

Trauma, Traumatization and Adverse Environments in War and Armed-Conflict

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Abstract

The present account outlines a scenario of chronically-unfolding disaster that has arisen from the propensity for 'ongoing-acceptance-of-war-states' despite the costs paid by all those touched by its epidemic proportions. From the perspective of trauma and traumatization of combatants, civilians and survivors, the consequences, generally life-long, may be measured in various terms that include posttraumatic stress disorder, epigenetic and telomeric manifestation, the destruction of relationships, child welfare and individual profiles with a high probability of irreversibility. The ravages of war describe a confluence of syndromes and disorders, pathophysiological and neurogenetic predispositions, and requirement for prevention and intervention that entice dire considerations of cataclysm if left to fester.

Keywords: Trauma; Traumatization; Posttraumatic stress disorder; Neuropsychiatry; Symptoms; Syndromes; Biomarkers; Intervention; Prevention

Introduction

Several aspects of brain regional biomarker and behavioral trauma are associated with the conditions of war, i.e., armed conflict whether based upon formal declaration and related connotations, revolutionary or independence, guerilla or terroristic, involving deteriorations in cognitive-emotional harmony, destruction of regional brain integrity and the blockade of brain maturation processes, not only at infantile, childhood, and adolescent levels but throughout the individuals' lifecycle; these may be illustrated long after the cessation of the conflict, in this case the Second World War (1939-1945), through the ability/disability of biographical writing interventional attempts influencing the course of depressiveness-anxiety and quality-of-life in comparison with daily diary writing [1]. For example, the repercussions and identity crises induced by enemy captivity during war, such as becoming a prisoner-of-war (POW) may be transmitted to spouses/partners of former or ongoing POWs through the mediation of posttraumatic stress Disorder symptoms (PTSDs). Arising from the horrors of the First World War (1914-1918), several of neurological conversion symptoms of "epidemic proportions" placed disproportionate demands upon the fledgling neuropsychiatric and psychological practices whether accompanied by formal cerebral damage or to all appearances intact individuals. Combat soldiers from all the nations-at-war expressed a myriad of functional convolutions in large numbers accompanied by serious neurological signs and symptoms, such as dizziness, tremor, paraplegia, tinnitus, amnesia, weakness, headache and mutism, psychotic episodes and criminalist expressions, all of psychosomatic origin. Among Australian soldiers surviving the Vietnam-war related co-morbidities included gastrointestinal, hepatic, cardiovascular, and respiratory systems, sleep disorders, and laboratory pathology markers of health deterioration [2]. The eventual terminology that was applied for these traumatic and completely unpredictable condition could alternate between such relatively innocuous formulations such as "shell shock" or "war neurosis" to demeaning expletives, formulated invariably by the general staff of the allied nations, like "lack of moral fibre" and "absence of moral turpitude" not least due to the paucity of informed understanding and the plethora of medically unexplained symptoms and somatic disruptions [3].

The serious, even permanent, consequences of War on the mental health of combatants, civilian-affected and survivors remains an obvious, ongoing and vested-interest fed calamity. The issue of gender, both in combat circumstance and in attitudes to war, does not offer itself to obvious or uncomplicated predisposition as illustrated by the greater willingness of Japanese male participants to accept the notion of "war" in comparison with their female counterparts, the relationship between attitudes toward war and masculinities was shown to be inconclusive, implying that favorable attitudes toward war among male participants may be modulated through interpersonal orientations [4]. For several reasons the assessment of biomarkers for traumatic stress arising from war zone conflict conditions lends a significant necessity in view of the enormous suffering due to first, second and third degree traumatization. For example, the BDNF gene codes for brain-derived neurotrophic factor, a growth factor involved in neural development, cell differentiation, and synaptic plasticity, and as a general rule decrements in brain and circulatory levels of brain-derived neurotrophic factor (BDNF) are linked to both neuropsychiatric and neurologic health deterioration. Both laboratory and clinical studies indicate that early life stress and adverse environments, such as prenatal and postnatal stress, alters in a broad sense the parameters of BDNF methylation, with presumed changes in gene expression. It ought to be borne in mind that the consistency of self-reported symptoms and concussive events in combat veterans who reported experiencing concussive events may not always remain dependable or even reliable [5] which places a requirement on suitable design and statistical adroitness. Neurocognitive modulations linked to chronic exposure to war/armed conflict experiences makes heavy demands upon emotional processing for the elaboration and implementation of adaptive social strategies in situations fraught with fatal risk. Ex-combatants, from illegally armed groups in Colombia, presented with higher assertion skills and showed

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more pronounced brain responses to faces than the control group, without combat experience, lacking also the bias toward “anger” that was observed in the control group wherein the latter group showed a greater likelihood of misclassifying the “neutral” faces as “angry” [6].

The developmental, or rather the anti-developmental-retrogressive, aspect of wars and armed-conflict, with their related repercussions at individual and group levels, present impacts contrary to health and well-being that in most cases outlast individuals’ lifespan and even succeeding generations. In Palestinian women residing in the Gaza Strip (N = 511) participating in a well-being study during their second trimester (T1) when their infants were 4 and 12 months of age, it was observed that that war-trauma reaction was not associated directly with maternal-foetal attachment but rather it was mediated through a low level of social support and high level of maternal prenatal psychological health problems and issues, as well as the case that intensive maternal-foetal attachment predicted optimal mother-reported infant’s sensorimotor and language development and mother-infant emotional availability but not newborn health or maternal postpartum psychological health [7]. These authors have observed also that higher levels of traumatic war incidents were not related to high levels of PTSD, depressive, or dissociative symptoms among those mothers showing high levels of posttraumatic growth implying that this effect may protect maternal psychological health from the traumatic effects of effects whereby the presence positive maternal positive posttraumatic cognitions was shown to protect the infants’ stress regulation from the ravages of the existing war trauma [8]. The loss of one or both parents in early childhood during ongoing war/conflict may exert serious long-term psychological consequences upon young individuals’ development and well-being. In a group of individuals (n = 98), whose fathers had died or been killed in the Homeland War in Croatia, and who had just been born at the time of their fathers’ deaths, or were children or adolescents at that time, and had since their father’s death grown up in a single-parent family with their mother and in comparison with a control group who had not suffered such loss, differences were demonstrated in some of the scales and subscales of anger as a state and anger as a personality trait with higher scores in those individuals who had suffered a civilian loss of father [9].

Invariably, the consequences of defeat are calamitous for surviving civilian population, particularly women and children. Following World War II, more than 200,000 German occupation children, fathered by occupation soldiers and born to local women so-called “children of war” a common consequence of the armed conflict, were to a great extent fostered under difficult-adverse conditions thereby subsequently expressing an over-representative prevalence rates of neuropsychiatric disorders several decades later. Tonic immobility, which is elicited in context of inescapable threat and perception of entrapment, presents an involuntary motor and vocal inhibition reaction, considered the last-ditch response of the defensive cascade model. It has been observed that peritraumatic tonic immobility presents a massive link to sexual trauma, especially in child sufferers but strongly too in adolescents and adults, than to other types of trauma experience in the general population [10]. In a study of these children compared to a representative birth-cohort-matched sample the outcomes indicated markedly higher prevalence rates of emotional abuse/neglect, physical, and sexual abuse in German occupation children compared to the birth-cohort-matched sample with all five subtypes of childhood maltreatment found to increase the risk of PTSD and somatoform syndrome; furthermore, depressive syndromes were linked to emotional abuse/neglect and physical abuse thereby emphasizing the complex, long-term impact of developmental conditions and childhood maltreatment [11]. Among Palestinian

children it was observed that that 43% of those participating reported playing or visiting a nice place as earliest memories, and about one third (30%) of the traumatic events or accidents (30%) or miscellaneous events (27%). The individual and social orientations of these children were almost equally common, the emotional tone mainly neutral (45.5%), with 60% remembering a specific event/episode. Furthermore, the boys remembered a greater number of earliest memories involving traumatic events or accidents, whereas girls remembered more social events. Finally, the trauma of war was associated with reduced positive emotional tone and with greater specificity of these memories [12].

Traumatization may be defined as the process(es) through which the criteria of PTSD are achieved. The traumatic effects of POW captivity have been well-documented elsewhere [13-16] with debilitating lifespan prognoses for example through telomeric shortening [17], but the effects of secondary trauma arising from transmission of trauma from prisoners to spouses-partners that causes an over-identification implies that the posttraumatic symptoms may have undergone impairments to wives self-differentiation resulting from (prisoner)husbands’ narrative demand attention. Demoralization during conditions of conflict/warfare exerts the effects of eroding the morale/well-being/health of both sides of warring combatants and non-combatants, even civilians at distance in time and space. Secondary traumatization has been operationalized through the elevated scores arising upon prisoners’ spouses’ and children’s internalizing or externalizing behavioral problems and on the spouses’ demoralization [18]. It has been observed from regression analyses that the ongoing PTSD condition among the Vietnam veterans was related to demoralization expressions among their wives or partners, which subsequently were associated with behavioral problems in their daughters [19]. The demoralization condition of the wives or partners was linked also to current levels of alcoholism in the veterans themselves. These associations were adjusted also for other war-veteran risk factors, such as severity of combat exposure, involvement in the harming civilians and/or prisoners, and prewar vulnerability for psychological problems. Lahav et al. [20] studied whether or not (i) the moderating influences of indirect exposure to captivity in the association between husbands’ posttraumatic symptoms and wives’ posttraumatic symptoms and differentiation; and (ii) the observed directionality of the association between wives’ differentiation and posttraumatic symptoms were altered over time. They observed an effect of indirect exposure to captivity that moderated the associations between husbands’ posttraumatic symptoms and wives’ posttraumatic symptoms, as well as an association between the wives’ differentiation and PTSS over time that was bidirectional, suggesting a “vicious cycle” between posttraumatic symptoms and differentiation.

On a note of necessary hopefulness, it was shown that the disclosures of the traumatized ex-POWs’ and combatants’ within the marital relationship may have contributed to the amelioration of their wives’ secondary traumatization [21]. The essential influence of the hypothalamic-pituitary-adrenal axis (HPA) in stress-related homeostasis suggests that there is a dysregulation of HPA involvement in the etiopathogenesis of PTSD. It seems to be the case that third generation holocaust individuals report lower levels of posttraumatic stress symptoms and psychiatric symptomatology than non- third generation holocaust participants in a large study, despite their fathers’ captivity status [22]. It has been observed during the ongoing conflict in the Democratic Republic of the Congo that civilians markedly exposed to traumatic stressful events, involving traumatizing experiences that cumulatively heighten the risk for trauma-related disorders demonstrated impairments of cognitive and psycho-social functioning [23]. Congolese trauma survivors suffered not only from the core PTSD

symptoms but also from deficits of cognitive functioning parameters. Severity of PTSD symptom profiles were additionally observed to be connected to impaired psycho-social functioning implying that trauma-related mental health problems may elevate the risk for poverty-misery and preclusion of well-being prospects that aggravate further the consequences of war and conflict. A longitudinal study performed 30 and 38 years following the Yom Kippur war in the middle-east indicated that the wives of ex-POWs endorsed higher PTSS compared to wives of controls [20]. Wives of ex-POWs with PTSD expressed greater levels of posttraumatic stress symptoms and higher attachment avoidance behavior compared with wives of ex-POWs exhibiting PTSD and a control group with associations between posttraumatic stress symptoms and attachment insecurities. They observed that the relationship between posttraumatic stress symptoms and attachment insecurities among wives of ex-POWs was unidirectional. Nevertheless, a moderated mediation analysis indicated that these affected offsprings' anxiety sensitivity levels mediated the association between Holocaust background and participants' posttraumatic stress symptoms and psychiatric symptomatology profiles, only among the offspring of ex-POWs.

Active duty combat soldiers that are deployed in conflict war zones have been shown to be at risk for PTSD, depression, and stress can lead to low-grade, chronic inflammation and biomarkers of health problems; identification of symptoms and biomarkers offers an initial step towards the derivation of potential interventions and possibly restricted levels of prevention. Traumatic brain injury, a relatively common injury experienced by service members across both deployed and non-deployed combat environments, may even constitute an occupational hazard [24]. In groups chosen for similarity in relation to demographic characteristics and affective profiles, war experience and traumatization, and psychiatric and medical conditions other than PTSD, the altered levels of cortisol in offsprings of veterans did not follow any systematic pattern [25]. It was found that depressiveness and anxiety associated with combat war zone deployment present powerful predictors of PTSD symptoms, c-reactive protein and hair cortisol which were shown to be correlated both with each other and with depressiveness and PTSD symptoms [26]. Chronic Inflammation arising from war-related PTSD may reduce hippocampal volume through blockade of neuroreparative processes and neurogenesis and the promotion neurodegeneration; assessments of the links between inflammatory markers and hippocampal volume offer important information regarding loss of integrity within regions of higher cerebral functioning. In a study of 246 Gulf war veterans, it was observed that increased tumor necrosis factor, a pro-inflammatory cytokine, but not interleukin-6, was related strongly to reduced hippocampal volume [27]. The relationship between tumor necrosis factor and decreased hippocampal volume was independent of potential confounds and covariates, including PTSD status. Nevertheless, higher PTSD severity was linked to marked increases in tumor necrosis factor and reduced interleukin-6 levels. In a prospective cohort of 133 U.S. Army soldiers, presenting with no prior history of war zone deployment, who were investigated for associations between the 5-HTTLPR (serotonin transporter) genotype, level of war zone stressors, and reported symptoms of PTSD, depression and anxiety during deployment in the Iraqi war [28]. They found that symptoms of PTSD, depression and anxiety were related to level of war zone stressors. The 5-HTTLPR genotype, which is associated with stress responsiveness, moderated the relationship between level of war zone stressors and symptoms of emotional disturbance. In this context, those individual soldiers who carried one or two low functioning alleles (the S or LG allele) reported enhanced symptoms of PTSD, depression and anxiety in response to

increased levels of exposure to war zone stressors, relative to soldiers homozygous derived from the high functioning allele (LA allele). In a study of Among 24 mothers and newborn infants in the eastern Democratic Republic of Congo, a region afflicted by long-lasting, extreme conflict conditions of violence towards women and children, it was shown that the maternal experiences of war trauma and chronic stress were associated with BDNF methylation in umbilical cord blood, placental tissue, and maternal venous blood [29]. These linkages of maternal stress and BDNF methylation were associated with high tissue specificity with significant associations observed in the putative transcription factor binding regions of these individuals; a notable demonstration of detrimental epigenetic changes with long-lasting, trans-generational consequences. A substantial (greater than 10%) subcortical brain atrophy in Gulf war combatants that consisted of the brainstem, highest level of atrophy, followed by the left cerebellum and right thalamus, then right cerebellum and left thalamus for the most part, with to a lesser extent, basal ganglia, amygdala and diencephalon loss [30]. The particular pattern and distribution of cerebral atrophy of atrophy, together with the observed systematic reduction in volume of other subcortical areas (basal ganglia, amygdala and diencephalon), corresponds to the distribution of atrophy observed in toxic encephalopathy. Taking into account the incidence of PTSD in war trauma, it has been shown that selective alterations in functional connectivity in the medial temporal lobe subsystem of the default mode network in PTSD contributes an important factor underlying pathophysiology and symptomatology [31].

There is an alarmingly and tragically abundance, disproportionately so, of evidence for psychiatric disorder, involving such conditions as depression and anxiety, insomnia, suicide ideation, and cognitive-emotional disharmony often of childhood origins, expressed both in military personnel and civilian non-combatants whether in wartime or peace, post-campaign or long-after [32-34]. From a database comprised 71,068 individuals, of whom 3139 were war veterans, it was implied that nightmares presented as an independent risk factor for suicide rather than providing an intermediary for history of traumatic experiences [35]. In a German study of asylum seekers from conflicts regions and in comparison with an ordinary German population of volunteers, the observed rates of traumatic events and distress including the prevalence rates of putative PTSD, depression, and anxiety were markedly higher [36]. In a study of 120 school-aged children and younger adolescents (10-15 years of age), whose parents/fathers were the veterans of war, there were markedly stronger differences in competencies, behavior, emotional difficulties and neuroticism with greater problems in activity, social and school conduct as well as in symptoms of behavioral problems between children of fathers presenting PTSD and those not doing so, to the disadvantage of the former [37]. Furthermore, there were notably strong correlational relationships arising between psychopathology of parents - fathers the veterans of war and their children. It ought to be noted also that following adjustment for combat exposure conditions, previous psychiatric history, and demographics, female healthcare-givers exhibited significantly higher odds of screening positive for PTSD than did their male healthcare-giver counterparts [38], although it is necessary to control for additional stressors, including long work hours, disrupted sleep patterns, and the number of casualties treated/untreated. The issue of torture, often an addendum to conflict, provides shocking reading: with cumulative exposure of individuals to multiple torture types predicted anxiety and PTSD, while mental health, basic resources, as expressed by access to food, shelter, medical care, and external risks, i.e. risk of being victimized at home, community, work, school) were the strongest psychosocial predictors of anxiety, PTSD, and depression with regression analyses presenting evidence that female

gender, older age, and unstable housing predicted a heightened severity for anxiety, posttraumatic stress disorder (PTSD), and depression as well as the amount of time spent in the United States before presenting for services [39]. Drug addiction amongst veterans, e.g. from the Gulf war era, tends to exacerbate neuropsychiatric pathology since following adjustment for gender, age, sexual orientation, combat exposure, traumatic life events, traumatic brain injury, posttraumatic stress disorder, depression, alcohol use disorder, and noncannabis drug use disorder, cannabis use disorder was associated markedly with both suicidal and non-suicidal self-injury [40]. The examination of a sample of 148 Croatian male war veterans has shown that combat-related PTSD veterans (patients) presenting co-morbid depressive disorders displayed an enhanced incidence of suicidal thoughts and differences in personality profiles compared with those patients suffering from PTSD by itself [41]. Applying the Temperament and Character Inventory to this population, it was found that the character dimension, cooperativeness, and the trait dimension, impulsiveness, were shown to be uniquely predictive of suicide ideation among these individuals.

Preventative and interventional treatment programs for individuals, i.e., civilians, soldiers, POWs and survivors, at risk of developing psychological and psychiatric problems following exposure/association to war trauma have blossomed during the course of the previous decades [42-45], and yet the suffering involved by these victims remains at catastrophic levels. Nevertheless, there are several positive aspects to the attempts at prevention and intervention. In this regard the neuropsychiatric health screening of war-ravaged populations using mobile applications and other IT devices seems essential [46]. For example in a study of war-afflicted children and adults resettled in Australia, the afflicted individuals placed in the intervention condition presented a higher level of symptom reduction, which was maintained at the three-month follow-up tests, than those individuals in the waiting-list control condition [47]. Sometimes the interventional requirements are both somatic and vegetative: among groups of military couples, both partners' positive and negative behaviors during conflict interactions were related to sleep quality with efficacy of communication and conflict-resolution skills playing a major role in developing not only the well-being of marital health of veterans and their spouses but also the physical health of both partners in addition [48]. In partnerships relations the risk of domestic violence is related to traumatic episodes as often arises under warring conditions: thus, Taft et al. [49] estimated the efficacy of the "Strength at Home Men's Program", which presents a trauma-informed group intervention based on a social information processing model to terminate intimate partner violence through application to a sample of veterans/service members and their partners. Their results offered support for the efficacy for the "Strength at Home Men's Program" in decreasing and terminating intimate partner violence among male veterans and service members. Applications of neurofeedback fMRI appear encouraging since preliminary findings show evidence of normalization of functional brain connectivity among PTSD-afflicted war veterans [50]. Narrative exposure therapy that focusses upon psychosocial interventions, i.e., trauma- and non-trauma-focused, for refugee populations experiencing post-traumatic stress disorder (PTSD), depressive or anxiety symptoms induced positive outcomes in war-torn refugees from a diverse range of backgrounds and trauma types [51]. Finally and conclusively, it is becoming ever-more clear that the intervention-prevention most likely to bring about amelioration of trauma consequences would be the preservation of peace [52].

Conclusion

In summary, the repercussions and culmination of armed

conflict and war are devastatingly measured in loss of any well-being expectations that are instead accompanied by a myriad of trauma expressions that generally include PTSD together with a concatenation of neuropsychiatric and vegetative syndromes, symptoms biomarkers of health disaster. The registered health problems arising from the condition of both partakers of the violence and survivors extend from the varying degrees of traumatization to alterations of regional brain functioning, the inducement of lasting pro-inflammatory loss of neuro-immune integrity, adverse epigenetic alterations to essential signaling agents and their metabolism and the ever-increasing requirement of newer, more adaptable and efficacious strategies for prevention and intervention.

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