

Resilience, burnout, and role stress among military personnel

Asmaa Amin Abdelaziz Mohammad

Department of Psychiatry, Ain Shams University,
Cairo, Egypt

Correspondence to Asmaa Amin Abdelaziz
Mohammad, p.o. 2352, Medical Military Services,
Doha, Qatar
Tel: +0097455313445; fax: +0097444613190;
e-mail: asmaa27567@yahoo.com

Received 10 June 2011

Accepted 1 August 2011

Middle East Current Psychiatry
2012, 19:123–129

Background

A growing body of research has provided evidence that cortisol and dehydroepiandrosterone sulfate (DHEA-S) are involved in an organism's response to stress and that it may exert beneficial behavioral and neurotrophic effects.

Methods

This study investigated plasma DHEA-S, cortisol level, and their ratio in 20 healthy participants working in military with psychological symptoms of burnout syndrome diagnosed by the Maslach Burnout Inventory scale.

Results

The level of DHEA-S and the cortisone and ratio between them were significantly and negatively related to stress-induced symptoms of burnout syndrome. Similarly, participants who reported fewer symptoms of burnout had increased levels of ratio of DHEA-S to cortisone level.

Conclusion

These data provide prospective, empirical evidence that DHEA-S are associated with superior stress tolerance and fewer psychological symptoms of burnout in participants working in military, and these results can be superiorly and objectively used to assess military performance.

Keywords:

burnout syndrome, hormones, military, stress

Middle East Curr Psychiatry 19:123–129

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2090-5408

Introduction

Although psychopathological change after stress is relatively common, it is noted that it is the exception rather than the rule. Even after significant exposures to stress or trauma, most people do not develop lasting psychopathology. Increasing interest in stress resilience has led to research on the neurobiological basis of protective factors as well as risk factors for developing psychopathological changes. Resilience has been defined as having either no symptoms or only one symptom after stress or trauma and also as a measure of coping and qualities that allow individuals and communities to grow in the face of adversity [1]. Resilience and recovery need to be differentiated. Bonanno [2] defined resilience as the ability of adults in otherwise normal circumstances who are exposed to an isolated and potentially highly disruptive event such as the death of a close relation or a violent or life-threatening situation to maintain relatively stable, healthy levels of psychological and physical, as well as the capacity for generative experiences and positive emotions, whereas recovering individuals often experience transient perturbations in normal functioning (e.g. several weeks of sporadic preoccupations or restless sleep), but generally exhibit a stable trajectory of health functioning across time [3]. We are only beginning to understand why some people exposed to chronic stress develop psychopathology and some people do not [4]. Special populations such as women, children, and

adolescents, individuals with preexisting health problems, and the poor are at increasing risk for psychological morbidity [5]. Chronic stress accounts for a substantial proportion of disease disability and burden. The burden associated with chronic stress and mental disorders is projected to increase over the coming years. Burnout syndrome (BOS) is a psychological term for the experience of long-term exhaustion and diminished interest. It is often observed in work-related stress as for example, among general practitioners, teachers, social service employees, police, and military men. Burnout is recognized in the International classification of diseases-10 as 'problems related to life management difficult' although it is not recognized in DSM [6,7].

The characteristics of the BOS are: (a) emotional exhaustion: protracted feelings of tension and emotional exhaustion in the relationships with other people; (b) depersonalization: negative or uncivil reply to people requiring or receiving professional services or a treatment; and (c) reduced personal satisfaction: while working with other people, one feels that one's competence and desire for success is failing [8].

Burnout shows a number of similarities to other psychosomatic disorders, for example, chronic fatigue syndrome (CFS). In CFS, symptoms also include physical exhaustion, fatigue, loss of energy, increased irritability, reduced accomplishment, nonspecific pain, and sleep and

concentration difficulties. In contrast to burnout, the occurrence of CFS is not restricted to social service professionals [9,10].

There are three levels of experienced feelings: (a) high degree of burnout: high scores on the Emotional Exhaustion and Depersonalization subscales and low scores on the Personal Satisfaction subscale; (b) average degree of burnout: average scores on all three subscales; and (c) low degree of burnout: low scores on the Emotional Exhaustion and Depersonalization subscales and high scores on the Personal Satisfaction subscale.

The consequences of burnout are potentially very serious, which suggest that burnout can lead to deterioration in the quality of work or service that is provided by the staff. It appears to be a factor in job turnover, absenteeism, and low morale. Furthermore, burnout seems to be correlated with various self-reported indices of personal distress, increased use of alcohol and drugs, and marital and family problems [11]. There is a complex interplay between physio/medical and psychological symptoms that may be presented by patients with a history of chronic stress disorder and BOS. As regards dysregulation of hypothalamic-pituitary-adrenal (HPA) is less clear for acute versus chronic stress state. Chronic stress has been associated with increased as well as decreased HPA activation [12]. Lower cortisol stress responses to a laboratory stress task were observed in individuals suffering from chronic work stress. This finding could be explained by the fact that adaptation and coping processes are invoked, and that the personality of the participants might determine how HPA regulation is affected by the stressor [13]. With regard to burnout, some authors proposed that burnout might result in lower basal HPA activity, in as much as the emotional exhaustion seen in burnout is similar to the fatigue seen in CFS. However, the often stressful work conditions of persons afflicted by burnout could also be regarded as a state of chronic stress, although no empirical proof for these hypotheses has been presented [12]. Increasing interest in stress resilience has led to research on the neurobiological basis for protective as well as risk factors for burnout psychopathology. Dehydroepiandrosterone (DHEA) is a steroid hormone that is synthesized *de novo* from cholesterol in the adrenal gland, central nervous system, and gonads. DHEA and its sulfated derivative, DHEA-S, were originally thought to be produced *in situ* in brain tissue but at present it is believed that its source is from the periphery; it is the most abundant circulating steroid in humans and is referred to as a neurosteroid [14,15]. In humans, data indicate that DHEA-S is a potential neurobiological resilience and stress-protective factor [16]. As most DHEA and its derivatives are produced by the zona reticularis of the adrenal cortex, it is argued that there is a role in the immune and stress response. DHEA is a cortisol antagonist and research studies indicate that DHEA supplementation has an antidepressant effect and protects from increased cortisol level over long time scales [17]. In addition, DHEA-S prevents corticosterone-induced performance decrements; thus, these findings suggest that DHEA-S may

play a significant role in modulating the vulnerability of the organism to the negative consequences of stress.

Aim of the work

The current study was carried out to (a) investigate the presence of BOS among staff of military personnel complaining of chronic stress in the work, (b) correlate BOS with age, sex, nationality, time spent in the current position and educational level, and (c) identify the complex interplay between the physio/medical and psychological symptoms that may be presented by patients with a history of chronic stress disorder and BOS, by investigating the possible neurobiological basis for protective factors as well as risk factors for developing BOS by evaluating the levels of DHEA-S and cortisol, the DHEA-S–cortisol ratio, and the relationship of these hormone indexes with stress-induced BOS, and comparing it with the severity of the symptoms or degree of BOS.

Methods

The sample of the study included staff of military personnel in the state of Qatar attending the psychiatric clinic with complaints of unspecific somatic symptoms and the presence of stress in the work, from October 2010 to March 2011. The exclusion criteria were past history of psychiatric illness or treatments before and the presence of chronic medical illnesses such as hypertension, diabetes mellitus, or any hormonal disturbance or treatment before. All surveyed staff gave written consent to participate in the study. They were surveyed for BOS using the Maslach Burnout Inventory (MBI). The MBI focuses on feelings of exhaustion, detachment from work, and a loss of drive as observed in all social service professions. In addition, we measured the DHEA-S levels in the morning sample of blood at 7 a.m. Plasma samples were spun down in a refrigerated centrifuge, pipetted into microtubules, and frozen within 40 min of venipuncture. Samples were stored at -70°C from the time of initial collection until analyses were performed.

The tools used in the study included MBI and the sociodemographic data sheet.

MBI consists of 22 questions to assess three dimensions of BOS: emotional exhaustion, depersonalization, and the low personal satisfaction. The 22-item MBI required a 7-point rating scale for each item (0 = never, 7 = every day) and measured physician appraisals of three aspects of the personal impact of work-related stress: emotional exhaustion, depersonalization, and lack of personal satisfaction. Emotional exhaustion entails feelings of work-induced emotional overextension and exhaustion. Sample items include work-induced feelings of emotional drain, fatigue, strain, and feeling used up or frustrated. Depersonalization refers to 'unfeeling and impersonal' attitudes toward the physician practices. The inventory was translated into Arabic through a translation–retranslation process.

The demographic sheet included information on age, sex, nationality, marital status, educational level, occupation,

time in the current position, time spent to reach work, and total working hours. It was formulated by investigators according to similar questionnaires found in similar studies.

Plasma dehydroepiandrosterone sulfate analysis method

Frozen plasma samples were used and processed in batches by means of DHEA-S commercial radioimmunoassay kits (Diagnostic Systems Laboratories Inc., Webster, Texas, USA). Determinations were performed on duplicate 10-ml plasma samples according to the manufacturer's recommendations, using supplied rabbit polyclonal anti-DHEA-S antibody-coated tubes. Plasma DHEA-S concentrations were measured with a sensitivity (detectability) of approximately 2 µg/dl and intraassay and interassay coefficients of variation of 9 and 15%, respectively.

Statistical analysis

All data were recorded and entered in a statistical package on a compatible computer and various analyses were performed using SSPS (Statistical package for Social Science) version 11.5 (SSPS Inc., USA). Presented prevalence estimates (*N*, %) were calculated with the data and screening status in order to address different sampling probabilities and systematic nonresponse. The χ^2 -test was used in the case of dichotomous variables and a *t*-test was used in the case of continuous variables: age, sex, nationality, time spent in current position, and educational level. The significance level was set at $\alpha = 0.05$ (two-tailed).

Results

The study included 20 participants; 40% were men and 60% were women and the average age was 39.5 years (*SD* = 13.00). Twenty percent of the participants were single, 60% were married, and 20% were divorced; 10% had college education, whereas 70% had only school education. The average duration in position was 16.1 years (*SD* = 10.27).

Thirty percent of the participants had military grades; all of them were soldiers and ranks other than officer (junior staff). Seventy percent of the participants had civilian grades, and 60% of them were Qatari. As shown in Table 1, demographic data were significantly different between cases, except age.

As Table 2 shows that 40% of the sample had high scores on the MBI emotional exhaustion component of BOS, 40% had high scores on the depersonalization component, and 60% had high scores on the personal satisfaction component.

We investigated the relationship between the severity of BOS components and demographic and work factors (Tables 3 and 4). BOS was related to sex, marital status, smoking, nationality, education, duration of work, and occupation.

We investigated the relationship between high DHEA-S, high cortisol level, high ratio of DHEA-S to cortisol level, and demographic and work factors (Table 5). A high level of ratio was related to sex, marital status, smoking, nationality, education, or occupation.

Table 1 Demographic data of the cases

Variables	Percentage (<i>N</i>)	<i>P</i> value
Sex		
Males	40 (8)	0.15
Females	60 (12)	
Nationality		
Qatari	60 (12)	0.07
Non-Qatari	40 (8)	
Social state		
Married	60 (12)	0.000
Single	20 (4)	
Divorced	20 (4)	
Graduation		
Secondary	70 (14)	0.000
Graduate	10 (2)	
Postgraduate	20 (4)	
Type of work		
Military	30 (6)	0.000
Nonmilitary	70 (14)	
Smoking	30 (6)	0.000
Nonsmoker	70 (14)	
Burnout syndrome		
Severe	40 (8)	0.000
Average	10 (2)	
Low	50 (10)	

Table 2 MBI scores of the entire sample

	MBI scores		
	High	Moderate	Low
MBI component or subscale	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
1. Emotional exhaustion	8 (40)	2 (10)	10 (50)
2. Depersonalization	8 (40)	2 (10)	2 (10)
3. Personal satisfaction	12 (60)	2 (10)	6 (30)

1 high (score >27) moderate (score 17–26) low (score <16).

1 high (score >13) moderate (score 7–12) low (score <6).

1 high (score <31) moderate (score 38–32) low (score >34).

High burnout in the personal satisfaction subscale means a low score, that is, low personal satisfaction.

MBI, Maslach Burnout Inventory.

Table 3 Mean and SD of some variables

Variables	Mean (<i>SD</i>)	95% confidence interval of the difference
		Lower–upper
Age	39.5 (±13.00)	33.41–45.58
Years of work	16.1 (±10.27)	11.29–20.90
Level of DHEA-S	3.3 (±2.288)	2.22–4.37
Level of cortisol	276.2 (±135.169)	212.93–339.46
Ratio between DHEA-S and cortisol	3.18 (±3.57)	1.51–4.86

DHEA-S, dehydroepiandrosterone sulfate.

Table 6 shows the relationship between the DHEA-S level, cortisol level, and the level of the ratio of both hormones. The high ratio between hormones was associated with a low level of severity of BOS and this relationship was statistically significant.

Discussion

Burnout is defined as exhaustion of physical or emotional strength as a result of prolonged stress or frustration in

Table 4 Comparison between frequency of high and low Maslach Burnout Inventory scores by demographic variables

Variable	Emotional exhaustion			Depersonalization			Personal satisfaction		
	L	S	P	L	H	P	L	H	P
Sex									
F	8 (40%)	2 (10%)	0.02	8 (40%)	2 (10%)	0.02	0	10 (50%)	0.00
Ma.	2 (10%)	6 (30%)		2 (10%)	6 (30%)		6 (30%)	2 (10%)	
Marital									
S	0	4 (20%)	0.03	0	4 (20%)	0.03	4 (20%)	0	0.01
M	6 (30%)	4 (20%)		6 (30%)	4 (20%)		2 (10%)	8 (40%)	
D	4 (40%)	0		4 (20%)	0		0	4 (20%)	
Nationality									
NQ	6 (30%)	2 (10%)	0.15	6 (30%)	2 (10%)	0.15	2 (10%)	6 (30%)	0.37
Q	4 (20%)	6 (20%)		4 (20%)	6 (30%)		4 (20%)	6 (30%)	
Education									
Sc.	6 (30%)	6 (30%)	0.11	6 (30%)	6 (30%)	0.11	4 (20%)	8 (40%)	0.10
G	0	2 (10%)		0	2 (10%)		0	4 (20%)	
PG	4 (20%)	0		4 (20%)	0		2 (10%)	0	
Years of work									
< 10 years	2 (10%)	6 (30%)	0.001	2 (10%)	6 (30%)	0.001	4 (20%)	4 (20%)	0.00
> 10 years	8 (40%)	2 (10%)		8 (40%)	2 (10%)		2 (10%)	8 (40%)	
Type of work									
Mi.	2 (10%)	4 (20%)	0.240	2 (10%)	4 (20%)	0.2	4 (20%)	2 (10%)	0.05
NM	8 (40%)	4 (20%)		8 (40%)	4 (20%)		2 (10%)	10 (50%)	

D, divorced; F, female; G, graduate; H, high; L, low; M, married; Ma., male; Mi., military; NM, nonmilitary; NQ, non-Qatari; P, P value; PG, postgraduate; Q, Qatari; S, single; Sc., secondary school.
P value is significant if less than 0.05.

Table 5 Frequency of high dehydroepiandrosterone sulfate, high cortisol level, and high ratio of dehydroepiandrosterone sulfate to cortisol by demographic variables

Variables	High DHEA-S		High cortisol level		High ratio of DHEA-S to cortisol level	
	N (%)	P	N (%)	P	N (%)	P
Sex						
Ma. 1	2 (10)	0.08	2 (10)	0.08	8 (40)	0.18
F 2	2 (10)	–	2 (10)	–	2 (10)	–
Marital status						
S 3	0 (0)	0.000	2 (10)	0.069	0 (0)	0.002
M 4	4 (20)	–	2 (10)	–	6 (30)	–
D 5	0 (0)	–	0 (0)	–	4 (20)	–
Smoking						
+ ve	4 (20)	0.000	4 (20)	0.000	4 (20)	0.018
– ve	0 (0)	–	0 (0)	–	6 (30)	–
Education						
C 6	0 (0)	0.001	0 (0)	0.001	0 (0)	0.002
Sc. 7	4 (20)	–	4 (20)	–	6 (30)	–
PG 8	0 (0)	–	0 (0)	–	4 (20)	–
Nationality						
Q 9	2 (10)	0.000	4 (20)	0	4 (20)	0.018
NQ 10	2 (10)	–	0 (0)	0.083	6 (30)	–
Occupation						
Mi. 11	2 (10)	0.001	0 (0)	0.063	2 (10)	0.018
NM 12	2 (10)	–	4 (20)	–	8 (40)	–

C, college; D, divorced; DHEA-S, dehydroepiandrosterone sulfate; F, female; Ma., male; Mi., Military; M, married; NM, nonmilitary; NQ, non-Qatari; P, P value; PG, post graduation; Q, Qatari; S, single; SC, secondary school.
P value is significant if less than 0.05.

Table 6 Relationship between severity of burnout syndrome and level of hormones and the ratio between them

Variables	Level of DHEA-S		Level of cortisol		Ratio between DHEA-S and cortisol		Years of work	
	N	AN	N	AN	High	low	AM	LM
Level of BOS								
Low	8 (40%)	0 (0%)	2 (40%)	2 (9.5%)	10 (50%)	0 (0%)	8 (40%)	2 (10%)
Average	2 (10%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (10%)	0 (0%)	2 (10%)
Sever	6 (30%)	4 (20%)	2 (10%)	2 (10%)	0 (0%)	8 (40%)	2 (10%)	6 (30%)
P value	0.001		0.009		0.002		0.004	

AM, above mean; AN, abnormal; BOS, burnout syndrome; DHEA-S, dehydroepiandrosterone sulfate; LM, lower than mean; N, normal.
P value is significant if less than 0.05.

the work that occurs frequently among individuals who do 'people-work' of some kind. A key aspect of the BOS is increased feelings of emotional exhaustion [7]. Usually, workers feel that they are no longer able to give of themselves at a psychological level as their emotional resources are depleted. Another aspect is the development of negative, cynical attitudes, and feelings about one's clients and such negative reactions to clients may be linked to the experience of emotional exhaustion, that is, these two aspects of burnout appear to be somewhat related [10]. This callous or even dehumanized perception of others can lead staff to view their clients as somehow deserving of their troubles, and among human service professionals, the prevalence of this negative attitude toward clients has been well documented [8]. Another aspect of the BOS is the tendency to evaluate oneself negatively, particularly with regard to one's work with clients. Workers feel unhappy about them and dissatisfied with their accomplishments on the job [18]. The present study was designed to evaluate the levels of DHEA-S and cortisol, the DHEA-S–cortisol ratio, and the relationship of these hormone indexes with stress-induced symptoms of burnout syndrome and objective performance in military personnel.

Previous investigations have demonstrated that military personnel represent a valid, reliable model for the study of stress in humans [19,20]. The results that the stress threatens the biological response systems and elicits psychological symptoms that affect his works in military. Clinical studies have provided evidence that peritraumatic psychological symptoms of dissociation represent a risk factor for the development of posttraumatic stress disorder [21] and that such symptoms are positively associated with the stress-induced release of glucocorticoids [22]. On the basis of this and the preclinical and clinical literature suggesting that an increased DHEA-S–cortisol ratio may buffer against the negative impact of stress [23,24]. We hypothesized that individuals with a higher DHEA-S–cortisol ratio during stress exposure would be protected from the negative impact of chronic stress as evidenced by fewer psychological symptoms and superior military performance. Also, the military performance or works reflect soldiers' cognitive and decision-making abilities during stress, and previous clinical studies have linked superior cognitive performance to higher concentrations of DHEA-S [25]. In our results, some interesting findings emerged from the demographic data analysis, but they must be interpreted with caution as some of the variables are clearly confounded with the type of occupation. The majority of our cases with high scores on BOS were men (30%), married (20% vs. divorced 0%), Qatari (30 vs. 10% non-Qatari), those with education up to secondary school (30 vs. 10% graduated), and those who worked in military less than 10 years (30 vs. 10%). These results were significant, except for the nationality, education level, and type of works (Table 4). The results regarding the duration of work show that working in military for less than 10 years increased the probability of BOS [11,26] who concluded that the older the medical staff the more likely they would appraise

nonclinical work and dealing with relatives of patients as more stressful. In addition, the longer the medical faculty were in practice, the more likely it was that they would rate professional development activities and dealing with relatives of patients as more stressful.

These results can be explained by the fact that the person may have adapted to chronic stress in the work or one possible explanation could be that exposure to early trauma or exposure to previous military training allowed the soldiers to develop enhanced resistance to (or tolerance of) high-intensity stress. This would be consistent with the concept of stress toughening [27]. A third possible explanation is that individuals prone to higher levels of stress-induced psychological symptoms may be screened out in the program used to select soldiers. A fourth possible explanation is that the sample of cases is small and we need more studies to clarify these results.

Although the mean total work hours were 8 hours, military work includes more recurrent shift and sometimes unexpected hard works. We measured the DHEA-S and cortisol levels of as morning cortisol response to awakening as an index of HPA activity, as awakening seems to represent an endogenous stimulation for the HPA. Also, the results indicated that measurement of the DHEA-S and cortisol response to awakening showed good intraindividual stability over time and that it can serve as a marker for HPA activity [28].

The principal finding of this study is this study is that individuals with chronic stress in their work have a higher DHEA-S plasma cortisol ratio that is associated with lower scores on the burnout scale, and these results are statistically significant. In comparison with other more recent studies, the increase in morning cortisol level was shown to be associated with prolonged psychological stress due to chronic work overload [29]. Another study in students suffering from chronic work overload reported higher cortisol increases after awakening [30]. Some authors proposed that burnout might result in lower basal HPA activity, in as much as the emotional exhaustion seen in burnout is similar to the fatigue seen in CFS. However, the often stressful work conditions of persons afflicted by burnout could also be regarded as a state of chronic stress, although no empirical proof for these hypotheses has been presented [5]. Because indexes of burnout and work performance presumably index central processes, the data presented here indicate that in healthy humans, the ratio or the balance between circulating levels of DHEA-S to unbound cortisol may help buffer against the centrally mediated, negative effects of stress. Another interesting observation of the present study is that patients with both high levels of stress and high levels of burnout showed the highest number of bodily complaints and the lowest self-esteem. Because self-esteem has been reported previously to be associated with burnout, the question is whether or not it can be regarded as a risk factor for the development of the BOS, together with the accompanying endocrine changes. Therefore, future studies will need to investi-

gate the role of self-esteem in this regard. Also, further researches are needed to determine personal and organizational risk factors for BOS. It would also be interesting to study those protective personal qualities that make some staff more resistant to burnout than others, which would be a useful guide for career choices and staff recruitment.

Limitation of the study

This study has several limitations. First, due to the inherent restrictions of a naturalistic study, two separate groups of individuals participated in the study. In addition, MBI does not perfectly reflect the actual distress or discomfort to military personnel as they tend to underreport distressing symptoms. Thus, it is better to use more scales to confirm the diagnosis of symptoms or syndrome.

Another limitation is that these participants may have a combination of physical stressors (physical fatigue, starvation, sleep deprivation, etc.), environmental pressures (e.g. exposure to relative extremes of heat and cold), and psychological stress. Each of these elements may have contributed to participants' responses on the MBI scale. Thus, it is not possible to determine which symptoms of burnout were elicited by psychological stress alone. However, working in military is considered to represent a reasonable analog of the combination of physical and psychological stress experienced in combat situations. The use of an ethologically valid experience for soldiers increases the likelihood that the data can enhance our understanding of combat-related psychological symptoms. Finally, given the small number of participants, these findings may be influenced by the overall homogeneity of the military population and may not be representative of the civilian population. Nevertheless, military populations are routinely exposed to high-intensity stress, and these data underscore the degree to which psychological and physical responses may be linked.

Conclusion

Symptoms of BOS are common in healthy military participants exposed to high-intensity and chronic stress. The principal finding of this study is that individuals with chronic stress in their work have a higher DHEA-S plasma cortisol ratio, which is associated with lower scores on a burnout scale, and these results are statistically significant. This ratio may index the degree to which an individual is buffered against the negative effects of stress.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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الملخص العربي

قوة التحمل واحتراق الأعصاب والضغط الوظيفي عند العسكريين

هناك عدد متزايد من الأبحاث التي تؤكد أن كل من هرمون الكورتيزون والدهيدروأبياندسترون سلفات لهما علاقة برد فعل الإنسان للضغط النفسي وهذه العلاقة تؤدي إلى سلوكيات سلبية وتوفر حماية للجهاز العصبي. أجريت هذه الدراسة على عشرون من المنتسبين للقوات المسلحة والذين يعانون من الأعراض النفسية لمتلازمة الاحتراق العصبي. وأثبتت الدراسة أن مستوى هرمون الكورتيزون والدهيدروأبياندسترون سلفات والنسبة بينهم لهم علاقة مؤثرة وعكسية لظهور أعراض متلازمة الاحتراق العصبي. وبالتالي فإن المشاركين في البحث الذين اظهروا أعراض طفيفة من متلازمة احتراق الأعصاب لديهم زيادة في نسبة هرمون الدهيدروأبياندسترون سلفات إلى نسبة هرمون الكورتيزون. وهذه الدراسة وفرت نتائج عملية تعزز أن هرمون الدهيدروأبياندسترون سلفات له علاقة بتحمل الضغط النفسي وكذلك ظهور أعراض طفيفة من متلازمة الاحتراق العصبي في العسكريين. والخلاصة أن هذه النتائج من الممكن أن تستخدم لتقييم الأداء العسكري.