Post-Traumatic Stress Disorder
Review of the Comprehensive Soldier Fitness Program

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Abstract: Since the start of the wars in Afghanistan and Iraq, the U.S. military has implemented several population-based initiatives to enhance psychological resilience and prevent psychological morbidity in troops. The largest of these initiatives is the Army's Comprehensive Soldier Fitness (CSF) program, which has been disseminated to more than 1 million soldiers. However, to date, CSF has not been independently and objectively reviewed, and the degree to which it successfully promotes adaptive outcomes and prevents the development of deployment-related mental health disorders such as post-traumatic stress disorder (PTSD) is uncertain. This paper critically evaluates the theoretic foundation for and evidence supporting the use of CSF.

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Introduction

The military can be a highly dangerous and stressful occupation and, although a military career can be fulfilling and growth-promoting, a small but salient percentage of service members struggle with military-related mental health problems over the life course.[1,2] Service members who deploy to war face numerous adversities and stressors, and depending on a variety of protective and risk factors, such as leadership, training, social support, and the extent of exposure to high-magnitude traumatic events, these experiences can lead to a range of mental health disorders.[3,4] However, because the risks of military deployment are foreseeable, care providers and leaders in the military have a unique opportunity and ethical mandate to attempt to mitigate the impact of the stressors that service members will likely face. Since the start of the Iraq and Afghanistan wars, each service branch within the U.S. military has implemented formal psychological prevention initiatives in an attempt to enhance the mental well-being and resilience of troops, and to mitigate the risk for deployment-related mental health morbidity.

This paper focuses on a formalized universal prevention program called Comprehensive Soldier Fitness (CSF), developed by psychologists for the U.S. Army. One of the goals of the program is to prevent post-traumatic stress disorder (PTSD), the signature mental health disorder associated with deployment.[5] At the broadest level, CSF aims to promote overall wellness and psychological health; the current paper focuses specifically on CSF's goal of preventing PTSD in soldiers. The military has a range of intrinsic endemic universal prevention processes, such as realistic deployment-role training, physical training, peer supports, and effective leadership (Whealin et al.[6]). This paper focuses exclusively on CSF because of its unprecedented nature as an extrinsic universal prevention program developed primarily by nonmilitary experts, its high profile,[7] and the controversy surrounding its implementation.[8]

The Comprehensive Soldier Fitness Program

Since 1999, the Department of Defense has required all service branches to create a doctrine for preventing and managing deployment-related stress, otherwise known as combat and operational stress control (COSC).[9] Each service branch (i.e., Army, Navy, Marine Corps, Air Force) has developed its own set of prevention concepts, frameworks, and strategies tailored to its specific ethos and culture, resulting in considerable programmatic heterogeneity.[10] The prevention programs implemented in recent years represent the U.S. military's largest-ever strategic attempts to formally offer psychological interventions that promote the mental health of troops during (and after) deployment.[11]

In 2009, the Army implemented CSF, a $125-million initiative designed to train all soldiers and their families in mental "fitness" and resilience.[11–14] The program is the

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largest deliberate psychosocial universal prevention ever undertaken.[15] It has been disseminated to more than 1 million soldiers to date, although the number of soldiers actually accessing and making use of program materials is less clear. The Army states that CSF aims to:

> shift the normal psychological performance "curve" of the soldier population to the right, that is, to increase the number of soldiers who derive meaning and personal growth from their combat experience (the rightmost part of the curve), to increase the number of soldiers who complete combat tours without pathology, and to decrease the number of soldiers who develop stress pathologies.[12]

Within the CSF framework, resilience refers to overall physical and psychological health and is defined as "the maintenance of normal functioning in the face of adversity."[15] A primary assumption underlying the program is that psychological resilience "is something that can be taught and learned."[15] In addition to promoting resilience and wellness, the program explicitly aims to prevent "stress pathologies,"[12] most notably PTSD. However, in contrast to selective and indicated prevention initiatives in the military,[16] the universal prevention components of CSF are not intended to assist soldiers after exposure to a high-magnitude traumatic event, but rather to equip soldiers over the course of their careers and prior to the occurrence of combat or operational trauma.[17]

The Comprehensive Soldier Fitness program operationalizes psychological resilience as entailing four dimensions—emotional, family, social, and spiritual—and provides training modules for each dimension. To increase acceptability, CSF is packaged as training and mental fitness rather than as a mental health preventive intervention. CSF content consists of four components: (1) computerized self-help learning modules (Comprehensive Resilience Modules); (2) ongoing assessment of these domains through an online self-report measure specifically developed for CSF called the Global Assessment Tool (GAT, characterized as a self-awareness tool to be completed annually; (3) in-person training of noncommissioned officers (NCOs) in so-called advanced resilience skills (ARS) to create what are referred to as Master Resilience Trainers, so that they can teach ARS to soldiers within their battalions and brigades via a prescribed curriculum; and (4) resilience training at all Army leader development schools.[12,15] Although it appears that the GAT was designed to identify strengths and deficits ideographically, it is unclear whether (or how) this translates to personalized targeted instruction and training.

The primary conceptual basis for CSF is positive psychology, defined as "the study of positive emotion, positive character, and positive institutions."[18] A positive psychology approach to prevention argues that positive human traits such as optimism and contentment buffer against psychopathology, and that identifying and amplifying these traits in at-risk individuals prevents mental health problems.[19] The University of Pennsylvania's Penn Resiliency Program (discussed below) served as the civilian blueprint for CSF program development.[14] CSF content has not been released to the public, but it draws from cognitive behavioral therapy, a form of psychotherapy that emphasizes actively changing one's thoughts and behaviors to alleviate suffering.

Critique of Comprehensive Soldier Fitness

Need to Demonstrate the Program's Evidence Base

The Comprehensive Soldier Fitness program developers argue that the intervention has a well-established evidence base, citing studies of CSF's civilian blueprint, the Penn Resiliency Program. Developed by Seligman and colleagues,[20] the Penn Resiliency Program has been tested as a universal prevention program in numerous studies in civilian populations, mainly of prevention of depression in child, youth, and college samples.[20] Prior to CSF, the Penn Resiliency Program was not tested as either a prevention or treatment for PTSD, and was not tested in military samples.

In discussing the justification for why the Penn Resiliency Program became the foundation of CSF, Seligman and Fowler[14] note that the program reliably produces less depression and anxiety among students. However, a meta-analysis of the Penn Resiliency Program's effect on depressive symptoms concluded that it is unclear whether the program's effects have clinical significance; the average reduction in depressive symptoms was one fifth of an SD, and the meta-analysis found no evidence that the program is effective in "preventing, delaying, or lessening the intensity or duration of future psychological disorders."[21] Improvement in subclinical levels of depression was more likely than preventing the future development of a depression diagnosis.[22]

In other words, although Penn Resiliency Program strategies may increase wellness and enhance soldiers' capability to manage and bounce back from hassles, conflicts, and adversities (worthy goals), and although CSF may possibly help soldiers who have existing preclinical and clinical PTSD symptoms, it is unclear how and why CSF would be sufficient to prevent the development of PTSD and other mental disorders in the face of severe war-zone trauma, one of the stated aims of CSF.

More broadly, whether it is even possible to prevent PTSD (short of mitigating exposure to trauma) through population-based efforts remains an open question. No studies have examined this issue and, as such, there is no

evidence from the trauma field that PTSD can be prevented through universal prevention initiatives in either the civilian or military arena. Universal prevention efforts such as psychoeducation (in which recent trauma survivors are provided with information about common reactions to trauma), though widely employed, have little empirical support to substantiate their use.[23] There is no evidence that a prevention program can avert the development of PTSD symptoms; the best available evidence for PTSD prevention supports the use of selective and indicated prevention initiatives, although the success of these interventions consists primarily of preventing *chronic* PTSD in those already endorsing clinically diagnosable stress-related symptoms.[24]

Need for Outcome Data

Despite widespread ongoing implementation to more than 1 million soldiers and their families to date, there are currently no peer-reviewed, published outcome data available on the universal prevention components of CSF. Moreover, CSF was not piloted prior to dissemination, despite the fact that previous broadly applied psychological interventions in the military that made intuitive sense, such as post-event psychological debriefing, were subsequently shown to hold little or no benefit and to increase symptoms in some people.[25]

The only effectiveness data available come from a non-peer-reviewed evaluation of CSF's Master Resiliency Training component[15] conducted by CSF personnel. The program evaluation involved comparing eight randomly selected brigade combat teams, half of which had embedded Master Resilience Trainers (who had completed a 10-day resilience training course at the University of Pennsylvania). Data consisted of GAT scores from more than 22,000 soldiers, collected over a 15-month period. The evaluation report's primary conclusion was that:

> there is now sound scientific evidence that Comprehensive Soldier Fitness improves the resilience and psychological health of Soldiers . . . this evaluation provides solid evidence showing that the MRT skills are having a positive effect on Soldier-reported resilience and psychological health.

The published results, however, do not substantiate these conclusions. The authors focus primarily on significance tests, which are highly subject to Type I error with very large sample sizes, rather than effect sizes. For those groups that had embedded trainers, the effect sizes for GAT score changes measured over a 6-month span, reported as partial eta-squared, were 0.000 for 10 of the 19 assessed dimensions. This includes three of the five GAT subscales putatively most closely associated with psychopathology, namely depression, negative affect, and loneliness. Overall, the largest reported within-group effect size was 0.005, for the "friendship" dimension; 0.01 is considered a small partial eta-squared effect size.[26] Between-group effect sizes at 8 months' follow-up, again reported as partial eta-squared, were 0.000 for 12 of the 19 reported outcomes, including four of the five subscales most closely associated with psychopathology (bad coping, depression, negative affect, and loneliness; the effect size for the remaining subscale, catastrophizing, was 0.001). Overall, the largest reported between-group effect size was 0.002.

The report's[15] authors argue that "the effect sizes reported here are consistent with or better than many other population-wide developmental interventions and public health initiatives," but offer no direct comparisons with other published comparable efforts to substantiate this claim. Effect sizes for population-level interventions indeed tend to be smaller than those for more targeted interventions; the argument is that even small changes, at the population level, can translate into substantial benefits (i.e., even minor shifts in overall incidence rates, for example, can translate into thousands of fewer cases of a disorder). However, the CSF effect sizes reported are very small and it is difficult to substantiate how a mean 0.71% increase in "good coping" or 0.54% increase in "emotional fitness" from pre- to post-intervention can be expected to prevent soldiers from developing PTSD (Figure 2 of report[15]).

The extent to which the reported effect sizes even fall outside the GAT's margin of error is unclear. Although all soldiers are required to complete the GAT, with 900,000 having done so to date,[27] no psychometric data have been reported. Also, the extent to which the effect sizes obtained may be due to chance is unclear, because CIs are not reported for the effect sizes.

Moreover, although GAT developers note that the measure is "a way of evaluating the success of these programs,"[13] a valid test of PTSD symptoms does not appear to be possible using the GAT. The GAT does not assess PTSD symptoms, assessing instead strengths and problems in emotional, social, family, and spiritual domains.[13] Constructs tested by the GAT include flexible thinking, positive emotions, trust, and character strengths such as wisdom and justice. Thus, the program evaluation could not adequately assess CSF's success in preventing PTSD. More broadly, because completion of the online modules is not mandated and the extent to which they are actually being used is unclear, the degree to which any improvements in GAT scores over time are actually due to completion of the modules is unknown. Of note, only the Master Resiliency Training is included in the report; remarkably, a footnote in the report states that separate analyses showed that the online Comprehensive Resilience

Modules "had no impact" on resilience and psychological health over time.[15]

Need to Articulate Change Agents and Mechanisms

The Comprehensive Soldier Fitness program developers have not clearly articulated the theoretic assumptions or putative change agents underlying their program content as it pertains to preventing PTSD, or explicated how the program content and processes are intended to help soldiers manage exposures to combat and operational trauma. The types of stressors that CSF must prepare soldiers for are broad and have substantially more emotional impact than those typical in civilian, youth, and college student participants. Psychologically deleterious events that occur during deployment center not only around situations of life-threat and fear, but around perceived errors of commission and omission (e.g., accidentally killing a child or failing to protect a buddy), fundamental shifts in world view (e.g., from witnessing acts of cruelty and brutality), and perceived acts of betrayal (e.g., suffering losses due to ineffective leadership), that can lead to highly treatment-resistant guilt, shame, and anger.[28]

A basic assumption of the program appears to be that increasing "resilience" prevents the development of PTSD, and that individuals with high overall well-being are less likely to develop PTSD. It is unclear empirically and conceptually whether this is the case: It is possible to be psychologically high-functioning and still develop PTSD. For example, it may be that soldiers with positive, compassionate views of the world may be particularly traumatized by the harsh realities of war, or that the ability to form strong bonds with buddies may make their deaths in combat even more traumatic.

Without a clear theoretic framework linking intervention strategies to intended outcomes, negative or positive effects are subject to third-variable explanations. Also, content that is too broad but promises specific positive impact may have unintended consequences. For example, a recent longitudinal study of PTSD in civilian survivors of serious physical injury suggested that unrealistically high expectations of one's ability to cope with stressors may at times be detrimental.[29] High initial self-coping efficacy (measured at post-injury hospitalization) predicted a trajectory of delayed PTSD symptoms in some survivors, in which distress and impairment emerged after an initial period of apparent adjustment, possibly once the true challenges associated with the injuries became apparent and were more difficult than anticipated.

More broadly, a major hurdle to developing universal PTSD prevention programs is that the known predictors of PTSD together account for at best only 20% of the variance in response to traumatic events.[30] The majority of soldiers who experience trauma, even severe deployment trauma, will not develop PTSD, and the risk and protective factors involved in the development and maintenance of PTSD remain poorly understood. What is clear is that PTSD does not have a single cause, but involves multiple interacting etiologic pathways consisting of a complex interplay of biologic, psychological, social, deployment, and trauma-related factors, some of which (genes, gender, prior history of trauma) are not subject to change.[16,31] Exposure to prior abuse and trauma is a particularly noteworthy and complicating factor, given that it has been shown to lower resilience to future trauma and increase risk for a host of negative adult outcomes.[32]

Discussion

The U.S. military is faced with the considerable challenge of protecting the psychological well-being of service members in the face of sustained threats to mental health and mission-readiness. In the absence of established universal prevention initiatives for PTSD to draw from, programs such as CSF have had to pave new ground. However, although there is a paucity of research on PTSD prevention strategies and outcomes, universal prevention programs adopted by the military have not been constrained by a lack of an evidence-based scheme. Basic elements of an evidence-based approach to prevention, such as piloting programs prior to mass dissemination, designing programs with clear theoretic justification for content, targets, and procedures, and using psychometrically sound instruments to assess outcomes, have yet to be demonstrated in CSF. Continued mass dissemination of programs without at least some preliminary evidence for effectiveness in a military population is difficult to substantiate on scientific and ethical grounds.

More broadly, to justify their cost and potential for unintended side effects, CSF and any other extrinsic mental health prevention program in the military need to demonstrate incremental value over the multitude of experiences and processes already endemic to military training and culture that promote resilience and serve a crucial prevention function.[33] Findings from the CSF program evaluation that show, at best, very small differences between the CSF and control conditions, call into question the incremental value of the program. Good leadership, morale, cohesion, and training have consistently been associated with lower PTSD scores[34] and represent potentially important avenues to wellness promotion and disorder prevention that are already endemic

and accepted in the military culture. Similar measures, such as providing rest, relaxation, and respite, are also amenable to scientific investigation to examine their protective function.

Moreover, an important goal for future programs is to, at the population level, train service members to recognize subclinical and clinical stress states in themselves and others so that they may know when to seek help. Because CSF focuses on wellness rather than on extreme stressors and responses to them, while offering no clear model to explain how wellness might lessen the prevalence or severity of PTSD symptoms in combat-exposed soldiers, it has no direct relationship with PTSD prevention. Rather, it appears that CSF training materials deliberately de-emphasize PTSD. Program developers note that "a continuing narrative of PTSD for combat exposure may kindle self-fulfilling prophecies and actually contribute to an increase in cases,"[35] but offer no theory or evidence to substantiate this claim.

Teaching service members that stress reactions are normal and expected parts of deployment stands in contrast to potentially unrealistic depictions of soldiers capable of "deftly navigating the emotional slings and arrows of daily military life, quickly capitalizing on opportunities for growth as they arise, [and] creatively finding new ways to self-generate personal growth," ideals described by CSF developers that may inadvertently increase stigma and shame in struggling service members.[36] In addition to reducing stigma, encouraging symptom recognition and care-seeking in soldiers may help prevent unnecessary treatment delays and secondary problems (such as alcohol and drug abuse) from arising. However, the extent to which programs can effectively attain these aims remains an empirical question.

Conclusion

The enormous personal, societal, institutional, and economic costs associated with military-related PTSD create a compelling need for rigorously tested, evidence-based prevention programs that draw on and expand existing scientific knowledge of PTSD prevention. The military is the largest and most well-resourced organization mandated with the prevention of PTSD. As such, it holds a unique opportunity and responsibility to develop an empirical and theoretic foundation for prevention efforts that can be used with generations of service members to come.

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