may affect the life course. The stress-diathesis model, originally developed as a framework for understanding the etiology of schizophrenia, builds from the premise that individuals vary in their levels of diathesis, where a diathesis refers to an aspect of individuals and their circumstances that increases their vulnerability to disease. The central insight of the model is that the presence of a diathesis is, by itself, insufficient to bring about a mental health disorder. Rather, vulnerable individuals will be most likely to experience the onset of problems when they are confronted by stress, and may function normally in the absence of stress. Although stress-diathesis models were designed and have mostly been applied toward understanding the etiology of mental disorders, the principles of the model apply equally well to understanding the consequences of these disorders. From this perspective, the presence of a disorder such as MDD, PTSD, and TBI may be considered a diathesis. For any outcome or negative consequence of experiencing these disorders, an individual will be most at risk to the extent that: a) the individual is characterized by other sources of vulnerability as well, and b) the individual encounters stressful or demanding events that tax resources and energy that are already limited by the disorder and other diatheses.

Whereas the stress-diathesis model offers a powerful framework for understanding who may be at risk for problems and when those problems are likely to occur, lifespan developmental models described two distinct mechanisms to account for how mental disorders may give rise to further difficulties throughout the life course. The first mechanism is *interactional continuity*, the idea that enduring qualities of an individual affect the way that individual interacts with others, who generally respond in kind. Interactional continuity highlights the ways that mental and cognitive disorders, to the extent that they impair interpersonal functioning, can have lasting

consequences for how individuals make their way in the world. A second mechanism is *cumulative continuity*. Cumulative continuity is the idea that behaviors and choices at each stage of life have consequences that accumulate to shape and constrain an individual's options at subsequent stages of life. Whereas interactional continuity focuses on interpersonal relationships and their immediate consequences for the individual, cumulative continuity highlights the ways that the immediate symptoms of a disorder may lead to a cascade of negative consequences that substantially affect later stages of the individual's life.

To guide the empirical review that follows, we describe a general framework that incorporates elements from the stress-diathesis model and the life-span developmental perspective. The model begins by acknowledging that even individuals who share a common diagnosis may have symptoms that range from mild to severe. The extent of the impairments arising from post-combat mental health disorders has direct, negative consequences for individual outcomes. Yet, a service member's resources and vulnerabilities can alter the immediate consequences of mental disorders. Sufficient resources can act as a buffer, protecting individuals and minimizing the immediate consequences of mental disorders, whereas significant vulnerabilities and other sources of stress can exacerbate the negative consequences of a disorder. Over the lifespan, the immediate consequences of these disorders may themselves have long-term consequences for individuals and their family members.

Comorbidity and Other Mental Health Problems

The stress an individual experiences with one disorder may place that individual at greater vulnerability or risk for developing a secondary disorder. Indeed, co-occurring disorders are common among individuals with TBI, depression, and PTSD, and often result in more negative outcomes than individuals experiencing any of the disorders alone. For all diagnoses, anxiety disorders are the most common co-occurring mental disorder; for TBI, co-occurring chronic pain is also common. Individuals with co-occurring mental, medical, and substance use disorders have been shown to have more severe symptoms, require more specialized treatment, have poorer outcomes to treatment, and more disability in social and occupation functioning than individuals with either disorder alone. These individuals also tend to have more severe and complex symptoms, require specialized treatment, and often experience more distress associated with their disorders. An ongoing issue in this literature is the extent to which symptoms of different disorders overlap, something that would lead to inflated estimates of comorbidity.

Research that examines symptom constellations of multiple disorders would be able to examine this overlap directly. Future research also should use standard diagnostic criteria to assess each condition and strengthen the integrity of comparisons among them. If rates of comorbidity continue to be prevalent among OEF and OIF returnees, treatment centers will need to adapt protocols for effectively screening, assessing, and treating co-occurring diagnoses.

Suicide

Alongside the concern over elevated rates of mental disorders upon returning from Iraq and Afghanistan, many are concerned about elevated rates of suicides among service members. There is consistent evidence that depression, PTSD, and TBI all increase the risk for suicide. PTSD, for example, is more strongly associated with suicide ideation and attempts than any other anxiety disorder. Psychological autopsy studies have consistently shown that a large number of suicide cases had a probable depressive disorder. Persons with TBI have a higher risk of suicide than persons without TBI.

Physical Health and Mortality

Persons with PTSD and depression face an increased risk of death relative to their similarly aged counterparts without these conditions. This increased risk appears to be driven by two primary causes: increases in the risk of death from unnatural causes (e.g., homicide, suicide, and unintentional injuries) and from cardiovascular disease. The impact of TBI on mortality is also pronounced because these injuries can, in and of themselves, be life-threatening. When asked about their own health, persons with PTSD, depression, and TBI are consistently more likely to endorse physical problems. The link between PTSD, depression, and TBI and negative physical health outcomes may partially be explained by increases in other types of health-risk behaviors that influence health outcomes. For example, there is a clear link between most psychiatric disorders, including PTSD and depression, and smoking.

Substance Use and Abuse

Among individuals with PTSD, MDD, and TBI, co-occurring substance use disorders are common and are often associated with more severe diagnostic symptoms and poorer treatment outcomes. These findings suggest that individuals with this comorbidity may be more difficult to treat and may present with more challenging and unique sequallae in treatment (Ouimette,

Brown, & Najavits, 1998). Some research has directly addressed the temporal ordering of substance abuse and other mental disorders, revealing that, whereas substance abuse often follows from PTSD, it often precedes depression and TBI. . Knowing that pre-injury substance use precedes depression and TBI in most cases suggests that efforts to curb alcohol and drug use in service members may reduce rates of depression and TBI indirectly. It is likely pre-injury substance use needs to be identified and integrated within treatment goals. Research on integrated treatment efforts to treat both substance use and comorbid conditions has provided preliminary evidence that outcomes are improved in integrated versus distinct mental health and substance use programs. Therefore, understanding the complexities of the conditions soldiers are returning with would allow more likelihood of successful amelioration of symptoms.

Labor-Market Outcomes: Employment and Productivity

PTSD, depression, and TBI have all been associated with labor market outcomes. Specifically, there is compelling evidence indicating that these conditions will impact returning service members return to employment, their productivity at work, and their future job prospects as indicated by impeded educational attainment. However, these findings should be interpreted cautiously. Most studies of these associations have been cross-sectional; it is not yet clear that these mental conditions are underlying causes of the labor market outcomes observed. In fact, working has many benefits in and of itself, ranging from enhancing social interactions to promoting self-esteem and expanding economic self-sufficiency. Thus, poor performance in the workplace can influence the development of mental health symptoms or enhance symptoms that may already exist.

Homelessness

The prevalence of homelessness is higher among veteran than non-veteran populations, but this may be due to risk factors common to the general population rather than those specific to the military setting. Mental illness and cognitive dysfunction are prevalent among homeless people, and those with mental illness experience more severe negative consequences (e.g., poorer physical health, decreased utilization of services, difficulty reintegrating into society). While it is unclear the degree to which our current military cohort will experience homelessness, increasing rates of PTSD, MDD, and TBI may act as a precursor to homelessness if the proper financial, emotional, and structural supports are not in place. Consistent with the structural theory of

homelessness, which states that one of the causes of homelessness is the lack of societal resources, an approach to decreasing rates of homelessness may be to apply more structural supports and interventions among those screened to be at highest risk.

Marriage, Parenting, and Child Outcomes

The effects of post-combat mental disorders inevitably extend beyond the afflicted service member. As service members go through life, their impairments cannot fail to impact those they interact with, and those closest to the service member are likely to be the most severely affected. Indeed, a broad empirical literature has documented the range of negative consequences that post-combat mental disorders have had on the families of service members returning from prior conflicts. In general, research on the consequences of mental disorders for families has identified direct and indirect routes through which these consequences come about. In the direct route, the specific interpersonal deficits suffered by service members have immediate effects on their loved ones and family members, e.g., difficulties with emotion regulation predicting greater risk of physical violence in the home. In the indirect route, the other direct consequences of a service member's disorder (e.g., the inability to sustain employment) themselves have negative consequences for the service member's family (e.g., financial hardship, deprivation). Indeed, each of these disorders has been linked independently to difficulties maintaining intimate relationships, and these deficits account for greatly increased risk of distressed relationships, intimate partner violence, and divorce among those afflicted. In addition, the interpersonal deficits that interfere with emotional intimacy in the romantic relationships of service members with these disorders appear likely to interfere with their interactions with their children as well. Thus, the impact of post-combat mental disorders may extend beyond the lifespan of the afflicted service member to stretch across generations.

Recommendations for Future Research

Address causal relationships. The model proposed here suggests that the experience of a post-combat mental disorder is a cause of negative outcomes for service members, in that they account for the experience of negative outcomes that the service member would not have experienced in the absence of the disorder. The research reviewed in this report is consistent with this position, but the vast majority has not been capable of ruling out alternative interpretations. Most of this research has relied on cross-sectional and retrospective designs, i.e.,

research participants have been contacted on a single occasion and asked to report on their experience of psychiatric symptoms and their functioning in other life domains. Supporting causal statements about the impact of mental illness will at minimum require longitudinal research, i.e., studies that assess individuals on multiple occasions to determine the temporal ordering of symptoms and outcomes. Longitudinal research that successfully follows service members from pre-deployment, through post-deployment, and into post-service would provide crucial insights into the etiology and consequences of combat-related mental illness. In the absence of such data, the existing research supports conclusions about how mental disorders are associated with subsequent negative outcomes for service members, but not about whether the disorders may be considered causes of those outcomes.

Assessment and diagnosis. Although research on the prevalence of PTSD, depression, and TBI after service in OEF and OIF has relied on only a small number of assessment tools, research on the consequences of these disorders has used a vast array of instruments and strategies. Some research has examined associations between each disorder and outcomes shortly after combat, whereas other research, especially research on veterans of Vietnam, have examined these associations years or even decades after the veterans had their combat experiences. Understanding how mental disorders affect the lives of afflicted service members will require greater attention to how and when these disorders are assessed.

Generalizing across services and components. Research on the implications of mental disorders in veterans of Vietnam rarely specifies the component of the military (i.e., active duty or Reserves) or the service within which the veteran served. Because different segments of the military are likely to have different experiences and have access to different sources of support, careful attention to service and component will be important in future research to understand the mental health implications of OEF and OIF. To inform the future allocation of resources between Reservists and active duty members, research that directly compares the prevalence and consequences of mental disorders across the services and across the components is needed.

Gathering population data. Virtually all of the data on the implications of post-combat mental disorders come from treatment, clinical, and help-seeking samples. Because those who seek treatment are likely to differ from those who do not, these samples form an inadequate basis from which to draw conclusions about the military as a whole. Systematic assessments of the entire military population will provide a more accurate sense of the distribution of post-combat

mental disorders and their consequences, and thus a more accurate view of the true costs of the current conflicts.

Recommendations for Policy and Intervention

Facilitate service members seeking and receiving treatment. The most powerful message of the accumulated research on the lives of individuals afflicted with PTSD, depression, or TBI is that, on average, these disorders are associated with great suffering and impaired functioning across multiple domains. To the extent that effective treatments for these disorders can be found, any efforts that connect afflicted service members with those treatments therefore has the potential to promote the well-being of afflicted service members substantially. One step toward that goal is to eliminate any stigma associated with service members asking for and receiving assistance for mental disorders. One possibility in this regard would be to provide concrete incentives for seeking treatment, upholding treatment for mental disorders as something that military not only accepts but rewards. A second step is to ensure that treatments are accessible to all service members suffering from mental disorders. Achieving this goal will require attending to the different ways that service members in the active duty and Reserves currently access mental health services.

Early interventions are likely to pay long-term dividends. The model described in this report emphasizes the accumulation of negative outcomes over time, suggesting that the immediate consequences of mental disorders, if left untreated, themselves can give rise to long-term consequences. To the extent that the research reviewed here supports this cascade, then it is crucial that programs and policies directed toward afflicted service members intervene early, to prevent the cascade of negative consequences from occurring. Frequent assessments of service members' mental health and early detection of problems be central to this effort. Waiting for service members themselves to seek treatment may be too late, as service members may be motivated to seek treatment only after their impairments have resulted in negative consequences.

Policies that promote resilience may be as effective as programs that target the symptoms of mental disorders directly. A second implication of the model described herein is that the consequences of a mental disorder are affected as much by the circumstances of the afflicted individual as by the severity of the individual's symptoms. The support for this idea throughout the research reviewed in this report suggests that policies aimed at alleviating the suffering of afflicted service members expand their focus beyond simply treating the disorders. To the extent

that financial security is a source of protection, then improved financial service for veterans may play an important role in mitigating the negative consequences of post-combat mental disorders. To the extent that close relationships with family members serve as a source of social support for afflicted service members, then treatment programs that address these relationships directly may be warranted. Overall, the connections among the various symptoms and consequences of each of these disorders points toward an integrated approach to treatment. Programs that account for multiple aspects of service members' lives may be more effective than programs that attempt to address specific domains independently

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