

Examining Psychic Consequences in Firefighters Exposed to Stress

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ABSTRACT

The total of 178 firefighters from the Littoral Mountainous County, the Republic of Croatia, have undergone psychotestings in three groups – 99 professionals from city Rijeka, 44 professionals from suburb and 35 volunteers from suburb. The scores of PSS 10 Cohen Stress Perception Scale, COPE questionnaire, STAI X1 anxiety test as condition and STAI X2 anxiety test as trait personality and Beck Depression Inventory were analyzed. The results have shown that firefighters do not suffer from negative effects of stress. There is slight anxiety as condition in city firefighters and medium anxiety as trait personality in all firemen. All firefighters are often problem-oriented, need only occasionally compassion of environment and sometimes react by avoiding to face stress. They differ significantly by depression ($p < 0.001$), which is negligible in relation to ordinary population. «Working anxiety», i.e. medium anxiety which is a distinctive trait of their personality becomes the necessary initiator of functioning in the most difficult working conditions.

Key words: firefighters, psychotestings, stress

Introduction

Firefighters belong to working population that perform jobs under particular working conditions almost daily exposed to hard work in non-physiological conditions of adverse microclimate¹. Besides physiological burden, firefighters are exposed to mental stress to which their autonomous nervous system reacts². Preventive programs and social resources play a major role in preventing stress in specific working population³. Individuals that show high level of antagonism towards environment and low level of efficiency run a considerable risk of developing PTSD after being exposed to traumatic experience, which means that specific personal traits can be constitutive markers of vulnerability leading to development of psychopathological symptoms⁴. Because of that psychotesting is very important in examining future employees in such professions to attain adequate professional selection. Even psychophysically fit candidates have to undergo special training in order to learn how to cope with traumatic experience and avoid the possible development of PTSD⁵. Besides classic psychotesting,

there are various other methods like auditory startle response measuring electrograms of orbicularis oculi muscles, and speed of skin conductivity as the response to auditory stimulus, with the purpose of finding the vulnerability factor for posttraumatic stress⁶. The recent research has shown that posttraumatic stress in firefighters causes also functional changes in CNS which was proved by positron emission tomography (PET) which showed considerably diminished flow of regional cerebral blood in affected individuals⁷. Coping strategies are very important in avoiding PTSD. Firefighters and rescue workers are the population with a high risk of developing PTSD and other psychic disorders while the risk increases with the time spent in the job⁸. Dissatisfaction with the job and negative social adjustment raise PTSD frequency, which is not the case with motivated firefighters⁹. Besides stressors at work, stressors in family life, as well as self-assessment of own condition and health make an important factor¹⁰. It is known that firemen are often exposed to CO₂ as a product of burning.

The studies have shown that inhaling high concentrations of CO₂ may in later years result in spontaneous panic attacks¹¹. There is nowadays a classification of a number of psychic disorders, but one should be careful in diagnosing them as they are often just reactive neurotic and depressive conditions, not real sicknesses¹². Surely, elevated anxiety and trait vulnerability predispose the incidence of real psychiatric disorders¹³. Special education, the basic knowledge of psychology as well as physical fitness, going in for sports, should in these specific occupations be »the defense« from developing any psychic disorders¹⁴.

The purpose of the research is to find out whether exposure to stress causes psychic consequences in the examined firefighters, and whether with the years spent in the job very stable individuals developed anxiety, feeling of stress and depression symptoms.

Material and Methods

The total of 178 firefighters from the Littoral Mountainous County, Republic of Croatia, grouped as professional firefighters from the city of Rijeka, professional firefighters from the suburbs and volunteer firefighters from the suburbs took the written psychotest in the surgery of occupational medicine in Rijeka.

From the city of Rijeka 99 professional firemen were examined of the mean age 38.49±9.02. Their mean height was 180.58±6.11 cm, and the mean weight 88.70±12.62 kg. Their mean BMI was 26.

From the suburbs 44 professional firemen who underwent psychotesting were of the mean age 38.50±8.93. Their mean height is 179.81±6.79 cm, mean weight 90.38±14.02 kg and mean BMI 27.

The third group consisted of 35 volunteer firefighters from the suburbs. Their mean age was 29.48±11.49. Their mean height was 181.94±5.88 cm and mean weight 87.54±15.93 kg. The mean BMI was 25.

The firefighters wrote five psychotests: PSS-10 Stress Perception Scale, COPE questionnaire on coping strategies, STAI X1 anxiety test as condition, STAI X2 anxiety as trait personality and Beck Depression Inventory (BDI).

PSS – stress perception scale was used to assess stress perception¹⁵. This scale measures how the examinees perceive their life as unpredictable, uncontrollable and overburdening, which are three basic components of the perceived stress. PSS elements refer to the examinee's feelings and thoughts during the previous month and the answers are scored on the Likert type scale of 5 degrees, where 1 signifies that the examinee never felt or thought in a certain way. The sum of all elements gives the final score. Scoring: 10–19 no stress or low stress, 20–34 medium stress, 35–45 high stress and 46–50 extremely high stress.

Cope Questionnaire – strategies of confrontation with stress situations¹⁶. The questionnaire consists of 15 statements describing thoughts and behavior of individuals under stress, and the examinees reply to what degree

(from 1 – never, to 5 – always) they do something of the suggested in a stress situation. There are three categories of confrontation – problem oriented confrontation, emotion oriented confrontation and avoidance oriented confrontation. Scoring: Problem oriented confrontation, 6–9 never or seldom problem oriented, 10–18 sometimes problem oriented, 19–26 often problem oriented, 27–30 almost always problem oriented. Emotion oriented confrontation, 3–6 never or seldom ventilate emotions or seek social support, 7–11 sometimes seek social support and ventilate emotions, 12–15 often ventilate emotions and seek social support. Avoidance oriented confrontation, 6–9, never use avoidance as confrontation strategy, 10–18, sometimes use avoidance strategy, 19–26, often use avoidance strategy and 27–30, almost always use avoidance strategy.

STAI X1 questionnaire on anxiety condition contains 20 statements and the examinee has to assess how he feels now, momentarily at the scale from 1 (not at all) to 4 (very). The sum of the results gives the total score on the anxiety condition scale. The elements refer to anxiety, tension, nervousness and concern¹⁷.

STAI X2 questionnaire on anxiety as trait personality contains 20 statements assessing the individual's prevalent feeling on the scale from 1–4, tension, concern, thoughts on oneself and events around one. Anxiety scoring: 20–29 no anxiety or mild anxiety, 30–44 medium anxiety, 45–55 intense anxiety, 56–60 extremely intense anxiety.

Beck Depression Inventory includes the list of 21 symptoms assessing the symptom intensity on the scale from 0–3. Statements refer to feelings of futility, guilt, irritability, sleeping difficulties, loss of appetite¹⁸. Scoring: 5–9 no depression or minimum depression, 10–18 low or medium, 19–29 medium or extreme and 30–63 extreme depression. Under 4 points means negating depression, lower result for normal individuals.

Results

From basic anthropometrical measurements, dividing weight by height squared the body mass index was somewhat increased – BMI 26 in the city professional firefighters and even higher in professional firefighters from suburbs – BMI 27. The younger volunteer firefighters from suburbs showed the average of normal and tolerable BMI 25.

The result of PSS analysis was almost the same for all three groups of examinees, mean scores 19.81 for the city professional firemen, mean scores 19.29 for suburban professional firefighters and 19.85 for volunteer firefighters. According to the score scale the results show that there is no or low stress in the examined firefighters (Table1).

Also, among firefighters generally we do not find anxiety as condition, which is indicated by STAI X1 mean scores 28.77 in professional firefighters from suburbs and mean scores 29.28 in suburban volunteer firemen.

TABLE 1
FIREFIGHTERS' ANTHROPOMETRICAL DATA AND PSS, COPE, STAI X1, STAI X2, BECK'S SCORE PSYCHOTESTINGS

Area	N	Age	Height (cm) X	Weight (kg)	BMI (score)	PSS	AnxCon	AnxPer	Depr	CopePro	CopeEmo	CopeAvo
City prof.	99	38	180	88	26	19	30	36	0.4	23	8	12
Sub. prof.	44	38	179	90	27	19	28	35	1.8	24	8	11
Sub. vol.	35	29	181	87	25	19	29	35	0.6	22	9	12

prof – professionals, sub – suburb, vol – volunteers, BMI – body mass index, PSS – stress perception scale, AnxCon – anxiety as momentary condition, AnxPer – anxiety as trait personality, Depr – depression, CopePro – problems oriented confrontation, CopeEmo – emotion oriented confrontation, CopeAvo – avoidance oriented confrontation.

Mean scores of 30.73 in professional firefighters from the city are at the beginning of the medium anxiety scale.

Anxiety as trait personality, test STAI X2 is found in all three groups of examinees as medium without significant differences, mean scores 36.27 in professionals from the city, 35.56 in professionals from suburbs and 35.83 in volunteers from suburbs.

The results of COPE questionnaire show that all firemen are often problem oriented, mean scores 22.97 in volunteer firefighters to 24.4 in professionals from suburbs. Only sometimes they seek social support and only occasionally ventilate their emotions, mean scores from 8.80 in professionals from the city to 9.57 in volunteers from suburbs. Only sometimes they turn to avoidance as a way of confronting stress, mean scores 11.4 in professional firemen from suburbs to mean scores 12.42 in volunteer firemen from suburbs.

The results have shown that for PSS analysis, STAI X1, STAI X2, COPE questionnaire, the firefighters do not differ from ordinary population.

Although negligible mean scores were received for depression, according to the answers to Beck Depression Inventory firefighters differ significantly ($p < 0.001$), (Fig-

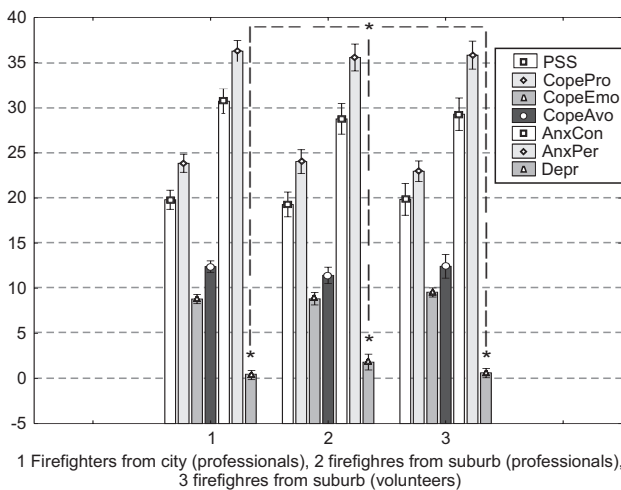


Fig. 1. Frequencies in examined firefighters, PSS – stress perception scale, CopePro – problem oriented confrontation, CopeEmo – emotion oriented confrontation, CopeAvo – avoidance oriented confrontation, AnxCon – anxiety as momentary condition, AnxPer – anxiety as trait personality, Depr – depression, * $p < 0.001$.

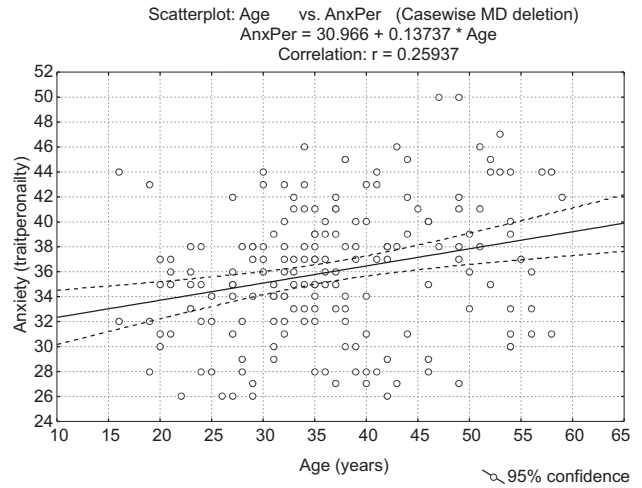


Fig. 2. Linear regression analysis and correlation coefficient between the age anxiety as trait personality.

ure 1). Such low scores are under the values compared with ordinary population.

Linear regression analysis has shown slightly positive correlation between age and increased anxiety as trait personality (Figure 2).

Discussion

The low points achieved by the examined firefighters at the scales of stress, anxiety as condition and depression may be another proof for the researches to support the need for regular exercise and training in order to enhance psychophysical abilities¹⁹. With firefighters, who have much in common with the police and the army, the right leadership is of great importance, as it has to contribute to satisfaction in work, and eliminate possible symptoms caused by stress²⁰. Chief of fire department, who carries out debriefing after interventions in traumatic situations, takes on the role of a psychologist in preventing adverse symptoms²¹. As PSS test scores indicate that the examined firemen do not show stress, it may be concluded that their chiefs of departments play their role professionally. Almost daily they meet severe accidents, but firefighters have developed individual ability to cope with traumatic experiences²². All three groups

of the examined firefighters with hardly and exceptions are often problem oriented, and only occasionally they seek support and compassion of those around them. Only sometimes they resort to avoidance as the confrontations strategy against incident – related stressors. It is an additional confirmation of the need for permanent coping skill training not only by firefighters but by all emergency personnel²³.

The examined professional and volunteer firefighters from suburbs show no anxiety as condition, while professional firemen from the city showed the lower level of medium anxiety. Anxiety is one of the basic elements of neuroticism. Variability of traumatic stimulus-response will be lower in persons with low neuroticism than in individuals with high neuroticism²⁴. Anxiety as trait personality is present among examinees in a moderate form. It is even necessary in a profession like firefighting. Namely, the studies carried out have shown that individuals with higher neuroticism perform better in a busy working environment than those without it²⁵. Furthermore, neurotics tend to increase the level of their effort in order to succeed an attaining the objective, particularly in performing difficult tasks²⁶. Whether or not an individual has developed neurotic disorder is hard to conclude because a normal and a neurotic person do not differ in showing their emotions verbally, which is not the case in acute psychic disorders²⁷. Again the experience of chiefs of fire departments is of utmost importance for they have to notice the changed behavior of their colleagues that may become obsessive and avoiding as the signs of generalized anxiety or neurotic disorder²⁸. The firefighters as specific working population in our study have shown only a slight increase of anxiety as trait personality, contrary to the studies of general population

where anxiety in mid-thirties begins to fall until mid-seventies²⁹. Firefighters as individuals are always ready to take highest risks, they simply »must« sustain their level of medium anxiety as trait personality to be able to act in unnatural situations. The firefighter's job is indispensable for the safety of human society, and firemen are recognized as such. They appreciate it and it helps them to avoid thoughts of suicide during short lapses into anxiety crisis or rare depression after some extremely traumatic professional experiences³⁰. It would be best to name medium anxiety as trait personality »working anxiety«, which may be classified among classic anxiety and depressive disorders³¹. Also, in examinees no correlation was found between their anxiety and smoking or drinking, as is the case in developing negative uncontrolled emotions – neuroticism³². Well-developed coping skills help to avoid the onset of bipolar disorders caused by negative life experiences due to professional activities³³. Fatigue, work in shifts, overstraining may lead to chronic fatigue syndrome that has to be differentiated from depressive disorder³⁴. Surviving firefighters and other survivors of severe injuries may develop major depression³⁵. There were no such cases among the examined firefighters. The examinees did not show depression symptoms, and professionals from suburbs who had a significantly higher score than their colleagues, but still negligible, showed lower result than ordinary population.

It may be concluded that the examined firefighters who almost daily participate in acute stress interventions, as mentally exceptionally stable individuals, did not develop psychological consequences, and that »working anxiety«, i.e. medium anxiety which is a distinctive trait of their personality, is the necessary initiator of functioning in the most difficult working conditions.

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ISPITIVANJE PSIHIČKIH POSLJEDICA KOD VATROGASACA IZLOŽENIH STRESU

S A Ž E T A K

U ovom istraživanju podvrgnuto je psihotestiranju 178 vatrogasaca iz Primorsko-goranske županije, Republike Hrvatske, podijeljeno na tri skupine – 99 profesionalaca iz grada, 44 profesionalaca iz okolnih mjesta i 35 dobrovoljnih vatrogasaca iz okolnih mjesta. Analizirani su bodovi dobiveni na PSS 10 Cohen skali percepcije stresa, COPE upitniku, STAI X1 testu anksioznosti kao stanja i STAI X2 testu anksioznosti kao osobine ličnosti, kao i Beckovoj skali depresivnosti. Rezultati su pokazali da vatrogasci nisu pod stresom, da postoji samo kod gradskih vatrogasaca blaga anksioznost kao stanje, dok umjerena anksioznost kao crta ličnosti postoji kod svih vatrogasaca. Svi vatrogasci su često problemu orijentirani, samo ponekad traže suosjećanje okoline i ponekad reagiraju izbjegavanjem suočavanja sa stresom. Znatno se razlikuju po depresiji ($p < 0.001$) koja je zanemariva u odnosu na običnu populaciju. »Radna anksioznost«, odnosno umjerena anksioznost kao crta ličnosti postaje nužni pokretač djelovanja u najtežim radnim uvjetima.