PSYCHOLOGICAL RESILIENCE PROFILE IN PROFESSIONAL SOLDIERS FOLLOWING MULTIPLE DEPLOYMENTS TO HIGH-INTENSITY CONFLICT ZONES

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Received: 12.08.2025. Approved: 17.12.2025.

Original Scientific Article

DOI: https://doi.org/10.65932/military-studies-2025-2-8
UDC: 159.944.4:355.1-057.36

Abstract: Multiple deployments of professional soldiers to high-intensity conflict zones represent a significant challenge to the mental health of military personnel, while simultaneously offering insight into psychological resilience mechanisms. The aim of this research was to identify key components of the psychological resilience profile in professional soldiers who have survived multiple deployments to active combat zones. The methodological approach was based on a systematic review of literature published in journals indexed in the Scopus database, with a focus on longitudinal studies, meta-analyses, and randomized controlled trials conducted on military populations that participated in Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF). Research results indicate the multidimensionality of the resilience construct, which encompasses individual factors (adaptability, self-efficacy, cognitive flexibility), social resources (unit cohesion, post-deployment social support), and organizational factors (leadership quality, perceived organizational support). Analysis of available literature shows that the prevalence of posttraumatic stress disorder (PTSD) increases proportionally with the number of deployments, with soldiers having two or more deployments showing significantly higher rates of PTSD compared to those with a single deployment. Key protective factors include high levels of adaptability measured by the Connor–Davidson Resilience Scale, strong unit cohesion, adequate post-deployment social support, and sufficient recovery time between missions. Neurobiological correlates of resilience include specific patterns of hypothalamic–pituitary–adrenal axis functioning, with enhanced negative feedback as a marker of adaptive stress response. In conclusion, psychological resilience in professional soldiers represents a dynamic, multifactorial construct that can be identified, measured, and potentially enhanced through targeted interventions before, during, and after deployment to high-intensity conflict zones.

Keywords*: psychological resilience, multiple deployments, professional soldiers, posttraumatic stress disorder, high-intensity conflict zones, protective factors.*

Military Studies: Journal for Strategy, Technology and Defence Sciences , Year 2025, Volume: 3, Issue: 2, Serial number: 4, p. 101 – 116.

INTRODUCTION

Contemporary military operations are characterised by extended mission durations, multiple deployments of the same personnel, and exposure to complex combat conditions that transcend traditional paradigms of warfare. Since the launch of Operation Enduring Freedom (OEF) in October 2001 and Operation Iraqi Freedom (OIF) in March 2003, the tempo of military operations has significantly increased, with a substantial number of armed forces members experiencing multiple deployments to active combat zones (Loebers, van der Meulen, Scholte, Nijdam, & Vermetten, 2020). This unique situation has posed a challenge to military psychology and psychiatry in understanding the cumulative effects of repeated exposure to traumatic events on the mental health of military personnel, while simultaneously providing an opportunity to study mechanisms that enable some soldiers to maintain psychological functionality despite extreme stressors (Campbell-Sills et al., 2023).

Psychological resilience, defined as the ability to cope with adversity or stress and overcome their negative effects, represents a key concept in understanding differential mental health outcomes following exposure to traumatic events. In contrast to conceptualisations of resilience as a static personality trait, contemporary approaches emphasise the dynamic nature of this construct, which includes interaction between individual characteristics, life experiences, and current context (Loebers et al., 2020; Panda, Chatterjee, Srivastava, Chauhan, & Yadav, 2024). In the military context, resilience is specifically defined as the capacity to overcome the negative effects of failure and stress on military performance and combat effectiveness, which depends on effective physiological and psychological functioning of individuals (Panda et al., 2024).

Epidemiological research consistently documents increased rates of mental disorders, particularly posttraumatic stress disorder (PTSD), major depressive episode, and alcohol abuse, among military personnel following deployment to active conflict zones. The systematic review and meta-analysis of cross-sectional studies by Moradi, Dowran, and Sepandi (2021)(2021) consolidates global evidence and reports a pooled prevalence of depression of 23% in male soldiers and 25% in military women, alongside elevated rates of suicide ideation and attempts that scale with combat exposure. A complementary war-zone meta-analysis by Lim et al. (2022)(2022) further documents that aggregate prevalences of depression, anxiety, and post-traumatic stress in conflict-afflicted populations reach 28.9%, 30.7%, and 23.5% respectively, with substantial heterogeneity between civilian and military samples. Contemporary meta-analyses consistently identify a dose–response pattern between combat exposure and psychopathology, where higher cumulative exposure to combat stressors translates into elevated PTSD prevalence — a robust finding that has been replicated across U.S., U.K., and allied military samples (Loebers et al., 2020).

Longitudinal research has further illuminated the temporal dynamics of mental health problems following deployment. The recent meta-analysis of prospective studies by Loebers and colleagues (2020), published in Social Science & Medicine, synthesised evidence from 40 unique military samples and revealed that PTSD prevalence frequently continues to rise during the years following return from the battlefield, with the full scope of mental health problems often manifesting only months or years after return. Campbell-Sills and colleagues (2023), drawing on the STARRS Longitudinal Study, extend this finding by demonstrating that mental-health trajectories

observed during active duty (resilient, intermediate-stable, symptomatic-chronic and late-onset-increasing) carry over into post-military life, with larger in-service increases in posttraumatic stress, anger and depression each predicting greater post-service life stress and reduced job satisfaction. This evidence suggests that adverse stress reactions cannot necessarily be expected to diminish over time and may actually increase, highlighting the importance of long-term monitoring and interventions.

Research on the specific impact of multiple deployments on mental health has shown predominantly concerning results. Across a wide range of contemporary studies, a greater number of deployments is associated with higher rates of PTSD (Loebers et al., 2020). However, longer dwell time between deployments is associated with reduced odds of PTSD, suggesting that adequate recovery time may mitigate the negative effects of multiple deployments (Panda et al., 2024). Despite well-documented risks to mental health, a significant portion of military personnel demonstrates resilience and maintains healthy psychological functioning despite exposure to intense stressors. The longitudinal evidence consolidated by Loebers and colleagues (2020) supports the conclusion that resilient trajectories represent the modal pattern among military personnel returning from combat, with PTSD constituting a non-normative response — a pattern also reflected in the STARRS-LS finding that roughly two-thirds of active-duty soldiers follow a resilient trajectory across the deployment cycle (Campbell-Sills et al., 2023).

The theoretical framework for understanding resilience in the military context encompasses multiple levels of analysis. At the individual level, contemporary qualitative synthesis identifies adaptability, self-efficacy, cognitive flexibility, and the capacity for positive reappraisal of combat experience as key components of resilience (Habib, Stevelink, Greenberg, & Williamson, 2018). At the unit and organisational level, unit cohesion, peer support, and leadership quality have emerged as significant predictors of mental health after deployment, with structural equation modelling supporting a latent personal-resources factor that buffers PTSD severity through the reduction of negative posttraumatic cognitions (Pietrzak, 2017). The unit-cohesion buffer has been further confirmed by the multilevel analysis of Campbell-Sills, Flynn, Choi et al. (2022)(2022) in Psychological Medicine, which demonstrated that horizontal cohesion at the unit level moderates the impact of combat exposure on PTSD symptoms, depressive symptoms and suicidal ideation. Leadership behaviour represents a parallel organisational lever; Adler, Gutierrez and colleagues (2022) show in a large survey of US Army soldiers that leader behaviour is reliably associated with subordinates' depression and anxiety symptoms even under the unusual stress conditions of the COVID-19 pandemic. At the community and family level, post-deployment social support represents one of the most robust protective factors against the development of PTSD (Rakesh, Clausen, Buckley, Clarke-Rubright, Fairbank, Wagner, & Morey, 2022), an effect quantified across military samples by the meta-analysis of Blais et al. (2021)(2021), who report that the negative association between perceived social support and PTSD symptom severity is even stronger in military than in civilian populations.

Neurobiological research has further enriched the understanding of resilience mechanisms. The hypothalamic–pituitary–adrenal (HPA) axis, as the main neuroendocrine stress response system, shows specific patterns of functioning in individuals with and without PTSD. Contemporary integrative reviews on military mental health

document a hypocortisolemic phenotype in PTSD, characterised by lower morning plasma cortisol, lower daily urinary cortisol excretion, and enhanced negative feedback suppression (Panda et al., 2024). These neurobiological characteristics not only serve as biomarkers of the disorder but can potentially inform the development of targeted interventions for enhancing resilience. Sleep, as a downstream physiological correlate of HPA-axis stress regulation, is also profoundly affected; the systematic review and meta-analysis by Bai et al. (2023)(2023) reports an overall pooled prevalence of poor sleep quality of 69.0% in military personnel and veterans, with veterans (82.9%) markedly worse than active-duty personnel (57.8%) and poor sleep quality strongly associated with PTSD and depression.

Posttraumatic growth (PTG), defined as positive change in an individual that arises as a result of successful coping with the consequences of trauma, represents an additional dimension of adaptive response to traumatic experiences. Research on military populations has shown that PTG is not uncommon among veterans, particularly among those with moderate levels of PTSD symptoms. Pietrzak, Tsai, and Southwick (2021)(2021), analysing data from the National Health and Resilience in Veterans Study, demonstrated that 43.3% of U.S. veteran respondents reported positive psychological change during the COVID-19 pandemic, with the prevalence of PTG markedly higher (71.9%) among those screening positive for pandemic-related PTSD symptoms. Greenberg, Tsai, Southwick, and Pietrzak (2021)(2021), drawing on the same study, further established that the number of deployments and PTSD symptom severity are positively associated with posttraumatic growth, and that PTG following combat is greatest for those with moderate levels of PTSD symptoms — a curvilinear pattern that points to a 'struggle' threshold beneath which growth does not crystallise. The qualitative systematic review by Habib and colleagues (2018) further documented several domains of PTG specific to military populations, including changes in self-perception, changes in relationships with others, and changes in life philosophy.

Measurement of psychological resilience in military populations typically relies on validated instruments, among which the Connor–Davidson Resilience Scale (CD-RISC) is one of the most commonly used. Rakesh and colleagues (2022) examined the role of trauma, social support, and demography on veteran resilience using the VA Mid-Atlantic Post Deployment Mental Health Repository, which includes 3,876 U.S. military veterans with and without PTSD diagnoses. Regression modelling results showed that CD-RISC was positively correlated with years of education and negatively correlated with PTSD severity, combat exposure, and childhood trauma. Specifically, high resilience predicted lower PTSD symptom severity than low resilience, and this relationship was amplified with increasing levels of combat exposure.

Interventions aimed at enhancing resilience represent a growing area of research and application in military organisations worldwide. Panda and colleagues (2024) synthesise global experience with such interventions, noting that programmes built on the Operational Stress Continuum Model and on cognitive-behavioural resilience-training modules can be implemented across diverse armed forces. Within the US Army, Kirk, Nolet, Adrian, and Knust (2023)(2023) document an iterative quality-improvement process for the Deployment Cycle Resilience Training programme, illustrating how training content is being progressively aligned with operational stressors and post-deployment realities. Sun et al. (2021)(2021) provide complementary meta-analytic evidence on mindfulness

meditation specifically, with 19 studies (N = 1,326) yielding a statistically significant reduction in military-related PTSD symptoms (SMD = −0.33, 95% CI [−0.45, −0.21]) compared to control conditions. On the treatment side, the JAMA Network Open randomised clinical trial by Schnurr et al. (2022)(2022) — comparing prolonged exposure (PE) and cognitive processing therapy (CPT) across 17 VA medical centres and 916 veterans — found both treatments effective and PE modestly superior in reducing PTSD symptom severity, while Dell, Sbisa, and colleagues (2022) in Psychological Medicine demonstrated that 2-week massed PE is non-inferior to standard 10-week PE in military samples, with a dropout rate 3.5 times lower in the massed condition. However, despite widespread implementation, the meta-analytic evidence consolidated by Loebers and colleagues (2020) shows that different conceptualisations of psychological resilience across different research designs are not strongly predictive of mental health and functioning among military personnel, calling into question the utility of broadly defined interventions to increase soldier resilience for the purpose of improving their mental health and functioning. These results highlight the need for further research and more refined conceptualisation of the resilience construct.

The aim of this review study is to synthesise available empirical literature on the psychological resilience profile in professional soldiers following multiple deployments to high-intensity conflict zones. Specifically, the research aims to: (1) identify key components of the psychological resilience profile at individual, interpersonal, and organisational levels; (2) analyse empirical evidence on the relationship between multiple deployments and mental health, with emphasis on factors that moderate this relationship; (3) consider neurobiological correlates of resilience and their implications for understanding adaptation mechanisms; and (4) evaluate implications of findings for the development of interventions aimed at enhancing resilience in military populations. The original contribution of this article consists in the integration of the most recent (2018–2024) post-OIF/OEF SCOPUS literature on military resilience into an ecological four-level model — individual, interpersonal, organisational, and neurobiological — that maps protective factors onto each level and explicitly incorporates posttraumatic growth as a parallel adaptive trajectory rather than a mere absence of pathology, a synthesis that has not previously been jointly demonstrated for multi-deployment military populations.

METHODOLOGY AND LITERATURE REVIEW

The methodological approach of this research was based on a systematic review of literature aimed at synthesising empirical evidence on the psychological resilience profile in professional soldiers following multiple deployments to high-intensity conflict zones. The review was conducted in accordance with contemporary recommendations for conducting and reporting systematic reviews, adapted to the specificities of a review paper focused on conceptual synthesis rather than quantitative meta-analysis (Loebers et al., 2020).

Literature searching was conducted in the electronic databases MEDLINE/PubMed, PsycINFO, Web of Science, and Scopus, with a focus on papers published in journals indexed in the Scopus database. The search timeframe encompassed the period from 2017 to 2024, in line with the contemporary SCOPUS standard for psychological and military health disciplines that prioritises post-OIF/OEF synthesis of long-term outcomes. The search strategy combined key terms organised into three

conceptual categories: terms related to population (military, soldier, veteran, service member, armed forces, combat personnel); terms related to exposure (deployment, combat exposure, combat zone, war zone, multiple deployment, repeated deployment, high-intensity conflict); and terms related to outcomes (resilience, psychological resilience, PTSD, posttraumatic stress, mental health, psychological adjustment, posttraumatic growth).

Studies included in the review met the following criteria: published in journals indexed in the Scopus database; conducted on samples of professional soldiers from developed countries (USA, United Kingdom, Australia, Canada, Netherlands, India, and other NATO and partner members); examined psychological resilience, mental health, or related outcomes in the context of military deployment; used validated instruments for assessing psychological outcomes; and published in English in peer-reviewed journals. Studies conducted on non-combat personnel, studies focused exclusively on physical health without a psychological component, and studies with samples smaller than 100 participants (except in the case of longitudinal studies with rigorous methodology) were excluded.

The study selection process included an initial review of titles and abstracts of identified papers, followed by full-text assessment of potentially relevant studies. For included studies, the following data were extracted: study characteristics (authors, year, country, study design); sample characteristics (sample size, demographic characteristics, type of military service, number and characteristics of deployments); outcome measures (instruments used, defined variables); and main findings relevant to the resilience profile.

The quality of included studies was assessed with regard to study design, with randomised controlled trials and prospective longitudinal cohort studies considered methodologically most rigorous (Pietrzak, 2017; Dyball, Taylor-Beirne, Greenberg, Stevelink, & Fear, 2022; Schnurr et al., 2022; Dell et al., 2022). For longitudinal studies, follow-up duration, attrition rates, and control of confounding variables were assessed. For cross-sectional studies, sample size and representativeness and use of validated instruments were considered.

Analysis of extracted data was organised according to an ecological model that distinguishes resilience factors at the individual level (intrapsychic factors), interpersonal level (social support, unit cohesion), organisational level (leadership, perceived organisational support), and macro-social level (cultural and societal factors). This framework derives from the contemporary conceptualisation of psychological resilience as an interaction between the individual, their life experiences, and current context (Loebers et al., 2020; Panda et al., 2024; Campbell-Sills et al., 2022).

Synthesis of findings was conducted using a narrative approach, integrating quantitative and qualitative data from included studies. Due to heterogeneity in outcome measures, resilience definitions, and sample characteristics, formal meta-analysis was neither possible nor appropriate. Instead, emphasis was placed on identifying consistent patterns across studies, considering convergence and divergence of findings, and formulating integrative conclusions supported by empirical evidence.

The methodological approach of this review has inherent limitations. Reliance on published literature is subject to publication bias, whereby studies with positive or statistically significant findings have a greater probability of publication. The focus on studies from developed countries limits the generalisability of findings to other cultural contexts. Heterogeneity in the operationalisation of the resilience construct

complicates direct comparisons across studies (Loebers et al., 2020). Finally, the review design does not allow for drawing causal conclusions about relationships between identified variables.

RESEARCH RESULTS

A systematic literature review identified studies that meet inclusion criteria and provide relevant empirical data on the psychological resilience profile in professional soldiers following multiple deployments. Results are organised according to conceptual categories: prevalence and trajectories of mental health outcomes, individual resilience factors, interpersonal and organisational factors, neurobiological correlates, and posttraumatic growth as a marker of positive adaptation.

Empirical data consistently document increased rates of mental health problems among military personnel deployed to high-intensity conflict zones, with evidence of cumulative effects of multiple deployments. The Loebers and colleagues (2020) meta-analysis of 40 prospective studies, published in Social Science & Medicine, synthesises evidence from longitudinal samples of military personnel and demonstrates a broadly consistent dose–response pattern between cumulative combat exposure and PTSD incidence. Across global samples, Moradi et al. (2021)(2021) report pooled depression prevalences of 23% (men) and 25% (women), and Lim et al. (2022)(2022) document aggregate war-zone prevalences of 28.9% for depression, 30.7% for anxiety, and 23.5% for post-traumatic stress, with marked civilian–military differences for depression and anxiety. The qualitative synthesis by Habib, Stevelink, Greenberg, and Williamson (2018)(2018) covering nine qualitative studies (N = 195 participants) confirmed that combat exposure across multiple deployments shapes the developmental trajectory of both PTSD and posttraumatic growth.

Longitudinal studies have provided insight into the temporal dynamics of mental health outcomes. Loebers and colleagues (2020) showed that PTSD prevalence frequently continues to rise during the years following return from deployment, with the full scope of mental health problems often manifesting only months or years after return. Campbell-Sills et al. (2023)(2023), using STARRS-LS data linking active-duty trajectories to post-military adjustment outcomes among 1,080 separated or retired soldiers, demonstrated that larger increases in posttraumatic stress, anger and depression over the deployment period each predicted increased post-service life stress and, for anger and depression, reduced job satisfaction. This finding suggests that adverse stress reactions cannot necessarily be expected to diminish over time, highlighting the importance of long-term monitoring and interventions tailored to professional soldiers who have experienced multiple deployments.

Research has identified a range of individual characteristics that contribute to psychological resilience among military personnel. Rakesh, Clausen, Buckley, Clarke-Rubright, Fairbank, Wagner, and Morey (2022)(2022) examined the role of trauma, social support, and demography on veteran resilience using the VA Mid-Atlantic Post Deployment Mental Health Repository (PDMH), which includes 3,876 U.S. military veterans with and without PTSD diagnoses. Regression modelling results showed that CD-RISC scores were positively correlated with years of education and negatively correlated with PTSD severity (Davidson Trauma Scale), combat exposure (Combat Exposure Scale), and childhood trauma (Trauma Life Events Questionnaire). Specifically, high resilience predicted lower PTSD symptom severity than low

resilience, and this relationship was amplified with increasing levels of combat exposure. Structural equation modelling identified a latent resilience variable composed of age, education level, social support, and race.

Van der Meulen, van der Velden, Setti, and Lothmann (2021)(2021) examined the association of resilience resources and long-term deployment-related PTSD symptoms in a longitudinal study of Dutch veterans. Hierarchical regression analysis results showed that fewer resources before deployment as well as decline in resources after deployment predicted PTSD. Low coping self-efficacy and low perceived organisational support before deployment, as well as decline in these resources over time, were significantly associated with PTSD symptoms five years post-deployment. This study provides initial support for the association of resource-loss processes and PTSD symptoms in veterans five years post-deployment.

The meta-analysis by Loebers and colleagues (2020) published in Social Science & Medicine examined longitudinal associations of psychological resilience with mental health and functioning among military personnel. The review identified 40 eligible peer-reviewed papers covering 40 unique samples included in the meta-analysis. Results, however, showed that different conceptualisations of psychological resilience across different research designs were not strongly predictive of mental health and functioning among military personnel, calling into question the utility of broadly defined interventions to increase soldier resilience for the purpose of improving their mental health and functioning. These results highlight the need for further research and more refined conceptualisation of the resilience construct.

Social support and unit cohesion have consistently been identified as key protective factors against negative mental health outcomes following deployment. Pietrzak (2017)(2017), in a study published in the Journal of Affective Disorders, examined the impact of social support, unit cohesion, and trait resilience on PTSD among treatment-seeking military personnel using cross-sectional data from 366 active military members with PTSD following deployment to Iraq or Afghanistan or their vicinity. Structural equation modelling showed that a robust latent variable called personal resources (indicated by social support, unit cohesion, and trait resilience) was negatively associated with PTSD symptom severity. Additionally, negative posttraumatic cognitions mediated the relationship between personal resources and PTSD. These findings suggest that among active military personnel seeking treatment for PTSD, personal resources may mitigate PTSD severity by reducing negative posttraumatic cognitions. Campbell-Sills, Flynn, Choi et al. (2022)(2022) extend this picture with multilevel evidence from US Army soldiers showing that horizontal cohesion at the unit level buffers the effect of combat exposure on PTSD symptoms, depressive symptoms, and suicidal ideation, and that vertical cohesion at the individual level provides additional protective effects.

Across the contemporary literature on resilience among (former) military personnel exposed to combat, perceived social support emerges as one of the strongest predictors of post-deployment adjustment. The meta-analysis of 30 studies of US military service members and veterans by Blais et al. (2021)(2021), published in the European Journal of Psychotraumatology, demonstrates a robust negative association between perceived social support and self-reported PTSD symptoms, with effect sizes larger than those reported in civilian samples. Habib and colleagues (2018), in their qualitative synthesis covering nine

qualitative studies (N = 195) conducted between 2011 and 2016, documented that participants consistently described post-deployment relationships and reconnection with family and community as central to both recovery from PTSD and the experience of posttraumatic growth. The longitudinal evidence consolidated by Loebers and colleagues (2020) further confirms that higher levels of perceived social support are associated with more positive psychosocial and mental-health-related outcomes post-deployment across diverse military samples.

At the organisational level, leadership behaviour and perceived organisational support emerge as key levers. Adler, Gutierrez, and colleagues (2022), using an anonymous electronic survey of 7,829 US Army soldiers across three major commands, established that soldiers' ratings of their immediate supervisors' behaviours during the COVID-19 pandemic were systematically associated with both depression and generalised-anxiety symptoms and with adherence to public-health guidelines, demonstrating that leader behaviour scales beyond combat operations into other high-stress contexts. Help-seeking behaviour, however, remains conditioned by structural and cultural barriers. The systematic review by Randles and Finnegan (2022)(2022) of UK veteran help-seeking behaviour identifies stigma, masculine norms, and concerns about career consequences as recurrent inhibitors of timely engagement with mental-health services. Heyman et al. (2022)(2022), in a Military Medicine systematic review, further document that career-impact concerns associated with mental-health evaluation and treatment in the US Department of Defense are often empirically overestimated, and Campbell, Boyd and colleagues (2023) demonstrate that targeted policy revision can measurably reduce institutional mental-health stigma — an organisational-level finding with direct implications for the design of resilience programmes.

Research on the hypothalamic–pituitary–adrenal (HPA) axis has provided insight into neurobiological mechanisms that differentiate individuals with and without PTSD following trauma exposure. Panda, Chatterjee, Srivastava, Chauhan, and Yadav (2024)(2024), in their integrative review published in the Medical Journal Armed Forces India, synthesise contemporary evidence on neuroendocrine correlates of resilience in armed forces personnel and document a hypocortisolemic phenotype in PTSD characterised by lower morning plasma cortisol, lower daily urinary cortisol excretion, and enhanced negative feedback suppression. The same review highlights that warzone deployment itself, independent of PTSD diagnosis, is associated with measurable changes in HPA-axis functioning, suggesting that the neurobiological signature of cumulative combat stress can be present in the absence of a formal psychiatric diagnosis. Downstream physiological correlates are equally important: Bai et al. (2023)(2023), in a meta-analysis of 59 studies (N = 28,100) published in Sleep Medicine Reviews, document a pooled prevalence of poor sleep quality of 69.0% (57.8% in active-duty personnel and 82.9% in veterans), with PTSD and depression identified as significant moderators — suggesting that disrupted sleep regulation is both a symptom and a perpetuating mechanism in the post-deployment stress cycle.

Posttraumatic growth (PTG) represents positive psychological change that can result from struggling with highly challenging life circumstances. Pietrzak, Tsai, and Southwick (2021)(2021), in a study published in JAMA Network Open analysing data from veterans who participated in the National Health and Resilience in Veterans Study, showed that 43.3% of respondents reported positive psychological benefits

during the pandemic, with PTG prevalence markedly higher (71.9%) among the 12.8% of veterans who screened positive for pandemic-related PTSD symptoms. Greenberg, Tsai, Southwick, and Pietrzak (2021)(2021), drawing on the same study, further document that the number of deployments and PTSD symptom severity are positively associated with posttraumatic growth following combat, and that the relationship between PTSD severity and PTG is curvilinear — peaking at moderate symptom levels — pointing to a structured 'struggle' window in which positive transformation tends to crystallise. The qualitative synthesis by Habib and colleagues (2018) identified several domains of PTG specific to military populations, including changes in self-perception, changes in relationships with others, and changes in life philosophy.

Dyball, Taylor-Beirne, Greenberg, Stevelink, and Fear (2022)(2022), in the ADVANCE cohort study published in Psychological Medicine, examined PTG among UK Armed Forces personnel who were deployed to Afghanistan and the role of combat injury, mental health, and pain. Results showed that participants who experienced deployment-related PTG also reported better overall health and better mental health (excluding PTSD), and that those reporting a greater number of combat experiences or the belief that they might be seriously injured or killed were more likely to report PTG. Soldiers who value their combat experience may therefore have better psychological adjustment post-deployment, even in the presence of substantial combat exposure.

Evidence on the effectiveness of resilience-oriented and trauma-focused interventions has consolidated significantly in the 2020–2024 window. The meta-analysis by Sun et al. (2021)(2021), published in the Chinese Journal of Traumatology and covering 19 trials (N = 1,326), reports a statistically significant reduction in military-related PTSD symptoms following mindfulness meditation compared with control conditions (SMD = −0.33, 95% CI [−0.45, −0.21], $p < 0.0001$), with comparable effects across delivery formats and durations. On the trauma-focused side, Schnurr and colleagues (2022) report, in a 916-veteran multi-site randomised trial published in JAMA Network Open, that both prolonged exposure (PE) and cognitive processing therapy (CPT) yield clinically meaningful PTSD improvements, with PE producing modestly larger reductions than CPT. The non-inferiority RCT of Dell, Sbisa and colleagues (2022) in Psychological Medicine demonstrates that a 2-week massed PE protocol is non-inferior to standard 10-week PE for active-serving members and veterans, with a dropout rate of 4.8% in the massed condition versus 16.9% in the standard condition. Within the prevention domain, Kirk, Nolet, Adrian, and Knust (2023)(2023) document an iterative quality-improvement programme through which the US Army has refined its Deployment Cycle Resilience Training, illustrating how field experience and evaluation data are being used to align resilience training more tightly with operational demands.

CONCLUSION

The systematic review of empirical literature on the psychological resilience profile in professional soldiers following multiple deployments to high-intensity conflict zones allows for drawing several integrative conclusions that have implications for both theoretical understanding of resilience and practical application in military organisations. Psychological resilience in professional soldiers represents a complex, multidimensional construct that transcends the simple absence of psychopathology. Empirical evidence consistently supports the

conceptualisation of resilience as a dynamic process involving interaction between individual characteristics (adaptability, self-efficacy, cognitive flexibility), interpersonal resources (unit cohesion, social support), and organisational factors (leadership quality, perceived organisational support) (Pietrzak, 2017; Rakesh et al., 2022; Loebers et al., 2020; Campbell-Sills et al., 2022).

Multiple deployments to high-intensity conflict zones represent a cumulative risk to mental health, with consistent evidence that soldiers with two or more deployments show higher rates of PTSD and other mental disorders compared to those with a single deployment. However, this relationship is not deterministic; a significant portion of soldiers with multiple deployments maintain healthy psychological functioning, indicating the existence of protective factors that moderate the effect of cumulative stressor exposure (Loebers et al., 2020; Campbell-Sills et al., 2023). Research identifies recovery time between deployments as a key moderating factor, with longer recovery periods significantly associated with reduced risk for PTSD. This finding has direct implications for deployment policy, suggesting that adequate recovery time is not a luxury but a necessity for preserving the mental health of military personnel.

Social support, particularly post-deployment support, consistently emerges as one of the most robust protective factors against the development of PTSD and other mental health problems. The contemporary evidence shows a negative association between social support and PTSD symptom severity, with effect sizes indicating a clinically significant relationship (Pietrzak, 2017; Habib et al., 2018; Blais et al., 2021). Unit cohesion during deployment also has a protective function, although evidence suggests that its effect may vary depending on type of military component (active duty versus reserve/National Guard) and on whether cohesion is operationalised at the individual or unit level (Campbell-Sills et al., 2022). These findings highlight the importance of not only individual interventions but also interventions aimed at strengthening social networks and unit processes.

Neurobiological research provides insight into physiological correlates of resilience and vulnerability, with consistent findings of a hypocortisolemic phenotype in PTSD characterised by enhanced negative feedback of the HPA axis (Panda et al., 2024). However, evidence also suggests that warzone deployment itself, independent of PTSD diagnosis, may be associated with changes in HPA functioning. The high prevalence of poor sleep quality in military and veteran populations (69.0% pooled) further connects neuroendocrine dysregulation to a measurable behavioural marker, with sleep emerging as both a vulnerability factor and an intervention target (Bai et al., 2023). These findings have potential implications for the development of risk biomarkers and possible pharmacological interventions, although the current level of knowledge does not allow for direct clinical application.

Posttraumatic growth represents an important but often neglected dimension of adaptation to traumatic experiences. Empirical evidence shows that a significant proportion of veterans with PTSD also experience PTG, particularly those with moderate levels of symptoms (Pietrzak, Tsai, & Southwick, 2021; Greenberg et al., 2021; Dyball et al., 2022). Paradoxically, the number of deployments shows a positive association with PTG, suggesting that multiple exposure may, under certain conditions, facilitate positive transformation. This finding does not diminish the seriousness of mental health risks but alerts to the need for a balanced perspective that includes the potential for growth alongside the potential for pathology.

Implications for practice derive from several key findings. Interventions aimed at enhancing resilience should target multiple levels (individual, interpersonal, organisational) and include components of proven effectiveness such as adaptability training, strengthening unit cohesion, and facilitating post-deployment social support (Panda et al., 2024; Kirk et al., 2023). Trauma-focused therapies — prolonged exposure (Schnurr et al., 2022), cognitive processing therapy, and massed delivery formats (Dell et al., 2022) — together with adjunctive mindfulness-based protocols (Sun et al., 2021) provide a tested arsenal that can be sequenced according to clinical phenotype and service context. Organisational interventions that strengthen leadership skills relevant to subordinates' mental health (Adler et al., 2022) and that explicitly reduce institutional stigma (Heyman et al., 2022; Campbell et al., 2023; Randles & Finnegan, 2022) are essential complements at the system level. Deployment policies should take into account empirical evidence on the importance of adequate recovery time, with dwell-to-deployment ratios that minimise mental health risk. Post-deployment screening and interventions should be conducted continuously, recognising that the full scope of mental health problems often manifests only months or years after return (Loebers et al., 2020; Campbell-Sills et al., 2023). Finally, a positive approach that recognises the potential for posttraumatic growth can complement the traditional focus on prevention and treatment of psychopathology.

The principal original contribution of this article consists in the integration of the most recent (2018–2024) post-OIF/OEF SCOPUS literature on military resilience into a unified ecological four-level model that maps individual (Rakesh et al., 2022), interpersonal (Pietrzak, 2017; Blais et al., 2021), organisational (Van der Meulen et al., 2021; Adler et al., 2022; Campbell-Sills et al., 2022), and neurobiological (Panda et al., 2024; Bai et al., 2023) protective factors and explicitly incorporates posttraumatic growth (Greenberg et al., 2021; Pietrzak, Tsai, & Southwick, 2021; Dyball et al., 2022; Habib et al., 2018) as a parallel adaptive trajectory.

Limitations of existing literature point to the need for further research. Most studies have been conducted on male soldiers from the USA, limiting the generalisability of findings to other genders and cultural contexts. Heterogeneity in the operationalisation of the resilience construct complicates integration of findings and requires consensus on conceptual and measurement definition (Loebers et al., 2020). The relative lack of randomised controlled trials evaluating resilience programmes precludes firm conclusions about the effectiveness of specific interventions, although the recent expansion of high-quality RCTs in adjacent trauma-focused therapies (Schnurr et al., 2022; Dell et al., 2022) provides a methodological template that resilience-prevention research can emulate. Longitudinal research that follows soldiers through multiple deployments and long after the end of service is needed for full understanding of the temporal dynamics of resilience and psychopathology (Campbell-Sills et al., 2023).

Psychological resilience in professional soldiers following multiple deployments to high-intensity conflict zones represents a critical area of research with direct implications for the health and wellbeing of military personnel. Integration of empirical evidence from various disciplines — clinical psychology, social psychology, neuroendocrinology, and organisational psychology — provides a foundation for comprehensive understanding of factors that contribute to maintaining psychological functionality under conditions of extreme stress (Panda et al., 2024).

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PROFIL PSIHOLOŠKE OTPORNOSTI KOD PROFESIONALNIH VOJNIKA NAKON VIŠESTRUKIH ANGAŽMANA U ZONAMA SUKOBA VISOKOG INTENZITETA

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Primljeno: 04.07.2025. Odobreno: 21.10.2025.

Originalni naučni članak

DOI: https://doi.org/10.65932/military-studies-2025-2-8
UDK: 159.944.4:355.1-057.36

Sažetak: Višestruki angažmani profesionalnih vojnika u zonama sukoba visokog intenziteta predstavljaju značajan izazov za mentalno zdravlje vojnog osoblja, dok istovremeno pružaju uvid u mehanizme psihološke otpornosti. Cilj ovog istraživanja bio je identifikovati ključne komponente profila psihološke otpornosti kod profesionalnih vojnika koji su preživjeli više angažmana u aktivnim zonama borbe. Metodološki pristup zasnivao se na sistematskom pregledu literature objavljene u časopisima indeksiranim u Scopus bazi podataka, s fokusom na longitudinalne studije, meta-analize i randomizirane kontrolirane studije provedene na vojnim populacijama koje su učestvovale u Operaciji Iračka Sloboda (OIF) i Operaciji Trajna Sloboda (OEF). Rezultati istraživanja ukazuju na višedimenzionalnost konstrukta otpornosti koji obuhvata individualne faktore (adaptabilnost, samoefikasnost, kognitivna fleksibilnost), socijalne resurse (kohezija jedinice, post-angažmanska socijalna podrška) i organizacijske faktore (kvalitet vodstva, percipirana organizacijska podrška). Analiza dostupne literature pokazuje da prevalenca posttraumatskog stresnog poremećaja (PTSP) raste proporcionalno broju angažmana, pri čemu vojnici s dva ili više angažmana pokazuju značajno više stope PTSP-a u odnosu na one sa jednim angažmanom. Ključni zaštitni faktori uključuju visok nivo adaptabilnosti mjeren Connor–Davidson skalom otpornosti, snažnu koheziju jedinice, adekvatnu post-angažmansku socijalnu podršku i dovoljno vremena za oporavak između misija. Neurobiološki korelati otpornosti uključuju specifične obrasce funkcionisanja hipotalamo-pituitarno-adrenalne osovine, s pojačanom negativnom povratnom spregom kao markerom adaptivnog stresnog odgovora. Zaključno, psihološka otpornost kod profesionalnih vojnika predstavlja dinamičan, višefaktorski konstrukt koji se može identifikovati, mjeriti i potencijalno unaprijediti ciljanim intervencijama prije, tokom i nakon angažmana u zonama sukoba visokog intenziteta.

Ključne riječi: *psihološka otpornost, višestruki angažmani, profesionalni vojnici, posttraumatski stresni poremećaj, zone sukoba visokog intenziteta, zaštitni faktori.*