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Understanding Military Workforce Productivity

Effects of Substance Abuse, Health, and Mental Health

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ISBN 978-0-387-78302-4 ISBN 978-0-387-78303-1 (eBook)
DOI 10.1007/978-0-387-78303-1
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2013952923

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

Our military men and women are regularly called upon to defend and support United States' interests across the world in combat and noncombat situations. These demands call for a highly functioning, productive force that is ready and able to respond to military requirements on short notice. This book examines challenges faced by service members and the conditions that affect their ability to respond to the multiple demands placed upon them. The challenges are many—recurring deployments, combat experiences, separation from home and family, the risk of injury or death, and problems in reintegration. How these challenges are met affects force productivity and the readiness of service members to perform their military mission. Substance abuse, poor health behaviors, and mental health problems interact with these challenges and may result in lowered force productivity.

This book examines trends in substance abuse, health, and mental health of the active duty military and provides the first broad-based examination of their independent and combined effects on force productivity and readiness based on original analyses. One of the key contributions of our study is the assessment of the influence of an array of complex factors in these important cross-cutting domains. Information on these issues is drawn from a series of 10 comprehensive surveys conducted between 1980 and 2008 of the U.S. military population stationed across the world. Begun in 1980, the Department of Defense (DoD) Surveys of Health Related Behaviors Among Active Duty Military Personnel (referred to here as the HRB surveys) were conducted for DoD by RTI International (RTI) from 1982 to 2008. The surveys are unique in selecting samples that represent the active duty military population comprising personnel in the Army, Navy, Marine Corps, and Air Force and are widely recognized as the most comprehensive source of information about substance abuse, health, and mental health of the active duty force. The surveys have been used as a broad barometer of how health, mental health, and substance abuse programs are working and as a signal of where adjustments in programs and policies may be needed.

The purpose of this book is to identify the health and behavioral health challenges faced by military men and women and the policy and programmatic implications of these challenges. Findings will be useful for military officials, policymakers, and researchers interested in a better understanding of military force productivity and ways to improve it. Although the series of HRB surveys has described trends in substance abuse, health, and mental health of our force over 3 decades, in-depth modeling of these outcomes has not been previously reported and the impact of the independent and combined effects of these behaviors and conditions on military force productivity has not been documented.

The authors of this book have all contributed to the conduct of the HRB survey and related analyses over the past 3 decades, in partnership with DoD. The senior author, Robert M. Bray, led the HRB surveys from 1982 to 2008, while the other four authors—Laurel L. Hourani, Jason Williams, Marian E. Lane, and Mary Ellen Marsden—have been contributors to the design of the study, analyses, and writing of the study final reports and other scientific papers based on these data. Drs. Bray, Hourani, Williams, and Lane are staff members of RTI. Dr. Marsden, who recently retired from RTI, contributed significantly to conceptualizing and writing this book but was unable to see it to completion. Numerous additional staff at RTI have contributed to the survey over the years, and the analyses reported here draw on their contributions.

This book is dedicated to the service, courage, commitment, and sacrifices of our military men and women and to their families who have supported them.

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About the Authors

Robert M. Bray, Ph.D., a fellow of the American Psychological Association, is a Senior Research Psychologist and Senior Director of the Substance Abuse Epidemiology and Military Behavioral Health Program at RTI International. His research interests focus on the epidemiology of substance use and other health behaviors in military and civilian populations, with an emphasis on understanding the prevalence, causes, correlates, and consequences of these behaviors. He has directed nine comprehensive worldwide Department of Defense Surveys of Health Related Behaviors Among Active Duty Military Personnel, which have furnished the most widely cited data on substance use and health behaviors in the active duty military and which serve as the basis for the findings in this book. He has directed and/or supported other studies of the military population assessing health-related behaviors among the Reserve component, risk and protective factors for initiation of tobacco and alcohol use, mental fitness and resilience among Army basic combat trainees, and a Web-based intervention to reduce heavy alcohol use among active duty service members. He is currently leading the RTI International component of a large multi-institutional clinical trial to optimize usual primary care for soldiers with posttraumatic stress disorder and depression. Dr. Bray is principal editor of the book *Drug Use in Metropolitan America*, which integrates findings from a large-scale study of drug use among diverse populations in the Washington, DC, metropolitan area. He has published and presented widely in the area of substance use- and health-related behaviors. Dr. Bray received his Ph.D. in Social Psychology from the University of Illinois.

Laurel L. Hourani, Ph.D., M.P.H., joined RTI International in 2001 as a research epidemiologist after heading the Health Sciences Division of the Naval Health Research Center in San Diego. She has conducted health and psychological research in the United States and abroad for more than 20 years and has extensive experience with military populations. Dr. Hourani's expertise and main research interests are in the areas of mental health and substance abuse. She has been the principal investigator on several military-sponsored studies of suicide and mental disorders among the U.S. Navy and Marine Corps personnel and was instrumental in the development

and annual analysis of the Department of the Navy Suicide Incident Report, which later became the basis for the current Department of Defense Suicide Event Report. She was associate project director for the 2002, 2005, and 2008 Department of Defense Surveys of Health Related Behaviors Among Active Duty Military Personnel and pioneered the Surveys of Health Related Behavior for the Reserve Component, both of which have served as models for military behavioral health research. She is currently leading a project on posttraumatic stress disorder that includes the development and testing of pre-deployment stress inoculation training programs in the Marine Corps and Army to prepare warriors psychologically to better deal with combat and operational stress. Dr. Hourani received her Ph.D. in Psychiatric Epidemiology from the University of Pittsburgh and is a Fellow of the American Psychological Association.

Jason Williams, **Ph.D**., is a Research Psychologist at RTI International with extensive experience in applying advanced statistical methods to the estimation and modeling of behavioral and mental health outcomes in military personnel. Dr. Williams has led the analyses for many large- and small-scale survey and program evaluation projects, including the Department of Defense Surveys of Health Related Behaviors Among Active Duty Military Personnel and the companion surveys for the Reserve Component. Dr. Williams' substantive research interests include program evaluation and substance use and violence prevention in at-risk populations such as youth and military personnel. In addition to leading analysis tasks for multiple studies, he conducts methodological development and applications studies, primarily in the area of mediation, including a National Institutes of Health-funded study examining methods of comparing mediated effects across groups. He has authored or coauthored multiple peer-reviewed articles on measurement of military-relevant mental health constructs such as PTSD as well as papers applying complex longitudinal and mediation models to military program evaluations and models of substance use. Dr. Williams received his Ph.D. in Social Psychology from Arizona State University.

Marian E. **Lane**, **Ph.D**., is a Research Psychologist at RTI International. She has more than 12 years of experience in industrial–organizational psychology, including more than a decade of studies of active duty and Reserve component personnel with an emphasis on substance abuse, mental health, and workforce productivity. At RTI, she has led numerous military research studies, including the Navy and Marine Corps Reservists Needs Assessment and the DoD/VA Integrated Mental Health Strategy (IMHS) Strategic Action #23: Chaplains' Roles studies. She has been a lead analyst for the Department of Defense Surveys of Health Related Behaviors Among Active Duty and Reserve Component Military Personnel. Her areas of expertise include survey research, multivariate statistics, focus group and key informant interviews, and organizational assessment, and she has had responsibility for study design, implementation, and evaluation of program effects. She has authored and coauthored articles on military mental health and substance abuse for peer-reviewed journals, presentations for national and international conferences, and briefings for senior military and civilian leaders. Dr. Lane received her Ph.D. in Experimental Psychology from the University of Memphis.

Mary Ellen Marsden, **Ph.D.**, has more than 35 years of experience in the study of substance use epidemiology, treatment effectiveness, treatment organization, and policy issues. In her 20 years as a Senior Research Sociologist at RTI International, she was an analyst on eight Department of Defense Surveys of Health Related Behaviors Among Active Duty Military Personnel, reporting director for the National Survey on Drug Use and Health, and associate director of the National Analytic Center for the National Household Survey on Drug Abuse. She is coauthor of *Drug Abuse Treatment*: *A National Study of Effectiveness*, coeditor of *Drug Use in Metropolitan America*, and author of numerous articles on substance use among youth and military personnel, substance abuse treatment, and the substance abuse treatment system. Dr. Marsden received her Ph.D. in Sociology from the University of Chicago.

Acknowledgments

Many individuals made substantial contributions to the design and implementation of the Department of Defense Surveys of Health Related Behaviors Among Active Duty Military Personnel, which provided the data for this book. This book includes many original analyses from these surveys that were designed for this study and which appear here for the first time. First and foremost we acknowledge the contribution of each of the military men and women who responded to the surveys over the past 3 decades. Without the time they gave to answering a series of questions about their behaviors, the surveys—and this book—would not have been possible. In addition, we express our appreciation to the numerous military liaisons both at the headquarters of each military service and at the participating military installations (around 60 for each survey wave) for their dedication in ensuring coordination of complex field operations that made it possible to obtain the survey information.

We are indebted to the many individuals at the Department of Defense who have supported and guided the surveys over the years, dating back to the 1980s. Included in this group of Defense employees are current and former project officers for the surveys, current and former Assistant Secretaries of Defense for Health Affairs, and current and former Under Secretaries of Defense for Personnel and Readiness. We especially want to thank the individuals who assisted with the Department of Defense clearance process and provided comments on the draft manuscript.

In addition to the authors of this book, many other staff at RTI International made important contributions to the surveys. RTI staff who were major contributors to the 2008 Health Related Behavior survey, which forms the basis of many of the analyses discussed here, include Michael Pemberton, Michael Witt, Kristine Rae Olmsted, Janice Brown, BeLinda Weimer, Scott Scheffler, Russ Vandermaas-Peeler, Kimberly Aspinwall, Erin Anderson, Kathryn Spagnola, Kelly Close, Jennifer Gratton, Sara Calvin, and Michael Bradshaw. Their efforts covered designing the survey questionnaire, developing the sampling frame and selecting the sample of participants, directing and participating in survey teams that traveled to military installations worldwide to administer the questionnaires to service members, conducting statistical analyses, and writing and coauthoring the survey final technical report. For this book, special

thanks go to Erin Anderson who coordinated reviews of the literature and figure production, to Shari Lambert, Valerie Garner, and Ally Elspas who produced the figures presented in the book, and to Justin Faerber who edited the volume.

We owe a debt of gratitude to RTI International for providing a positive and supportive working environment for us to think and to write and for a Professional Development award to Drs. Bray, Marsden, and Hourani that helped fund the preparation of this book. We express special thanks and appreciation to Dr. Gary Zarkin, Vice President of the Behavioral Health and Criminal Justice Division, Dr. Jan Mitchell, Vice President of the Social Policy, Health, & Economics Research Unit, Mr. Tim Gabel, Executive Vice President of Social, Statistical, and Environmental Sciences, and Dr. Wayne Holden, President and Chief Executive Officer for their encouragement of this project.

We also thank the staff at Springer for their interest in the book concept and their patience during the writing process. In particular, we acknowledge Bill Tucker, Editorial Director Behavioral Science, for his interest and help, and Khristine Queja and Christina Tuballes for their editorial assistance, oversight, and management of the production and publishing process.

Finally, we note that the views and opinions expressed in this book are solely those of the authors. They do not represent and should not be construed as an official policy or position of the U.S. Department of Defense, the branches of the U.S. military services, or the U.S. Government.

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Chapter 1
Health and Behavioral Health in the Military

1.1 Overview and Background

The U.S. military has spent over a decade in the longest and one of the most challenging sets of conflicts in our nation's history—the wars in Iraq and Afghanistan (2001 to the present, collectively). These conflicts have placed extensive stress and strain on military members from all service branches and on their families, including spouses, children, parents, and siblings. This is not surprising in view of the high operational tempo that has been in effect for an extended period and the frequent and lengthy large-scale deployments that have resulted in a combination of visible and invisible wounds of war in addition to loss of life. Even though Operation Iraqi Freedom (OIF) has officially concluded and Operation Enduring Freedom (OEF) is beginning to wind down, many of the substance abuse, physical health, and mental health concerns that emerged during the height and intensity of these conflicts are continuing issues for the military. The dynamics and sequelae of training, deploying, experiencing combat and combat-related traumas in theater, supporting others, and reintegrating after returning home are complex processes for service members and families to navigate (Adler, Bliese, & Castro, 2011; MacDermid Wadsworth & Riggs, 2011; Riviere & Merrill, 2011). Unfortunately, a sizable number of dedicated personnel experience physical health, mental health, and substance abuse problems stemming from their military experiences. Not only do these losses occur for service members and their families but they also diminish the ability of the military to provide continued high-level functioning of the active duty force and to meet the military mission. The costs of substance abuse, poor physical health, and mental health problems—whether they are monetary, legal, and/or personal/family-related—compromise our military's ability to protect the nation in the most effective, efficient manner.

To understand these complex issues, which impair military readiness and reduce military productivity, this book uses population-based data to examine these problems and their correlates across the military. This book is the first effort to provide a broad integrative look at the nature and extent of substance abuse, health status

R.M. Bray et al., *Understanding Military Workforce Productivity: Effects of Substance Abuse, Health, and Mental Health*, DOI 10.1007/978-0-387-78303-1_1,

and health behaviors, and mental health problems in the active military and their impact on the productivity and readiness of the active duty armed forces across the world. Findings are based on the analyses of the 10 comprehensive Department of Defense Surveys of Health Related Behaviors Among Active Duty Military Personnel (HRB surveys) conducted from 1980 to 2008 (see Bray et al., 2009, 2010).

Productivity is viewed here not in terms of the production of goods but in terms of workforce productivity and the readiness of military personnel to perform their military mission. Throughout the book's discussion of military productivity and readiness, attention is given to the role of deployment and combat experience. Our focus centers on the active duty military force, although for the OIF/OEF conflicts the Reserve components have been called upon and played a key role in supporting the military mission at home and abroad. Behavioral health and readiness issues for the Reserve component (which include the Army Reserve, Army National Guard, Navy Reserve, Marine Corps Reserve, Air Force Reserve, and Air National Guard) are examined in Hourani et al. (2012).

1.2 Military Context

U.S. military forces are charged with maintaining national security and supporting peacetime operations. The importance of this military mission has deepened as the number of threats to national security has increased since September 11, 2001, and the military has been increasingly called upon to defend U.S. national interests across the world. The wars in Iraq and Afghanistan have been particularly demanding and present many challenges for military leaders, service members, and their families. Repeated deployments pose social, economic, mental, and physical challenges. Lengthy separations and combat exposure often lead to worry and anxiety, to psychological health problems as service members return from deployments, to relationship difficulties related to reintegration, and to needed adjustments for physical and psychological wounds (Joint Mental Health Advisory Team 7, 2011; MacDermid Wadsworth & Riggs, 2011; U.S. Department of the Army, 2012).

Indeed, the pressures and stresses associated with military service and deployment in unfamiliar and often dangerous environments may result in and be exacerbated by substance abuse, poor physical health or health-related challenges, and preexisting or recently developed mental health problems. These problems in turn affect the productivity of military personnel and the physical and mental readiness of the force to perform its mission.

Readiness or fitness of the force has traditionally focused on physical fitness and encompassed such components as strength, endurance, flexibility, and mobility (Roy, Springer, McNulty, & Butler, 2010). More recently, due in large measure to the unprecedented demands from the sustained conflicts in Iraq and Afghanistan, the concept of fitness has been broadening to recognize and encompasses the complexity of human behavior. The thrust has been toward a broader, more holistic concept of fitness referred to as Total Force Fitness. Total Force Fitness is an

outgrowth of efforts begun by the Army under the direction of General George Casey in 2008 to develop a Comprehensive Soldier Fitness (CSF) program that emphasized physical, emotional, social, family, and spiritual components (Casey, 2011). The new Total Force Fitness paradigm, which was embraced by Admiral Michael Mullen, former Chairman of the Joint Chiefs of Staff (Mullen, 2010), recognizes dimensions of both mind and body, expands on the Army's CSF program, and posits eight fitness domains: behavioral, social, physical, environmental, medical, spiritual, nutritional, and psychological (Jonas et al., 2010). This broader conceptualization of total force fitness builds on current DoD guidance and if fully implemented will contribute to improved productivity of military personnel. More work is needed, however, to clarify the definitions of the fitness components within the eight domains, the metrics for measuring achievement within and across domains, and the training requirements that will be needed for each of these fitness domains.

Although we are not able to consider the integration of all of these domains, the analyses in this book begin to address the overlap in physical, behavioral, and psychological aspects of fitness and their relationship to productivity. Without question, an effective force depends on having healthy and well-trained personnel with a high level of technical competence who are prepared for action. A healthy force is critical to military readiness, and considerable emphasis continues to focus on ways to maintain or improve the health readiness of military personnel (Department of Defense [DoD], 2007; U.S. Department of the Army, 2012).

Resiliency or mental readiness in the face of combat and the psychological stresses of military operations is also essential to the effectiveness of the military force (Thompson & McCreary, 2006). A review of epidemiological studies of troops returning from deployment to Afghanistan and Iraq found that the rates of posttraumatic stress disorder (PTSD) were between 5 and 15 %, and the rates of depression were between 2 and 10 % (Ramchaud, Karney, Osilla, Burns, & Calderone, 2008). More recent population data indicate that the overall PTSD rates across all active duty personnel increased from about 7 % in 2005 to around 11 % in 2008 and that the depression rates were relatively stable during this time (22 % in 2005, 21 % in 2008) (Bray et al., 2010). The physical and mental readiness of each individual service member becomes increasingly important as plans for reset and reductions in the size of the military force proceed (Department of Defense, 2012a; U.S. Department of the Army, 2012).

Substance abuse, poor health, and mental health problems are detrimental to the military in terms of lowered productivity and readiness or fitness and they are also costly to the nation as a whole. A number of studies have examined the enormous economic costs of these often preventable health problems. Despite differences in methodology, these studies have looked at these problems in terms of decreased productivity, absenteeism, increased health care costs, and the costs of criminal justice involvement. For example, cigarette smoking and exposure to tobacco smoke resulted in premature deaths and productivity loss, annually accounting for $96.8 billion (Centers for Disease Control and Prevention, 2008). In 2002, the economic cost of drug abuse to the nation was estimated to be $180.9 billion in terms of health

and criminal justice consequences and loss of productivity related to disability, death, and withdrawal from the workforce (Office of National Drug Control Policy, 2004). Excessive alcohol use was estimated to cost $223.5 billion in 2006 in terms of lost productivity, health care costs, criminal justice costs, and other costs (Bouchery, Harwood, Sacks, Simon, & Brewer, 2011).

Substance abuse has economic impacts similar to some other health problems, which together cost the nation trillions of dollars each year. Annually, seven chronic diseases (cancer, diabetes, hypertension, stroke, heart disease, pulmonary conditions, and mental disorders) cost $1.1 trillion in lost productivity and another $277 billion for treatment (DeVol, Bedroussian, Charuworn, & Chatterjee, 2007). The cost of obesity alone is estimated to be $147 billion annually in terms of increased medical spending (Finkelstein, Trogdon, Cohen, & Dietz, 2009). Serious mental illness was estimated to cost $193.2 billion in 2002 in terms of reduced earnings among mentally ill persons (Kessler et al., 2008). Further, cancer accounts for $265 billion, diabetes for $174 billion, and cardiovascular diseases for $291 million each year (Harwood, 2011). The most costly medical conditions in terms of expenditures for health care services nationwide—heart disease, trauma-related disorders, mental disorders, and cancer—all have important components related to potentially intervenable human behavior (http://www.nimh.nih.gov/statistics/4TOT_MC9606.shtml).

In the armed forces, annual tobacco-related costs to the military health system were estimated at $564 million (IOM, 2009). Excessive alcohol use cost DoD an estimated $745 million in reduced readiness and judicial expenses (e.g., prosecution of misconduct charges) (Harwood, Zhang, Dall, Olaiya, & Fagan, 2009). One study calculated the productivity loss resulting from alcohol and illicit substance abuse as being between $411 million and $446 million per year for DoD active service branches. This was estimated as $24 million to $59 million in lost work time, plus an additional $387 million in training and relocation costs to replace personnel who were discharged from service due to alcohol and drug abuse problems (Mehay & Webb, 2007; Friedman, n.d.). In the military, estimates from 2003 of health-related lost productive time translated to roughly 2.5 million lost productive hours per week or an estimated $2 billion per year. When adjusted for inflation, this translates to $2.5 billion in 2012 (Stewart, Ricci, Chee, & Morganstein, 2003; Friedman, n.d.).

1.3 The Active Duty Military Force Across the World

As of September 2011, there were 1.4 million active duty military personnel in the Army, Navy, Marine Corps, and Air Force. Military personnel are stationed on bases and afloat in locations across the world. In 2011, of the total of 1.4 million active duty military personnel, the vast majority—about 1.2 million—were stationed in the United States and its territories. About 81,000 were stationed in Europe and 56,000 were stationed in East Asia and the Pacific. Among Reserve and National Guard personnel, 92,000 personnel were stationed in Iraq as part of