Terence M. Keane, PhD

JRRD Guest Editorial

Posttraumatic stress disorder: Future directions in science and practice

For nearly 30 years, the U.S. Department of Veterans Affairs (VA) has led the scientific study of the effects of war on combatants. Beginning with the development of the diagnosis of posttraumatic stress disorder (PTSD) in the American Psychiatric Association (Diagnostic and Statistical Manual of Mental Disorders-Third Edition) and World Health Organization (International Classification of Diseases) classification schemes, the VA has supported growth in the world's understanding of war, trauma, and PTSD. The growth in knowledge spans multiple levels of scientific analysis, from studies of behavioral genetics to pathophysiology, prevalence studies, treatment efficacy trials, and even effectiveness trials. In its most recent form, this progress is represented in the VA's national dissemination of evidence-based treatments for those war veterans who are grappling with PTSD and related psychological disorders. For those of us who have worked in the veterans' healthcare system for these past 30 years, the changes in scientific evidence, available clinical programming, and supportive public policy are great and deeply impressive. The present sequence of articles in the *Journal of Rehabilitation Research and Development* reflects the growth and maturation of the field. Yet more knowledge on the treatment of PTSD in combat soldiers and veterans is needed urgently as we enter the sixth year of conflict in the global war on terrorism.

To date, our country has deployed more than 1.7 million Americans to Iraq (Operation Iraqi Freedom [OIF]) and Afghanistan (Operation Enduring Freedom [OEF]), with some of our military deployed multiple times. With increasing amounts of combat exposure come increasing levels of psychological distress, disorder, and impairment, findings that are consistent across wars, cohorts, countries, and cultures. Remarkably, this country is responding well to the growing needs for treatment and rehabilitation of returning war veterans. Largely as a result of the early warning signs from the Walter Reed Army Institute of Research (WRAIR), the Department of Defense and the VA began preparations for the psychological and physical war injuries that are now known as the signature wounds of OIF/OEF: PTSD and traumatic brain injury. Programs designed to treat war veterans with multiple injuries emerged concurrent with the epidemiological evidence collected at WRAIR. These polytrauma programs highlight the importance of interdisciplinary care of returning war veterans. The focus on physical, emotional, and cognitive injuries secondary to blast exposure emphasizes the inherent importance of interdisciplinary care in the rehabilitation process. While treatment models are still evolving, collaborative care that involves multiple healthcare disciplines interfacing with the individual patients, their families, and the environment in which they live and work may provide the optimal foundation for recovery.

Some might argue that future progress in the treatment of PTSD will come from a more fundamental articulation of the genetic, physiological, and psychological factors that contribute to the development of PTSD. This argument may or may not be true. Will correction of a disorganized neurotransmitter system yield benefits in psychosocial functioning? Similarly, will studies identifying cognitive factors that differentiate those who develop PTSD from those who do not result in the next breakthrough treatment? Further, will uncovering the nature of the neurohormonal defects among those with PTSD lead to the development of advanced treatments? Silo-based studies of PTSD may have contributed to the current state of knowledge, but what is now needed is greater integration of studies across disciplines and specialties. Rarely do teams of individuals with requisite skills across multiple levels of analysis approach a single problem in the most sophisticated ways. Future progress in understanding PTSD, or any psychological disorder for that matter, will likely be the result of interdisciplinary studies of structure and function over time. Yet, these analyses are so complex and the costs of such studies so great that few funding agencies are ready and willing to cast their lot into such an ambitious undertaking. Given the context of the current global war on terrorism and the high rates of psychological trauma and PTSD observed, military soldiers and war veterans may be best served by the development of interdisciplinary efforts to study key variables that contribute to risk and resilience over time. Operating from a sound theoretical framework will guide these pursuits as data are generated and theories evaluated. This strategy will permit us to parse out the causal variables and correlates that are associated with PTSD and its disabling consequences.

The VA led the world in the study of combat's long-term effects. The National Vietnam Veterans Readjustment Study (NVVRS) was the first psychiatric epidemiological study in America to use a nationally representative sample; it also represented the first time that any country took it upon itself to try to understand the psychological and social impact of war on the citizens assigned the responsibility of fighting it. The NVVRS findings firmly established PTSD in the diagnostic nomenclature and influenced public policy for the past generation. The time now is ripe for planning both the near- and long-term scientific agendas for OIF/OEF veterans. Collaborations among the major scientific stakeholders in America might now focus on the key questions regarding recovery from war trauma. As the VA and its stellar healthcare system were a direct outgrowth of World War II, the current conflicts should generate a call to action among all Government departments to address the wounds and needs of this newest cohort of war veterans. The component institutes of the National Institutes of Health; the Centers for Disease Control and Prevention; the National Science Foundation; the Departments of Justice, Education, Housing and Urban Development, Labor, and Defense; and the VA are some of the most apparent stakeholders in the rehabilitative efforts for returning war veterans. Providing incentives to agencies for collaborating in the study of the rehabilitation of war veterans seems like one very modest way to promote the best clinical care, rehabilitative programming, and scientific study.

This series of articles on PTSD includes important new knowledge that spans many levels of scientific analysis. From basic clinical science on neuroimaging and brain wave analysis, to measurement/assessment models, to risk factor analyses, to longitudinal studies examining the impact of deployment on neurocognition and functioning, to the adverse effects of sexual harassment and sexual assault, to intervention trials, these studies represent many of the finest research laboratories in the nation studying combat-related PTSD. Inclusion of the study on Bosnian refugees in the United States reminds us that our civilian neighbors may experience long-term effects from exposure to war even though they may never have been combatants.

Future studies of combat's effects must focus on longitudinal strategies accompanied by strategic sampling methods and advanced computational statistics. Measures across a wide array of functional parameters will ensure that looking at the complex interplay of genetic, physiological, and psychological

factors as they influence outcomes is possible. Consideration of the impact of war on combatants' spiritual life may also prove to be a crucial component of the recovery process. Finally, analyses beyond the individual level must be prioritized; the individual is always nested within the family, the community, and the workplace. All areas are affected by the returning war veteran and may need to be a part of the rehabilitative and healing processes. Attention to these environmental components may provide the important and needed ingredients that facilitate recovery.

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Terence M. Keane, PhD

Department of Veterans Affairs Boston Healthcare System, Boston, MA; National Center for PTSD; Boston University School of Medicine, Boston, MA

Email: Terry.Keane@va.gov

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