



# Circumstances of intensity of anxiety among firemen – pilot study

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**Abstract:** *Introduction:* The aim of this paper is to increase knowledge on the subject of the circumstances of anxiety among firemen, while taking account of the quantitative criteria according to the time scale and qualitative factors associated with the locations of conducting duties. *Material and methods:* The research encompassed 35 people, including 27 men (aged: 30.8±5.0 years of age) and 8 women (aged: 26.5±2.0 years of age) who conduct fire services in the State Fire Services (SFS) in several locations in Poland. The STAI (State-Trait Anxiety Inventory) method was applied, which is recommended for diagnosing predisposition for professions that require a low level of anxiety and increased levels of resistance to stress. The research was supplemented by survey questions relating to everyday life and health behaviour. *Results:* In cluster group no. 1 of an average seniority of 10.78 years, the level of anxiety amounted to 59.92 points, while attention to making nutrition choices was at the level of 2.5 points. In the second cluster group selected with a seniority in the fire services of 4.40 years, the level of anxiety amounted to 53.07 points, while attention to making nutrition choices was at the level of 1.53 points. *Conclusion:* Longer seniority in the fire services is not associated with a lower level of the situational level of anxiety felt. The effect of the combined impact of factors occurs in the form of interactions such as in the form of the fire services, as well as seniority with relation to the intensity of anxiety amongst firemen.

Keywords: anxiety, firemen, stress, STAI

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## INTRODUCTION

Stress that is inexorably connected with participation in activities involving extinguishing fires, rescuing people and their property causes physiological and psychological dangers to firemen [1–3]. These threats may be of a mutual nature, such as in the case of the co-existence of unease and sleeping disorder, which deteriorate the cognitive and emotional functioning. Research indicates that the quality and amount of sleep constitute a specific factor in terms of the physiological risk and burnout as a specific psychological risk [1,4,5]. Stress, while also the intensity of anxiety and its circumstances therefore constitute the subject matter of universal research aimed at analyzing the problems associated with health and professional activity [6–8], yet a particular type that has a strong impact on stressful situations is what is associated with extinguishing fires and rescuing people [9–12].

Anxiety is a common emotion that the majority of people experience during their lives. Nevertheless, the intensity and resistance to stress associated with the case of arousing stress varies amongst particular people. Some people are more susceptible to the feeling of anxiety, thus it is assumed that this phenomenon may be perceived as an individual feature of an individual [13]. The increased level of anxiety is usually connected with external factors, such as danger, threats, fear and panic associated with the actual situation that the particular person is dealing with. The state of anxiety warns a person about chaos, entropy and the loss of perception in terms of seeing oneself in confrontation with natural threats [14].

With relation to the reactions occurring in situations of natural disasters, it is assumed that there is an element of uncertainty in terms of predicting these reactions [17]. The substantive preparation, training, seniority and experience are all significant factors in conducting this type of rescue action. A second group of factors belongs to the area of mental health, personal resources, emotions in difficult situations, while also coping with stress [18]. This also indicates the mediatory role of social support in terms of coping with chronic stress associated with conducting rescue operations [19].

Hence, the aim of this paper is to evaluate the intensity of anxiety amongst firemen while taking account of the chosen circumstances of performing duties in the fire services. The following three questions are addressed as follows:

1. Do the people working in the fire services constitute a uniform group with regard to the anxiety in evidence ?
2. How does the correlation between the lack of peace and the position and degree held look ?
3. Does seniority have an impact on the level of unease felt ?

## MATERIAL AND METHODS

### *Subject*

The research encompassed 35 people (27 men (aged: 30.8±5.0 years of age) and 8 women (aged: 26.5±2.0 years of age) serving duty in the State Fire Services (SFS) in selected locations in Poland.

### *Research tools*

The measurement was conducted by means of the standardized questionnaire called the State-Trait Anxiety Inventory (STAI), which is recommended for the diagnosis of the predisposition for professions that require a low level of anxiety and increased levels of resistance to stress and risk, including e.g. firemen, security guards. It consists of 20 questions for which it is possible to receive between 20 and 80 points. The higher the result of the test, the higher the level of anxiety. In addition, survey questions were applied with relation to everyday life and health behaviour regarding nutrition.

### Ethics

The research presented is of a totally voluntary nature and was preceded by the provision of consent. All participants in the analysis were informed about the procedures and voluntarily participated in the accumulation of data. The research was conducted in accordance with the principles of ethics on the basis of the Declaration of Helsinki.

### Statistical analysis

Sample size estimated using G\*Power software (version 3.1.9.2; Kiel University, Kiel, Germany) [20] returned a minimum of 23 participants, for  $\alpha=0.05$ , effect size  $f=0.8$  and  $\beta=0.95$ . All the stipulated indicators were calculated as the average value (AV) and standard deviation (SD). The normality of the distribution was checked by means of the Shapiro-Wilk test. In the case of the chosen variables, they were calculated by means of Pearson's correlation coefficient. Analysis was conducted of the effect of the combined impact of the factors, namely, ANOVA. The statistical significance was accepted at the level of  $p<0.05$ . All the calculations were conducted with the aid of Statistica 12.00. With the aim of conducting taxonomy of the analysed people on the basis of the data acquired, the k-means cluster analysis was applied, which is a method that is recommended for statistical analysis for this type of materials [21].

## RESULTS

In Table 1, a statistical description has been laid out in terms of the generally chosen factors, such as the intensity of anxiety, seniority in SFS, social support, worsening nutrition in circumstances of feeling stress, attention to making healthy nutrition choices broken down into two identified clusters on the basis of the conducted taxonomy of those analysed. In cluster no. 1 of an average seniority of 10.78 years, the level of anxiety amounted to 59.929 points. Attention to food in terms of making nutrition choices was at the level of 2.5 points. In cluster no. 2, a focus group of seniority in fire services of 4.404 years was chosen, in which the level amounted to 53.077 points, while the factor perceived to be attention to food, namely making choices of nutrition, was at the level of 1.538 points.

In Table 2, the chosen effects of the combined impact of these factors has been presented. It is possible to note that there is a statistically significant difference in terms of the effect of interaction between the "SFS Corps x Seniority in SFS", whereas no differences have been noted in terms of the effect of the "current location serving duty\*Degree in SFS"

Table 3 contains coefficients that define the relations between the intensity of anxiety and the fire services corps, the position of fire and rescue services, while also work seniority. No statistically significant coefficients were noted in the analysed group without taking account of the division into clusters.

Figure 1 illustrates the relation between the intensity of anxiety and seniority while taking account of the differentiation in the sphere of the represented corps of serving duty in the State Fire Services.

Table 1. Descriptive statistics

Indicator	Cluster 1		Cluster 2		F	p
	Mean	SD	Mean	SD		
Seniority in SFS [years]	4.40	2.71	10.78	6.28	20.25	<0.001
Intensity of anxiety [points]	53.07	4.26	59.93	2.76	29.36	<0.001
Social support [points]	3.50	0.71	3.64	0.49	0.45	0.507
Attention to making healthy nutrition choices [points]	1.53	0.65	2.50	0.94	14.55	<0.001
Worsening nutrition in circumstances of feeling stress [points]	1.81	0.80	1.93	0.92	0.18	0.668

SFS - State Fire Services, SD - standard deviation

Table 2. Layout of statistical significance for chosen effects of interaction

Effect	SS	MS	F	p	$\eta^2$
SFS corps * Seniority in SFS	315.169	52.528	3.602	0.036*	0.684
Current location of serving duty * Degree in SFS	47.076	7.846	0.31	0.917	0.157

SFS - State Fire Services; \* statistical significance at the level of  $p < 0.05$

Table 3. Correlation coefficients between State Anxiety Level factors associated with executing duty in fire services

Indicator	State Anxiety Level	
	r	p
State Fire Services (SFS) corps	-0.22	0.19
Fire and rescue services (JRG) position	-0.29	0.09

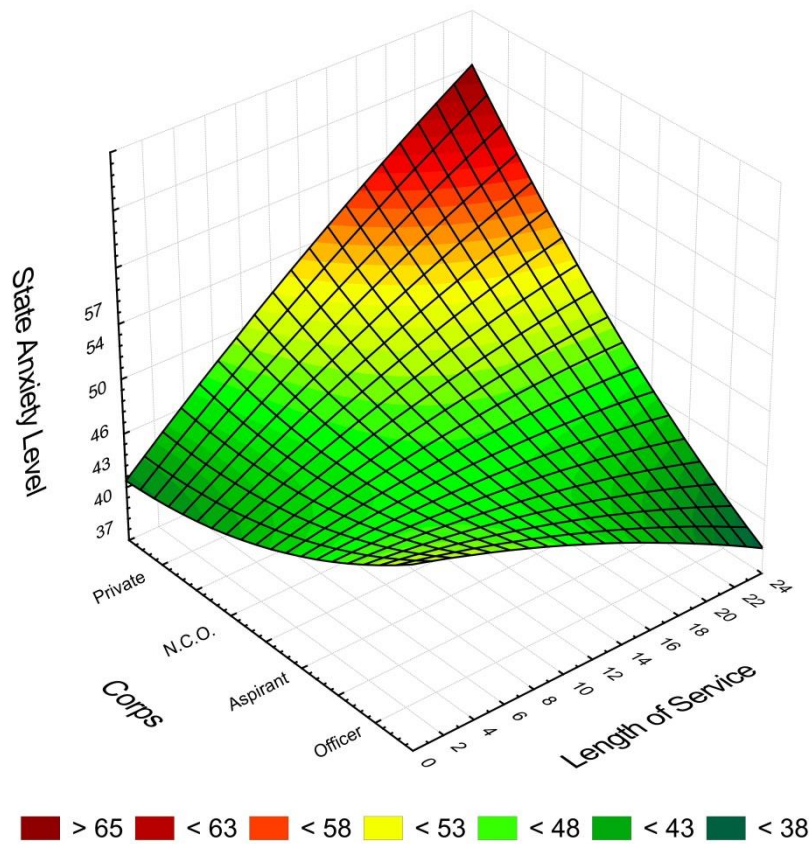


Figure 1. Relation between intensity of anxiety and seniority while taking account of the differentiation in scope represented by the fire services (Private – private fireman; N.C.O. - non-commissioned officer).

## DISCUSSION

The research presented facilitated the acquisition of results that illustrate the dependencies between years of service and the represented corps in the fire services and the feeling of anxiety is more complicated than simple dependencies which are postulated in some research projects which determine that seniority is connected with the adaptation

to this experience [5,22,23]. This may be certified by the findings of this research conducted, in which the consequences of the combined impact were taken into consideration, which in turn confirmed the significant effect of the interaction of two factors, namely, the location of the fire services corps and professional experience (Table 2). The acquired findings reveal the existence of internal differentiation from the viewpoint of situational anxiety, which is indicated by the findings of the analysis on the clusters conducted (Table 1), which expanded the picture of variability acquired by means of the application of absolute measurements, such as variance [24]. Cluster 2 encompasses firemen of a longer work experience and indicates a rather higher level of anxiety by approximately 6 points than cluster no. 1 encompassing firemen that have 6 years less experience. Perhaps this is the result of the phenomenon of post-traumatic growth that involves the occurrence of the paradoxical phenomenon encompassing positive changes in the perception of one's own situation and development of personality following the experienced trauma [25]. This picture supplements the result indicating the intensity of anxiety in the context of the interaction between the position in the corps and professional experience expressed in terms of the years of service.

Research in the sphere of health psychology indicate the occurrence of elements in some people who experience traumatic events (e.g. with regard to the professional activity conducted) such as appreciation of the present moment, while also becoming sensitive to the suffering of others [25]. Likewise, the relation of this phenomenon with certain psychological features became apparent, including the feature known as resilience, which is defined as resistance and the ability to regenerate strength, while also the smooth return to the state of normality after a decrease in the unfavourable circumstances, as well as the skill of coping with adversity, problems and difficult periods, or in other words, the ability to adapt to the varying circumstances of the environment [26]. The research findings indicate the significant role of mental resilience in terms of the development of future positive change amongst the firemen experiencing traumatic events with relation to the professional activity performed [27].

This corresponds with the research findings which indicate that individual, subjective feelings and emotions fulfil a mediatory role in the case of people who, within the framework of professional activities, are actively engaged in activities associated with risk during the execution of duties connected with restoring safety [1,28].

The not so simple image of dependencies between seniority and experiences in fire services acquired in the research may probably be interpreted in the way that experiences are also the greater level of awareness of the risk of serious consequences arising from the action taken. It would seem that it is justifiable to perceive the acquired results in this manner in terms of the sphere of conscious and attentive nutrition. This is particularly true in the sub-group (cluster) of a higher intensity of anxiety where there was simultaneously a higher level of value in the sphere of making careful everyday and typical nutrition choices that are favourable for the health (Table 1). There are substantive arguments in order for this to be viewed as a factor in itself in terms of protecting against the consequences of severe stress. This is indicated by the research findings which illustrate the significant multi-dimensional and favourable role of healthy nutrition for sleep hygiene and frame of mind in the case of firemen [29].

A positive aspect is the fact that, generally speaking, no correlation was noted between the level of anxiety and the position and corps of SFS. It is possible to assume that to a certain extent this may be the image of the relation between firemen, thus the position in the hierarchy of the fire services has an impact on the level of safety (Table 3).

From the graphic interpretation of the relation between the intensity of anxiety and seniority while taking account of the differentiation in the sphere of the represented corps of the service conducted in the State Fire Services (Figure 1), it is visible that anxiety rises together with the length of work service and the lack of promotion. This may arise from, among other things, the subjective perception of the inadequacy of the gratification with relation to the psychological and physical costs incurred during operations in the face

of danger. This becomes a broader problem as there are research reports that indicate the risk factors of professional burnout amongst firemen [30,31]. The acquired research findings indicate that the longer the level of seniority, the greater experience does not need to be associated with a lower level of situational anxiety felt. It is probable that it may be viewed in such a way that more experience is simultaneously greater awareness of the risk of the occurrence of serious consequences of the action undertaken. The small amount of data constitutes certain limitations. However, due to the fact that research tools were availed of that facilitated multiple research projects for the purpose of an objective comparison of changes in the intensity of anxiety, the acquired findings opens up the perspective of longitudinal study for further analysis of this phenomenon. In future research projects, it would also be worth taking account of the role of the feeling of coherence and personal resources, which determine the choice of strategy of coping with stress.

## CONCLUSION

The acquired results indicate that the firemen encompassed within the research do not constitute a uniform group from the viewpoint of the anxiety in evidence. The internal differentiation revealed displayed the existence of two clusters which are different from each other both in terms of the intensity of anxiety, while also the fulfilment of duty and attention to making nutrition choices. In the former cluster identified that has a lower average intensity of anxiety, there is a shorter length of work service and lower value of definition of attention to nutrition choices than in the latter one, in which anxiety, careful nutrition choices and seniority are all higher. Likewise, there is also the existence of the combined impact of the factors in the form of interaction of such factors as the corps of SFS, as well as the seniority with regard to the intensity of anxiety amongst firemen.

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